






From Centralisation to Decentralisation? Transition Visions of Circular Bioeconomy in Rural Finland

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INTRODUCTION

Fossil metabolism is the primary cause of the majority of the escalating sustainability problems that humanity is currently facing. Fossil energy is fuelling climate change and the accelerating pace of resource use, which have led to transgression of most of the planetary boundaries (Richardson et al., 2023). At the same time, the fossil economy has created a steep division between the urban and the rural, with rural areas serving as

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providers of resources, labour, ecosystem services and recreational spaces to be consumed by the growing urban class (LeVasseur et al., 2021). Indeed, the increasing prominence of urbanisation and the concurrent marginalisation of the rural should be seen as the result of centralising tendencies arising due to fossil-fuelled, neoliberal capitalism.

The fossil economy needs to be replaced by more sustainable sources of energy, materials and modes of social organising in order to return to the limits of planetary boundaries. Circular bioeconomy (CBE; D'Amato et al., 2019; Stegmann et al., 2020), referring to the frugal exploitation of bio-based resources and the application of cascading principles, offers an alternative, plausibly more sustainable, metabolic basis for the economic system. As the metabolic nature of the fossil economy and CBE are fundamentally different, the transition from the fossil-fuelled economy towards a CBE implies a radical metabolic shift. Such a metabolic shift is likely to entail the spatial processes of social organising, thus offering possibilities for rescaling the decidedly centralising tendencies of fossil metabolism (see also Becker & Naumann, Chapter 10).

The potential for rescaling brought by the transition from the fossil economy to a CBE is relevant from the point of view of rural areas. Fossil metabolism builds on a centralised metabolic model, in which energy sources are derived from unevenly located pointwise sites of extraction: fields (oil and natural gas) and mines (coal). By contrast, the materials and energy utilised in a CBE are more evenly distributed, which makes its material foundations decentralised in nature. Consequently, metabolic transitions hold the potential for transformation in terms of scaling down and localising not only the material reality of social systems but also the institutions and power relations that govern these systems (Castán Broto, 2016; Heinberg, 2015; Kuhmonen & Kuhmonen, 2023). These relations extend from geopolitics to the ownership of critical resources and the distribution of value within supply chains as well as welfare (Heinberg, 2015; Tynkkynen, 2023; Urry, 2014).

The CBE transition can thus change the spatial relations of many societal activities as well as shake the contemporary power relations that are cemented within fossil metabolism. This potential shift opens up important avenues of exploration from the point of view of rural and peripheral areas and actors (Clausen & Rudolph, 2020). However, even though rural actors have direct access to many of the critical resources necessary for a CBE, it is unclear whether they have the capacity to act on the possibilities offered by the CBE transition. Furthermore, the way many

of the transition processes are currently unfolding seems to deepen rather than counteract the prevailing trends that ensure the success of urban agglomerates and marginalise rural and peripheral areas (Golubchikov & O’Sullivan, 2020). As argued by Albrecht and Klein (Chapter 2), the potential for rescaling a sustainable bioeconomy transition exists, yet the process is facing much friction that is likely to reinforce a centralised production structure and corporate ownership instead of more local and/or territorial forms of organisation.

Therefore, in this research, we seek to understand the processes related to a CBE transition that either maintain or challenge the centralising tendencies of contemporary social structures in Finland. More specifically, we ask what kinds of visions of a CBE would be (1) probable in terms of contemporary trends and (2) preferable from the point of view of rural areas. Such a rurally preferable future vision would enable a rurally just transition towards a CBE through promoting rural livelihoods and, more generally, rural prosperity. In this context, rural prosperity should be understood broadly; thus, instead of being confined to the frame of economic development, it should enhance the well-being and resilience of rural areas and actors (Rivera et al., 2018). To do this, we utilise futures studies’ methodologies for exploring future visions that elaborate the spatial organisation of the post-fossil economy. Futures involving human action are open in the sense that humans always have some latitude for choice (Bell, 1997). This means that despite tendencies towards one way or another, the spatial organisation of the metabolic shift is not predetermined. Therefore, analysing the prospective transition pathways can contribute to societal envisioning about normatively desirable future states.

To explore the transition processes from the point of view of rural areas and livelihoods, we analyse the prospective visions of spatial organisation in a number of CBE manifestations. Our empirical context is Finland, a high-income industrialised country in Northern Europe characterised by a steep urban–rural divide. We selected 10 cases that are relevant for both the post-fossil transition and rural livelihoods and that should scale up or fundamentally transform along the metabolic shift. The cases relate to food, energy and forest-based resources (for forest sector and rural development, see also Halonen & Lundmark, Chapter 12). We operationalise the structure of alternative future states for a CBE in relation to two dimensions: centralised vs. decentralised structure and non-local vs. local ownership and governance.

CENTRALISATION, DECENTRALISATION AND SUSTAINABILITY TRANSITIONS

Rural and peripheral areas have so far received only negligible interest in transition studies (Häyrynen & Hämeenaho, 2020; Isaksson & Hagbert, 2020; Sareen & Shokrgozar, 2022). Much of the existing research on rural areas in sustainability transitions concerns energy transitions (Clausen & Rudolph, 2020; Golubchikov & O’Sullivan, 2020; Klanićki et al., 2020). Many studies have observed that rural areas host promising niche-level manifestations of the post-fossil economy (Hansen & Koenen, 2015; Trahan & Hess, 2022). However, whether the rural actors can host rapidly growing, extensive, novel and in part strongly reformed (e.g. non-fossil-based farming) systems is a question that has not been widely discussed. Indeed, ample examples exist in which rural areas have not been able to exploit the window of opportunity offered by sustainability transitions due to factors such as political underrepresentation, the absence of economic agglomeration advantages and backward technologies and practices (Golubnikov & O’Sullivan, 2020). Rural areas are facing a contradictory situation in which “there is a general discrepancy of scale: while international recommendations predominantly draw on small-scale RE (Renewable Energy) cases to justify RD (Rural Development) possibilities, the current political desire is for large-scale developments” (Clausen & Rudolph, 2020, p. 7). Thus, rural areas are clearly facing the risk of becoming not only spatial peripheries but also resource and energy peripheries (Tirado-Herrero & Fuller, 2021).

At the same time, while transition processes are expectedly geographically uneven (Carr & Affolderbach, 2014; Coenen et al., 2012), they also have the potential to shake the power constellations of contemporary societal structures (Avelino & Rotmans, 2009; Brisbois, 2020; Truffer et al., 2015). Many scholars have suggested that the diversity and multiplicity of spaces should have a more visible role in transition studies (e.g. Hansen & Koenen, 2015; Munro, 2019; Murphy, 2015). The elements, patterns, rhythms and ploys of transitions are likely to take different manifestations in different kinds of places due to the variability of resources, capabilities, infrastructure and production and consumption activities (Binz et al., 2020; Golubnikov & O’Sullivan, 2020). As long as the ploy of the future is not fixed or foreseeable, there is a new “struggle surface” (Carr & Affolderbach, 2014, p. 568): what might be sustainable in one context might not be sustainable in another. Furthermore, what is

considered sustainable may differ between the locals and the non-locals, and the sustainable solutions offered by local initiatives may be resisted by the mainstream or incumbent actors (Carr & Affolderbach, 2014; Eaton et al., 2014). Different actors have different views of the future, and societal discourses may reproduce peripheralisation or provide new narratives for rural agency (Phillips & Dickie, 2014; Willet, 2020). For example, within the Finnish forest-based sector, a variety of conflicting views about the CBE transition coexist among the involved societal actors. Some of these views highlight the potential for a transformative shift of centre–periphery relations, while others align with the reproduction of the status quo (Halonen et al., 2022; Näyhä, 2019).

The calls for just sustainability transitions in rural areas give floor to alternative storylines about how to implement transition policy in an inclusive way (also Connelly et al., Chapter 8): if and when the sustainability transition is a must for all societies, the costs and benefits incurred by it should be allocated on a just basis (e.g. Wieliczko et al., 2021). How the benefits and costs of the transition processes are distributed is affected by the models of ownership and governance. Questions of ownership are linked to questions of rural livelihoods as well as political power (Brisbois, 2020; Scoones, 2009). While rural communities might be struggling to receive benefits from, for example, renewable energy projects that operate at broad spatial scales, local modes of ownership could offer a means for increasing the income streams directed to rural areas (Munday et al., 2011). Roesler (2019) argues that local modes of ownership and governance, such as bioenergy cooperatives, “improve local value creation and strengthen local enterprises” (p. 273). For these reasons, attending to the nature of transition processes, which either strengthen rural livelihoods or deepen the process of peripheralisation, requires attention not only to the process of centralisation vs. decentralisation but also to questions of local vs. non-local ownership and governance.

Finnish rural actors are intrigued by the CBE transition as a means to improve their livelihood opportunities (Halonen et al., 2022). However, to date, the evidence about the implications of CBE and low-carbon transitions for rural areas indicates that both the discourses and practices related to such transitions seem to perpetuate rather than reverse the process of peripheralisation and the marginalisation of rurality. Low-carbon energy transitions entail “ownership by large financial actors, decision-making at high levels away from citizen interests and agency, and infrastructural arrangements suited to maintaining centralised control”

(Sareen & Shokrgozar, 2022, p. 1). Many transition processes in fact risk hindering rather than boosting opportunities for rural livelihoods. For example, the dietary shift towards plant-based foods has been estimated to reduce rather than increase the scope of rural livelihoods (Huan-Niemi et al., 2020; Lehtonen et al., 2022). Eversberg et al. (2023) argue that bioeconomy discourses are deliberately used to sustain the status quo and, at the same time, perpetuate the process whereby the role of the rural diminishes as one of resource providers.

DATA AND METHODS

In this study, we utilised the futures studies methodology to understand how the CBE transition can either bolster rural viability, empowerment, positive development patterns and livelihoods or reproduce the process of marginalisation and peripheralisation of rural areas. In doing so, we were looking for the probable and preferable visions (Dator, 1993; Schirrmeister & Warnke, 2013) regarding the manifestations of the post-fossil economy. While the probable future entails the continuation of current development patterns, the preferable future is a normatively defined vision, which, in this case, means maximising the well-being and livelihood opportunities of rural areas and actors. We did not focus on static categories, such as rural/urban and periphery/centre, but instead aimed to capture the development patterns in which rural areas become more dependent on centres and, at the same time, more disconnected from them, as Fischer-Tahir and Naumann (2013) describe the process of peripheralisation.

We chose 10 manifestations of CBE that should scale up and/or grow in importance with the metabolic shift and that have relevance for rural areas. We then asked expert interviewees to anticipate both probable and preferable futures for these manifestations. Preferable futures were defined as improving the livelihood opportunities and income streams of rural areas. Studying the visions that CBE experts hold in this kind of facilitated procedure can reveal insights into the unfolding transition processes and the position of rural areas in them. The studied CBE manifestations represented agriculture and the food system, the energy system and the forest-based sector (Table 6.1).

To capture the rural relevance of the diversity of the possible future visions, we operationalised the possible future states for each of the cases in relation to two dimensions: centralised vs. decentralised structure and

Table 6.1 The study cases by system

<i>Case</i>	<i>System</i>
Energy supply of rural premises Wind energy Biogas	Energy
Nutrients in agriculture Alternative protein sources Domestic fish Biofibres	Food and agriculture
Non-wood forest products Forest ownership Wood construction	Forests

local vs. non-local ownership and governance (Fig. 6.1). This strategy produced a four-cell matrix, *a vision map*, which was then adapted for each case to observe its specific features (Table 6.2). This adaptation was based on relevant literature as well as the authors' knowledge of the cases. Thus, the future visions of the cases in similar quadrants were not direct matches of each other; rather, they reflected the specific features and characteristics of each case as a manifestation of the CBE transition.

We conducted 60 interviews with professionals who have expertise in the cases, representing (1) businesses, (2) administration and governance, (3) research and development organisations and (4) advocacy groups. For each case, six interviews were conducted, with the exception of biofibres (five interviews) and energy supply of rural premises (seven interviews). The interviewees were selected based on a matrix, in which each type of expertise was represented in each case by one or two experts. We pursued a regionally balanced mix of interviewees. The interviews were conducted via a remote connection between June 2021 and February 2022. Of the interviews, 59 were conducted in Finnish and one in English. The interviews lasted between 60 and 90 minutes. The interviews were recorded, and during the interviews, notes were written down on Google Jamboard, which was also used to share the vision map depicted in Fig. 6.1.

The interviewees were first primed with a short general description of the transition towards a CBE. They were then asked about the *most probable* organisation of the case in accordance with the vision map as depicted in Fig. 6.1 and as specified for each case in Table 6.2, assuming the continuation of current development trends. After this, the interviewees were asked to identify the *most preferable* arrangement from the

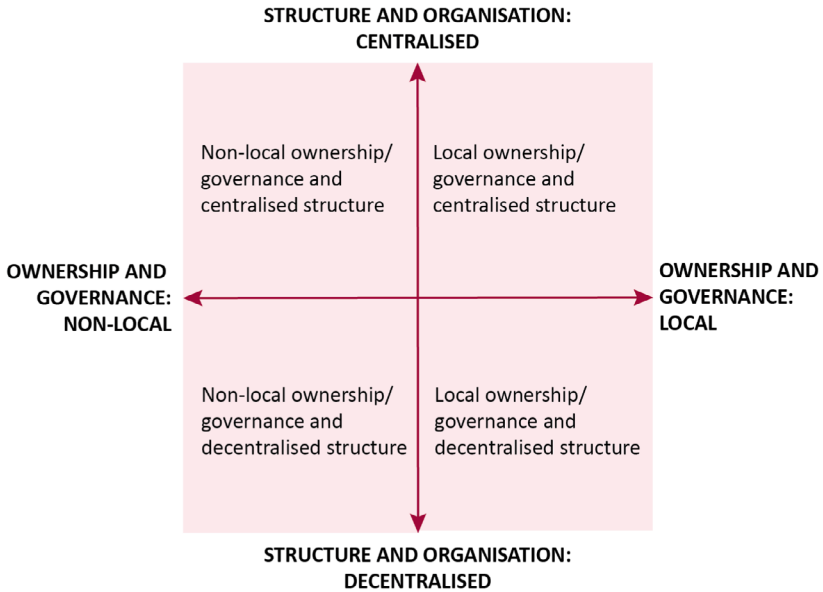


Fig. 6.1 Vision map with four alternative future visions: centralised vs. decentralised structure and local vs. non-local ownership and governance

perspective of rural areas in Finland, in which the vitality of rural areas was to be maximised in terms of livelihoods and income.

The interviewees were asked to place both the probable and the preferable visions in the vision map. In the analysis, percentages were counted for each quadrant of the vision map: (1) for each interview, (2) for the probable and preferable future visions separately and (3) for each case on average. If the probable or preferable future vision was seen to reside in only one quadrant of the map, it was assigned a 100% compatibility for this interviewee. If the probable or preferable future consisted of several quadrants, the percentages were assigned accordingly, with the total amounting to 100%. Notes regarding the nature of the probable and preferable future visions were also documented.

Table 6.2 Vision map adapted for each CBE case

<i>Case</i>	<i>Non-local & decentralised</i>	<i>Local & decentralised</i>	<i>Non-local & centralised</i>	<i>Local & centralised</i>
1. Energy supply of rural premises	Decentralised energy supply serving the national grid	Local energy communities, estate-specific energy production, local energy networks	Centralised energy supply serving the national grid	Energy supply organised by local firms and communities, local energy networks
2. Wind energy	National grid, many owners and producers of wind energy	Local energy networks, estate-specific energy production, prosumer wind energy	National grid, large-scale wind farms owned by a few firms	Local energy networks, locally owned large wind farms
3. Biogas	Networks of biogas plants owned by large companies	Many village- and farm-based biogas plants	Central plants owned by towns and large companies	Regional central plants
4. The nutrient economy in agriculture	Diversified production, many specialised operators in nutrient businesses	Diversified production, local agroecological symbioses, manure, legumes	Specialised production, nutrient businesses operated by a few large companies	Specialised production, nutrient businesses operated by local actors
5. Alternative protein sources	Decentralised production, high value added, protein-rich food components and food products	Decentralised production, low value added, legumes etc	<i>Food without agriculture</i> , laboratory food	Production units for mushrooms, insects, etc
6. Domestic fish	Fish farms owned by large companies, hired fishers	Diversified fishing for domestic purposes, professional fishers and fish farming	Large fish farms owned by large companies and hired fishers	A few professional fishers and large fish farms
7. Biofibres	Diversified fibre production, centralised processing in large plants	Diversified fibre production, small-scale processing	Production of a few selected fibres, centralised processing in large plants	Production of a few small-scale processing fibres,

(continued)

Table 6.2 (continued)

<i>Case</i>	<i>Non-local & decentralised</i>	<i>Local & decentralised</i>	<i>Non-local & centralised</i>	<i>Local & centralised</i>
8. Non-wood forest products	Diversified harvesting and processing operated by several regional or national operators	Citizens collect a diversified harvest for domestic use and for sale	Harvesting and processing of a few cash crops operated by a few wholesale companies	Many locally owned units that buy, process, pack, store and sell products
9. Forest ownership	Non-local forest owners, urban forest owners	Diversified family forests/farms	Institutional owners: state, companies, funds	Centralised forest ownership, large forests/farms
10. Wood construction	Decentralised community structure, wooden houses built by regional or national actors	Decentralised community structure, wooden houses built by local actors	Centralised community structure, wooden houses built by regional and national actors	Centralised community structure, wooden houses built by local actors

RESULTS

Overview of the Results

The visions of the probable and preferred futures differed considerably (Figs. 6.2 and 6.3). Taking a look at the average across all 10 cases, the most probable structure of ownership and governance in the CBE manifestations was centralised and non-local (51%), followed by decentralised and non-local (22%). In other words, the interviewees anticipated that in the transition towards a CBE, 73% of the CBE manifestations would be owned and/or governed by non-local actors and that 64% would take place with a centralised structure.

This situation was in stark contrast to the most preferable *pro-rural* futures, in which the vitality of the rural areas was to be maximised upon the transition. To enable a rurally just transition towards a CBE, the most commonly cited mode of organisation in the CBE manifestations was a decentralised structure together with local ownership and governance (34%), followed by a centralised structure with local ownership (29%). As many as 62% of these rurally preferable visions of the CBE manifestations featured local ownership and governance, while 58% featured decentralised organisation.

Transition visions of CBE manifestations

The arguments that the interviewees provided for their choices of probable vs. preferable futures offered insights into why the observed CBE manifestations would or should develop in the directions mentioned above. In the case of the energy system, the probable development patterns for the energy supply of rural premises and biogas were more diversified than for wind energy. The development of *wind energy* is locked within a trajectory in which large non-local actors dominate the field due to economies of scale. While the interviewees saw the economic feasibility of this model, in the rurally preferable vision, decentralised and local modes of organisation would have more prominence through the development of estate-scale wind turbines and modes of local ownership, which would also improve the local acceptability of windmill parks. The *energy supply of rural premises* includes both electricity and heating, as a result of which there was greater variability in both the probable and preferable futures. The role of burning biomass in heating was expected to decrease, while the role of electricity in heating was expected to

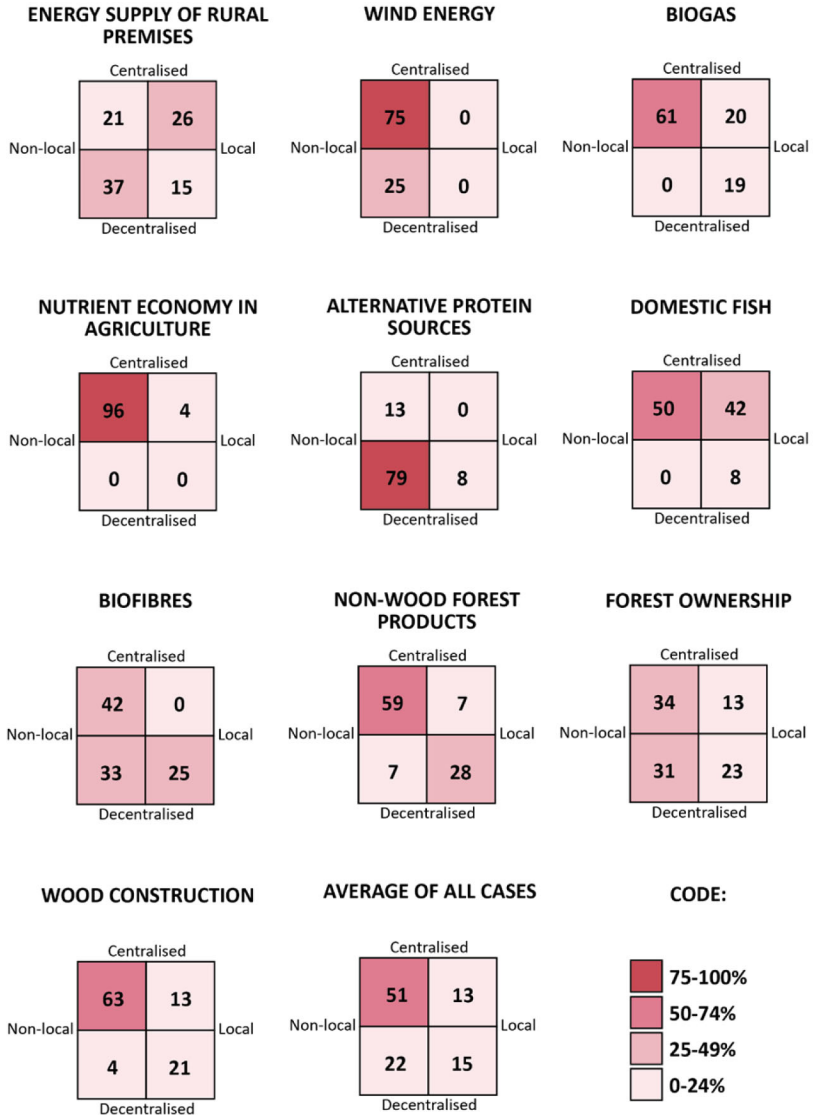


Fig. 6.2 Organisation of the visions for probable futures (%)

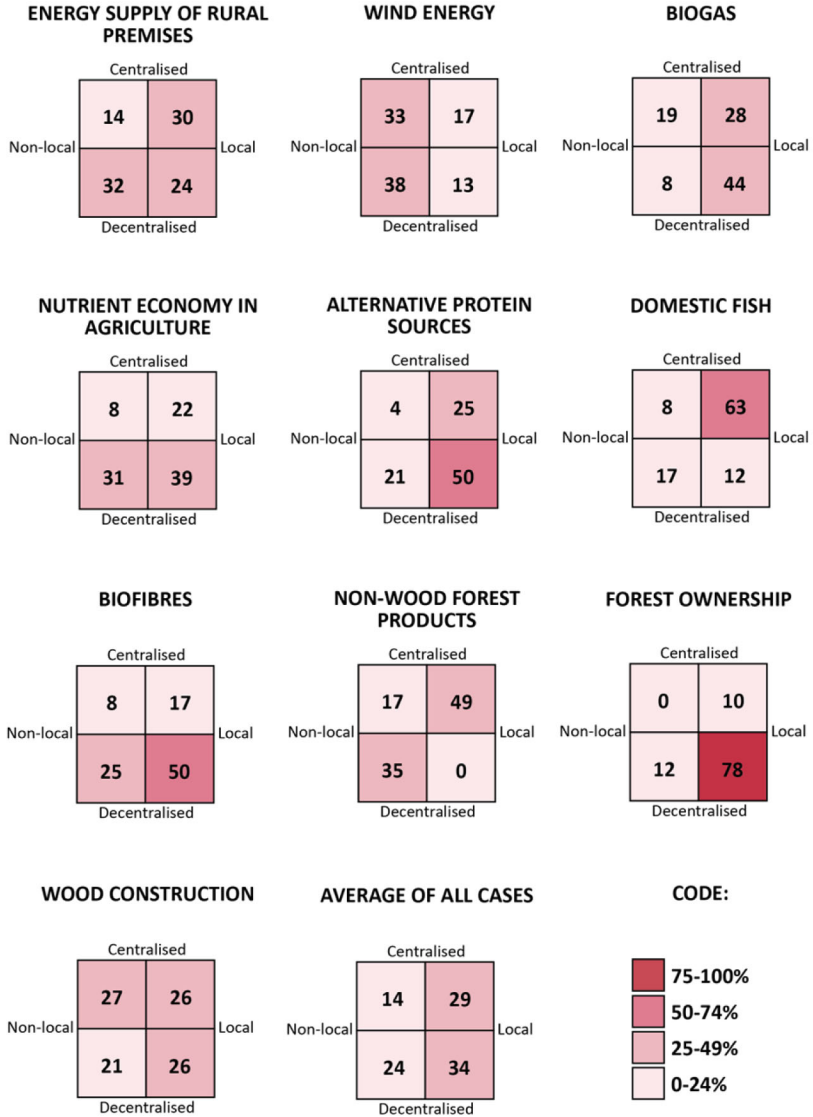


Fig. 6.3 Organisation of the visions for preferable futures for rural areas (%)

increase, although burning biomass for heating would still be prominent in rural premises. However, the transition to renewables is going to require a systemic transformation of the energy system with respect to demand elasticity, the changing role of consumers, ways of storing energy, etc. There was also a notable tension between the priorities at the EU and national levels that the interviewees identified. The EU is committed to supporting community-level renewable energy production, but at the national level, the interests of energy incumbents, which entail a centralised mode of energy production, dominate the transition discourse. Accordingly, a recurring tenet regarding the preferable future was related to democratising the Finnish energy system.

Biogas was expected to grow mainly via a centralised–non-local trajectory. This is largely due to the role of biogas production in waste management facilities, but it also reflects the ability of large non-local actors to invest in biogas plants. The preferable vision, by contrast, demands that the versatile benefits that biogas production can bring are acknowledged: as a source of energy or as a source of nutrients alone, biogas may not be the most competitive option, but its value lies exactly in its multi-dimensional sustainability and in its transformative potential in relation to the metabolic shift. Biogas production is closely related to the *nutrient economy in agriculture*, as biogas production offers a potential way to increase the efficiency of nutrient recycling instead of constantly adding nutrients from virgin deposits or nutrients manufactured with fossil fuels to the fields. The most probable vision for the nutrient economy was seen to reside in the centralised–non-local quadrant, in which production is strongly regionally specialised and the recycling of nutrients is operated by only a handful of companies. In this case, there was the strongest unanimity among the interviewees about the centralised–non-local quadrant being the most probable future vision, with 96% of the visions indicating this structure. As the strong regional segregation of agricultural production is a major cause of accumulation of nutrients and the consecutive problems with nutrient leaching and eutrophication, addressing the nutrient question within a centralised structure would require large, capital-intensive technological solutions for recycling nutrients within the food system. A more diversified model of agricultural production would, however, make it possible to utilise the synergies between various lines of production through agroecological symbioses and the integration of animal and crop production. Decentralised and diversified modes of agricultural production were also largely

seen as being more preferable by the interviewees, and only 8% of the preferable visions entailed a centralised–non-local vision, which was still deemed to be the most probable.

Production of *alternative proteins* was most likely seen to take place in the decentralised–non-local quadrant, in which the production of raw materials (e.g. legumes) is decentralised, but the upgrading takes place in large, centralised and non-local units. Such a consumption-oriented model is a natural continuum of the current consumer-led dietary shift towards more plant-based diets, in which food processing innovations play an important role. These innovations, in turn, require a large capital base for the processing equipment in factories. The preferable future, by contrast, would consist of local modes of governance in either centralised or decentralised structures. In practice, this would mean consuming more such proteins that can be produced at the farm level, as well as locally owned production units for protein alternatives such as mushrooms and insects.

An important sustainable protein source that was discussed as a case of its own is *domestic fish*, including both cultivated and wild fish. The most probable future for fish was seen to take place via centralisation, in which the number of actors does not increase or increases only moderately. The trends leading to centralisation within the value chains for fish are numerous. Fish farms are increasingly being moved to the open sea to avoid eutrophication of the coastal waters; as a result, operating them is costly and requires leaning on economies of scale. Inland fish farms, while still a new business model, require a large capital base and similar economies of scale to operate profitably (see also Albrecht & Klein, Chapter 2). Open sea fishing has already moved into the hands of foreign operators, and the number of fishers in inland waters and coastal areas of the Baltic Sea is rapidly decreasing due to various factors. These include profitability problems, problems caused by seals and cormorants, the difficulty of finding successors and difficulties in acquiring funding and accessing consumer markets. The preferable future for domestic fish would also entail more decentralised modes of organisation, enabling, for example, the profitability of fishing less-valuable fish species for food.

Biofibres entail a versatile group of fibres (e.g. hemp, linen, nettle, common reed, moss, wood-based fibres and wool) that can be used to produce textiles, packaging materials, biocomposites, animal bedding and hygienic and medical products. As the range of materials and products

is wide, their development also requires a versatile set of upscaling pathways. The most probable future was seen to be non-local and centralised, but decentralised futures were also deemed to be probable. Centralised, large-scale processing was deemed to be a fast way of detaching from unsustainable, fossil-based materials. The most often-cited preferable future was, by contrast, in the local–decentralised quadrant. The preferable future was seen to consist of utilising a very versatile set of fibres, offering possibilities for the re-industrialisation of Finnish rural areas.

Non-wood forest products entail a variety of resources growing in forests, such as berries, mushrooms, lichens, wild and semiwild plants, herbs, sap, resin, spruce tips and birch leaves. They can be either collected on the basis of everyman's rights (berries, mushrooms and herbaceous plants), or their utilisation requires permission from the landowner. Most of the companies operating within the sector are very small, but there are also a handful of large companies that operate the collection of wild berries with guest workers. Collecting berries for one's own use is also very common in Finland, but commercial collection has mostly shifted to guest workers. This setting is reflected in the most probable vision for the sector, dominated by a non-local and centralised upscaling pathway. The preferable vision, by contrast, was situated in the opposite quadrants of the structural model, indicating a preference for the stronger role of small businesses and the versatile use of non-wood forest products.

The collection of many of these non-wood forest products requires the owner's permission, and, most importantly, forest owners are the group deciding on the use of the wood harvested from forests. *Forest ownership* thus plays a central role in the transition towards a CBE. Currently, the majority of Finnish forests are privately owned by citizens, especially in the southern parts of the country. However, due to urbanisation, an increasing share of forest owners live in urban areas, geographically detached from their forests (Karppinen et al., 2020). Moreover, the proportion of institutional owners, such as funds, has been increasing rapidly (Viitala et al., 2022). Consequently, the most probable future vision for forest ownership was in the centralised–non-local quadrant, reflecting the growth of such ownership models. However, other forms of ownership were seen to persist as well. By contrast, the local–decentralised ownership model was seen as the most preferable way of organising for both rural livelihoods and multifunctional forest management.

There is a long tradition of *wood construction* in Finland, and it is regarded as an important means to promote long-lived carbon stocks

in the infrastructure. In particular, replacing buildings traditionally built from concrete with wood offers a means to increase the role of such stocks and replace carbon-intensive concrete buildings with wood. This was also regarded as the most probable scaling-up pathway for wood construction, taking place in the centralised–non-local quadrant. This mode of organisation was also thought to offer possibilities for rural livelihoods, as the manufacturing plants were anticipated to be located in rural areas, close to the raw material source. However, in the preferable future, more local and decentralised modes of organising would increase in importance, especially due to the increasing role of repair construction, conservation and the more decentralised community structure.

Summary of the Results

In summary, the most probable visions for the 10 important manifestations of the post-fossil economy were generally more centralised and non-local than the most preferable visions. The visions fostering rural vitality were more decentralised than the probable visions, especially in the cases of the nutrient economy in agriculture (70% vs. 0% decentralised) and forest ownership (90% vs. 54% decentralised; Fig. 6.4). Overall, more than half of the visions concerning the preferred futures of forest ownership, biofibres, alternative protein sources, domestic fish, biogas, the nutrient economy in agriculture, energy supply of rural premises and wood construction were based on local ownership and governance, and only wind energy (71%) and non-wood forest products (52%) were expected to be non-locally owned and organised in the preferred futures. The most striking differences between the probable and preferable visions took place in the context of the food system, in which the trends of centralisation and geographical specialisation are currently very strong.

DISCUSSION AND CONCLUSIONS

The metabolic transition from a fossil economy towards a circular bioeconomy is at the centre of the sustainability transition. Such a metabolic transition could offer new sources of livelihoods for rural areas, as the production systems would no longer operate on the logic of the linear economy, which tends to reduce the role of the rural to that of a resource periphery. However, our results concerning the CBE transition in Finland indicated that this promise is likely to remain largely unfulfilled. This

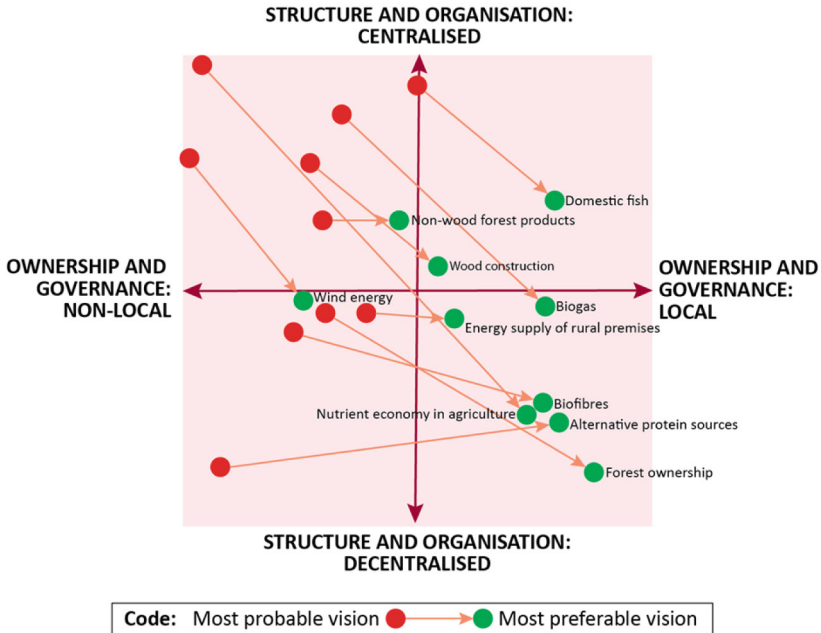


Fig. 6.4 Comparison of the most preferable and most probable visions in the 10 cases

is due to the fact that the transitions, as they are currently unfolding, are not systemic, despite being portrayed as such. Instead, they reproduce the same centralising tendencies that characterise the fossil economy. Exploring the future visions of CBE manifestations revealed that non-local ownership and governance, on the one hand, and a centralised structure, on the other hand, were perceived by the expert interviewees as the more probable vision in all 10 cases of CBE manifestations compared to local ownership and governance and a decentralised structure, which would be more preferable from the point of view of rural livelihoods.

How transitions unfold, and whether rural areas can prosper in these processes, is not simply a matter of justice, uneven development or political–normative preferences about the type of futures that should be pursued. Our results can be seen as a reflection of two underlying narratives that by and large characterise the debate over transition pathways: whether a CBE transition is best facilitated by focusing on technology,

green growth and incremental adjustments or whether there is a need to fundamentally transform the social systems and localise them on the way (Ahlqvist & Sirviö, 2019; Eversberg et al., 2023). According to the results of this study, the unfolding of the CBE transition is currently coupled with trends related to increasing returns from economies of scale, investments requiring large capital bases and increasing specialisation. These development patterns are likely to reinforce, rather than reduce, the current injustices and power imbalances between cores and peripheries. At the same time, due to their focus on economic growth and increasing intensity of resource use, these developments are not likely to lead to the economic system staying within the planetary boundaries.

The agrifood system serves as a fitting example of this discrepancy between the unfolding of transitions and the preconditions for a sustainable CBE. The contemporary trajectory of structural development within the Finnish food system is towards larger scale, concentration and specialisation (Kuhmonen, 2023). Accordingly, the CBE solutions explored here were anticipated to develop along this line by exploiting or adapting to centralised scale economies. However, a significant part of the transformative potential of CBE manifestations such as biogas, nutrient recycling and alternative protein sources is lost along such a trajectory. The focus on economies of scale and structural development can even prevent the food system from transforming from a linear model to a circular model. A food system based on the circulation of nutrients between cropping and animal husbandry systems and closer integration of energy and nutrient metabolism should be organised around agroecological symbioses that operate on a local–regional level and require a regionally diversified rather than specialised (as is currently the case) production structure (Koppelmäki et al., 2021).

Similarly, domestic fish could provide sustainable protein for human food and clearly has room for sustainable upscaling, especially on the part of commercially less-valuable and thus far underutilised fish species, such as roach. However, small-scale fisheries, in particular, are facing a vicious cycle of decline. Organising the commercial fishing of wild fish in inland waters and coastal areas according to the logic of economies of scale is an ecological and technological impossibility. Thus, the survival of the livelihoods associated with small-scale fisheries is one of the key ingredients for a just CBE transition in Finland (Salmi & Svets, 2022).

Within the energy system, small-scale, locally organised energy production is an important ingredient of energy transitions, but the vision

regarding such modes of energy supply is shady (see also Wallace & Batel, Chapter 5). Currently, the system is proceeding on a strongly centralising pathway, which seems to resist other forms of energy production, such as community energy solutions. In EU policies, community energy initiatives are believed to both contribute to the energy transition and strengthen the economies of marginalised communities, but the spreading of these initiatives is facing challenges across the EU, partly due to the lack of visions and goals guiding the policy development (Busch et al., 2021).

In the forest-based sector, the probable future visions were strongly aligned with the centralised model dominated by the incumbent forestry companies. Such a model relies on the pursuit of increasing output and economic growth, which has been enabled by the growth of the tree stock that has lasted from the 1950s up to recent years (Korhonen et al., 2021). At the same time, Finnish forests are facing conflicting demands: while the pressures for using wood are increasing, so are the demands for alternative uses of forests as carbon sinks and conservation areas of biodiversity (Takala et al., 2020). According to Majava et al. (2022), the increasing use of (wood) biomass required by the carbon-neutrality targets of the Finnish industry exceeds the limits of sustainable use of forest resources. This discrepancy was acknowledged by some of the interviewees, who pondered the possibility of sufficiency-oriented lifestyles in which forest-based livelihoods could play a role.

CBE transitions promoting rural livelihoods seem to form a connection between locally oriented production systems and an economic model aimed at sufficiency. As Rivera et al. (2018) argue, the definition of (rural) prosperity should be widened so that it is understood in broader terms than simply economic success, which seems to include the idea of indefinite growth and progress. In this way, approaching sustainability transitions from a rural lens also comes close to the need to redefine well-being on a societal level. Many of the livelihoods in rural areas are connected to the utilisation of natural resources—directly or indirectly—and the prosperity of these areas is related to income streams derived from natural resources. At the same time, the focus on economic growth, transmitted as increasing cost pressures, is pushing rural primary producers towards overexploiting these resources. If the tendencies transmitted from the societal structures offer few alternatives in terms of obtaining livelihoods in rural areas, it is difficult to break from the unsustainable trajectories (Haider et al., 2018). Thus, creating structural conditions for rural livelihoods based on natural resources to be operated profitably

without leading to environmental degradation and overexploitation is of utmost importance for a rurally just transition.

Many of the experts we interviewed are also involved in the making of the transition processes we studied here. This brings forth the question of the role of these actors as transition agents: to what extent do they see their role as aligning to a structure that is given, and how much do they perceive themselves as having the agency to change this very structure? While our results could not explicitly shed light on these questions, they highlighted the importance of elaborating on the structure–agency nexus in relation to sustainability transitions (for agency, see also Sarioego-Kluge & Morales, Chapter 3). In many of the interviews we conducted, a general sentiment could be read between the lines, in which, instead of committing to action with the intention of changing the operational environment, the experts perceived this environment as something to be adapted to. This led to the interviewees talking mostly about problems confined to the dominant paradigm, such as how to utilise the export potential of CBE products, instead of focusing on how to lead a change that could alter the domestic metabolic flows built around the fossil economy and thus create a demand for these products. It is obviously understandable and reasonable that the actors aim at operating efficiently within the choice space that they realistically perceive themselves to have, but at the same time, this leads us to ask where the potential for transformative change towards sustainability is, if not in the fields themselves.

From the point of view of rural areas, the CBE transition seems to be centralising power in the hands of the few rather than allowing a diverse set of actors to become active agents in such a societal change. Transition from the fossil economy towards a CBE does not automatically translate into improved rural livelihoods; rather, there is a risk that the rural resource periphery will prevail regardless of the nature of the resources utilised in a post-fossil economy. In other words, a rurally just transition towards a CBE would ask for radical changes in policies as well as in the distribution of power, resources and capacities. Decentralisation and downscaling of CBE manifestations could promote rural livelihoods and also work in alignment with an economic model aimed at sufficiency, thus building a CBE that is designed to operate within the planetary boundaries.

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