5 A forward-looking framework

This chapter provides perspectives on the development of rural manufacturing from a future-focused lens. It uses knowledge from a strategic foresight and futures literacy workshops held with policy experts in January and June 2022 that mapped rural developments against five megatrends i) global warming and biodiversity loss ii) population decline iii) digitisation iv) globalisation, and v) declining trust in government. The chapter explores the means in which altering the framing of perceptions can expand the possibilities for policy development. Specifically, it points to possibilities for the development of manufacturing in rural regions from improvements and worsening of each megatrend and provides policy direction for policy experimentation in light of these opportunities.

In Brief

Summary

The context: Technological advances, reconfigurations of supply chains and other market pressures have seen manufacturing processes change drastically and show no signs of stopping. Rural regions are also set to change due to their complex relationships with urban regions, other rural places, regional networks, national policy regimes and multilateral systems. As such, potential developments of rural manufacturing and rural regions must be considered together to produce effective and transformative policy.

The challenge: How can policy makers formulate policy that effectively takes into consideration the transformations happening at multiple spatial and temporal scales? The challenge of considering the potential of rural manufacturing in the context of transforming rural areas requires engaging on the topic of foresight and rural futures. It can help assess the future readiness of current policies with regard to potential changes in the future and build proactive rather than reactive policy.

The chapter: This report takes a future perspective to assess the potential development of rural manufacturing. It reports back from a strategic foresight workshop held in January 2022 with rural policy experts, which mapped rural developments against five megatrends and produced a vision of how rural regions could change. This workshop was complemented by a Futures Literacy Lab that was organised on 11 July 2022, involving rural development experts to explore the development needs of a wide variety of rural communities and the manufacturing therein.

The Futures Literacy Lab: The exercise enabled participants to reflect on how they approach the future, identify their own values, reframe assumptions, question priorities, arrive at new insights and identify new kinds of challenging areas to address. Several new realisations and insights were made via the lab.

The conclusions: The participants noted that the challenge of advancing rural manufacturing is becoming less about distributing high-technology processes to every place in the same way and more about being open to how rural manufacturing can support rural communities in achieving their multi-faceted goals, including social relationships, well-being and care for the natural ecosystems in which they are located.

The recommendations: Based on the exploration of this opportunity, policy makers should engage in policy experimentation in five directions:

- Redefining the purpose of production as a means to benefit rural communities and thus choosing value-creation economic activities accordingly.
- Exploring the convergence and interdependence of global and local manufacturing as a source of ambition and inspiration.
- Using rurality as an asset to revitalise human relationships with nature.
- Advancing a "capabilities approach", i.e. empowering and improving local capacity to think broadly first, then to consider outcomes, rather than the other way round.
- Activating futures conversations and futures literacy development processes in rural communities.

Elaborations of how these policy directions might play out in specific regions are being developed to illustrate how these can be applied to different kinds of rural communities, with case study examples.

Introduction

Using futures thinking to adapt to transformations occurring in rural manufacturing

Supporting manufacturing in rural communities, where interactions between local and remote systems exert in surprisingly different ways, is far from simple or homogenous and demands more than replicating development pathways from elsewhere. Both instantaneous and gradual changes can test the resilience of communities. When imagining the future of rural areas and rural manufacturing, it is tempting to focus on "imagining it correctly" so that we can "place the right bet". But this is not enough. Uncertainty and complexity produce a continuous stream of changes. Rural manufacturing can suffer from an ageing and shrinking local labour pool, weak connectivity to external markets, small local markets that offer a limited set of goods and services, high dependence on primary sectors and first-stage processing, a workforce dominated by lower-skill workers, higher unit costs to deliver public services, dispersed residential areas that lead to fractured local government systems and a small local tax base. How can rural community members and rural policy makers anticipate the changes, welcome them and understand their potential?

To be effective, leaders of rural regions and localities must reflect on how well policy priorities continue to fit and in what ways they need to evolve. Many old formulations of what to emphasise in a rural region (e.g. primary activity) and how to structure policies toward certain aims (e.g. job growth, liveability, climate resilience, attractiveness) require frequent reconsideration.

The many social, technical, political and ecological systems of any given rural place are never truly isolated from the rest of the world. For example, even the most remote rural places will be impacted by global changes such as global warming and biodiversity loss. Additionally, when something new happens in one place, it can quickly spread to others, such as the COVID-19 outbreak and the repercussions of the war against Ukraine. Aspects of change can happen rapidly or slowly and, even when past patterns appear to repeat in the present, they necessarily take new forms in changed and changing contexts.

A variety of emerging trends, such as climate change, depopulation and digitalisation, once viewed as distant, are now close enough that they deserve the attention of policy makers. These transformations are impacting rural areas and are irretrievably linked to the development potential for manufacturing: how a rural area changes will impact manufacturing firms' decisions and policy support needs; how manufacturing changes broadly and, in a specific location, will impact the policy choices and strategies in rural areas, specifically where manufacturing plays a central economic role. Therefore, this report explores the future of rural manufacturing in relation to the changes in rural communities and regions. Introducing and fostering futures thinking among policy makers, rural stakeholders and local actors could have an important impact on how rural communities experience and engage in the transformation of their regions. Taking a holistic view of rural manufacturing requires a crosscutting appreciation of the diversity and uniqueness of the many rural communities where it happens. The key question is how rural manufacturing can support rural communities in achieving their multi-faceted goals – including responding to megatrends and caring for their natural ecosystems, social relationships and well-being. By taking this view, advancing rural manufacturing becomes less about distributing high-technology processes to every place and more about supporting rural and regional development goals. Identifying a more desirable future ensures that the unique characteristics, ecological settings and needs of rural communities are served in a more effective and impactful way by policies and strategies.

This chapter provides insights into the future of rural manufacturing using both strategic foresight and futures literacy. It draws heavily from a strategic foresight exercise conducted in January 2022 that explored the potential impact of megatrends on regions and a more targeted effort, a Futures Literacy Lab on the future of rural manufacturing in July 2022. The chapter begins with a description of futures thinking and strategic foresight and why they help policy makers introduce more long-term, out-of-the-box thinking when crafting strategies that will impact rural manufacturing implicitly or explicitly. The second section provides an overview of the Foresight Workshop and key lessons learned. Similarly, the third section

reviews the process and key takeaways from the futures literacy workshop. The final section brings it all together; it illustrates how these new policy directions can be applied to different kinds of rural communities, using the case study regions from the Future of Rural Manufacturing project as examples.

Futures thinking and foresight can help futureproof policy

Futureproofing refers to policies today that can withstand the changes likely to come. The tools here can help to do this. The OECD recommends member countries embrace futures and strategic foresight at all levels of government. It should be used to develop policies, prepare for long-term trends and deal with unexpected developments (either to increase agility in responding to shocks or a recent disruption). The OECD Strategic Foresight Unit exists for this very purpose. Through its work, it seeks to increase the use and utility of strategic foresight in OECD policy expertise and policy making by governments. The OECD Regional Development Policy Committee is advancing this agenda with a dedicated work stream that leverages futures thinking and foresight to strengthen regional, urban and rural policy. As a contribution to this work, the *OECD Regional Outlook* (2023[1]) includes a chapter that discusses the value-added of leveraging foresight to futureproof regional development policy and proposes three different scenarios for OECD countries and regions in 2045.

Different modalities can be used to examine the future. Determining what approach to use hinges more on the aim or the goals of the exercise. Creating policies that directly respond to the needs of rural areas requires considering the different variables of diverse rural places, assessing potential opportunities and anticipating challenges. This work involves making assumptions about the future, both implicitly and explicitly. These assumptions will drive perception, prioritisation and choice. Even though the future ultimately cannot be known in advance, decisions are made based on best guesses and reasonable expectations for what could happen. Engaging with these "anticipatory assumptions" can provide valuable analytical clarity and new insights to inform actions in the present (Miller, 2018[2]).

One mode of engaging assumptions about the future is through strategic foresight. Through foresight processes, organisations and networks seek insights about how their operating environment is changing to inform their strategic direction. Foresight tools are designed to help people describe various futures and their drivers to produce useful outcomes such as identified threats and opportunities, assessments of policy fit, perspectives on change and shared intentions. Thus, foresight exercises can aid in forming a proactive rather than reactive policy position, by helping policy makers and stakeholders. Foresight can produce new insights which help guide strategic choices by discussing transformation in terms of drivers of change and their potential impacts.

Complementary to the tools and processes of foresight is futures literacy. This relates to building a capability to expand, diversify and vary both the purpose and approach for considering the future, moving beyond "preparation and planning" to also include "appreciating novelty". The former involves great concern for the futures you are imagining or modelling, because you know you will use it to make a choice: this is called "anticipation for the future". The latter mode, namely "anticipation for emergence", involves noticing, naming and making sense of the potentials of the novel.

By investing effort into developing its collective futures literacy, a group increases its awareness and experience of how imagined futures drive its perspective, its skill for intentionally changing between "planning and preparation" and "appreciating novelty" modes and its capacity to recognise new potentials. The recognition of anticipation for emergence as another mode for engaging futures helps groups identify new formulations of what can change and why, which can aid in innovative thinking. Its reflective stance places greater attention on learning, not only about the potential developments of any given topic but also about how and why people use the future.

This tool enables decision makers and the people they serve to effectively express and discuss the futures they imagine, explore the assumptions beneath those futures, identify experiments or new actions to pursue and be more open and responsive to new potentials of transformation. It is about developing capabilities rather than specific visions or outcomes. Therefore, futures literacy is well suited to support policy makers and the communities they serve to imagine, discuss and derive actionable insights from many unique futures of many unique rural places. Both areas of work encompass a wide swathe of theories that convex and converge in different ways and sometimes use the same tools.

However, a simplified way to think about their value-added is offered in Figure 5.1. Futures literacy, at its core, focuses more on increasing the ability to imagine the future that is desired, while strategic foresight explores scenario planning and extrapolating policy actions based on the futures imagined. Overall, both futures literacy and foresight workshops can be valuable in helping individuals and organisations to develop a more nuanced and forward-looking perspective on the future and to take proactive steps to shape the future they want to create.

## Figure 5.1. Understanding futures literacy and foresight
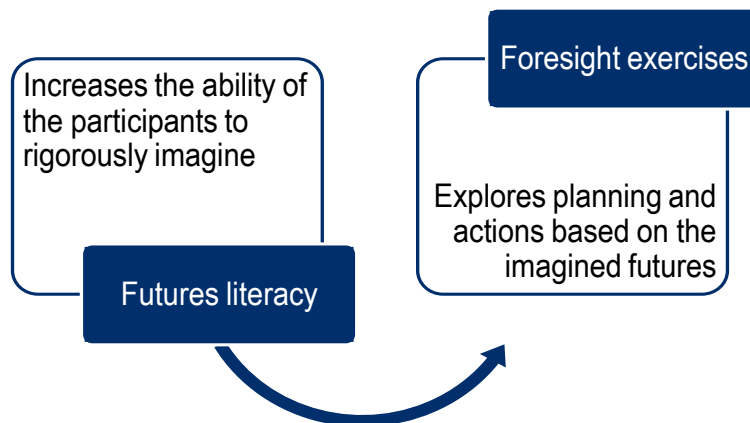
How to consider the "future" of rural manufacturing

When considering how manufacturing firms are changing, there is an understandable temptation to go directly to building scenarios that respond directly to firm needs (see Figure 5.2, Panel B). They need to consider whether to expand or scale up operations, navigate market changes, manage supply chain upsets and challenges, human capital needs and costs, diversify offerings and operational efficiencies and keep pace with the industry, just to name a few. A scenario planning or foresight approach that starts from this point could yield good results but may overlook other relevant factors that make policy responses based solely on this less successful over time. Taking this approach only makes sense when all of the circumstances impacting the decision of the firms are well understood. But rural areas are complex, featuring multiple interlinked systems. Manufacturing is never isolated from community, inter-relations among families, education processes, sports and recreation, culture, intergenerational relationships, connections between people, power and wealth and mobility patterns among neighbouring and distant places, which all play a role in who is manufacturing, what is produced and who benefits from it. Earlier chapters note the path dependency of regional manufacturing, in which heritage and cultural identify are key drivers of the related economic activity. Additionally, developments elsewhere can and do produce new phenomena locally.

The decisions taken by business leaders are shaped explicitly and implicitly by a collection of variables. For example, in instances where the rural manufacturing firm is the largest employer in the community, automation decisions become a much more nuanced choice when the potential impact on the labour

market pool in the community is considered. In many rural communities, closing manufacturing plant can reduce local employment, earnings and government tax revenue (Low, 2017[3]). Similarly, the technological and production processes in some rural manufacturing firms may have to be adapted to the infrastructure capabilities that are available versus what is optimally desired by the firm. For these reasons, the future of rural manufacturing is explored in tandem with the transformations associated with megatrends identified in Chapter 4 and the characteristics and trends identified in Chapters 1-3 identifying how rural manufacturing is evolving (see Figure 5.2, Panel B where the arrows indicate how concepts of Panel A integrate). This makes the exploration of the future of rural manufacturing a multi-layered examination. Considering all of these variables ensures that policy actions are strategic, in sync with regional and rural development strategies and can respond effectively to challenges to mitigate risks.

Figure 5.2. Examining the future of rural manufacturing, multidimensional or direct approach
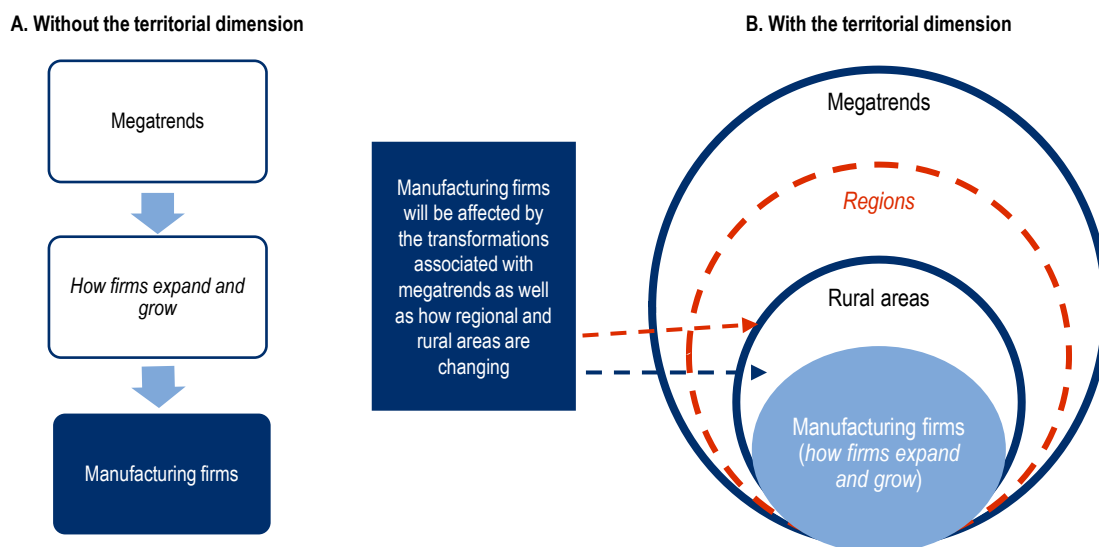
The typology of the rural region also plays a role. Across small OECD territorial level (TL) 3 regions, the extended OECD typology defined three types of non-metropolitan regions (see Box 2.1) and for rural manufacturing, Chapter 1 developed a taxonomy base on whether products are differentiated or commoditised defining five types of rural manufacturing regions that include artisanal, heritage, innovative, anchored by natural resources and anchoress. Any explorations of the future of manufacturing would do well to consider the type of rural regions within which the firm sits.

Foresight workshop: Megatrends and rural manufacturing

In January 2022, the OECD conducted a strategic foresight workshop to consider the implications of megatrends on regional development. The five megatrends (Table 5.1) include global warming, depopulation, digitalisation, globalisation and reductions in governmental trust. The OECD describes these trends as "unequivocally good or bad", offering "opportunities and risks" (OECD, 2019[4]). Economic trends, new technologies as well as demographic and environmental changes will affect urban and rural regions in fundamentally different ways (OECD, 2019[4]). For this reason, it is important to explore how the trends can be leveraged to support inclusive economic growth and sustainable development. In-depth exploration of megatrends and the construction of plausible alternative futures/scenarios can afford decision makers greater dexterity to build in "unforeseen and emerging issues" and more effectively develop potential policy responses (OECD, 2018[5]). While the foresight exercise was not specific to rural areas or rural

manufacturing, there are important lessons to be gleaned and it provided a good baseline for the futures literacy discussion.

Megatrends as a basis for futures analysis

In the workshop, the participants were divided into groups and each group was assigned a megatrend. The trends were then explored in two stages: going back to the basics and impact of megatrends. The first stage explored the purpose of regional development policy in relation to the trends and the latter explored the impact of the trends using two possible future scenarios: high and low. For example, in the going back to the basics segment, the climate change group determined that the purpose of regional development policy is to help regions flourish by reducing inequalities to develop their economic growth and well-being. They posited that in the high scenario, the impact of climate change would yield less favourable outcomes, such as the collapse of global co-operation, drought and famine but, in the low scenario, the opposite was put forward, with climate change goals reached and global collaboration at its highest.

The results of the foresight exercise are presented in Table 5.1, categorised as follows: reduction of the trend (improving), moderate movement (staying the same with minimal changes) and amplification of the trend (worsening). The exercise revealed how rural areas could transform both through exogenous factors, such as actions conducted by urban areas which spill over, and also actions conducted by other countries that affect the global dynamic. It also notes that changes may be driven by endogenous means through local community actions and policy decisions. As the direction of trends is always somewhat uncertain, they provide examples of what the world may look like if these trends were amplified, continued their trajectories as are or reduced. Further, this provides a possible snapshot of the future under different conditions, at a general level, in the year 2100. Note that the goal was not to come up with a definitive answer about the future but rather to encourage participants to think critically and creatively about what lies ahead.

Table 5.1. Different worlds from changes in megatrends

Megatrend	Improvements in the trend	Moderate extrapolation	Worsening of the trend
Climate change and biodiversity	**The world meets climate change goals, keeping global warming below +2 degrees Celsius (°C) and stopping biodiversity loss**. Global co-operation is high and changes in production and economic growth have helped to meet this goal. Some biodiversity loss and other climate impacts have still happened and are happening. There is more to be done but progress is visible.	**The world makes some advances in reducing greenhouse gas (GHG) emissions but does not meet climate goals, resulting in global warming of +2.5°C to 2.8°C**. Co-ordinated aggressive emissions reduction measures have not been implemented. Many parts of the world become even more vulnerable to severe climate impacts. Many species are extinct and biodiversity suffers.	**The world does not meet climate change goals**. GHG emissions have risen throughout the decades, causing **global warming to surpass 3.2°C above pre-industrial levels**. Droughts and floods worsen considerably, destroying food and property. Heat waves occur nearly 40 times more often, killing many people and other lives each time. Biodiversity is significantly reduced.
Population decline	**Depopulation is not an issue in most countries**. Fertility rates have increased and migrants are well integrated, which increases demand for food, services and goods.	**Some countries still face depopulation risks**. Fertility rates are just enough to replace the population (about two children per woman). Other countries still enjoy good fertility rates but with regional differences. Migrant attraction policies remain popular.	**Populations decline rapidly in many countries** as fertility rates cannot sustain population levels. Migrant attraction polices to sustain workforces are not sufficient and, in many countries, not accepted. Some municipalities and remote regions are set to disappear in less than four years.
Digitalisation	**The world is almost 100% virtual**. All services and goods are accessed virtually and people have complete interaction through virtual platforms (friends, work and leisure). Logistics, commerce and trade systems are all based on digital tools, leaving the risks	**People keep interacting and accessing services and goods virtually**. Many activities are still conducted face to face (education, culture and work). Digital infrastructure is still somewhat patchy, leaving some behind.	**Backlash occurs on digital technologies**. Cyberattacks have increased and protests against robots and the use of private information are increasing. More and more people live without cell phones or social media interaction. Some communities go

	of hacking a key vulnerability.		completely off-digital/virtual.
Globalisation	**The world is united.** Despite differences in economic and political systems. Most countries (including the People's Republic of China [hereafter 'China'], the European Union, India, the Russian Federation [hereafter 'Russia'] and the United States) form a single market with common rules. Migration is highly accepted and trade has very few barriers.	**A mixed environment** has some countries actively co-operating internationally and trading, while others restrain/control their interactions and with trade barriers.	**A divided world sees a collapse of international trade and co-operation. Large blocks of countries disintegrate, creating only** small blocks of countries with very few pockets of co-operation. Large blocks like the European union fail and just a few countries remain in the European Union with increased regulations.
Declining trust in Government	**Democracy is fully accepted and everyone has the opportunity to be elected and control/monitor the outcome of his/her vote.** Diversity in government is high and new systems have been created to decide openly and efficiently about new policies and laws.	**Trust is still earnable but scepticism is alive** with some countries with democratic systems and others with long-terms regimes.	**Backlash to democracy and trust** in democratic governments is widespread. Many countries are under totalitarian regimes. Military and security become a priority. Separatism in many countries has succeeded.

Source: This table was co-designed with the OECD Regional and Multilevel Governance Division.

Applying the megatrends analysis to rural manufacturing

As explored in Chapter 4, globalisation, automation and digitalisation are already changing all stages of the manufacturing world. Demographic change, customisation, scarcity of resources and the shift in economic power are further accelerating this transformation. How can rural manufacturing firms work efficiently and sustainably in order to reduce environmental pollution and remain competitive over the long term? The demographic trend carries tremendous implications for the rural labour market, which is typically smaller and less nimble than urban. Automation solutions are often welcome but could negatively impact the local labour market pool in rural areas and foster unintended consequences. Also, the recent trend towards geographical clustering of supply chains allows manufacturers to produce closer to local markets and increase customer satisfaction. These are just a few of the many elements that should explored in relation to the impact of megatrends on rural manufacturing. Each development in the trends is not inherently good or bad and the exercise draws out the conceivable opportunities and challenges in each possible world.

Table 5.2 attempts to extrapolate possible impacts on rural manufacturing from the setting identified above, where the megatrends take a positive turn or worsen. In the table, potential changes in rural areas are combined with their impacts on the manufacturing sector. For example, if climate change mitigation strategies are increasing, this could open up new economic opportunities in rural areas. Similarly, if the world moves towards being more connected, one could imagine this making rural areas more attractive to manufacturing firms that need high-speed broadband. It is important to state that these are indicative, non-exhaustive examples. This exercise also demonstrates: scenario thinking and design is an excellent way to do this.

Table 5.2. Possible development in rural manufacturing from extreme changes in megatrends

Megatrend	Improvement of the trend	Worsening of the trend
Climate change and biodiversity	• Greater relevance to bioeconomy and circular process, which open new green economic opportunities in rural regions through production and use. • Greater acceptance of slow lifestyles with local production prioritised. • More incentive for manufacturers to develop production processes to mitigate polluting activities. • More scope for manufacturing firms to optimise across the	• Main economic activities linked to natural resources much more vulnerable to natural hazards, leading to an increase in input costs as well as supply challenges. • Rural-urban migration intensifies, seeking protection from climate change and better economic opportunities, meaning fewer skilled workers in rural areas. • Energy affordability and availability make some production unfeasible.

Megatrend	Improvement of the trend	Worsening of the trend
	• value chain, finding efficiencies in production processes and adopting "reuse, reduce, recycle". • More renewable energy sources as alternative power reducing the volume of atmospheric carbon.	• A greater need for manufacturing firms to optimise across the value chain, find efficiencies in production processes and adopt "reuse, reduce, recycle". • Less renewable energy sources as alternative power increasing the volume of atmospheric carbon and carbon-intensive production.
Population decline	• Some cities have grown even further than today and expanded their boundaries, leading to a greater market for manufacturing and coping with increased labour-intensive manufacturing. • A more nuanced approach to automating due to increased access to high/low-skilled workforce. • Increased demand for food services and goods could foster more opportunities for manufacturing. • Manufacturers needing to fill vacancies will need to adapt to better attract workforce. • Scope to boost worker productivity and transform factory work activities.	• Worsening public service provision could trigger firm relocations. • Some regions and areas might lose all inhabitants and disappear administratively, leading to no workforce. • Lower fertility and population ageing generate more automation and capital-intensive productions.
Digitalisation	• More scope for manufacturing firms to increase the adoption of new technologies such as additive manufacturing (using three-dimensional [3D] printing technology to produce tools and parts to enable quicker production and continuous quality improvements). • More opportunities to optimise operations and improve production. • Increased job displacement from automation.	• As there is no longer an incentive to keep up, manufacturers do not develop production processes that make use of digitalisation. • Issues in the provision of services to some communities as current digital solutions do not fit, leading to regional inequality. • Skills gaps may widen between local skills and those needing to be imported in. • Less scope for manufacturing firms to increase the adoption of new technologies because the focus is on basic connectivity.
Globalisation	• Greater mobility of goods and information. • Regions without good infrastructure and digital connectivity may struggle to grasp the benefits of globalisation and integrate into supply chains. • Greater competition in the manufacturing sector from other exporters but increased opportunities for competitive companies to integrate into global supply chains and produce for a wider network. • Greater knowledge sharing.	• Increased opportunities for rural producers to take the lead for local production needs. • May end up being rule takers rather than makers, causing difficulties in influencing and keeping up with regulations. • Less reliance on external imports for supply chain pieces requires innovation and reshoring.
Declining trust in government	• More space for regulatory discussion for manufactured products and other issues such as land use. • More integrated decisions on strategies for manufacturing and economic development in the region.	• An imbalance in national policies that will affect manufacturing firms and may result in local shopping. • Opportunities for private businesses to fill the gaps of government to produce/provide.

Futures literacy lab on rural manufacturing

The megatrends exercise mentioned in the previous section offers a basis for broad changes; it underscores the value of being more targeted in the futures approach, allowing for more specific takeaways. The Futures Literacy Lab for Rural Manufacturing workshop, held in July 2022, convened 25 participants – a mix of policy makers and stakeholders from or serving rural communities – to apply a rural lens to the megatrends, i.e. consider how each of the changes would differ for rural areas. This section presents their insights and further develops them into five tentatively proposed policy-making domains for potential action. They offer policy makers new avenues for addressing the specificity of diverse rural communities.

The workshop examined the subject matter – the future of rural manufacturing – by starting with a focus on the "future of rural areas" and then on how rural manufacturing would fit within that frame. The length

of the workshop did not allow for a comprehensive deep dive into the subject matter but it did provide a foundation on which local leaders could build similar or more elaborate exercises in their regions. The exercise was seen as a means to reduce fear of the future and increase agency while navigating our persistently complex and uncertain world.

During the lab, the participants imagined futures in familiar and unfamiliar ways. The discussions and exercises produced a large set of new insights and realisations as well as a set of proposed rural transformation actions. The future-oriented concerns raised by the lab participants resonate with issues generally under consideration by many rural stakeholders, experts and policy makers. Underlying these concerns are complex challenges involving many interconnected systems active in multiple domains, including climate change (Table 5.3). All topics raised were intertwined with others, making it difficult for the assembled experts to reach any consensus on how they could (probabilistically) or should (normatively) evolve.

Table 5.3. Concerns and themes raised by Futures Literacy Lab participants

Theme	Relational flows
Specific impacts of climate change on rural places versus urban ones, and how much forward planning and preparation rural areas could or should receive in comparison to more populated urban areas.	How relationships between rural and urban areas could develop. Considerations of rural demographic change, its relation to migration flows and effects on culture and labour markets.
Practical effectiveness of technologies and manufacturing sector to address key challenges like climate change in relation to the threat of increased impacts.	Transportation and communication connectivity among rural places and between rural and urban areas, and their function in fostering access and equity among regions.
Causal links between revenue/capital, energy security, war and the capacity for achieving the "green transition".	Roles of co-operation, action and power in development processes.

The following sections provide an overview of the structure and process of the lab. This is complemented by insights that emerged as the participants moved through the different phases.

Box 5.1. Futures Literacy Lab: Structure and process

A Futures Literacy Lab aims to generate new insights about a given topic by systematically analysing a variety of methods and purposes for imagining futures. The lab is a collective learning event in which participants, through a series of exercises, come to recognise new potential directions that can challenge previously held priorities and support new actions. A Futures Literacy Lab follows a general design pattern with four phases: reveal, reframe, reflect, next steps (sometimes called "identify opportunities"). These phases can make use of any type of exercise or activity as long as they support participants in achieving the purpose of the phase (Table 5.4). Participants reveal their hopes and fears in Phase One and imagine probable and desirable futures. These are the types of futures often at play when people engage in planning and preparation. The second phase involves reframing futures by collaboratively imagining them from unusual starting points and underlying assumptions. This type of collective imagining requires acceptance of novelty, inventing new terms and making sense of differences, which are another form of engaging the future. The third part is a chance to reflect upon the typically intense experiences of the first and second parts, a chance to return to the topic and identify new insights into or questions about it. The fourth part involves inventing an experiment or action informed by the new insights.

Table 5.4. Phases of a Futures Literacy Lab

Phase	1: Reveal	2: Reframe	3: Reflect	4: Next steps
Activity	Sharing and discussing predictions and visions	Collectively imagining a reframed future	Reflecting individually and collectively on the experiences of Phases 1 and 2 by comparing different ways of using the future	Identifying concrete actions and experiments in applying the insights
Purpose	1) To make implicit assumptions about the future of the topic explicit 2) To become aware of how assumptions inform imagined futures	To experience sensing and making sense of emergent novelty by imagining futures of the topic in a scenario that challenges assumptions	To generate insights from the experience of using the future in different ways, to formulate new questions about the topic	1) To create practical value by identifying experiments that implement insights 2) To create collective value by mobilising action towards shared goals

Phase 1: Reveal – Hopes and fears, probable and desirable futures

Hopes and fears

During this first phase, the participants identified the hopes and fears set out in Table 5.5. Considering hopes and fears efficiently brings imagined futures to light and simultaneously expresses one's concerns and values. Hopes and fears are expressions of values in the present that can serve as a motivation for action. They are always future-oriented and responsive to each other; a person can translate a hope into a fear and vice versa. These fears reflect the kinds of concerns many stakeholders and inhabitants of rural places may hold, while the hopes reflect the kinds of aspirations local actors and policy makers at multiple levels may hold for rural places.
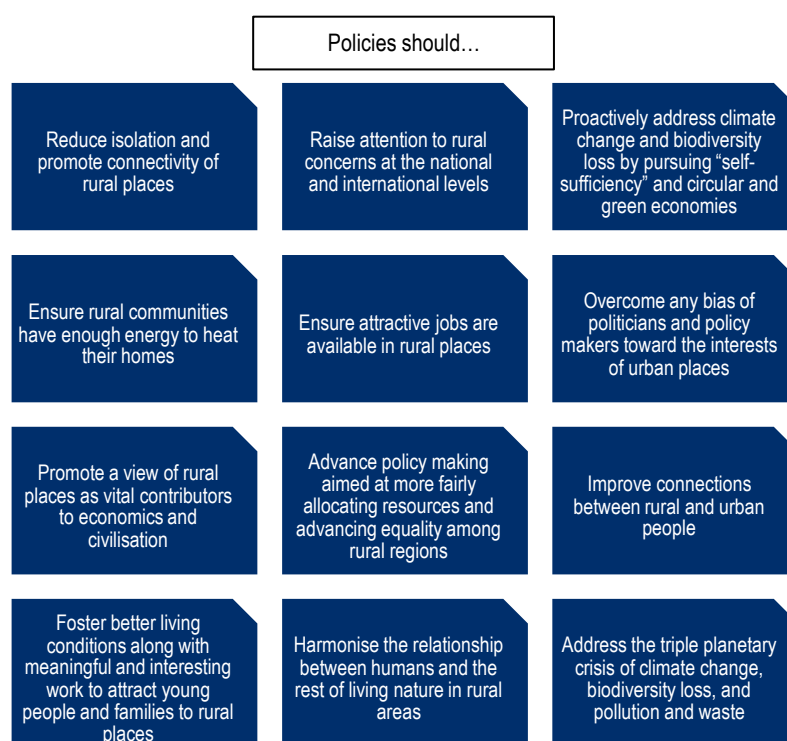
Table 5.5. Hopes and fears identified

Hopes identified	Fears identified
• Wider recognition of the intrinsic value of rural places and equal consideration of rural interests to that of urban areas at the national and international levels, including the significance of rural regions in economic development. • Innovative economic models to support rural life and the ingenuity of rural people. • Technology-enabled connectivity infrastructure to reduce remoteness and isolation. • Food and energy self-sufficiency of rural regions. • Balanced population between rural and urban areas emphasising the attractiveness of rural places to young people and families (recognising the vast opportunities to pursue their vocations and avocations). • Better integration between rural and urban places. • Improved governance of natural resources in rural areas to highlight the harmony and ecology of these rich parts of the world that support wider human civilisation. • A green transition and implementation of a circular economy. • Remote work options that allow for more people to move to rural places.	• Rural issues remain unaddressed in public policy and uncoordinated administration and governance prevent regional development. • Impacts of climate change in rural places become extreme and communities become unable to adapt quickly enough to meet their challenges, leading to continued biodiversity loss and irretrievable environmental degradation. • Irreversible opulation change and specifically the migration of young people to cities due to a lack of jobs in rural communities • Rural policy that end up producing divisions and scarcities, locking in "yesterday's visions" instead of inviting bolder new ones. • Not enough energy for heating homes in remote rural places. • Disparities among regions continue. • Rural development activities that are too uniform and one-size-fits-all.

Insights from hopes and fears discussion

The policy implications identified by lab participants are listed in Figure 5.3. The intrinsic value of rural places should be widely recognised: innovative economic models would be developed to better support rural lifeways; technologies would be deployed to reduce the remoteness and isolation of rural areas; rural regions would be seen as inspirational and an equal part of national and regional innovation ecosystems; and the imagination and creativity of people living in rural places would be more fully utilised in their vocations and avocations. There is hope for greater food and energy self-sufficiency in rural regions; people would want to move to the countryside for better health and life conditions and for rural areas to be recognised as harmonious and ecologically rich parts of the world that support wider human civilisation. The future could reflect the sustainability keywords of today such as green future, circular economy and green transition, plus a continued trend of remote work following the COVID-19 pandemic. Better integration between rural and urban places can lead to improved governance of natural resources, better job opportunities for people living in rural places and wider recognition of the significance of rural regions in economic development. This extends further to consider the internationalisation of the industrial sector and the effective integration of industrial companies into global value chains.

Ignoring rural interests in public policy making would lead to detrimental effects, including little to no attention on the impacts of climate change or irreversible depopulation as consequences should the fears manifest. Present policy lock-in would trap rural places in yesterday's visions instead of bolder, newer ones, with them losing access to wider society due to low investments in social and technological infrastructure. A lack of administration/governmental co-ordination could prevent regional development and societies being unable to change to meet their challenges; policies would produce specific divisions and scarcities. Not addressing the challenge of ageing rural populations and the broader demographic change of young people moving from rural to urban places could lead to the negative cycle of a lack of jobs and opportunities. Low energy availability can exacerbate these concerns, with businesses continuing to relocate. The expanded use of a uniform and one-size-fits-all approach to development activities may lead to continued disparities among regions and a rural future when there is nobody around, nothing to do and no remaining natural resources.

Figure 5.3. Policy insights and ideas from hopes and fears

Policies should…

Reduce isolation and promote connectivity of rural places	Raise attention to rural concerns at the national and international levels	Proactively address climate change and biodiversity loss by pursuing "self-sufficiency" and circular and green economies
Ensure rural communities have enough energy to heat their homes	Ensure attractive jobs are available in rural places	Overcome any bias of politicians and policy makers toward the interests of urban places
Promote a view of rural places as vital contributors to economics and civilisation	Advance policy making aimed at more fairly allocating resources and advancing equality among rural regions	Improve connections between rural and urban people
Foster better living conditions along with meaningful and interesting work to attract young people and families to rural places	Harmonise the relationship between humans and the rest of living nature in rural areas	Address the triple planetary crisis of climate change, biodiversity loss, and pollution and waste

Source: Based on input from lab participants.

Probable and desirable futures

The participants generated many ideas about the future (Table 5.6). The wide assortment of ideas touched on hot topics like political negligence of rural issues or their higher prioritisation, rural depopulation or repopulation and its causes, failure or success in adequately addressing climate change, reliance or self-sufficiency, uptake of radical technologies and their potential to destroy or create jobs, and attractiveness of rural places for families. Some groups imagined ominous probable futures, while others imagined probable futures featuring a mix of "good" or "bad" conditions. Some groups dared to dream of a desirable future only a little different than today, while others had somewhat bolder visions where nature was fully restored as climate change was fully addressed. Many participants noticed how their assumptions about the future were similar between their probable and desirable futures. These imagined probable and desirable futures may resonate with many worries or dreams of rural places.

Table 5.6. Probable and desirable futures identified by Lab participants (divided into four groups)

Example/ group	Probable	Desirable
1	• Economic transitions in developing nations not translating to economic benefits in developed nations • Limited collaborations between cities • Externally imposed technology shapes what is manufactured • Extreme climate change • Development of green energy and food production for self-sufficiency • Higher birth rates and climate refugees but limited-service delivery and skills shortages	• Communities empowered • Policies and resources specifically address rural areas • A higher number of remote workers spending and living locally • Increase in happiness index scores • Rural region attractivity • Fast-speed transportation network connects us all • Fast adaptation of and creation of innovative technologies • Creative/cultural production hubs

Example/ group	Probable	Desirable
2	- Political volatility - Deeper conflicts between rural and urban due to rise in inequality - New modes of food production, e.g. genetically modified/lab-based - Isolation and depression due to teleworking - Zero hunger in Africa and Europe - Farmers blamed for the rising ineffectiveness of antibiotics - New forms of connectivity come with new problems: flying car crashes and satellites cause lost Internet connections - Extreme climate change	- Climate targets surpassed in all countries - Jobs of the future based in rural areas - Carbon capture markets benefit the income of rural households - Rural areas connected with circular economy - Rural regions subsidise urban areas - High level of well-being, happiness and health - Technologies have finally arrived in rural places, e.g. rural mobility fully electrified - Rural traditions maintained and preserved
3	- More power to the rural population - Continued economic crises - Rural green energy production is in high demand but lacks skilled workers - Lack of raw materials for manufacturing leads to increasing input costs and greater dependency on other countries - New discoveries lead to new jobs - Depopulation despite attractiveness strategies, e.g. broadband - Biodiversity loss and natural disasters - Remote work has become a fully common practice	- Circular economy is fully functional - Migration leading to population increase - Sufficient staff for service delivery - Good work-life balance - Breakthrough innovations in small villages frequent - New technologies that do not demand customer relationship management, i.e. face-to-face work with customers - Renewable energy fully deployed - Natural restorations underway "Back to nature" way of life - Lifelong learning commonplace
4	- Policies targeted to supporting rural areas but not tailored to specific regions or communities - Unemployment rises due to increasing automation - The lack of agricultural labour force causes shortages locally and afar - Transport difficulties are aggravated - Technological breakthrough enables spatial linkages - Better circular economy - The desire for a more nature-connected life causes people to move away from the cities	- Increased rural migration due to the attractiveness of lifestyle - Rural areas champions of climate resilience - Excellent education access and specialised training schools - New technology brings new jobs - Self-sufficient areas (e.g. energy/food)

Note: Comparison of streams allows readers a chance to compare scenarios produced by the same groups and look for similarities and differences and thus may see overlaps in some themes.

Source: Based on lab outcomes.

Insights from probable and desirable futures discussion

Based on this exercise, three prominent factors emerged. First, the urgent present plays an important role. For example, the lab was conducted within six months of Russia's war of aggression on Ukraine and amid active discussions about how Europe could diversify from Russian gas and oil. It is not surprising that thematic emphasis on energy self-sufficiency coloured the discussions. Current events like these can encourage extrapolations toward the future built on assumptions that these issues are important now and will be highly relevant in the future. Yet, the thematic emphasis of current events frequently changes, albeit at differing rates, and what ultimately happens in the future will be shaped by a wide variety of interacting systems, many of which we cannot even imagine or model today. Highlighting this parameter does not mean the urgent present ought to be ignored when discussing potential developments. Rather, the point is to look for how it defines boundaries to imagination and ask how these boundaries can be escaped.

Second, imagined futures contain moral dimensions. Expressing hopes and fears mobilises a person's views of what should or should not happen. For example, underlying the above set of hopes and fears from the lab are norms such as "rural areas should not be overlooked in national and international contexts", "we should act faster to address climate change before we run out of time", "population decline of rural places must stop so these communities don't die", "governance of rural areas should be better

co-ordinated" and "we must avoid divisions, scarcity and inequality among and within rural communities". Becoming sensitive and reflective to the presence of norms and values in discussions about the future can help illuminate what types of contributions are worthy of pursuit. Being clear about what values are active in discussions about the future can aid in clarifying which objectives may merit emphasis in policy and why.

Third, hopes and fears can correspond to trends and megatrends and thus desirable and undesirable outcomes. For example, ageing populations in many Western nations combined with the trend of young people leaving rural places for better opportunity appears in the above list as fears of rural depopulation. Meanwhile, reversing these trends becomes a source of hope, such as living in rural areas becoming more desirable because it can provide better life conditions. The megatrend of urbanisation is contrasted with a hope for rural areas as "harmonious and ecologically rich parts of the world will support human civilisation". The megatrend of climate change fed hopes of preventing "irretrievable environmental degradation" due to an "uncontrolled relationship" between "humans and nature" and its opposite. This forwards-reverse correspondence between megatrends and hopes or fears invites questions about how else futures can be imagined – beyond "dialling up or down" trends. This parameter draws attention to the intersubjectivity of our relationship to descriptions of the futures we receive from others. The hopes and fears discussions of trends produced should not be pushed aside; rather, they are a valid part of any discussion about the future and shed light on rising ethical considerations and deeper intentions in the present.

Box 5.2. Key considerations when engaging in futures thinking

- **Imagined futures play a key role in seeing problems or solutions**. What we expect and/or wish what will happen, are imposed constraints where our minds operate. Whilst on the one hand, it is useful to say, "here is a problem today, and here is the technology or concept – renewable energy, circular economy, digital connectivity – which could solve it (if it became widely adapted)". On the other, futures can be imagined at a fuzzier level, drawing attention to how the functions of the social whole, such as economics or manufacturing, are all interconnected. When specific details about these connections are expressed in conversations about how rural areas could or should develop, it helps to understand the constraints of problems and solutions thinking and go further in our conversations to elaborate and model how many processes of change and continuity are interlinked.

- **Desirable futures tend to map today's values on tomorrow**. When imagining a desirable future, even though it is known that values have changed over time, there is a tendency to assume tomorrow's values will continue to be the same as today's. Societal values have changed in the past and can change in the future, so they are a variable to experiment with when imagining futures. Also, expressing desirable futures (as well as probable futures) provides a surface for noticing what values underly discussions of a topic such as rural manufacturing, which can highlight some potential trajectories of change over others and play a role in setting priorities.

- **Implicit parameters limit what kinds of futures we are often willing to imagine**. While imagining both kinds of future, there can be implicit parameters in play, such as "to keep grounded", "be realistic" and "not to set yourself up for disappointment". The way we define reality affects our images of the future and what we find ourselves to "be allowed to believe in". Additionally, there can be "official futures" which we feel obligated to endorse or echo. To widen the variety or boldness of futures we are willing to imagine, to expand the terrain of potentiality we can see, tactics are needed to step outside of these implicit parameters. One such tactic is to notice the assumptions we make about the future and generate vastly different ones as starting points when imagining the future.

- **Emotions, pessimism and optimism are valid and useful elements**. Looking closely at the probable and desirable futures we find pessimistic or optimistic views on how things could develop over 20 years: for example, teleworking is positive for rural areas (more job opportunities and new residents) but also negative (physical isolation from other living beings). In practice, different individuals hold to some mix of these perspectives. Awareness of the relationship between emotions, pessimism and optimism when discussing various imagined futures supports analytical clarity when these aspects are met with reflective questions like "Why do we feel this way about this future?". The participants' expressed hopes and desirable futures, and fears and probable futures are summarised in 0.

- **Humility toward the future alters agency**. Ultimately, no one knows exactly how the future will turn out. Paying attention to uncertainty is important when imagining futures. There are times when people feel convinced of their expertise: they know what the context is, they know what the policy is and they know that if they do X, Y will happen. Yet the uncertainty of the future requires humility, which, if taken on board, can alter the power relationships between policy and responsiveness. Humility toward the future – admitting it cannot be known – allows for new forms of agency, power-sharing and openness to potential.

- **Big assumptions underly imagined futures**. People have a wide range of sources for the futures they imagine, including anything from lived experience, expertise and well-researched reports to "gut feelings". When imagined futures are presented, they contain big assumptions about what might happen next. Noticing these assumptions about the future is useful because they are a key analytical detail about how a topic is being framed. Several assumptions were noticed in the Futures Literacy Lab: that sustainable transition is possible and there is enough time for it; that raising attention to rural areas would help these areas develop more productively; that access to technology and skills are key to rural manufacturing; that people want what rural areas have to offer, yet various systems are pulling them away; and that all issues are solvable through human decision making. The function of assumptions is a key to imagining futures differently so as to open new perspectives on the present. Indeed, this is what happened in the reframed futures.

Merging hopes and fears with probable and desirable futures

Finally, viewing the topic of rural areas and rural manufacturing through various futures as lenses helped the lab participants focus on a specific set of issues (see Table 5.7). The groups at the lab covered many topics of interest to policy makers today. Even though hopes and fears can function together to generate desirable and probable futures, there were clear thematic links between the labs' hopes and desirable futures and fears and probable futures. For example, hope is for "rural self-sufficiency", which entails a desirable future that is "effective, prosperous, happy and tradition-rich", and the fear of "inability to meet challenges" and the probable future of "deadly politics, fiery heat waves, urban/rural conflict". The differences and relationships between these types of projections – things going well versus things not going well – are reminders that we cannot know the future. When we imagine futures, it draws upon our emotions – which are not often discussed; yet being aware of the role of emotions in relation to pessimism and optimism perspectives can help us tune into how the futures we imagine are shaping perception in the present. In summary, untangling hopes and fears and desirable and probable futures gave lab participants high-level insights into how they were thinking about the changing circumstances of rural areas and rural manufacturing.

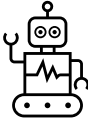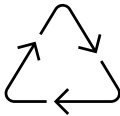## Table 5.7. Merging hopes and fears with probable and desirable

Hope and fears	Probable and desirable
Hopes: Higher valuation of rurality. *Fears:* Rural interests are ignored in policy making.	*Probable 2042:* Mixed self-sufficiency and dependency of rural places. *Desirable 2042:* Rural innovation advantage.
Hopes: Self-sufficiency of rural regions. *Fears:* Rural places are unable to meet their challenges in time.	*Probable 2042:* Deadly politics, fiery heat waves, urban/rural conflict. *Desirable 2042:* Effective, prosperous, happy tradition-rich.
Hopes: A greener tomorrow. *Fears:* Rural population loss and energy shortages.	*Probable 2042:* Depopulated, expensive and disaster-prone. *Desirable 2042:* Circular, green, self-sufficient lifelong learners.
Hopes: Nature, jobs, economic participation and ties to urbanity. *Fears:* Inequality among regions, homogenisation and absence.	*Probable 2042:* Hungry, poor and can't get around. *Desirable 2042:* Youth flock to the rural lifestyle.

Phase 2: Reframing the futures

In Phase Two, participants engaged in a reframing exercise based on atypical assumptions about the future. Reframing is the steepest and most difficult part of the lab's action-learning journey and is designed to support the free-flowing exchange of ideas. It pushes participants to use marginal ideas, hidden or unnamed phenomena, to spark novel ideas about the topic's future. Participants also discover their own ability to change and invent the assumptions that underpin the scenes, interactions, textures, colours, emotions, rationales, etc., of imagined tomorrows. The prompt in this scenario (see Figure 5.4) is intentionally disassociated from conventional reasons and methods for imagining the future. In the OECD lab, they worked from a scenario called Nature-Intensive Society, set 20 years from today, where rural areas are neither central nor peripheral. Instead, forests have taken over. Diverse species have started using humanity's older technologies. To do anything, humans living in rural places needed to negotiate and share power with the other lifeforms co-inhabiting in their communities.

The reframing exercise was designed to be playful and, at the same time, deliberately encouraged participants to think outside the box and escape the traditional assumptions about the future (see Box 5.2).They were also invited to imagine the future from the perspective of individuals living in a specific rural community. Participants had to take on self-invented roles in the scenario and attend an imagined future town hall meeting to discuss their rural community's "concern of the day". Although it might seem that the aim of such an exercise is to come up with highly inventive futures, this is not the point. Rather, by working together to fill in details of a non-probable, non-desirable scenario, lab participants not only discover that they can invent their own anticipatory assumptions but that, by doing so, their perception of the present changes.

Figure 5.4. Phase 2: Reframe – Nature-Intensive Society discussion questions

COLLABORATION	UNIQUE	TESTED	POWER
How do humans collaborate with other species to design products useful for their survival?	How do we learn to create unique goods services and exchanges	What skills do we need?	What is the relationship between manufacturing unique goods and power?

Insights from reframing the futures

The reframed futures show how perception changes when different modes and purposes for engaging futures are deployed. It would be convenient to discard these ideas about the future as "useless fiction"; however, when interpreted more closely, they raise key questions and point to potential pathways for reconfiguring the present. For example, while people may never learn how to directly communicate with other species, imagining a future when people could do so invites policy-relevant questions for the present, such as:

- What would we do differently if we fully understood how our actions harm or benefit others in our local and global ecosystems?
- What could we learn from nature if we had significantly increased information about what other life was perceiving and doing?
- How can nature inspire reorganisations of our systems of production and consumption?
- What would our industrial processes be like if humanity's needs were no longer seen as being "above" those of other living beings?

Going further, concerns identified in the lab's four imagined future rural communities merit attention today. All species living in rural places, including humans, would benefit from a fairer distribution of availability and access to land, food/energy and water. Now more than ever, we need better skills for conflict resolution and related capabilities to negotiate among diverse interests – on local and global levels and even across species. As we humans continue to use old, non-green technologies, the advancement of a greener economy is hampered despite the urgent need for new modes of production and consumption. "Group think" is also in the way of such transitions because it locks communities and whole industries into unchecked assumptions about the future. Greater awareness of how these anticipatory assumptions frame change and efforts to discuss them with a wider representative set of local actors could be helpful.

Additional interpretations that can arise from these reframed scenarios include power structures in rural communities often steering what can happen or not in rural development, which points to the imperative to include people beyond the already powerful – such as youth, minorities and disenfranchised – in decision making about rural economic development. The world today is very interconnected and co-operation (versus competition) continues to be a key – often underutilised – route to pursuing common interests. Bringing together a diversity of perspectives, experiences and expertise opens new ideas, meaning co-creation processes are an engine for addressing pressing needs such as self-sufficient energy production, environmental restoration and new models of consumption. Fair and well-distributed access to critical infrastructure is more than a connectivity issue: it is also an equality issue – from

transportation/mobility plus communications systems among regional, remote communities and rural communities to/from major cities to basic needs like family and child-rearing services, education and continuous learning and participation in community development.

Table 5.8. Participants' reframed futures with implications for rural manufacturing

	Novel rural community	Participants' insights	Interpreted potentials for rural manufacturing
1	*Concern*: How to negotiate the threat of old technology in dialogue with other species?	• Being closer to nature would alter our urban-rural spatial patterns and raise collective well-being above individual well-being.	• Industrial production systems need new design principles which forefront and address their system-level impacts on ecosystems. • Local and global impacts must be considered at the same time.
2	*Concern*: Fair distribution of water, support of food provision and broadening networks beyond their local industry leader.	• Rural areas are a frontline of climate change impacts. Technologies and infrastructures like renewable energy could help them adapt and mitigate.	• Rural manufacturing is a human activity but could also serve the needs of the rest of living nature. • Rural manufacturing firms could play a major role in advancing renewable energy for rural areas.
3	*Concern*: How to become even greener?	• Reliable renewable energy is a key issue vital to many types of community members, human, non-human species and technological.	• Planning should engage all people who will be affected and treat them as equals and with empathy during negotiations about the manufacturing happening in their communities. • An obvious win for all living nature, including humans living in rural areas, is to implement reliable, non-polluting renewable energy systems.
4	*Concern*: Knowing who (all species) can do what; continuation of key social services; and being a community even though it is shrinking.	• Better skills are needed for listening, learning and re-learning from nature. • Manufacturing unique goods opens rural areas to do something different than copying industrial processes and products that threaten our societies.	• Inspiration for new products and production processes can be found in natural ecosystems. • Rural manufacturing could focus more on producing unique and specific products for the local region. This would increase jobs and unique products and services for local communities.

Phase 3: Reflections

The purpose of this third phase was to generate insights from the experience of using the future in different ways in the previous two phases. Four questions were discussed (Figure 5.5). The lab participants arrived at many new insights and realisations (see Table 5.9). Cross-cutting these realisations is the disruption of conventional logic and modes of policy making for rural manufacturing and a rising interest in more dynamic, experimental and capabilities-driven approaches to rural development. Simply put, it makes a difference for both diagnosing problems and proposing solutions to have a better understanding of the imaginary futures which are active in the background of policy-making discussions.

Figure 5.5. Phase 3 questions

How would you compare your experience imagining futures in Phases 1 and 2?

What idea from today has challenged you the most?

What present way of doing things need to change based on an observation from today?

What belief in the future do you now question?

The insights are "food for thought" as we consider how rural areas could or should develop. They contain several perspectives on how transformation could happen and what roles various actors would need to play.

Table 5.9. Lab participant realisations about rural areas and rural manufacturing

Uniqueness of all rural places	Every rural place is unique and defies generalisation – "once you've seen one rural community, you've seen one rural community".
Urbanity of policy making	Conventional centre-to-periphery flows in policy making are insufficient and alternative approaches are needed (e.g. periphery-to-periphery).
Local and global frames are interlinked	Local and global perspectives need to be addressed without putting one frame over the other.
Problematisation of industrial-era assumptions	Industrialisation and its manufacturing systems are problematised by uniqueness, specificity and introducing perspectives of non-human life. Co-creation is an engine of value creation: locally contextualised processes are best suited to create outcomes tailored to each place and its specific interests and needs and rural areas can be at the forefront.
Deploying climate change mitigation and adaptation resources	Many rural areas are at the frontline of climate change impacts. Implementing existing and emerging technologies to help rural communities mitigate and adapt to climate change should be a priority. However, there appears to be a causal link between making the green transition and overall peaceful conditions: when nations spend their attention and resources on war-making, there are fewer resources for building renewable energy systems, adaptation infrastructures or co-ordinating internationally to reduce global emissions.
Communication systems need to support understanding each other	Greater communication and understanding among people in any given rural place, among rural places and between rural and urban places would help identify and implement their own approaches to challenges, living effectively as part of an ecosystem.
Connectivity infrastructure is about fostering mutual understanding	While the infrastructures of connectivity and transportation continue to be important for many rural places, what people can do with these communication and mobility systems deserves greater consideration. Supporting greater communication and understanding among people in a rural place as well as among rural places in a region and between rural and urban places would help everyone identify and implement their own approaches to the challenges they face.
Foresight and futures literacy are needed to unlock new potentials	Assumptions about the future are powerful. It is worthwhile to take more time to investigate these anticipatory assumptions when doing policy-related foresight, e.g. developing scenarios and valuing the time required to discuss them. Along these lines, rural policy makers should systematically embed futures literacy and reflect upon their assumptions in their processes.

Policy making for rural manufacturing needs to reassess the relationship of manufacturing to community-recognisable value. Thinking beyond the buzzwords like Manufacturing 4.0, we can ask "what does it mean to put rural well-being central to economic development through manufacturing?". The COVID-19 pandemic led to the widespread uptake of many tools for remote meetings that already existed but went

unused. In a similar way, it is probably true that there are already existing tools which we are not using to their full potential.

In the context of trying to rethink the tangible activity of manufacturing, its relationship to value creation for a given community needs consideration. The insights from the lab emphasise how value creation is linked to the specificity and uniqueness of any given rural place. In other words, specificity – not generality – is what confers meaning and creates value. Value needs to be comprehended via multiple lenses: some already have names like social capital, green finance and natural capital; and some value lenses still need to be recognised or invented. By carefully exploring a variety of modes of anticipating futures, the assembled policy experts generated new insights they could use to prepare the first iterations of actions which could be supported by policy making.

Phase 4: Identifying areas of action for rural transformations

Taking inspiration from their efforts to imagine futures, the lab's participants cultivated their new insights about key rural issues into four potential actionable ideas (Figure 5.6). Cross-cutting all four proposed rural transformation actions is an interest in empowering local actors with resources and capabilities to address their needs on their own terms in their own unique situations. These are near-term actions which could produce transformational future conditions for people living in rural places. Underpinning these proposed transformative actions is an appreciation for the considerable differences among rural communities and regions. Policy makers need approaches to enable transformative developments that address specific needs, interests and situations of any given rural place. Treating rural regions as homogenous in policy making works against policy effectiveness. Yet, policy makers and rural communities can recognise the uniqueness of every place and situation as a source of inspiration for invention and innovation.

Figure 5.6. Rural transformation actions proposed by lab participants

Encourage community-driven development to maximise and develop a "rural edge"

Every rural area is unique and can find its own "edge" – key sectors, learning systems and service offers – which links directly with global functions. Policy makers can do four things to make this rural transformation action happen: first, improve their approaches to local politics, economics and collaborations along with skills to overcome conflict; second, foster local networks, scale them and connect them globally to support knowledge sharing and link them to policy cycles; third, strengthen the green transformation agenda globally, emphasising well-being and taking inspiration from nature so that larger structures enable rural places to adapt and mitigate climate impacts; and fourth, be less prescriptive toward rural communities and pay closer attention to what works. Often, manufacturing choices are made with a desire to participate in the global economy but considerations of local ecosystems are secondary.

There is a push and pull between local and global. While being aware of global trends, policy making should support local actors to be successful on their own terms and these terms will be different for each specific rural community. Rural areas can find their own edge that takes into account the well-being of the region and the services they need – and link their local edge with global functions. They would be willing to think big even if their community is small and remote. By first considering "what we need locally for our community", rural areas will be better able to engage global systems and priorities on their own terms, determining what matters and how it matters most. For example, one edge rural communities could be encouraged to explore would be how to become a driver for humanity's capability for making the green transition. Rural places have sometimes been treated as spatial areas for absorbing externalities of economic activity, e.g. to absorb negative byproducts from production. However, a new nature-centric focus could serve as an economic advantage to rural places.

The goal thus is not to simply integrate into global value chains but to be targeted in a way that highlights the comparative advantages of the area, enhances local well-being and limits the costs such as pollution or low value-added. Policy makers should help local areas develop their own territorial projects. Identity and meaning are important factors in these initiatives: community values and sense of purpose can be strongly associated with what they produce, what they consume, how they relate to each other, how they work together and how they relate to their landscapes and ecosystems. In addition, policy makers can provide rural areas access to global dialogues by fostering local networks, scaling them and connecting them to each other globally. Rural areas can benefit from knowledge sharing and more substantive involvement in policy cycles through these networks. Tending and contributing to the global green transformation agenda, taking inspiration from nature and focusing on well-being can help rural areas adapt and mitigate climate impacts.

Box 5.3. Key reflection points: Encourage community-driven development to maximise and develop a "rural edge"

The proposed actions to *Encourage community-driven development to maximise and develop a "rural edge"* entail prioritisation of several sub-actions, including:

- Prescribing less and seeking ideas from the ground.
- Recognising the diversity and uniqueness of rural places and encouraging local actors to find their advantage.
- Building and scaling local networks and connecting them globally, fostering exchange and ongoing experimentation at the local and global levels.
- Celebrating what works and communicating successes so all can learn from them, noting the comparative advantage whilst ensuring activity is welfare enhancing.

Develop more resilient rural energy systems and decentralise scalable energy production

Manufacturing activity is energy intensive. Rural areas should take advantage of their geographic positions to aid the green transition and continue economic activity. Rural communities can promote their own resilience by manufacturing their energy and material systems. They can demonstrate new energy and material production models that minimise or eliminate climate impacts, pollution and waste while supporting biodiversity. These demonstrations could be supported by energy policy at the regional and national levels aimed at promoting self-sufficiency and resilience in rural places and addressing the climate crisis.

Rural places would need capabilities for implementing and running wind energy, biomass and solar energy systems and peer-to-peer power distribution (e.g. smart grids). Access to technical training about renewable energy systems in remote rural areas could produce these capabilities. Ideally, rural communities would lead efforts to create their own local renewable energy systems. Communities face industry pressures to centralise energy production and lock in demand for fossil fuels. International policy co-ordination would help overcome these barriers.

Mobilising existing technology and know-how for renewable energy and energy conservation in rural places could produce a self-reliant alternative to today's conventional centralised energy solutions. Locally run renewable energy systems could be interlinked among rural communities into regional energy exchanges. Buying energy from these exchanges would put manufacturers and food producers within striking distance of becoming "net-zero". By taking additional measures to protect landscapes and living ecosystems, additional ecological merits could be achieved.

Investing in inter-community renewable energy systems would improve liveability year-round for families and households by providing jobs, reducing energy costs and ending pollution from fossil fuel power plants. Complementary actions would include investing in communication and other infrastructure to boost liveability, providing access to education and skills, and learning opportunities for respecting and interacting with nature and ecosystems. Learning to live symbiotically could benefit the well-being of rural communities, not only through their direct interactions with the natural environment.

Box 5.4. Key reflection points: Develop more resilient rural energy systems

The proposed actions to *Develop more resilient rural energy systems and decentralise scalable energy production* entail prioritisation of several sub-actions, including:

- Promoting and enabling the implementation of scalable decentralised renewable energy instead of centralised energy systems.
- Developing/renewing infrastructures to allow for decentralised renewable energy systems, e.g. peer-to-peer distribution.
- Widening access to technical education about energy reduction in manufacturing production processes.
- Exploring complementary policies to support resilience and self-sufficiency of rural communities and regions.

Create opportunities for more bottom-up initiatives and social innovations

Often, policy making can prescribe pathways and outcomes for rural areas and provide limited opportunities for local communities to identify their own challenges or set their own goals.

One way to pursue this action is to establish local innovation hubs or "regulatory sandboxes" for the manufacturing industry and university/research institutions to collaborate. Specifically, rural communities could be supported to establish local innovation hubs for forging their own hyper-specific transformative ideas sourced from the community for the community. These hubs would aim to generate and implement transformative project ideas from and for local communities instead of seeking innovations for the benefit of everyone on an abstract global market. These hubs would bring people together to define their own community's key challenges and find ways to address them. It would also boost a culture of start-ups and scale up activities through networks of idea sharing. By coming together to understand their situations more deeply, local actors can develop projects of high contextual relevance and mutual interest.

To make these hubs go, policy makers would work directly with local actors to co-create conditions and processes to form and run their own rural innovation hubs. For example, rural policy makers can provide dependable, long-term and low-effort financial support structures so that these hubs have time to engage complexity, build trust and host multi-stakeholder innovation processes which build productive relationships. Hub participants would be local stakeholders with a variety of perspectives and would be challenged to be open-minded, think locally and globally at the same time, and hold space for all dimensions of what could be a project (e.g. not only business creation). Their innovation projects could address cross-cutting issues such as economic, technological and administrative obstacles. They could draw on other sectors, including government and businesses, for cross-fertilisation. For remote communities, which are often especially small, this type of innovation hub could help them continue to exist while fostering productive internal and external relationships to tackle local challenges.

Box 5.5. Key reflection points: Create opportunities for more bottom-up initiatives and social innovation

The proposed actions to *Create opportunities for more bottom-up initiatives and social innovation* entail prioritisation of several sub-actions, including:

- Promoting opportunities for local communities, even small ones, to create their own projects aimed at benefitting local populations and increasing start-up culture, particularly boosting the opportunities for craft and artisanal manufacturing.
- Establishing mechanisms in rural communities such as multi-stakeholder innovation hubs and launching innovation processes for their own community's benefit.
- Convening local actors to discuss their own community's situation more deeply and enabling local actors in rural places to create and promote their own ideas and innovations for transformative actions.
- Encouraging relationship building – both inside and outside communities across other sectors – and accepting all dimensions of what a project could be.
- Providing financial support to give communities a forum and enough time for longer-term multi-stakeholder innovation processes while avoiding prescribing development pathways, and avoid limiting funding to achieve pre-specified outcomes.

Build education systems that ensure rural communities develop skills, knowledge and know-how in step with change

Strengthening their own capabilities would help rural communities see, with new eyes, their function and role in the broader economy. Formal and informal education systems are key to finding new ways to relate to strengthen skills and knowledge in rural communities. Learning processes and knowledge exchanges should be mobilised to help rural communities see their contexts and histories differently, engage with transformation processes and recognise the creativity in themselves and their ecosystems. Rural communities should develop capabilities for systems thinking, sciences, social sciences and futures and foresight.

Opportunities to learn from Indigenous peoples should be done so respectfully, making efforts to engage effectually and have them be effectively represented in learning processes. Realising there is far more to know about "living as part of an ecosystem" raises the question of "who can we ask?". Many Indigenous peoples around the world have a living heritage of knowledge about how to live in alignment with nature and their perspectives should be meaningfully raised and represented in this education and learning processes (a fine example of what such knowledge production can look like includes the article "Gapu, water, creates knowledge and is a life force to be respected" (Wright et al., 2020[6])).

Developing capabilities to imagine futures in a wider variety of ways for a diversity of purposes can help people find hope in complexity and uncertainty, perceive potential change, identify new options and develop new solutions. Convening opportunities to learn futures literacy in rural communities – both in formal and informal settings – would help people invent new meanings, realise new aspects of their unique situations, explore new ways of being and produce their own experiments toward nurturing conditions in which they can thrive. Introductions to futures literacy could be embedded in formal education systems to ensure equitable access to it. To complement the planning and preparation skills already taught, students should have learning experiences appreciating novelty involving creating, playing, improving, inventing new words and finding new meanings. Informal learning processes should also be utilised. For example, Futures Literacy Labs hosted by rural communities would help people from all "walks of life" find the power

their images of the future have on the present. Digital tools could be used to run labs involving multiple rural communities to discuss a regional topic. Participants should include a wide variety of stakeholders, including rural politicians.

Box 5.6. Key reflection points: Build education systems that ensure rural communities develop skills, knowledge and know-how in step with change

The proposed actions to *Build education systems that ensure rural communities develop skills, knowledge and know-how in step with change* entail prioritisation of several sub-actions, including:

- Inviting deeper appreciation of complexity and ecosystems through education and participatory opportunities.
- Supporting rural communities in developing skills which they can use however they wish to drive their own local development.
- Increasing the capability to build futures thinking and foresight into preparation and planning at the local level can help rural communities see their contexts and histories differently, engage with transformation processes and recognise the creativity of both themselves and their local natural ecosystems.
- Recognising and respectfully engaging the knowledge systems of Indigenous people and including these approaches to knowledge production and distribution in education.

The exercise to consider future scenarios developed a range of possible actions. These actions were not proposed as solutions but as a cultivation of key issues which can be elaborated on later. They are propositions for how rural manufacturing *could* serve as a leverage point for transformation and are based on the underlying values of the policy makers.

Crosscutting all four ideas is a desire to empower local actors with resources and capabilities to address their own needs. These ideas involve policy making that: experiments with alternatives to conventional configurations of economic co-operation; advances a decentralised and scalable system of renewable energy production; embeds teaching about futures literacy, complexity, systems thinking and interfacing with Indigenous knowledge systems into all levels of education; and convenes rural stakeholders and local actors to better understand their own situation and produce innovations of high value to themselves.

These ideas for supporting rural transformation engage questions concerning the specificity and differentiation of rural communities and, thus, how the manufacturing sector changes along these transformations. The degree of variation and diversity of rural places are not fully captured in tools like a three-part typology based on urban boundaries and distance from urban centres (within urban, near urban, remote). The full extent of differences in rural places can be seen as a source of uncertainty for policy effectiveness. In contrast, the uniqueness of every rural community can become a source of inspiration for inventing new approaches and innovating new solutions.

Mobilising this idea, policy making can aim to respond to the full range of unique people, needs and concerns of rural places. To do so, policy and the prosperity of rural areas depend on:

- Being able to include uncertainty.
- Making sense of novel potentialities.
- Diagnosis complex situations.
- Giving the people in those communities the ability to perceive their own specificity (not one-size-fits-all characteristics).
- Acting toward their own benefit.

In the context of trying to rethink the tangible activity of manufacturing, its relationship to value creation for a given community needs consideration. Value creation is linked to the specificity and uniqueness of any given rural place. Specificity is what confers meaning and creates value. Experimentation with new frameworks for realising multiple forms of value from rural manufacturing can support the relevance of new modes of doing it.

The lab participants' ideas indicate aspirations for a more fully contextualised policy making which can be more reflective and responsive to the unique situation of every rural place. Transforming rural manufacturing is not only about adapting the latest and greatest technologies: it is about tending to the whole picture of how manufacturing functions in the lives of communities and communities coalesce around the productivity and benefit it produces. Furthermore, it involves how communities pursue activities and purposes such as learning, inventing, collaborating and addressing key local and global challenges.

Futures-inspired policy experimentation toward transformation

Areas for policy experimentation

Five domains are informed by the foresight exercise and Futures Literacy Lab and are presented as conversation starters to help policy makers, rural manufacturing stakeholders and rural communities identify new experimental pathways. The section is formulated with a list of questions one can consider when applying the tools to one's own rural area and provides some examples from the case studies in the report.

There is a risk when policy makers experiment toward the future that policies implemented to develop rural manufacturing will be too replicative of the past, closing off truly novel and relevant transformative opportunities and imposing one set of imagined futures on populations and communities. Pushing forward modes of rural development, which are too narrowly defined and focused on one aspect or another (e.g. education or manufacturing), come at the cost of trimming away social and cultural aspects and needs, which are significant drivers of change and valuable sources of difference. Thus, each proposed area for policy experimentation is presented with a set of questions to stretch discussions during policy-making processes. Special considerations for these questions using the degree of urbanisation typology of rural communities are presented, followed by examples of how the questions could be answered using the overall projects' case studies.

Figure 5.7. Areas for policy experimentation

What	Redefine	Redefine the target beneficiaries of rural value creation processes
	Explore	Explore convergence and interdependence of global and local as a source of ambition and inspiration
	Revitalise	Revitalise human relationships with nature
How	Empower	Empower rural communities through supporting them to develop the skills and capabilities needed
	Activate	Activate multi-perspective futures conversations in many rural places

Redefine the target beneficiaries of rural value-creation processes

People living in rural places are often asked to present their community to outsiders as a commodity, which serves to flatten their full nuance, social dynamics and unique creativity. If these rural communities themselves became the target beneficiaries of their value-creation activities, it would fundamentally change what forms of economic contribution and benefit would be sought or recognised. It would change how and what is manufactured for whom. It would serve to help these rural places diversify their economic activity.

Reframing the purpose of industry in rural settings as serving community interests first could enhance the development of rural manufacturing conducted in a way that prioritises creating multiple forms of value for the rural community, material or immaterial. This well-being approach includes balancing the impacts of industrial processes on the biophysical world. Policy in this area of experimentation would recognise how such transformation of value-creation processes could reconfigure social and cultural relationships, both inside a rural community and between it and communities elsewhere. Such manufacturing could also further draw on cultural manufacturing, building on local, artisanal and heritage crafts to preserve the sense of belonging and attachment to the region in a way that can also contribute positively to economic output.

New technology is not an answer in itself to rural liveability challenges. While a concern for unequal access to technological advances is merited in policy making, these advances should be invited and steered as much as possible by local communities themselves. This is important because technologies change culture: the affordances they provide and how they are integrated into daily life become part of a community's lifeways and imagined futures. Technologies can reconfigure practices, costumes and traditions. Discussions about equal access to advanced manufacturing technologies invite the question of whether technologies designed in urban areas are best suited to rural communities.

Table 5.10. Redefine the target beneficiaries of rural value-creation processes

General questions	• What would rural manufacturing be like if production was able to balance local needs with external ones? • How do you address the mismatch between local manufacturing needs and external manufacturing demands over the long term? What kinds of policies would correspond more to the former than the latter? • What forms of platforms for learning (e.g. innovation environment) and relationship building should rural communities in a region foster to enable them to address local needs inspired by innovations in other communities?		
Type of rural area	Non-metropolitan close to a medium-sized city	Non- metropolitan close to a small city	Non- metropolitan remote
Considerations	Production of items jointly with nearby cities to build on the well-being aspects and opportunities from the two types of regions and from regional linkages.	Building on historical manufacturing or forming innovation hubs for disruptive ideas for local community needs.	Production of locally sourced items that aid in the notable challenges of service delivery from accessibility perspectives. Further use of digital tools.
Case study example: Arezzo, Italy (NMR-M)	A region with, among other things, superior traditional know-how in gold jewellery and textiles that has the opportunity to embrace innovations whilst maintaining current links. Embracing innovations can strengthen the value-added of outputs and increase even further links between neighbouring regions. Linking together Inner Area Strategies (aimed at noting the nuances between different types of rural areas to aid rural well-being) to industrial strategies more definitively could simultaneously bring economic and wider well-being developments. Utilising local agricultural output for biogas meets local needs for energy and provides circular economy benefits.		

Note: Geographical typology refers to OECD TL3 typology defining metropolitan (large MR-L and medium MR-M) and non-metropolitan regions (near a large city NMR-M, near a small city NMR-S and rural region NMR-R), for further details see Box 2.1.

Explore the convergence and interdependence of global and local as a source of ambition and inspiration

Manufacturing is commonly understood as producing outputs for use in larger supply chains in service to the global economy. This view fosters competition among rural communities to attract foreign direct investment and manufacturing facilities for large multinational companies. With a plethora of often

unaffordable financial incentives, a race to the bottom often ensues, even when co-operation and collaboration across rural regions can produce more strategic advantages. Framing participation in economic activity as plugging into a suitable place in international supply chains targets value production for exterior actors – both in terms of the produced materials exported and the revenues received. It often does little to consider the underlying value and benefits to the local economy. Whilst one option is to produce goods further along the value chains in which they are already integrated, the other relates to pivoting to new sectors and supply chains. Deciding which option to take should consider the inherent value of each option to the local stakeholders.

Experiments targeting the interplay between global and local scales could expose how dominant models may be "unfit for purpose" and motivate the search for alternatives. The complexity of trading systems involves considering how various open and semi-open systems influence each other at various scales. Experiments in combining local and global perspectives while appreciating the uniqueness of every rural community can help rural communities identify projects, which would benefit them and be applicable to global challenges. Experimentation in this domain should aim to enable actions in rural communities directed toward both global and local needs simultaneously and produce solutions and innovations more specific to unique local conditions and challenges.

An underlying assumption is that innovating to produce value for and first benefit the specific local community can produce spillover innovations that may be valued and deployed by other communities. These experiments should strengthen local actors to be successful on their own terms and expect those terms to be different in each community. Frequent questioning of active frames and assumptions will be key to promoting these mindset shifts.

Table 5.11. Explore the convergence and interdependence of global and local as a source of ambition and inspiration

General questions	• How do you get decision makers to better consider the needs of rural manufacturing firms and rural communities in developing global-facing strategies and policies? In what way do each party's frames represent global and local interests? • When, and concerning which issues, would simultaneously engaging the global and local perspective serve a rural community? • What programmes would help policy makers, rural stakeholders and local actors seek inspiration for their development from both global and local perspectives? • How can locally driven innovation experiments considering global perspectives be initiated?		
Type of rural area	Non-metropolitan close to a medium-sized city	Non- metropolitan close to a small city	Non- metropolitan remote
Considerations	Participation in global value chains is already relatively easier through logistics with larger cities; thus, carefully defining which of the many options is best for the particular rural area is crucial.	Working together with other small rural areas to formulate a joint vision can increase the global reach.	Niche production in a high value-added production can deliver financial output rapidly in the area but must note the need to find a way to be resilient to external shocks and ensure production is not to the detriment of the rural area itself.
Case study example: Goriska, Slovenia (NMR-S)	The region of Goriska in Slovenia is mountainous and borders Italy to the west. Currently, its economic development strategy targets a very large number of industries in the manufacturing sector. The region would benefit from narrowing down its options and focusing on a few strong outputs. The way in which the options can be narrowed down can be through considering which holds the most potential for producing the largest value added financially but also beyond this to the wider wellbeing. For example, if chemical production is chosen, how can it remain competitive with little impact on the environment and water supplies? The question of how this choice may cause disruptions to the local community, e.g. noise pollution, barriers for new housing due to land use for commercial purposes, must also be considered.		

Note: Geographical typology refers to OECD TL3 typology defining metropolitan (large MR-L and medium MR-M) and non-metropolitan regions (near a large city NMR-M, near a small city NMR-S and rural region NMR-R), for further details see Box 2.1.

Revitalise human relationships with nature

When manufacturing is understood as a human function within a whole ecosystem, our impacts can no longer be accepted as externalities. Human-centric development of the industrial era has located manufacturing in rural places, oftentimes to absorb negative byproducts of production. Larger tracts of available land and low-density populations made this practice attractive in the past. Additionally, societies in many OECD member states and elsewhere have self-conceptualised themselves as above or outside of nature. However, contemporary research is beginning to emphasise the need to seriously consider humans as nature: we are indeed part of our own natural ecosystems. If nature is framed as "who we are" and not as an external factor, and if we are able to reframe human activity as part of the whole ecosystem and not as separate, our impacts on other living species and our shared environment can no longer be seen as externalities of the business of production. Granted, this is easier said than done.

The realisation that we have limitations in our understanding of our relationships with the natural environment can motivate new forms of inquiry and the recognition of new forms of value. The human relationship with the rest of living nature needs a serious and profound rethink in terms of our material extractions from the planet and our contributions to natural systems. This is reflected in international triple planetary crisis – biodiversity loss, climate change and pollution and waste – declarations (Andersen, 2021[7]; UN, 2021[8]).

A revitalised relationship with the rest of nature would profoundly alter what we manufacture, for whom and how. Recent history, starting from greater environmental awareness, has taken us from what could be called an inexperienced industrialism – from before the 1970s when industrialists did not really understand the consequences of pollution (e.g. the deadly London Fog of 1952) to the present time which, in its worst cases, lead to similar outcomes: particulate pollution and climate forces conveying hazes over Delhi (India), New York (United States) and Shanghai (China) in just the last year. Companies and governments could be viewed as partaking in "compulsory" environmental rule-following, complying only just enough with environmental processes, sometimes ploughing through legal requirements and popular rebuke to make short-term gains.

A sufficient response to climate change, biodiversity loss and pollution and waste demands transformations from all of humanity. Yet, larger change requires changing ourselves first. From a large historical perspective, not "all humans" caused climate change; rather, a subset propelled industrialisation, with economic mechanisms and violent forces setting these conditions in motion (Moore, 2016[9]). Likewise, small subgroups of people can introduce new approaches for innovation, being part of nature and restoring natural habitats. Small rural community-led experiments to reduce harm caused by human production and consumption could lead to new, sustainable global patterns.

Table 5.12. Revitalise human relationships with nature

General questions	• What priorities arise for a rural community when rural manufacturing is seen as a key interface? What goals merit championing? What externalities can no longer be tolerated? • What policies should be considered to help manufacturing firms in rural communities prevent harm to natural ecosystems, extractive economics and push forward rejuvenating actions for the environment? • What would rural manufacturing firms need to consider in order to contribute to a wider systems change toward nature-centric values and effective actions to address climate change, biodiversity loss and pollution and waste?		
Type of rural area	Non-metropolitan close to a medium-sized city	Non- metropolitan close to a small city	Non- metropolitan remote
Considerations	Externalities from production and residency in nearby cities. Such rural areas could be a role model for technologies and ways of living for these places.	Considering effective land use that protects the natural and cultural heritage whilst allowing industry and population attraction.	Considering utilisation of natural resources in a circular way, such as wood. Consider externalities from existing production processes relative to new explorations, e.g. critical minerals.
Case Study example: Grossetto, Italy (NMR-S)	Grossetto is a rural coastal town in the region of Tuscany, with a less advanced manufacturing sector but hosting a few big chemical plants (sulphuric acid, titanium oxide). As they are large employers of the region, the environmental costs of the multinational enterprises have, on occasion, had to be weighed against the economic benefits they bring. Seeking further employment opportunities from the prevailing food processing sector, such as adding value through bio and organic production, can help limit the long-term environmental costs and draw on natural resources for value creation sustainably.		

Empower rural communities by supporting them in developing the skills and capabilities needed

A capabilities approach,[1] in contrast to conventional outcomes-based approaches, would focus on supporting rural communities in developing skills and having confidence-building experiences which they can use to drive local development. When a group or community gains a capability, the capability itself becomes an affordance of the local actors' situation. These capabilities may be acquired and developed by individuals or collectives. Capabilities would help rural communities see their function and role in the broader economy with new eyes.

Supported by the new policy, rural communities could decide to:

- Develop capabilities which would help them go beyond their previous approaches to development, such as learning how to convene multi-stakeholder innovation processes, shift points of view and reframe development discussions, apply alternative evaluation models, implement alternative organisational structures and develop futures literacy.
- Grow local skills and resources on site and install renewable energy systems along with their supporting infrastructure (digital, civil, power grids, service access), awareness of sustainability choices and community practices for more efficient energy and material use.
- Invest resources into knowledge-sharing platforms, raising the visibility of alternative knowledge systems and ongoing collective knowledge creation and sensemaking processes.
- Apply their new and emerging capabilities to lead their own innovation processes.

In the spirit of experimentation, rural communities should drive the process of selecting which capabilities they wish to develop and how they wish to develop them. Noting the limited resources and population in rural areas, it is a method of effective prioritisation. This approach to policy making would seek to empower local stakeholders to invent their own direction rather than prescribe it. A capabilities approach would produce new potentials for how rural places and regions can develop, as well as help them set new objectives for their own development.

Table 5.13. Empower rural communities by supporting them in developing the skills and capabilities needed

General questions	• When have alternative approaches taking into account external priorities been able to consider local conditions and foster effective engagement? • How can rural communities be supported in identifying which capabilities they wish to develop based on their own contexts, interests and priorities? What policies would enable rural communities to introduce, nurture and apply new capabilities? • What types of policy cycle is appropriate to a given rural community to drive a capabilities approach and enable local initiative and empowerment?		
Type of rural area	Rural community close to a medium-sized city	Rural community close to a small city	Remote rural community
Special considerations	There exists a larger population to build and train with a wide range of diverse capacity. Therein exists the ability to identify and make use of knowledge base in urban area.	Whilst often traditional manufacturing skills are abundant, a redirection to wider skills with a focus on re-education may help attraction in the long term. This can, for example, identify infrastructure challenges that exist for the chosen industries.	Smaller populations could require greater selectivity in which capability to grow. Longer-term objectives may be to expand and/or prepare for even fewer resources in the future.
Case study example: Germany	Germany's GRW is a collaborative measure between the federal government and federal states where financing for this instrument is shared equally. The programme's recent reforms have increased the emphasis on further advancing the climate and environmental transformation. Based on the new co-ordination framework, it will be easier for businesses wanting to invest in projects to accelerate the transformation to a climate-neutral and sustainable economy to receive support. How each rural region then takes advantage of this requires local capability. For example, for a region where hydrogen – the current national objective – may not be suitable/sufficient, to develop scalable renewable energy systems capabilities to site and install wind energy systems. Systems thinking would be obviously needed, as would skills in addressing the hydrogen vision. Capabilities for installing and supporting infrastructure (digital, civil, mobility, power grids) would also be helpful, as would capabilities for education and learning.		

Initiate multi-perspective futures conversations in many rural places

It would be beneficial for groups working on rural development to allow more time for investigating their assumptions about the future when engaging in their specific challenges. When given time and structures for expressing and discussing the many futures they imagine, they are then able to reframe and play with these futures to produce new realisations and insights.

By seeing a situation or topic through a wide variety of imagined futures, the perception of potential for transformation can widen, providing fertile ground for growing new ideas about "what to do now", in addition to enabling the perception of the potential for transformation and inviting a practical sense of agency in stakeholders and local actors. The opportunity should be offered to actors from all sectors and hierarchical levels to include a full range of perspectives.

To support this experimentation, policy-making processes should be designed to systematically integrate opportunities to introduce, develop and apply futures literacy. These integration points for applying futures literacy could take several forms. Futures are implicitly part of most policy-making conversations and explicating these futures in real time, spontaneously reframing imagined futures to see what else becomes apparent about a challenge area or being aware of how foresight interventions rely on the participants' anticipatory systems would be beneficial. Designing workshops, questionnaires, etc., to diversify how many of these systems are in play can raise awareness of their presence. Whenever possible, futures sessions could be organised with local hosts in rural regions and communities, with diverse stakeholders at the early stages of a policy-making process.

These futures conversations would simultaneously contribute to outcomes such as immediately useful insights and long-term capability development. By enacting processes of generating, describing, discussing and playing with imagined futures for a variety of purposes, through a wide range of processes, groups of local actors and multi-location stakeholders can launch or continue their own futures literacy learning journeys. This capability, in turn, can serve as a community or rural network resource which can be accessed and utilised as needed, however they wish.

Table 5.14. Initiate multi-perspective futures conversations in many rural places

General questions	• When and in what contexts do rural communities discuss the future and share their ideas about it? What additional approaches are they interested in? • What experiments or events could be launched to help regions expand and diversify their approaches to imagining the future as well as their purposes for imagining it? • What could happen if many rural places become capable of discussing futures, not only to plan and co-ordinate together but to also practice skills for appreciating novelty and making sense of new ideas and phenomena?		
Type of rural area	Non-metropolitan close to a medium-sized city	Non- metropolitan close to a small city	Non- metropolitan remote
Special considerations	Ensuring the consideration of the rural areas' future aligns with that of the metropolitan area to avoid future conflict.	Considering how regional visions and strategies align, not just with national visions but also with neighbouring regions.	Taking lessons and regular conversations also from rural remote areas outside of the immediate country where similar regions are limited.
Case study example: *Territoire d'industrie* programme, France	The *Territoire d'industrie* programme in France has set one of the best foundations for futures conversations at the rural and regional levels. The programme that aims to strengthen the dynamics of reindustrialisation already notes that industrial policy should be supplemented by supporting local development and the initiatives of elected officials and industrialists as closely as possible to the challenges of each. Thus, workshops, conferences and opportunities that exist in this network could highly benefit from futures activities in each of the regions to fully identify the situations at play and outcomes that may arise in the future. These can provide both immediately useful insights and long-term capability development.		

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Note

[1] For more about the capabilities approach, see Human Development and Capabilities Approach Association, https://hd-ca.org/ (accessed 9 September 2022).

Annex 5.A. Methodology of Future Literary Lab

What are Future Literacy Labs and its theoretical basis

The substantial contents of this chapter were produced via a Futures Literacy Lab, a type of research intervention in the form of a workshop which aims to simultaneously help participants learn about the capability called futures literacy, exchange and express ideas about the future and develop new insights about a topic. The lab was held on 11 July 2022 with 25 participants, who are experts or policy makers working in rural development.

Background

Futures Literacy Labs have been developed as a cross-disciplinary academic area and theoretical discussions are taking place in the context of futures studies. Riel Miller led a team at the United Nations Educational, Scientific and Cultural Organization (UNESCO) from 2012 to 2022, which formed and orchestrated a network of UNESCO chairs in futures literacy and anticipation as well as other researchers, educators and foresight practitioners to develop the futures literacy approach. In relation to other foresight intervention formats, Futures Literacy Labs are rather new on the scene. Yet, at least 100 of these have been conducted worldwide in more than 35 nations. This workshop format has demonstrated itself to be a highly effective and efficient way to help participants imagine the future in a wider variety of ways, become aware of their own assumptions about the future and generate new insights about a topic of mutual concern.

Theoretical basis of this methodology

A Futures Literacy Lab is distinctive from some other forms of foresight intervention in that it emphasises knowing something about the futures people are imagining now versus knowing something about what will happen in the future. Its assumptions about what can be known and how to know it are informed more by interpretivist-subjectivist accounts of the world versus empirical-objectivist accounts. However, the workshop encourages participants to engage in the process with whichever ways of knowing they are most accustomed to.

Recognition of both the diversity and powerful roles played by human anticipatory systems and processes is rather recent (Miller and Sandford, 2018[10]). Research into the different reasons, methods and contexts for imagining the future has demonstrated that both perception and choice turn on the selection of anticipatory systems and processes (ASP). This is because ASP determines the kind of future imagined and different kinds of future significantly alter what is perceptible, what is deemed important and the emotions, such as hope and fear, that are associated with different images of the future. Cutting-edge social science is allowing researchers and policy makers to better understand the novel dimensions of present phenomena like a global pandemic, climate extinction and societal fragmentation.

The ability to incorporate time, in one way or another, into biological functioning is a universal characteristic of all living organisms (Rosen, 2005[11]). For humans, conscious anticipation depends on our ability to imagine that which does not exist: the inevitably fictional, imaginary future.

Anticipatory assumptions "are what enable people to describe imaginary futures" and are produced by ASP (Miller, 2018[2]). The structure of a Futures Literacy Lab provides opportunities for participants to deploy distinctive forms of ASP, which can be broadly separated into two kinds: anticipation for future and anticipation for emergence. The methodological reason for engaging multiple ASP is to make explicit

anticipatory assumptions so participants can use them to recognise their own framings of the topic, engage in discussing these and expand their perception of the potential for transformation in the present.

Analytical approach

The outcomes of a lab are typically analysed in three moments. The first is inside the lab, via steps designed to invite participants to reflect on their experiences and generate new insights in real time. The second is after the lab, in a debriefing session with facilitators aimed at producing a first synthesis of the insights produced by participants as well as interpretations and sensemaking of other aspects of the lab. The third moment of analysis is in writing an account of the lab such as this one. In all of these sites of analysis, great attention is paid to understanding the meanings expressed by the participants and interpreting them in relation to the original interests of the host, larger discussions in the broader context and the growing body of knowledge concerning how people and groups use futures. On this last point, anticipation research and the futures literacy framework are often deployed to comprehend how specific ideas moved through the lab as topics, themes, futures and value.

Description of workshop scenarios – Probable and desirable

Probable 2042: Mixed self-sufficiency and dependency; and Desirable 2042: Rural innovation advantage

Probable scenario snapshot 2042: Mixed self-sufficiency and dependency

In this scenario, rural populations in the Global North have increased thanks to political support for it. Economically, collaborations with big cities are only a memory. Meanwhile, economic transitions for rural places from the East are well-known and people are asking why they cannot have the same successes in the West. Memories of economic collaborations with large cities are discussed and those collaborations are unfamiliar with how economic interactions between rural places and cities happen today. Remarkably, many rural places which have historically relied on food imports to feed their populations are now self-sufficient for the first time – a leading example is Newfoundland, the island province of Canada. An eighth (15%) of worldwide rural gross domestic product (GDP) is from bespoke production and services. Education in rural places has not kept up with developing needs and there is a shortage of skilled workers in these communities. Meanwhile, birth rates have mysteriously increased in remote rural places and questions are rising about how to provide services for these new people. Technology developed elsewhere feels like it is taking over rural systems. A benefit, however, is an abundance of solar panel installations, which provide shade to crops and are substantial enough in their capacity to power manufacturing. Another external impact to the global north as Newfoundland. The last coke-fired steel plant closes, which bodes well for the environment of its neighbouring rural community. Many rural places have suffered severe damages from extreme climate change events, which are perceived as unexpected even though science has forecast they would happen in increasing strength and frequency for decades: these include heat domes, wildfires, floods, coastal erosion, etc., bringing shocking devastation after shocking devastation.

Desirable scenario snapshot 2042: Rural advantages for innovation

Political systems have emphasised the empowerment of rural communities and many policies and resources have been in place specifically addressed to rural areas. These choices have had an impact. Economically, more than half of the Fortune 500 no longer have physical headquarters, which has led to a higher number of remote workers in rural places. These remote workers bring their income and spending habits to local economies. According to Eurosurvey, for the first time in its history, the vast majority of people are happy because they can live where they want and thrive. In North America, rural communities are winning attractiveness rankings: for example, CBC News declared Newfoundland the most desirable place to live in Canada for 2042. Rural places have been faster in adapting and advancing innovations,

and experts are asking, "How can we help cities catch up in disruptive innovation?". Rural communities are connected by a high-speed transportation network, supporting an efficient exchange of people, ideas and materials. However, the true rural edge in its innovation processes is its "slow innovation" approach and capacity to imagine. The rural places first learned that "solving hard problems requires slack". Rural places have also become key sites of cultural production, resulting in 10% of worldwide creative intellectual property originating from these communities.

Probable 2042: Deadly politics, fiery heat waves, urban/rural conflict; and Desirable 2042: Effective, prosperous, happiness and tradition-rich

Probable scenario snapshot 2042: Deadly politics, fiery heat waves, urban/rural conflict

This future is politically volatile. Another virus outbreak, killing many, is blamed on the intensive farming practices in the European Union. Meanwhile, armed conflicts between rural and urban populations, as are their death counts, are on the rise. Economically, new modes of food production are on the rise. Cell factories producing lab-grown meat have overtaken abattoirs (slaughterhouses) for meat production. Displaced companies reached 90% of total production in Europe. Economic inequality between rural places has increased over 20 years. Socially, levels of clinical depression are high as isolation and teleworking are the standard mode of work. One bright spot for rural places is a recent study showing people from rural places living, on average, three years longer than those in urban ones. In world news, Africa and Europe have achieved zero hunger. Technological developments have led to increased urban farming, flying car infrastructure and a rural dependence on satellites for Internet connectivity. Rural communities are blaming urban farms for a trend of increasingly useless antibiotics. Flying cars, like the road-based ones before them, have suffered a long track record of fatal crashes but, thanks to some recent advancements, the number of accidents is finally decreasing. Internet outages are common in rural places due to occasional collapses of satellites. Extreme temperatures due to climate change are causing record crop losses. Fires continue to degrade the natural amenities of rural places. Worldwide efforts to address climate change have resulted in more full-grown trees in rural areas, which are beautiful but can catch fire in high heat.

Desirable scenario snapshot 2042: Effective, prosperous, happiness and tradition-rich

A monumental worldwide political success was achieved: rewilding targets were surpassed in all nations. Political decisions and policies have encouraged skilled labour and youth to move en masse to rural regions in search of "jobs of the future". This economic impact comes through in other differences between rural and urban: it is now more common for rural regions to subsidise urban areas than the opposite. One sector driving this change is rurally located carbon sinks. Carbon absorption outweighs emissions for the first time in 2042 and rural household earnings are boosted due to the strong performance of local carbon sinks on the carbon markets. Rural areas are connected with the circular economy, which is standard now across Global North nations. Things are going well socially, according to statistical rankings. New indicators for measuring rural happiness have been introduced. In 2042, a remote rural place earned the coveted top spot in the OECD "highest well-being" rankings. Global health outcomes have measurably improved. Many technologies have finally arrived in rural places: for example, rural mobility is now fully electrified. Major feats have been achieved for the environment: soil quality has recovered on a global scale, ozone depletion has been stopped and there has been zero pollution for a decade (since 2032). There are no more floating islands of plastic in the ocean: humans succeeded in cleaning up the final one. Throughout these changes, rural places have managed to maintain and preserve traditions, which contribute to their attractiveness to young people. Many outdoor concerts and festivals took place in rural areas as well.

Probable 2042: Depopulated, expensive and disaster-prone; and Desirable 2042: Circular, green, self-sufficient lifelong learners

Probable scenario snapshot 2042: Depopulated, expensive and disaster-prone

Political systems have given more power to rural populations. The national government was forced to resign after an economic shock, the latest economic crisis of a long series, starting with the COVID-19 pandemic in 2020 followed by the Russia-Ukraine war and all that followed in the next two decades. Despite this, there is demand from the markets for "anything but fossil fuels", making the battery factories typically sited in rural places desperate for skilled workers. Even with workers, a lack of raw materials (even more extensive than the car chip shortages of 2021-22) has put a halt to production. Dependence on 3rd party countries introduces vulnerability. A bright spot in the economy is that a new species of fish has been successfully commercialised, opening up at least some jobs near where it can be farmed. Input costs continue to increase for the manufacturing sector. All of this causes increased costs for consumers. People are moving to cities because they can find better work there, further depopulating rural areas. In response, the town of Finnmark is running campaigns to attract new residents. Technologies are being deployed to make rural places more attractive; for instance, several remote areas have established full-speed Internet access. Technological breakthroughs are frequently in the news. Rural places are seeing biodiversity loss up close: fewer species of wildlife are seen. Natural disasters are also frequent. A storm shut down the Internet connection for a factory, disrupting its productivity. Culture has changed significantly as remote work has become common practice: indeed, many rural inhabitants work from home for companies located far away.

Desirable scenario snapshot 2042: Circular, green, self-sufficient lifelong learners

This desirable future includes a fully functional circular economy. Demographically, in-migration over the last 20 years stabilised the forecast population decreases of 2022. In fact, new statistics show more people are moving to remote areas than earlier expected and some places are responding by "preparing for population booms". Society is also healthier: a greater number of people can access an increasing range of health services. There is a stress-free feeling in the community thanks to shorter working weeks and working hours. A lower need for workers due to artificial intelligence (AI) makes these reduced hours possible. Technology breakthroughs are common in small villages and there are new technologies that do not demand customer relations management. Furthermore, deploying renewable energies has allowed some small nations like Slovenia to stop using fossil fuels. Several natural restoration projects started in the 2020s have successfully rewilded part of the landscape. Meanwhile, overall pressures on natural ecosystems in Canada are decreasing with higher efficiency business processes. Some spices that were thought to have gone extinct in the 2030s have reappeared, renewing interest in some older popular recipes. Croatians are preparing to celebrate the two-year anniversary of their nation's water sources being found to be 100% drinkable. Culturally, green and self-sufficient living is the norm and there is widespread interest in "back to nature" ways of life. Lifelong learning is also mainstream, with 80% of rural populations in all regions continuing their education throughout their working life. Stories of innovative teaching practices spread quickly, such as that of a municipality inviting pensioners to teach, leading to a rise in entrepreneurship.

Probable 2042: Hungry, poor and can't get around; and Desirable 2042: Youth flock to the rural lifestyle
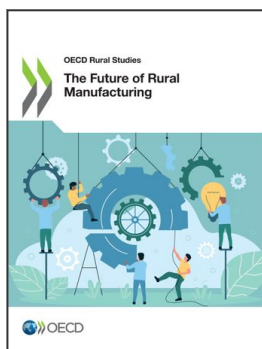
Probable scenario snapshot 2042: Hungry, poor and can't get around

Despite many targeted policies regarding rural areas, the latter face a diversity crisis. The unemployment figures in these areas are rising due to increasing automation. The lack of agricultural labour causes shortages of food, locally and afar. In-person social interaction is difficult due to aggravated transport difficulties; however, technological breakthroughs have been announced which would enable spatial

linkages. A better circular economy is active in many places, leading to positive impacts on the environment. The desire for a more nature-connected life encourages people to move away from cities.

Desirable scenario snapshot 2042: Youth flock to the rural lifestyle

Many are migrating to rural areas: these incomers value the lifestyle, characterised by self-sufficiency in terms of energy and food. Rural areas lead the way in terms of climate resilience. Ageing population trends have slowed down. Education access is excellent and 20 new rural schools opened this year, as well as a data science training institute for rural children. There are technological advanced areas featuring automation in the countryside and new technology brings new jobs. There are also zero-waste areas. Globally, carbon dioxide (CO_2) emissions absorbed by forest mass have doubled. Perhaps due to this reforestation, remote places are particularly attractive to incomers.