Transition pathways and transitions to sustainability – A critical exploration of perspectives, typologies and agendas

Discussion paper

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Summary: The perspective of transitions to sustainability seems to have almost replaced the perspective of sustainable development these days. The idea and concept of 'transition pathways' features prominently in it. Though originating from the field of systems thinking, it often tends to be approached in a rather instrumentalist way: how to make it happen. This often goes with a focus on technology and innovations. A different approach would be to focus on how to engage with related processes in appropriate ways and considering appropriate principles and values to be expressed through transition pathways. Another tendency is it to always think of transitions as something positive: "transitions to sustainability – must be good!". In this discussion paper we problematise transition pathways as concept and approach to societal change – in particular in relation to food systems – and list a series of critical reflections. As we unpack related dimensions, perspectives, and societal processes, a clear picture emerges: the need to carefully consider implications of underlying dynamics and political agendas more than researchers tend to do. We close with a number of suggestions regarding ways in which this can be done.

Keywords: Transitions, transformations, systems, pathways, sustainability

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Preface

Many projects and programmes in the field of sustainable development have become framed along the lines of the language of 'transitions' and 'transition pathways'. Initially more in the field of climate, environment, and energy, this way of framing efforts that are meant to contribute to enhanced 'sustainability' and 'resilience' has also reached the field of food systems research and interventions. Generally considered as neutral language that conveys a move from a (system) state that has problematic characteristics to a state in which those characteristics have been resolved, this discussion paper lists a series of considerations that are meant to be food for thought in deciding on appropriate ways of engaging with initiatives that are presented along the lines of transition language.

This discussion paper is an intermediate product that is meant to stir up some discussion and problematise the field of transition studies and practice with specific reference to food systems. It builds on critical approaches related to e.g. the topic of power in transitions and transition ethics such as conceptualised along the lines of 'just transitions' and describes a number of other concerns.

Others (e.g. Elzen et al., 2020) have proposed ways of understanding transitions and transition pathways that is very helpful. They take a position of defining what transitions and transition pathways are about. This discussion paper does not so much depart from a fixed perspective on how best to define transitions and transition pathways, but rather explores how it is interpreted in a variety of ways, what are related ways of structuring an understanding about this, what are relevant concerns that may play out in related change initiatives, and what lessons we may derive from this in relation to 'transition practice'.

Lelystad/Wageningen, 6 December 2021

The authors

Summary

Problem statement
'Transitions' seem to take over what we know as (sustainable) development. Although the term might suggest a more neutral stand toward sustainability by avoiding classifications such as 'underdeveloped or developed' countries, the often instrumentalist approach to transitions that is used in relation to (food) system thinking seems to overlook certain contextual complexities that we aim to address. We do so specifically in relation to the various paths transitions can take; the so called transition pathways. Here we therefore aim to address the suggested need by Berggren et al. (2015) for more fine-grained analysis and typologies of transition pathways, and of Turnheim et al.'s (2015) conclusion that we need better ways of evaluating sustainability transitions pathways.

Defining transition pathways
The concept of 'transition pathways' has become widely used in relation to significant change processes in society[1] (Farla et al. 2012). It carries connotations associated with transition, which concerns a movement from one situation/state to another, and with pathways, which concerns a demarcated trajectory that leads from situation A to situation B through a particular territory. Just as transitions are not neutral, transition pathways are not neutral either, and we found quite different ways in which authors on transition pathways conceptualise what such pathways relate to.

Typifying transition pathways
In typifying the different ways in which transition pathways are conceptualized, various approaches are helpful in providing answers to how to distinguish transition pathways. We elaborate on socio-technical transition characterisations, the Leverage Point Approach, the Theory of Modal Aspects, all of which often require thinking along a Multi-Level Perspective (MLP) of change. MLP is very helpful, but may potentially also lock-in perspectives on transition pathways exclusively within this frame, potentially limiting our thinking along different perspectives.

Pathway orientations
Hebinck et al. (2021a) present a framework and approach for this that is meant to enable reflexive evaluation and multi-actor negotiation of food systems outcomes. In Chapter 2 we complement perspectives from that article to create further opportunities for creating rich perspectives on considering what happens in different dimensions and dynamics in processes of food system transformation. The following types of pathways are distinguished, and sub pathways for each type are listed.

1) Pathways focusing on the type of **process** involved
2) Pathways focusing on particular desired **outcomes**
3) Pathways focusing on addressing particular **challenges**
4) Pathways focusing on the **potential for change** of particular options
5) Pathways focusing on **geography**

In this paper we'll first discuss several perspectives on this matter. Whether it's viewed from systematic, a social, or a process orientated viewpoint, all perspectives offer a way to create typologies of transition pathways. So the way people perceives transitions may vary, yet there is a tendency to push certain perspective more to the forefront than others. This is because contrary to transitions alone, transition pathways imply that they can be steered.

Designing transition pathways usually focusses on the search for solutions that will lead towards a desired outcome. People often use visioning-backcasting as a way to determine the steps that need to be taken to come to a certain desired future, but this approach generally lacks attention to normative

[1] "It has therefore been suggested that societies need to fundamentally restructure systems of consumption and production by initiating so-called sustainability transitions" Farla et al. 2021: 991

functions, such as societal values and principles. Yet exactly these principles and values are often at the heart of what we perceive as good, just, or equal, and therefore something to aspire.

We also encourage to be critical about the inclusiveness of transitions pathways. Transition pathways can we highly political, certain interest could be entangled or specific narratives could be excluded. This also includes being critical on the information we base ourselves on. Although often unintentionally, people usually engage in transition pathways while biased by certain convictions. De concept of 'just' transitions attempts to draw attention towards a better distribution of views by incorporating diversity and equity as key ingredients. In our fourth chapter, we also offer some propositions to engage with transition pathways on a more responsible manner.

- To embrace methodological plurality
- To approach transition pathways from a system-perspective rather than an instrumentalist perspective
- To scrutinize, organise and prioritise transition pathways (including normative factors such as principles and values)
- To emphasise strengthening food system resilience
- To also look for consistencies

Taking this into consideration we propose a framework for responsible transition (pathways) along the lines of the following dimensions:

The extent to which, simultaneously,

- the interest of the diversity of stakeholders are addressed in a satisfactory way;
- a variety of expressions of sustainability is used in considering trade-offs;
- transition processes are considered from a system-change perspective;
- resilience of relevant groups, systems, sectors is built/sustained as a result;
- key values and principles (e.g. re: collaboration, participation, 'do no harm', sovereignty, etc.) are 1) discussed and agreed as stakeholders, and 2) expressed appropriately from design through processes to outcomes;
- characteristics of responsible innovation (anticipation, reflexivity, responsiveness, inclusiveness) are applied towards a perspective on responsible transition.

1 Introduction

In recent years, the concepts 'transition', 'transition pathways' and related concepts such as 'transformation' have gained prominence in literature related to the wider field of sustainable development. Initially applied in the context of sectors such as the energy sector, more recently it has also become used in the context of food systems. Food systems describe all food related activities from production to consumption and emphasize feedback loops from the food supply chain to wider system elements such as the environment, policy – and market domains.[2] Is the application of transition thinking to food systems about new buzz words or about genuine new ways of approaching issues related to sustainability and associated aspirations such as food and nutrition security for all?

In this discussion paper, we problematise the subject of transitions to sustainability and related ideas on transition pathways with specific reference to the context of food systems. This involves asking critical questions about what is behind both the concept as such and the way in which it is being used in practice: e.g., is it actually an appropriate and helpful way of framing change processes, what does such framing do to perspectives on desired changed, and what issues that matter to stakeholders tend not to get articulated? We do so, because literature and our own experience gave rise to concerns about an alleged tendency towards an overly *instrumentalist* approach to the subject, which means a rather narrow focus on 'how to make transitions to sustainability happen?', and much less focus on how to do so in, e.g., responsible ways. We do not pretend to be complete nor do we try to set up a coherent argument, yet. Rather, this paper should be seen as a composition of critical reflections on the subject. We aim to help be alert to a variety of relevant dynamics involved in transition thinking and practice that tend to not be addressed due to that alleged *instrumentalist* approach. We hope that this will help ask better questions in the design and guidance of initiatives framed as relating to transitions and transition pathways, and that these can be realised more responsibly.

1.1 Getting acquainted with transition pathways

From 'development' to 'transitions'
What used to be called 'development' and 'development pathways' appears to have been replaced to a significant extent by 'transition', 'transformation', 'transition pathways', and, much less, 'transformation pathways'. This probably has to do with the growing popularity of transition studies and related frameworks, the increased focus on engaging with system change, and the more defined desired futures in relation to the grand challenges. The term 'sustainable development' sometimes appears to be gradually replaced by terms like 'sustainability transitions' and 'sustainability transformation'. In other words, 'development' would then be replaced by 'transition' and 'transformation'.

Speaking in terms of transitions and transformation offers a different perspective, including a different perspective of what the desired goals are. No longer is development the goal, but a certain state of 'sustainability'. And no longer do we need to think about development processes, but rather about moving towards (transition to/transform into) a situation characterised as being more sustainable. Development is often about a particular state of affairs as point of reference and focuses on a process of moving away (up) from that state. Transition is often more about taking an aspired future state as point of reference and moving towards that state.

This change of terminology likely results from an uneasy relationship to the term development. Speaking of development and associated distinctions between under-developed and developed implies classes of countries and peoples. Further, the normative assumption is that developed is good, even though in reality there are always trade-offs: economic development can have negative effects such

[2] Van Berkum et al. 2018 https://library.wur.nl/WebQuery/wurpubs/fulltext/451505

as creating more pollution. We should however remember that transition is not more of a neutral word than development, and in itself a statement that prefers to understand changing realities in a certain way over other ways. The quote in box 1 below illustrates this further.

Transition pathways

The term transition comes with the associated concept of transition pathways.

The concept of transition pathways has become widely used in relation to significant change processes in society[3] (Farla et al. 2012). It carries connotations associated with transition, which concerns a movement from one situation/state to another, and with pathways, which concerns a demarcated trajectory that leads from situation A to situation B through a particular territory. There is a whole field of transition studies, which relates to system changes in society (from one system state to another). Many still interpret its contribution in terms of problem solving (e.g. Zolfagharian et al. 2019). However, problem solving in terms of fixing a problem (project) is quite different from a problem-solving approach that engages with system change (e.g. van Mierlo and Beers, 2020). As a result, much what is framed as transitions thinking, is not much different from the old linear approach to solving problems.

Box 1: What transitions involve

"Transitions (...) being evolutionary (...) means that they are open ended, non-linear, fundamentally uncertain, and based on searching, learning, trial and error, and experimentation. Surprises and unintended outcomes are likely. Such transitions depend critically on interpretations and social acceptance. They are also conflictual and deeply political, producing trade-offs, 'winners and losers', and related struggles, as politically influential and well-resourced incumbents often resist change." (European Environmental Agency, 2018:11)

Dixon (2011) highlights an important common application of the concept of transition pathways, which is that it's about seeking "to develop well-established technological and economic scenario-building techniques by focusing on the co-evolution of actors and technological infrastructure in transition processes". And, "pathways seek not only to discover if different futures are technically and economically feasible but how such futures might plausibly be brought about by different social actors". Frantzeskaki et al. (2019) reiterate this by stating that the 18 pathways to sustainability that they list "follow scenario-specific logics because each context scenario provides differing opportunities for, and constraints to, actions".

Just as transitions are not neutral (see box 1), transition pathways are not neutral either. It means pathways involve trial and error, being political, and producing trade-offs. There are many sides to it that need to be unpacked to understand what transition pathways in specific situations may involve.

We found quite different ways in which authors of literature on transition pathways conceptualise what such pathways relate to. In a recent mapping of current thinking, research, and action on food system transitions & transformations (Wigboldus 2020) we observe a diversity of ways in which the concept of transition pathways is applied, such as in relation to multi-stakeholder pathways (Bortoletti & Lomax 2019), co-learning between transition pathways (Luederitz et al. 2017), and scaling up and out as a Pathway for Food System Transitions (Pitt & Jones 2016).

There are many roads to Rome and likewise there are many transition pathways to desired futures. In particular because there is not just one "Rome" but many different perspectives on that desired future. But also because in more-encompassing change processes, many things need to move and since they are different in nature and context, they will also be following different pathways.

In a food system transition to sustainability, market and trade related change needs will involve quite different processes than farming related change needs. Moreover, there is no such thing as one unified food system, but rather a constellation of a variety of subsystems. Therefore, an encompassing wider change process such as a food system transition will play out in different fields, and even following different types of principles, which is illustrated in figures 1.1 and 1.2.

[3] "It has therefore been suggested that societies need to fundamentally restructure systems of consumption and production by initiating so-called sustainability transitions"

A system perspective also includes perspectives on governance of transitions, because who will ensure alignment and coherence between transition pathways? The Food and Land Use Coalition (2019) provides an illustration of such system perspective on transitions (Figure 1.1). The World Business Council for Sustainable Development further expands on such type of presentation by outlining related pathway perspectives as depicted in figure 1.2. Thereby they also attempt to illustrate different change arenas and the dynamics involved.

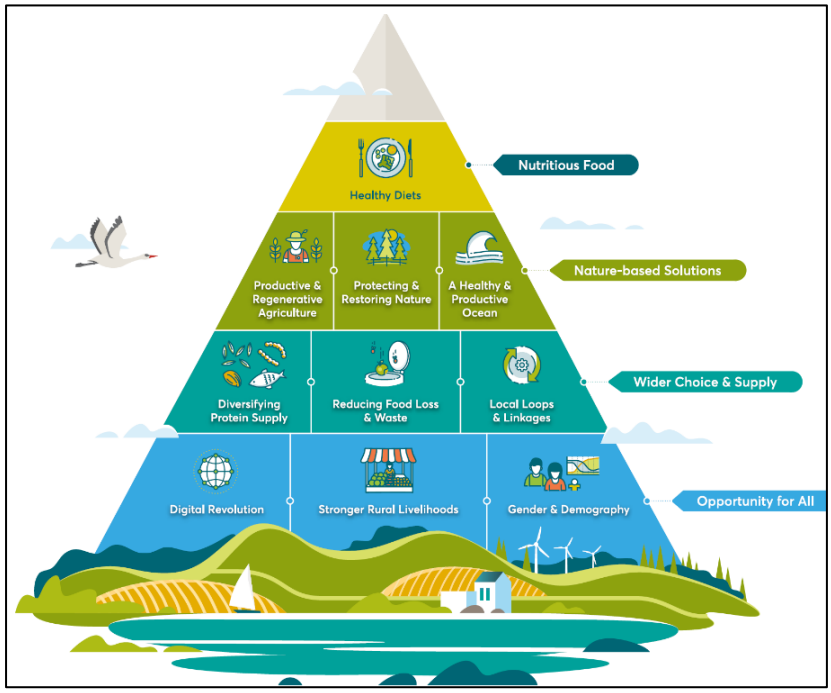


Figure 1.1 *Illustrating an integrated perspective on a viariety of pathways contribution to a common goal – the case of healthy diets. Source: The Food and Land Use Coalition (2019).*

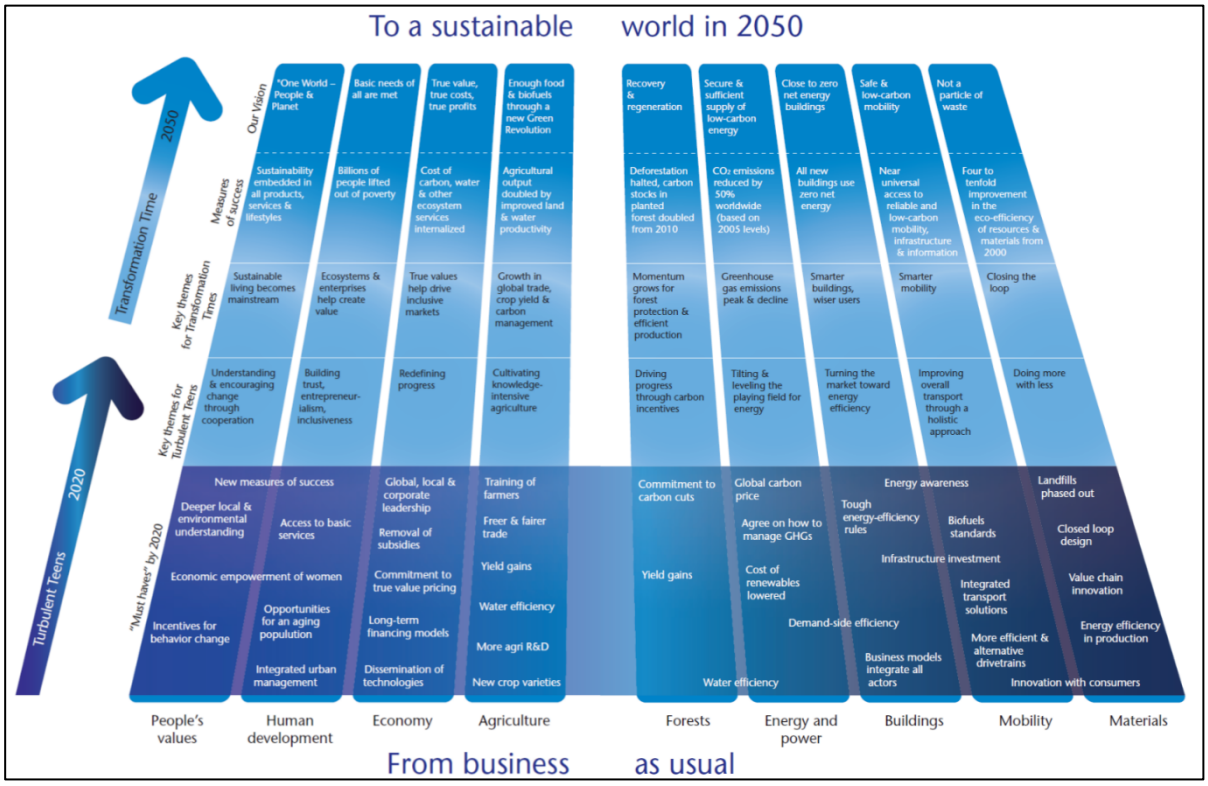


Figure 1.2 *Illustration of compound pathways. Source: The World Business Council on Sustainable Development (2010).*

This introduction illustrates what Hinrich (2014:153) already emphasised: "(...) the plural form of transitions to sustainability needs to be underscored. The implied forward movement in transition should not be taken to mean sustainability has one easy, obvious or uncontested pathway". Termeer (February 5th 2021)[4] reiterates this by stating that there is "no 'one size fits all' approach for sustainable transitions".

[4] https://www.wur.nl/en/newsarticle/No-one-size-fits-all-approach-for-sustainable-transitions.htm

The purpose of the rest of this discussion paper is to help to reflect critically and strategically on engaging with ideas and practices associated with what is framed as "transition pathways". This is not a comprehensive study, but rather presents a relatively short overview of key considerations. Other reports (e.g. European Environmental Agency, 2018) have done more extensive explorations albeit with a specific focus on particular topic and approach. We hope that our overview will help in asking appropriate questions in relation to specific initiatives which are framed along the lines of specific transition pathways.

1.2 Reading guide

Chapter 2 presents existing transition pathway characterizations, approaches, and types. Chapter three problematizes these aiming to avoid locking our thinking along currently existing transition pathway characterizations, approaches and types. Various examples are given. Chapter four, based on concerns raised in Chapter three, explores and suggests a number of ideas on ways of engaging strategically and responsibly with transition pathway perspectives. This will lead to our conclusions in Chapter five.

2 Ways of creating typologies of transition pathways

2.1 Pathway characterisations

The more one explores literature on transitions and transition pathways (selections shown in Table 1), the more it becomes clear that there are many different ways of thinking about what a transition pathway can be about. In this chapter we explore a number of frameworks that can help think in a structured way about different ways of articulating transition pathways. The purpose of this is to become more aware about the variety of ways of approaching transition pathways, and by doing so create opportunities for having better-informed discussions among actors in collaborative efforts related to what is framed as transitions to sustainability. Namely, the usefulness of outlining such typologies is that they provide more handles on understanding transition pathways as relating to underpinning theories of change (i.c. theories of transition regarding the question of 'how we think transition happens/can happen'). We thereby also aim to address the suggested need by Berggren et al. (2015) for more fine-grained analysis and typologies of transition pathways, and of Turnheim et al.'s (2015) conclusion that we need better ways of evaluating sustainability transitions pathways.

Sociotechnical transition pathway characterizations
Different transition pathways can be about different ways of engaging with change processes in society. Geels and Schot (2007) explored a number of typical sociotechnical transition pathways. They focused on variations in the depth of change as pursued through different pathways and main actors involved, namely: 1) De-alignment/re-alignment or efficiency gains oriented pathways, 2) (technological) substitution oriented pathways, 3) reconfiguration/redesign oriented pathways, and 4) transformation oriented pathways. This type of characterization of transition pathways has been further explored and presented in similar forms by other authors (e.g., Wigboldus et al. 2020a), including in relation to agroecological transition pathways (e.g., Padel et al. 2020).

Typologies of transition pathways tend to remain rather abstract. Geels and Schot (2007) comment that "(...) pathways are not deterministic" and that "the sequences of events are not automatic", and "pathways are ideal types" (:415). Therefore, Berggren et al. (2015) call for "a more fine-grained analysis of transition pathways and a more dynamic positioning of actors in the multi-level framework". In relation to this, Anton Törnberg (2021) suggests a typology along socio-political lines, distinguishing transition pathway orientation in terms of aiming for reproduction, adaptation (through repression, top-down adjustment, co-optation), de- and realignment, regime substitution, reconfiguration, and mixes of some of those orientations. These characterizations require thinking along the lines of the Multi-Level Perspective (MLP) which provides a structured perspective on interacting innovation niches, dominant system (regime) configurations, and wider context (landscape) conditions. That is indeed a very useful and therefore widely used framework, see e.g. its use for food system transformation processes (Leeuwis et al., 2021). It may however also lock-in perspectives on transition pathways within that frame of reference only.

Following are therefore other suggestions of what can be done in terms of creating typologies of transition pathways along the lines of other parameters than discussed in the above.

Critical questions as a typology framework
The first suggestion to create a typology framework is rather straightforward and non-theoretical. It is based on an exploration of relevant questions to ask in order to understand different transition pathway orientations. Answering these questions can help in characterizing different aspects of the nature of the transition pathway. Is the transition pathway about, e.g.,

- moving away from undesired characteristics in the present (e.g. loss of biodiversity)?
- moving towards desired future characteristic (e.g. climate change resilience)?
- who is driving the transition (whose pathway is it, who pays for expenses)?

- the way in which transition is meant to come about – incremental, "small wins[5], abrupt/disruptive[6]
- a focus on whose behavior needs to change as pathway (e.g. consumers, or farmers)?
- where the pathway is located (spatiality of pathway, e.g. urban context)?
- a particular paradigm guiding the transition (e.g. agroecology, or industrial agriculture)?
- a particular focus of people of topics (climate, youth, nutrition, ...)?
- a particular focus on what needs to change (e.g. reducing pesticide use, use of digital technologies, agricultural intensification, scaling up)?
- At what scale does the transition pathway play out (and how much encompassing)?
- In what time frame does the transition pathway play out (temporality of pathways)?
- How complex/ambiguous /contested are issues related to the transition pathway?
- How much system inertia is the transition pathway confronted with?
- How stable/locked-in is the dominant current regime (system state)?
- What normative frameworks are guiding the transition pathway?
- How are efforts in relation to the transition pathway governed?
- Spatiality of navigating pathways: where to start, where to focus, etc.
- Etc.

The leverage points approach

Different people and different initiatives will tend to focus on, or emphasize the role of, different ways (pathways) for engaging with transition/transformation processes. Part of this may be reason for triggering debate and contested perspectives and approaches, e.g. in relation to alleged neo-liberal agendas underpinning particular pathways. These pathways are not necessarily competitive (Luederitz et al. 2017), but can, if well aligned, be mutually supportive and enhancing. Meadows' perspective on leverage points for sustainability transformations is helpful in this (e.g. Abson et al. 2017). It illustrates how different ways of engaging with system change bring along different levels of potential for system change. Addressing underpinning paradigms which motivate decision-making, for example, has the potential of affecting a system more deeply than addressing production volumes.

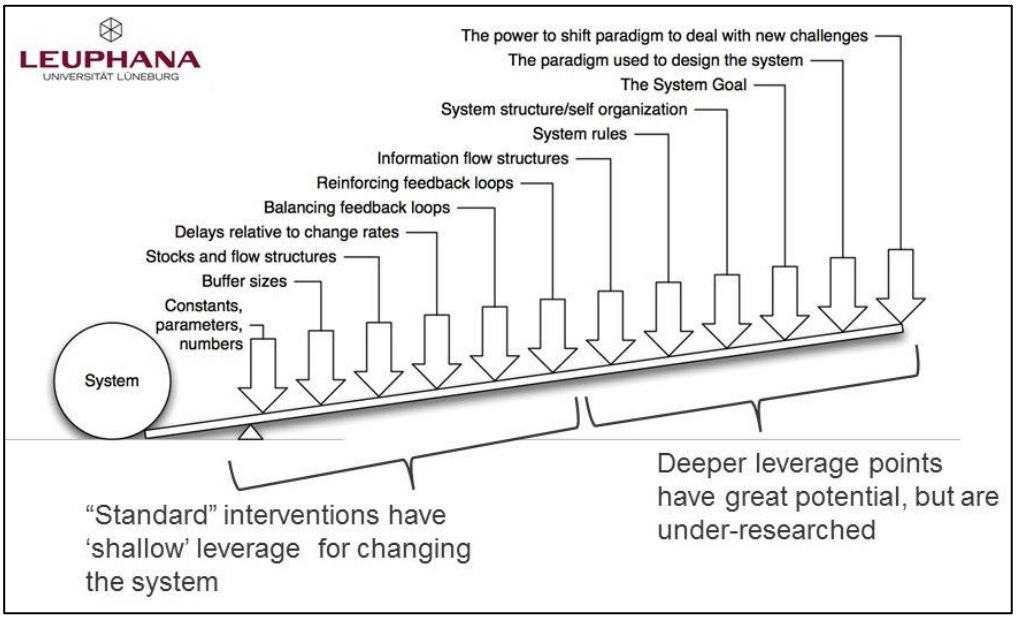


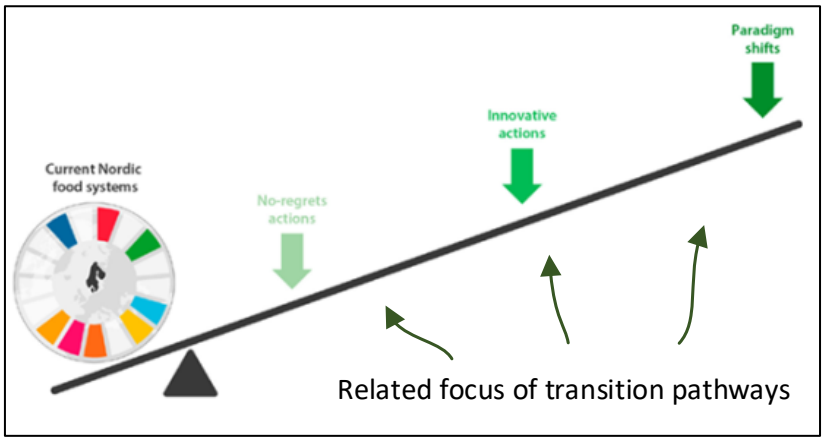
Figure 2.1 *Meadows' leverage points as presented by Leuphana University (https://leveragepoints.org/project-overview/).*

Figure 2.1 illustrates The Leverage Points approach, which offers a particular framework along the lines of which transition pathways may be distinguished.

[5] https://edepot.wur.nl/500675

[6] Along similar lines as Freeman and Perez (1988) distinguished four types of innovations: incremental, radical, system, techno-economic paradigm.

The leverage point approach is about a repertoire of options for leveraging (food) system transformations to sustainability. Deciding on what options are best choices depends on specific system and context conditions, preferences, and opportunities. The leverage points may be considered as relating to the variety of transition pathways. Each has its place and role to play if they are working in the same direction (Luederitz et al. 2017). Figure 2.2 illustrates the application of the idea of leverage points in relation to food system transitions to sustainability (from an SDG perspective)



Figuur 2.2 *Considering leverage points in relation to food system transitions to sustainability. Source: Adapted from Wood et al. 2019.*

The theory of modal aspects

Another way of thinking systematically and systemically about transition pathways is by applying the theory of modal aspects (Wigboldus and Jochemsen, 2020b). The theory of modal aspects includes a philosophical framework of fifteen aspects in which all entities function. This framework offers opportunities for developing integral assessments of the way in which these entities (including in relation to food system dimensions) function in each of these aspects. This will, in many cases, reveal how one or a few of these aspects have become the sole focus at the expense of how the entity functions in other aspects (Ibid). Table 2 shows the aspects, related basic questions to ask, food system connections, and potential dimensions in a transition pathway. We assert, based on the premises of the theory of modal aspects, that all transition pathways will function in all aspects, but differently. This perspective helps to consider implications of a particular transition pathway: e.g. it may work out positively in one aspect, but not well in another.

Table 1 *Developing systemic perspectives on strategic choices in transition pathways (adapted from Wigboldus and Jochemsen, 2020).*

Aspects	Related basic questions	Food (system) connections	Sustainability in terms of…	Potential dimensions in a transition pathways
Quantitative	How many?	Food amounts	Sufficiency	Changing numbers/amounts
Spatial	Where? How big?	Food geographies, food sovereignty area	Proportionality	Changing location, size – spatial transitions
Kinematic/ kinetic	How fast? What direction?	Food chains	Circularity	Changing speed, connection
Physical	What substance, what energy levels?	Food calories, nutrition	Energy, sustenance	Changing energy/nutrition
Biotic	Is it thriving, flourishing?	Food growth, safety, security, health	Vitality	Changing consumption patterns – e.g. ecological transitions
Sensitive/ psychic	How perceived?	Food preferences	Sensibility	Changing perceptions, attitudes
Analytical	How to make distinctions?	Food systems thinking	Validity	Changing concepts, theories
Formative	What are the ways of developing, creating?	Food production and provision	Functionality	Changing ways of production, intervention; e.g. technological transitions

Aspects	Related basic questions	Food (system) connections	Sustainability in terms of…	Potential dimensions in a transition pathways
Lingual	What are the ways of symbolising, signifying?	Food cultures, food framing	Clarity	Changing symbols and framing, cultures
Social	What social interaction/ communion?	Food democracy	Inclusiveness, equity, being a community	Changing social interactions
Economic	What are the ways of providing & managing?	Food economy	Affordability, prudence, frugality	Changing management, changing efficiencies – economic transitions
Aesthetic	What is enjoyed, cherished?	Food art, food appeal	Appeal, enjoyment	Changing recipes, food presentation
Jural	What laws, regulations and how are they applied?	Food regulations	Legality, legitimacy	Changing laws and regulations
Ethical	What is considered good?	Food justice, food equity, food ethics	Justifiability, unselfish love, righteousness,	Influencing ethical dispositions – just transitions
Pistic/ fiduciary	What are the beliefs, the values?	Food as source of trust and hope	Reliability, trust	Influencing mind-sets, paradigms – scientific revolutions/transitions

The theory of modal aspects is particularly useful in identifying reductionist approaches in transition agendas and can be used to explore trade-offs between (anticipated) positive and negative outcomes of proposed transition pathways (Wigboldus and Jochemsen, 2020). A general tendency in terms of focus of transition pathways is an over-emphasis on the formative (technology options) and economic (efficiency) aspect.

With these characterizations and approaches in mind, in the following section we explore ways in which to distinguish different transition pathways in terms of their orientation.

2.2 Pathway orientations

Pathways can be quite different in terms of their orientation, such as oriented towards the process involved, the desired outcomes, addressing particular challenges, focusing on the potential for change, or towards specific geographical locations.

In this section, we list a range of the different types of pathways. These types of pathways are then further specified by sub pathways. The exploration is further informed by another document produced by the KB motif on Transition Pathways and Integral Findings (July 2020) entitled, "Comprehensive mapping of the landscape of food system transitions/transformations related current/recent thinking, research, and action"[7].

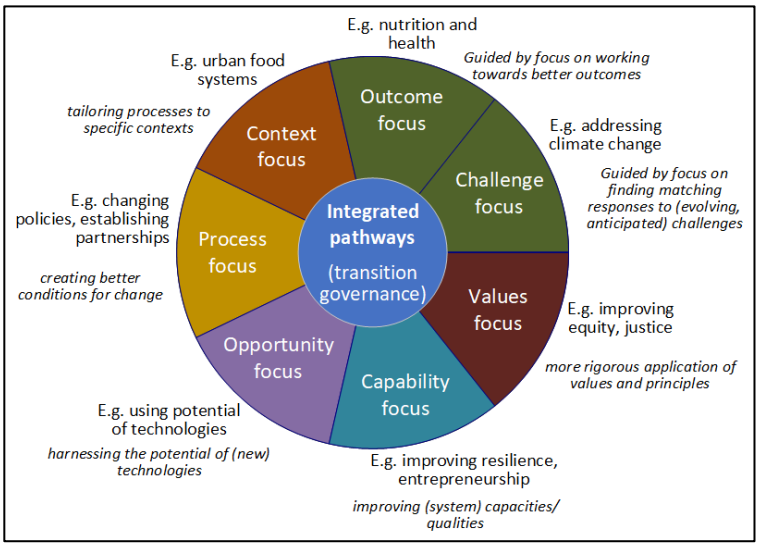


Figure 2.3 *A categorisation of transition pathways.*

[7] https://research.wur.nl/en/publications/on-food-system-transitions-amp-transformations-comprehensive-mapp

Main types of pathways

1) Pathways focusing on the type of **process** involved
2) Pathways focusing on particular desired **outcomes**
3) Pathways focusing on addressing particular **challenges**
4) Pathways focusing on the **potential for change** of particular options
5) Pathways focusing on **geography**

The following sub pathways fit with these main types of pathways:

1. Pathways focusing on the type of **process** involved. Sub pathways:

- Policy/incentives oriented pathways: (New) policies and related incentives as a contributing pathway in food system transitions/ transformations to sustainability
- Governance oriented pathways: (New) ways of governing as a contributing pathway in food system transitions/transformations to sustainability
- Partnership-building oriented pathways: (New) types of partnership and collaborations as a contributing pathway in food system transitions/transformations to sustainability. Currently, living labs as prominent transition pathway are quite popular in EU projects
- Food-energy-water nexus oriented pathways
- Research/knowledge generation oriented pathways: (New) ways of research/knowledge generation, e.g. transdisciplinary, as a contributing pathway in food system transitions/transformations to sustainability
- Advocacy oriented pathways: (New) ways if influencing (behavior, policies, etc.) as a contributing pathway in food system transitions/transformations to sustainability
- Sustainable business model development oriented pathways: (New) ways of doing business as a contributing pathway in food system transitions/transformations to sustainability
- Market conditions/access oriented pathways: Market conditions/access improvement as a contributing pathway in food system transitions/transformations to sustainability
- Disaster risk management oriented pathways
- Citizen movements oriented pathways
- Education and communication oriented pathways

Other sub pathways to the main type of pathways are:

2. Pathways focusing on desired **outcomes.** Sub pathways:

- Resilience oriented pathways: (New) ways of building resilience as a contributing pathway in food system transitions/transformations to sustainability
- Productivity oriented pathways: (New) ways of enhancing productivity as a contributing pathway in food system transitions/transformations to sustainability
- Circularity oriented pathways: (New) ways of enhancing circularity as a contributing pathway in food system transitions/transformations to sustainability
- Bio-based economy oriented pathways
- Nutrition and health oriented pathways
- Food security oriented pathways
- Food justice, food ethics, food equity orientation

3. Pathways focusing on **widely agreed challenges** to be addressed. Sub pathways:

- Climate change response oriented pathways
- Food loss/waste orientation
- Biodiversity conservation and restoration pathways

4. Pathways focusing on **potential for change** which is offered. Sub pathways:

- Innovation/technology pathways: Innovation and the introduction of new technologies (in general – see specific examples below) as a contributing pathway in food system transitions/transformations to sustainability

- Agroecological pathways: Contributing to food system transitions/transformations to sustainability through the (widespread) application of agroecological approaches (e.g. Anderson et al. 2019)
- Agricultural intensification oriented pathways:
- GMO/biotechnology oriented pathways: Contributing to food system transitions/transformations to sustainability through genetically modified organisms and/or biotechnology
- Digitalization oriented pathways:

5. Pathways focusing on **geography** (spatiality of pathway). Sub pathways:

- Urban/peri-urban
- Rural
- Local food system oriented pathways: Short chain/local food system development as a contributing pathway in food system transitions/transformations to sustainability

The above is still not an exhaustive list but rather a selection of prominent transition pathways. For example, more specific pathways such as different types of policy pathways, may be characterized. Kanger (2021) describes how choices regarding transition pathways will (need to) be informed by, amongst others, the intensity of landscape pressure, the resilience of the regime, and the maturity of what is going on in the niche.

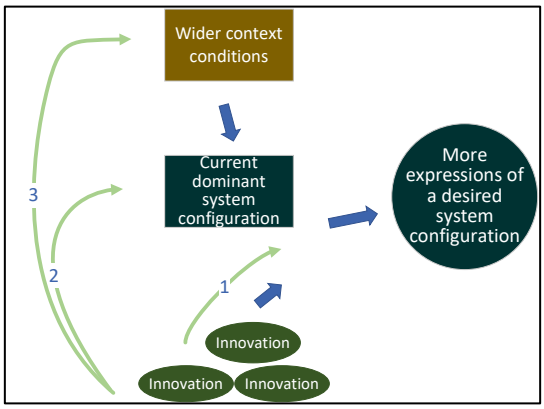


Figure 2.4 *Categorising transition pathways along the lines of the dimensions of the Multi-Level Perspective. Source: the authors.*

Relating to pathways focusing on the type of process involved, Smith (2012) illustrates how many of the above pathways can be considered on the canvas of the MLP (figure 2.4). The MLP provides a different angle on differentiating between transition pathways (figure 2.5). Both figures illustrate how transition pathways can focus on:

1. Options/innovations that become part of food system configuration (push pathways)
2. Influence current regime actors so they will ask for options/innovations (pull pathways)
3. Influence wider context so that there will be pressure on regime to support transition (pressure pathways).
4. A combination of the above

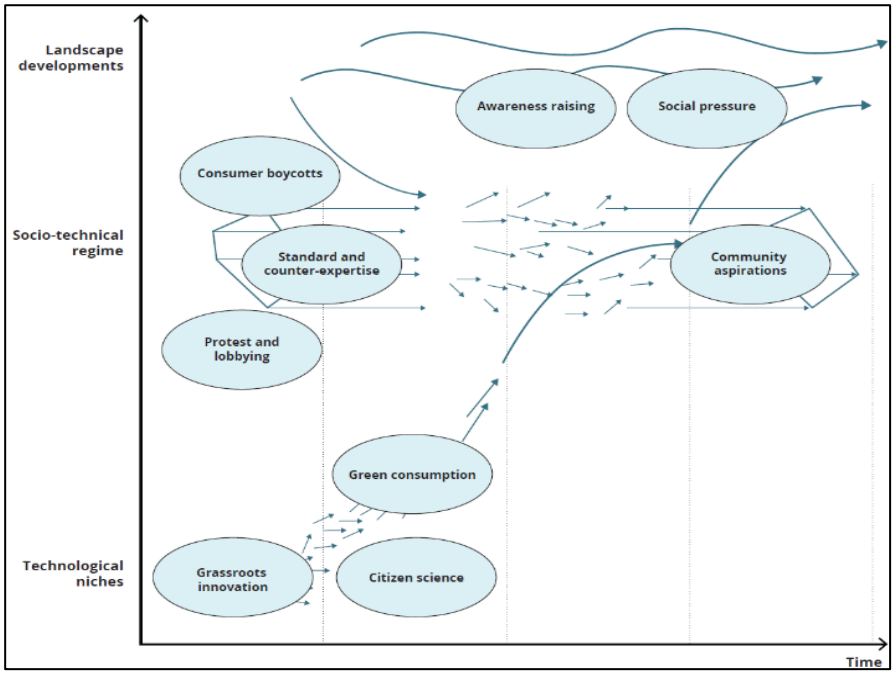


Figure 2.5 *Illustration of types of transition pathways in relation to dimensions of the Multi-level Perspective. Source: Smith, 2012, adapted in European Environmental Agency, 2018:104.*

A particular initiative may comprise several different (types of) pathways (also see Figures 1.1 and 1.2). The configuration of appropriately complementary pathways as part of a wider transition process will be needed to prevent reductionist approaches as discussed in relation to the theory of modal aspects. This requires an integral approach to transitions to sustainability (Wigboldus and Jochemsen, 2020) and not a mere juxtaposing of a series of "solutions" or silver-bullet pathways. We will discuss related complications and concerns in the next chapter.

3 Further unpacking transition pathways and critically considering related interpretations and implications

Transitions should (...) be seen as deeply political projects (requiring high-level 'political will'), as societal projects (including interactions with stakeholders and citizens to achieve support) and as cultural undertakings (requiring positive visions and discourses that create legitimacy and enthusiasm). Also the open-ended, uncertain and non-linear character of transitions should be acknowledged, with sufficient attention given to disagreements between groups about the pros and cons of different transition pathways." European Environmental Agency, 2018:67.

3.1 How we understand transitions

After having presented the transition pathway characterizations, approaches, and types, we here further unpack the concept of transition pathways more critically. Because of the available diversity of ways in which to understand pathways, this requires first to state how we understand transitions and transition pathways. We take the following as our understanding of what transitions and transition pathways are about: Transitions are about long-term evolutionary processes (EEA, 2018) that involve a shift in governance and ethical values (Bui et al. 2019), and "(...) transitions involve the co-evolution of technological innovations and social behaviors, and emerge through interactions among multiple actors, including businesses, users, scientific communities, policymakers, social movements and interest groups." (EEA, 2018:11). Adding "pathways" to this changes the focus from evolutionary to deliberate change processes that are part of particular change agendas. We therefore understand transition pathways as deliberate and planned transitions of sets of particular characteristics in/of society from one state to another which are guided by agendas. Generally speaking, these two states (before transition and after transition) are often characterized in terms of the level of 'sustainability'.

As already mentioned in our introduction, how transition pathways are understood raises many questions, including on the question of ways in which 1) agendas are decided on, and 2) how agendas are translated in to matching transition pathways, including how related decisions are made. To get more to grip on the ins and outs of what transition pathways may connect to, we will undertake a number of brief explorations of critical reflections. The purpose of this is not to be provide a comprehensive argument, but rather to present a number of topics that may inspire further discussion.

We are already on transition pathways

Transitions happen constantly and therefore we are already on particular transition pathways. Transitions also do not necessarily require a transition initiative. They are part of life and part of the evolution of societies. In other words, any initiative framed along the lines of a transition (to sustainability) will need to relate to an understanding about current effective transition pathways, their history, and their anticipated consequences. This is illustrated in Figure 3.1. Transition-related initiatives and transition pathways need to connect to such trends if they are going to enable a breaking away from a particular undesirable trend. This also connects to the topic of path dependence (e.g. Conti et al. 2021; Klitkou et al. 2014; Ong et al. 2020), which in simple terms means that it matters where a system state is coming from and where it has been.

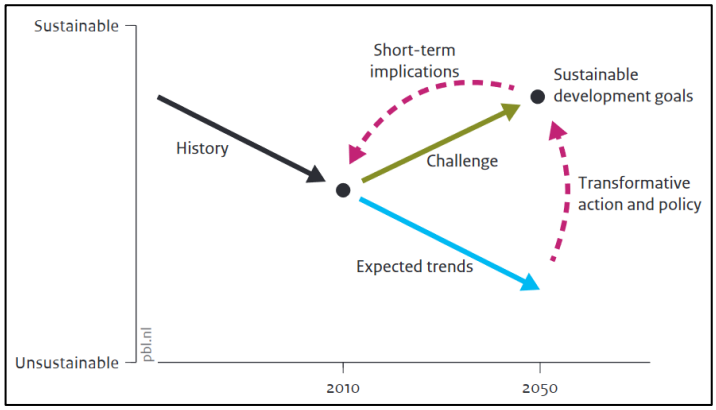


Figure 3.1 *Transition pathway as a moving away from a particular trend. Source: Van Vuuren and Kok, 2001.*

Helpful and unhelpful metaphors and analogies

It is not easy to find a metaphor that really fits transition and transition pathways, but it matters how we picture things in our mind. In transition studies, the transition of state A to state B is often pictured as in Figure 3.2: as a movement from one state (A) to another (B), etc. Inadvertently, this creates the impression that transitions are about one singular, monolithical transition. The picture is often further elaborated by showing strategies to push up the floor beneath state A, or lower the hill between the two states, to indicate how a transition may come about. We would argue that this oversimplifies the real picture of what is happening in larger societal change processes. Usually, such transitions are about changes in relation to a variety of things (Wood et al. 2019).

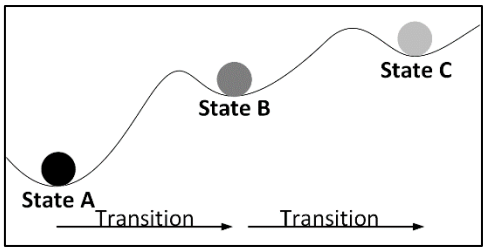
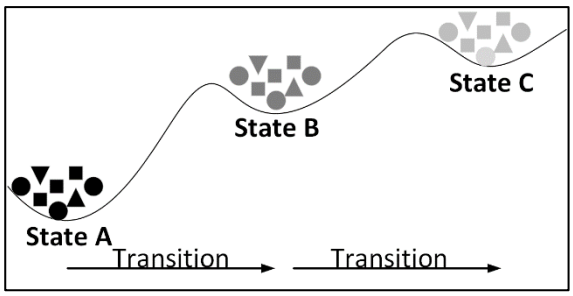


Figure 3.2 *Transition pictured as a movement from one state to another. Source: the authors.*

Figure 3.3 is an illustration of certain varieties, yet it is not articulating the related different conditions of all these different things in their move from one state to another.



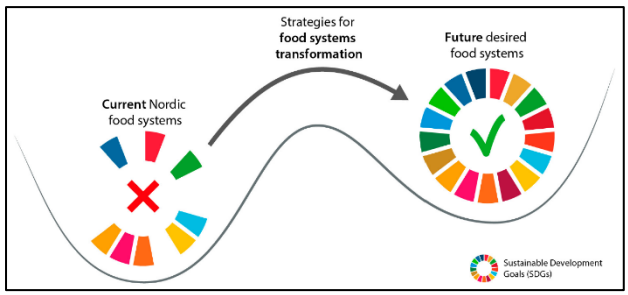


Figure 3.3 *Transitions are about a range of different things that define a certain state and many of these will be part of the transition, but each may involve a quite different transition pathway. Source: the authors (left) and Wood et al., 2019 (right).*

This may involve a variety of transition pathways in a diverse landscape, as it depicted in Figure 3.4. So then we may think of transition pathways as routes on a map, or a journey with many people following a route on a map. We already referred to Hinrich (2014) who emphasized the need to think in terms of transitions (which, we would argue, applies the same way to transition pathways) in plural. This is reiterated in the approach of Franteskaki et al. (2019) in which "(...) a total of 18 pathways were formulated across the European context scenarios, with 4–5 pathways per context scenario. They focus on governance, leadership, lifestyles, technology development and innovation as well as resources management including water, land and biodiversity. The pathways follow scenario-specific logics because each context scenario provides differing opportunities for, and constraints to, actions". In conclusion, simplistic visualizations of transitions are perhaps helpful at first but do not reflect the complexity and multiplicity of pathways that are part of transitions. How we visualize things matter.

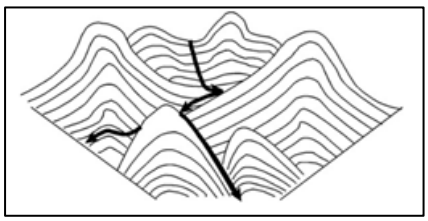


Figure 3.4 *Illustrating transition pathways as journeys through a landscape. Source: Sahal 1985.*

Context and scale level

It further matters where you are coming from, not just in terms of path dependence (historical perspective), but also in terms of the specific context to which transition processes play out. For example, different countries can be involved in an agroecological transition to sustainability. But different countries have a different history and state of affairs in that respect. In the end, the way in which agroecology is expressed in those different settings, will connect to local customs, preferences, cultural conditions, economy, etc.

Perspectives on transitions generally apply to sector and societal change. Policies will then tend to focus on general patterns and not on individual or even local cases. As a result, the consequences of transition-related interventions may be quite different between individuals and localities (i.e. across scale levels). This is another area in which trade-offs apply. Transition thinking is generally the field of the policy makers and will hence tend to adopt a top-down transition (pathways) approach. The tensions that emerge because of this, is illustrated by the example of (Dutch) farmers struggling to cope with (climate) policies that are informed by (EU) transitions thinking.

Nested and entwined transition pathways

Besides the reality of the multiplicity of transitions, we may also think of nested transitions and interconnected (constellations of) transition pathways, illustrated in Figure 3.5. Transitions and related transition pathways are related to different constellations. We may, for example, distinguish between society-wide, system-wide, and sector-wide transitions. They are different and yet connected.
There are situations in which particular initiatives (transition pathways) that are considered to be part of a wider sustainability transition, can in fact be trying to move in a different direction then the mainstream transition orientation. For example, agroecology as food system approach is contributing to a wider agriculture and food system transformation to sustainability. However, it does so with a specific focus (13 principles, Nyéléni Declaration) and agenda that is not quite aiming for what mainstream transition pathways are aiming for (e.g. Wezel et al. 2020). This creates friction. Figure 3.6 illustrates this.

Different interpretations of "transition" language

Besides diverse visualization of transitions, there are different interpretations of the concept of "transition". It is helpful to consider in relation to specific initiatives to what interpretation of "transitions" the initiatives relate to, for example:
- Rather **pragmatic**, not much different from how previously things were discussed in terms of "development";
- Used as **rhetoric** which is mainly about making political statements ("a transition is needed");
- A framing that is part of a **paradigm** along the lines of which much of societal processes are interpreted (perhaps DRIFT[8] is an example of this);

[8] https://drift.eur.nl/

- An **ideology** in the sense that it became the overarching framework for what is important in society (perhaps WEF[9] provides an example of this).

Different stakeholders may therefore have quite different things in mind when they refer to transitions (to sustainability); it is good to be aware about the fact that quite different ideas may meet at the same 'transition table'.

Transition are not fairy tales
Further exploring the terminology, the terms transition(s) and the associated term of transition pathways may not be so helpful after all. It leaves something important quite open: after the transition (pathway), then what? Obviously, it is not about a fairy tale that ends with 'and they lived happily ever after'. A transition narrative will focus on the discontinuous, but there is also the continuous. New problems will arise; even the transition processes by themselves may have given rise to new challenges. It means that a transition narrative and the way in which one engages with transition pathways needs to continuously adjust to new realities. It is not a simple roll out of a transition process after which everything is in order. Yet, some transition narratives are framed that way. If we look at the vision of the World Business Council for Sustainable Development (Figure 1.2) it was phrased as "a sustainable world in 2050". That seems to be a quite implausible state of affairs in 2050. This may be part of the problematic of replacing the concept of development by the concept of transition. It may invite mere political rhetoric.

3.2 Critically reviewing ways of engaging with transition processes

After addressing how transitions are visualized and understood, here we further critically explore various ways in which one can engage with transitions and transition pathways.

The visioning-back casting approach
A popular way of engaging with transitions is through the visioning-back casting approach: 1) discussing and outlining a vision for the future ("visioning"), and then 2) through a process of "back casting" consider what needs to happen for that vision to become reality. Because the vision needs to be indeed visionary and create a perspective on a desired future, it may be described in rather lofty terms. It puts the focus on goals and targets and achievements in relation to those, which may inadvertently support an instrumentalist approach to the transition. Perhaps the focus should be much more on principles and values to be expressed 1) in a desired future, and 2) in the process of moving towards that desired future. This means less focus on visions, goals, and targets, and more on principles and values since those can be both articulated well in relation to both the process and the outcomes. In other words, this process of visioning and then back casting may put us on the wrong track, because of its tendency of leading to an overly instrumentalist approach to transition pathways.

An alternative approach to visioning-back casting could be to agree on values, principles, and premises that stakeholders would want to see expressed and practiced more, agree on what current practices do not express this sufficiently, and how such practices can be transformed. Monitoring and evaluation would then not focus on the extent to which goals are being achieved as much as on considering to what extent values and principles are becoming better expressed in practices, relationships, etc.

Diversity, complexity and ambiguity
As EEA (2018) stated, transitions (...) are open ended, non-linear, fundamentally uncertain, often involve surprises and unintended outcomes are likely, and depend critically on interpretations and social acceptance. The term 'transition pathways', however, have the connotation of something defined and clearly identifiable. That is also the tendency of some methods applied in relation to transition studies which define characteristics of a desired future and then through 'back casting'

[9] https://www.weforum.org/agenda/2020/06/now-is-the-time-for-a-great-reset/

explore a 'roadmap' or pathways between the now and the desired future. The question is whether such methodological approaches sufficiently take into account relevant diversity, complexity and unpredictability of processes. It easily creates a perspective of malleability of societal transitions, or even of social engineering possibilities.

Furthermore, since we can distinguish a variety of food systems, one may also expect a diversity of related pathway options and opportunities (Gaitán-Cremaschi et al. 2019). It points to the need to develop options for articulating theories of change in relation to anticipated transition processes, i.e. theories of transition. Moreover, as Luederitz et al. (2017) argue, there may be many choices and approaches (and different related pathways) which not necessarily rule out each other, but rather need to start working together better. Also, how pathways playout will be context and country specific (Dengerink et al. 2020). There will be commonality in different pathways, but also differences. So, again, in the same way as Hinrich (2014) emphasized the need to think of transitions in plural, so we need to think of transition pathways in plural. And not only that, we also need to think about how different pathways relate to each other, are perhaps complementary or rather conflicting, how they may run in parallel, how they may follow up on each other in different transition phases, etc.

Normative perspectives on transitions and transition pathways

Normative perspectives on transitions are a central part of sense-making. In other words: how we experience transitions, is vital to the construction of our reality. For example: earlier we mentioned that people often experience sustainability as something inherently good, therefor they will be less tempted to question sustainable transitions. Jochemsen and Rademaker (2019) point to the need for a normative approach. Normative is about doing the right thing, which is about ethics, but more than only ethics. Key words used in relation to this are "just", and "equitable".

Box 2: About 'Just Transitions'

Just Transition is a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy. This means approaching production and consumption cycles holistically and waste-free. The transition itself must be just and equitable; redressing past harms and creating new relationships of power for the future through reparations. If the process of transition is not just, the outcome will never be. Just Transition describes both where we are going and how we get there.[10]

There is a growing movement around the concept of "just transitions" (See box 2). "Just Transitions emerged as a framework developed within the trade union movement to encompass a range of social interventions needed to secure workers' and frontline communities' jobs and livelihoods as economies shift to sustainable production" (Morena et al. 2020:1). Initially articulated in relation to environmental and climate-change concerns, it is now also explored as a framework for food system transformations (Aubert et al. 2019; Anderson et al. 2020). This includes the development of principles and criteria to guide policies and decision making (Tribaldus et al. 2021).

Even with all good intentions, the question remains: who decides what normative framework will guide transitions? Who decides on what is considered "just" or "equitable"? What is considered just, may by some be felt as restrictive or inappropriate. Maybe the most important thing is therefore to be transparent about underlying normative frameworks. If transition processes are about deeply political processes, what makes for "just transitions" will need to become a shared reference framework/shared worldview.

Science may tend to approach transitions and transition pathways in an instrumentalist way (how can it be done) and may need to find a way of landing scientific perspectives appropriately in political arenas where questions regarding transitions being just or not are increasingly considered relevant.

Pathways and way makers

Already in 2003, van Lente et al. discussed the roles of systemic intermediaries in transition processes. Kivimaa et al. (2020) further expanded on this topic by discussing ways in which such intermediaries can play a role in accelerating transitions. This relates closely to the idea of institutional entrepreneurship.

[10] https://climatejusticealliance.org/just-transition/

This calls to question the appropriateness of defining pathways as a kind of programme to follow. Perhaps more attention needs to be paid to way makers and trailblazers. People (or groups) that show the way forward by providing an example. Like pioneers. Frontrunners. Trailblazers. These may be farmers who dare to take risks and cut down the use of pesticides and improve their soils with organic matter, not because there is some project, but because they chose to follow that path. But they can also be organizations that chose to accept a lower profit margin on their products, or that chose to pay a higher price to farmers who apply certain sustainability practices.

So then the question is whether to follow in the footsteps ('foodsteps') of pioneers and consider that to be the transition pathway, or to create a grand architecture of projects that push certain propositions as the pathways that many should follow. Perhaps a combination is needed, but it is good the raise the question as to how much is done to bring forward the potential of learning from positive deviance.

The politics of transition pathways

Since "sustainability transition" has the connotation of being something positive and good, anything framed as being part of it, presented as a transition pathway, will automatically tend to get the benefit of the doubt. Then who will say that their work is not part of a sustainability transition? Nobody. Here, we can learn from what happened in the field of innovation studies. Innovations tended to have that same positive connotation of being something good and positive. Gradually, more critical reflections came to the fore, notably by Benoit Godin (2017) in relation to the idea of innovation, and through the introduction of the concept of 'responsible innovation' in relation to the practice of innovation.

Box 3: Illustrating how food system transition (pathways) is not an uncontested field

"In a briefing note released today, IPES-Food warned that the UN Food Systems Summit (UNFSS) is being used to advance a new mode of decision-making that could exclude many voices in food systems.

A small but influential group of actors has long been demanding the creation of a new panel – an 'IPCC for Food' – to streamline decisions on the future of food systems.

On the eve of the UNFSS Science Days, where the idea will be showcased, IPES-Food underlined the importance of science-based decision-making. However, the briefing note warned that the new panel – as planned – risks imposing a narrow view of science, and shutting down democratic debate.

The new panel could also undermine the High-Level Panel on Food Security and Nutrition (HLPE), which already provides scientific guidance to governments, taking into account diverse knowledge and perspectives from across the food system." (August 2021)[11]

Box 3 illustrates how certain groups in society will tend to streamline transition pathways along the lines of particular paradigms rather than to seek to benefit from diversity in knowledge and perspectives on, and approaches to food system transitions.

Transition pathways always take certain factors as a given. So they are always normative. E.g. they will consider it impossible to reduce consumption patterns and preferences. They will take certain market mechanisms as a given, etc. So one may focus on the change in the pathway, but also on what is considered to remain the same (or get even worse) in it.

[11] http://www.ipes-food.org/_img/upload/files/GovBrief.pdf

Box 4: Case: The politics of meat consumption

In the summer of 2021, Spain's consumer affairs minister, Alberto Garzón, launched a campaign inviting people to consider reducing their meat consumption for the good of their health and the planet. Although his intentions were only to get people to think about the consequences of their diets, his campaign was heavily criticized by the countries livestock sector and fellow coalition parties. In defence, Luis Planas, the minister for agriculture, fishing and food, emphasized the annual economic contribution of the farming sector, whilst prime Minister Pedro Sánchez spoke out about his personal conviction that 'a medium-rare steak is hard to beat'[12]. Both Planas and Sànches are members of the socialist party, which has strong support in some rural areas and among traditional working-class voters. Mr Grazón however, is from the left-wing Unidas Podemos, which depends on younger and urban progressive voters. Similar divides can be detected in European political debates around the reduction of meat consumption. Other examples are the Dutch labour party, opposing a suggestion for meat-taxation by arguing that 'average people should be allowed their meatball[13]', or the centrist French minister of agriculture Julien de Denormandie, accusing the mayor of Lyon of imposing 'ideological' and 'elitist' behaviour when temporarily changing to vegetarian school menus[14]. So why are these parties opposing a reduction of meat-consumption? According to a study by Sievert et al (2020), many high-income countries play a large role in the production and export of meat. Cutting down will likely have a feasible impact on their rural economies that will probably affect people that depend on industrial labour the most. However, the environmental repercussions of not changing these food systems are highly alarming. Therefore, Sievert et al. argue that research on policy efforts to reduce meat production and consumption should incorporate a better understanding of the role of power and political feasibility.

The case described in box 4 illustrates how certain political agendas, representing different interests and ideologies, are connected to how certain transition pathways enjoy preference and others do not.

Whose agendas, whose pathways – political economy of transition pathways

Following up on the above, we may also ask questions regarding 'drivers of transition', and even 'rhetoric of transition'. Who talks about transition in what way? Who is pushing for particular transition pathways? Are transition agendas market-led, government-led, civil society-led? How is the transition and the allegedly needed move on particular transition pathways framed? These questions relate to what may be called the political economy of transition pathways.

This involves particular agendas. From en exploration of foresight reports on food systems' challenges and proposed diverse pathways of change towards sustainability. Zurek et al (2021) conclude that there is limited consensus on the choice of change options and how to address potential trade-offs. But then who decides on transition pathway choices? Who are the 'winners and losers' in this? Whose normative perspectives are taken as guidance? On what basis will we decide what is appropriate, just, and helpful?

Of course, this plays out from the simplest project to the most complex societal transformation, but if we address these questions in relation to choices regarding transition pathways in the same way as we do in project, we may not do justice to the fact that implications tend to be more far-reaching in such transition processes than in more focused projects.

There are different interests involved and different power differentials. How do we take all this into account? Dominance in regimes is clearly addressed in MLP. Including the implications it may have for systems to become "locked into" a situation from which it is easy to change towards enhanced sustainability (e.g. because of vested interests of particular corporations). We argue that there is a need to consider dominance in the same way in relation to transition pathways. Transition visions can be interpreted by some stakeholders as narratives that can be co-opted ("if you cannot beat them, join them") and used as window dressing/greenwashing.

[12] https://www.theguardian.com/world/2021/jul/08/spanish-ministers-eat-less-meat-plea-meets-resistance
[13] https://www.trouw.nl/opinie/de-vleeseters-hebben-een-tandje-bijgezet~bc4d90f0/?referrer=https%3A%2F%2Fwww.google.com%2F
[14] https://www.theguardian.com/world/2021/jul/08/spanish-ministers-eat-less-meat-plea-meets-resistance

We may therefore start with an agreed perspective on a desired future in relation to, e.g., renewable energy, and then see companies start lobbying for particular "solutions" to be applied widely as pathway to that future? How big is the chance that integrated perspectives on transitions get translated into the application of simple (simplistic) "solutions". In other words, what is the chance that we effectively revert to the application of the same kind of thinking that gave rise to the very problems we are seeking to move away from through this particular transition process (Wigboldus, 2018)? We may call this the 'simplistification' of transition pathways.

Box 5 illustrates a case where a dominant pathway is pushed with limited attention to the required trade-offs, specifically to questions about who the societal and geographical winners and losers can be, and how the pathway can support local development pathways that are already being practiced.

Box 5: Case: Low-emission dairy development in East-Africa

Low-emission development (LED) for the dairy sector in East-Africa aspires win-win-win situations with higher productivity per cow, lower emissions per unit of product (L of milk) and higher incomes for cow-keepers. Environmental benefits of this 'intensification' are proven and best agricultural practices are defined, but how to realize socio-economic development remains debatable. Who the 'winners and losers' are is not addressed.

LED initiatives for dairy are a result of global environmental governance initiatives that then have to 'touch down' to national level, via regional administrative zones and diverse market structures eventually to dairy producer level. LED thereby navigates various levels and great diversity of interests, some which suit dominant transition pathways more than others. For example, producers largely operating in 'informal' instead of 'formal' milk markets are barely addressed while these are the majority of dairy producers. They are barely addressed for various reasons such as intervention design complexity, but also because of political economic interests that make 'formal' sector development a political priority over 'informal' sector development.

Research aimed to address who can be winners and losers to inform inclusive intervention design and implementation. This was done via mapping disaggregated intervention strategies responsive to observed variation in dairy production which resonate with local policy planning and capture diverse priorities. Specifically, national, regional and local stakeholder priorities were explored and embedded in LED (Yesuf et al. 2021), producer heterogeneity was typified (Kihoro et al. 2021) and intra-household dynamics were elaborated (Tavenner et al. 2018).

The research shows that LED-interventions combining intensification and commercialization into one pathway are not commensurable with local development pathways. It is argued for appreciating perspectives of local capacities to navigate climate change options and to open solution spaces for actors willing to collectively contribute to low emission outcomes in a socially inclusive manner.[15]

"cockpit-ism" and transitions

Another way of engaging with transitions is described as cockpit-ism. Hajer et al. (2015) describe cockpit-ism as "the illusion that top-down steering by governments and intergovernmental organizations alone can address global problems. (...) multiple perspectives on sustainable development are needed that respond to the various motives and logics of change of these different actors." (*ibid.*:1652). Such "cockpit-ism" may apply particularly in relation to transition narratives. For instance, we see this in current policy making in the EU. With all possibly good intentions, transition policies tend to seek to control and steer transition processes and push towards particular transition pathways.

Solutions thinking and transition pathways

There is a strong tendency to articulate options and opportunities in terms of being a "solution". This may be considered as rhetoric and part of transition politics. Once something is called a "solution", who can be against it? But a solution only becomes a solution once some particular issue in a

[15] https://www.nwo.nl/en/projects/w-08260306

particular context, for a particular stakeholder, has been dealt with in such a way that the particular issue is no longer an issue for that particular stakeholder in that particular context. Only then can we say that what was applied turned out to have been a solution. But we cannot have solutions "on the shelves", nor can we characterize anything as a solution in general as if that is a characteristic that is independent from the specifics of context, stakeholder, etc.

On top of that, as we already quoted from EEA (2018), transitions will involve trade-offs as well as 'winners and losers'. What may have been a solution for one issue, or for one stakeholder, may be problematic or worse for another issue or stakeholder.

Therefore, transition pathways, e.g., in relation to renewable energy, may be hijacked by particular interests or preferences. The more broad perspective of "renewable energy" may become replaced by particular means to this end (Figure 3.7). For example, the transition pathway may then become framed as "solar and wind energy". Even if this would be a good choice, still it would involve a different landscape of trade-offs and of 'winners and losers'. This has been discussed in more detail in relation to the topic of 'scaling innovations' before, in relation to the maxim of "find out what works and do more of the same" (Wigboldus, 2016; Wigboldus, 2018). Transition pathways may be narrowed to what was found out to work in particular contexts, for particular purposes, for particular interests and benefits, and under particular conditions. In other words, transition pathways may be narrowed to scaling particular innovations. This will undermine the application of resilience principles (sustaining diversity, flexibility, etc.).

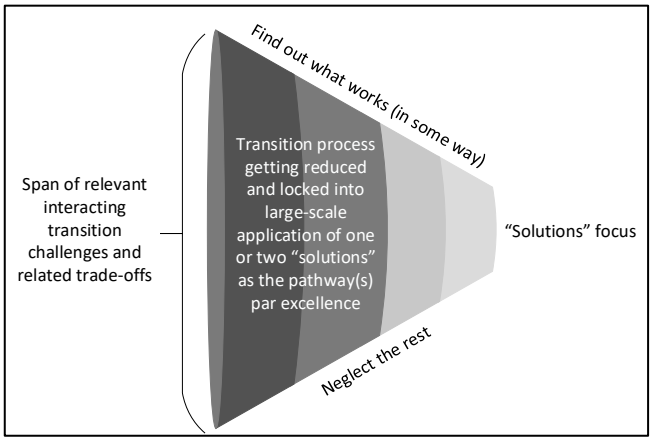


Figure 3.7 *The process of perverting transition pathways. Source: The authors.*

Scaling innovations as dominant transition pathway

Scaling innovations features prominently as a transition pathway par excellence. It relates to a fundamental approach in dominant development/transition paradigm to "find out what works, and do more of the same". This is considered to be the highway to success. Wigboldus (2018) critically reviews this approach and point to related problems such as the fact that "what works" involves many questions: what do you mean by 'works'? who says it works? where does it work? For who does it work? For what exactly does it work, etc. Target-setting can be helpful, but can also become perverse incentives for irresponsible scaling of related innovations. This leads back to the earlier note on means replacing the end. In the energy transition, massively scaling the construction of windmills and solar fields can become the primary focus for enabling the meeting of CO2-emission targets.

Yet, transition pathways often tend to be equated with "pathways to scale" of particular innovations ,often framed as "solutions" (Pitt and Jones 2016). This is a dominant transition approach. It is informed by business thinking on scaling up enterprises which is problematic when applied in relation to societal transition processes. So pathways here is an approach to achieve food system transition, not the transition itself. Adoption thinking features centrally in this approach. Widespread "adoption" of certain proposed innovations is considered to be a key transition pathway. The focus is then on particular means (often technologies).

A similar approach is framed as transition accelerators. The World Economic Forum, e.g., speaks of the role of technology innovation in accelerating food systems transformation[16]. So this is singling out particular type of pathways as highways of choice.

[16] http://www3.weforum.org/docs/WEF_Innovation_with_a_Purpose_VF-reduced.pdf

3.3 Between transition and creating more of the same

Besides concerns about the various ways in with which can be engaged with transition processes as described above, here a few concerns are raised about how different certain developments that are labelled as 'transitions' really are. Transitions typically have a tendency towards a dominant pathway. An associated risk to that are pathway lock-ins in which what is described as a transition is merely jumping from one dominant pathway to the next.

How radical is the transition?

Wigboldus et al. 2020 discuss how interpretations of sustainability transitions may range from mere optimizing existing structures and processes in relation to certain products and services, to complete system transformation, and everything in-between. Using 'transition' as a label, whether for pathways or for anything else, may easily become a greenwashing of activities that are just more of the same and have little to do with system change. For example, shifting from the use of fossil fuel to the use of renewable energies may do little to curb energy consumption or work as an incentive to use even more energy. The fundamental architecture of economies may be left untouched (e.g. Daly, 2013; Goudzwaard and de Lange, 1995; Nelson and Edwards, 2021; West et al. 2018) and the transition may stay stuck in a technological transition while it was meant to rewire the economy more deeply.

Tendency towards dominant transition pathways

There is a tendency for one particular pathway to become dominant, e.g. related to carbon emissions. Investors will look for how they can make money out of new pathways. They invest in particular pathways and will not like it when the focus would shift in different directions. Their business case is based on that particular pathway, such as making solar panels or wind turbines. As Klerkx and Rose (2020) argue, a discussion of what makes for a responsible transition pathway thereby moves to the background. Risks are that a situation can arise where the ends may justify the means, and that transition pathways are reduced to scaling certain technologies. Box 6 elaborates on a case that illustrates the rise of a certain dominant transition pathway, and how this may come with certain risks.

Box 6: Case study: The rapid rise of vertical farming

As populations keep growing and the demand for food keeps rising, sustainable land use constitutes as one of the main challenges towards creating a 'sustainable future'. A highly popular proposed solution to this wicked problem, is vertical farming. One of the main advances of vertical farming is that they are adaptive to urban spaces, reducing the environmental detriments and costs of transportation and increasing access to fresh produce all year long. There are also benefits for food safety as products are grown in controlled environments which make pesticide unnecessary. And perhaps most important, vertical farms are perceived as highly efficient, allowing crops to grow faster while using -and reusing- significantly less water in comparison to conventional farming and off course, while using less space. No wonder that vertical farms are becoming a booming business.

Large corporations like IKEA[17], or Google[18] and notorious big spenders like Amazon's CEO Jeff Bezos are currently at the financial frontline of the vertical farming market, which is estimated to reach $6.4 billion by 2023 (Wright 2018). Although these investments are crucial to accommodate high-tech innovation, they do not come without risk. First off, vertical farming needs lots of energy. Even if technological advancements could eventually reduce costs and enable fossil free power generation, access to the vertical farming market is likely to be limited to a wealthy few. Klerkx & Rose (2020) argue that "investments in agriculture having private return on investment as a primary motive instead of serving broader public goods should be a matter of concern, for it has formerly been proven that many of today's problems concerning food security can be ascribed to poor distribution rather than a lack of production, therefor it is important to be aware of concentrated ownership and control over food systems in order to safeguard food sovereignty." Secondly, vertical farming is part of a strong technocratic narrative. Not only does this exclude many people who are not able to familiarize themselves with certain technological abstractions, it also tends to exclude other ideas that might challenge current economic structures, such as the degrowth paradigm (Nelson and Edwards 2021). Without adequate challenge to the notion that high-tech innovations are the best way of solving some

[17] IKEA, David Chang and ruler of Dubai invest $40 million in AeroFarms vertical farming (inhabitat.com)
[18] GV leads $90 million investment in Bowery Farming | The Packer

of our most serious food security issues, we are left we few options if something along the path of technology might go wrong.

In other words: there is strength plurality, especially when it comes to food systems. Lastly, due to the heavy financial burden vertical farming is not something a conventional farmer can easily convert to. Plus a lot of what famers perceive as meaningful work, from seeding to harvesting to simply 'caring' for crops is done by robots, leaving peoples merely necessary at the assembly line. Taking this all into consideration, this is not to say vertical farming should not be further explored. It still holds a lot of potential, especially for highly urbanised countries with scares agricultural resources. But there is something to say for keeping an open mind towards multiple pathways, and taking the possible consequences of specific pathways in consideration.

Related to dominant transition pathways, as history has shown, some transitions and transition pathways are instrumental in mainstreaming particular agendas or approaches. Think for example about society-wide transitions such as industrialization, modernization, electrification and the green revolution (Wigboldus and Jochemsen, 2018). In these transitions, particular modes of production, transportation, communication, etc. deeply impacted on the social fabric of societies and in many ways homogenized these. It is important to realize this potential of transitions and transition pathways, and to become aware of the potential of certain (dominant) pathways to reduce diversity, and the societal implications of this.

Transition pathway lock-ins and diversity of people

The risk of pathways becoming dominant is that of pathway lock-ins, where what is labelled as a 'transition' is merely jumping from one dominant configuration to the next. If particular technologies cause problems, we usually try to solve it with new technologies. This can for example be observed in relation to Covid19: Vaccines are the (one and only) answer and if they turn out to not protect adequately or long enough, the answer is: we need more vaccines. Transition pathway lock-ins risk limited room for purposefully creating, maintaining and cherishing diversity, for example in modes of production, distribution, etc. This is because efficiency became the overarching reference. Besides related efficiency and (political) economic motivations for certain pathways, what also plays a role is that genuinely tackling those aspects that halt transitions to a more sustainable world can touch on our personal feeling of comfort.

What complicates matters is that people are different. They have different ways in which they make sense of the world (e.g. Mann 2018). And they have different ways in which they evaluate situations. Some think about transitions in terms of regaining what has been lost. Others think about transitions in terms of progressing to something new, leaving behind the old. Some want a transition to regain values lost in the past, and others want to adopt new values and do away with old values. However, this risks one type of people taking control. We may then get locked into a "getting back the old and holding onto what we have", or into a "let's leave the past and only accept what is new". Instead, we need a creative balance, or rather a creative tension between the two (Wigboldus, 2018).

Because people are so diverse, framing something as a sustainability transition pathway on food may draw in people with actually quite different visions, principles, and interests. Sometimes this may remain concealed and/or used as windows of opportunity for pushing new items on political agendas. Figure 3.8 illustrates this.

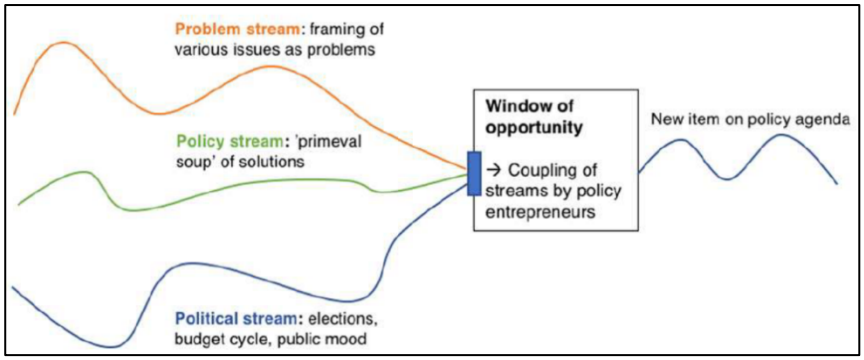


Figure 3.8 *Illustrating the idea of transition pathways as windows of opportunity. Source: Smeds and Jones 2020.*

4 Rethinking perspectives on transition pathways – some propositions

Cast your bread upon the waters, for after many days you will find it again. Divide your portion among seven, or even eight, for you do not know what disaster may befall the land. (Ecclesiastes 11:1-2)

If there were only one key take-way message it would be: make sure you are talking about the same thing before collaborating under the flag of something that is framed along the lines of transition pathways. In relation to the recent Food System Summit, we see how politically motivated ideas on pathways can be (perceived).[19] Everyone wants "sustainability", but what that means, what roads (pathways) will lead us to the aspired state of sustainability, and how we should be travelling that road (strategic principles), that is where we will be dealing with many different views and agendas. In this chapter some propositions are presented to help rethinking perspectives on transition(s) (pathways).

4.1 Suggested approaches

Based on concerns raised in previous chapters, here we build on earlier suggestions and assemble them under a few key suggested approaches to address the concerns and risks.

Need for methodological
In an older article Termeer & Dewulf (2012) argue that a variety of theoretical lenses is needed to understand transitions: "We conclude that these theories reveal additional and more varied leadership mechanisms and steering options than the overarching approach of transition management alone. Therefore, we suggest an approach of theoretical multiplicity, arguing that multiple theories need to be applied simultaneously for dealing with the complex societal sustainability issues" (*ibid.*: abstract). This expresses a need for methodological plurality. Since MLP is a rather dominant approach, a first suggestion is therefore to also consider and develop additional approaches besides MLP to minimize the risk of becoming too one-dimensional in how we approach transitions.

Challenging the methodological practice of back casting
In chapter 3.2 we discussed some issues in the common methodological approach of creating a vision as stakeholders and then through a process of backcasting devise ways of moving from the current state of affairs to those defined under the vision. We proposed a different approach which focuses more on values and principles to be expressed. We think this may actually align quite well with the approach of transitions through accumulating "Small Wins" (e.g. Bours et al. 2021; Termeer and Metze 2019; Termeer and de Wulf 2012). This perspective focuses on how small changes can cumulatively propel wider transitions. This is different from thinking about transitions as grand designs that are centrally steered and managed, and this approach provides more room for trusting emergence (of transformation) from the cumulative effects of a diversity of initiatives.

Theories of transition and transition systems
There is a lot to learn from innovation studies and work done from the perspective over (agricultural) innovation systems. We think that transition studies can learn from this and could translate relevant elements of it towards what we may call "transition systems". The same goes for the common methodological approach of articulating theories of change, theories of innovation, and theories of scaling. We may also conceptualize something like theories of transition to better articulate what exactly is meant by particular initiatives when they articulate their intentions along these lines. It would also help to create more transparency about intentions and motivations.
In similar ways, as "transitions" are now considered to provide handles on larger societal change processes, "innovation" used to be embraced as the way to address societal concerns and challenges.

[19] See IPES-FOOD

Apart from innovation typologies, there have also been developments along the lines of innovation systems thinking and responsible innovation (Stilgoe et al. 2013). Along similar lines, it is time to start thinking more in terms of transition systems and responsible transitions. Perhaps the responsible innovation characteristics of anticipation, reflexivity, responsiveness, and inclusiveness would apply, though in different ways, to what makes for responsible transitions as well. Or other, complementary, characteristics may apply.

Further areas in which to learn from innovation studies, are along the lines of innovation intermediaries. These are actors who play a bridging, intermediating, and brokering role to make more possible in innovation processes. In similar ways we may conceptualize transition intermediaries (Kiyimaa et al. 2020) as we discussed in section 3.2. Janssen et al. (2019) make an attempt to bring the world of innovation and the world of transition together when they discuss systemic innovation intermediaries driving sustainability transition developments. Another way in which innovation thinking can inform transition thinking relates to a pro-innovation bias ("innovation is good"); in the same way there may be a pro-transition bias ("transition is good"). By framing something as an innovation, it does not automatically become something good, and the same applies to framing certain change agendas as being about transition.

Organizing priorities

Hebinck et al. (2021a) wrote an article which outlines a "sustainability compass", which is about a (normative) framework to guide decisions in relation to sustainability-oriented initiatives. This idea of a sustainability compass is very useful. However, the proposed compass leaves fundamental values, principles, and premises unarticulated and the focus is more on the application side such as on budget for green financing. Strangely, when it comes to the use of the sustainability compass the authors do not see a direct use in policy implementation. This raises the question of what needs come first in terms of articulating transition pathways: to start with values, principles, and premises, and then follow with options and opportunities, or the other way around?

The common approach is to first focus on "solutions" and then only to consider ethical implications. But that may be the wrong way around. In agroecology, we often see a different approach (Anderson et al. 2020). Figure 4.1 show how stakeholder started articulating principles first and then looked at concrete options. The ideas of planetary boundaries also identifies principles (or rather: boundaries) which are to guide innovation and transition. E.g. navigating pathways in the safe and just space for humanity (Leach et al. 2013). A similar discussion may apply to questions regarding a bottom-up and top-down approach to transitions and transition pathways.

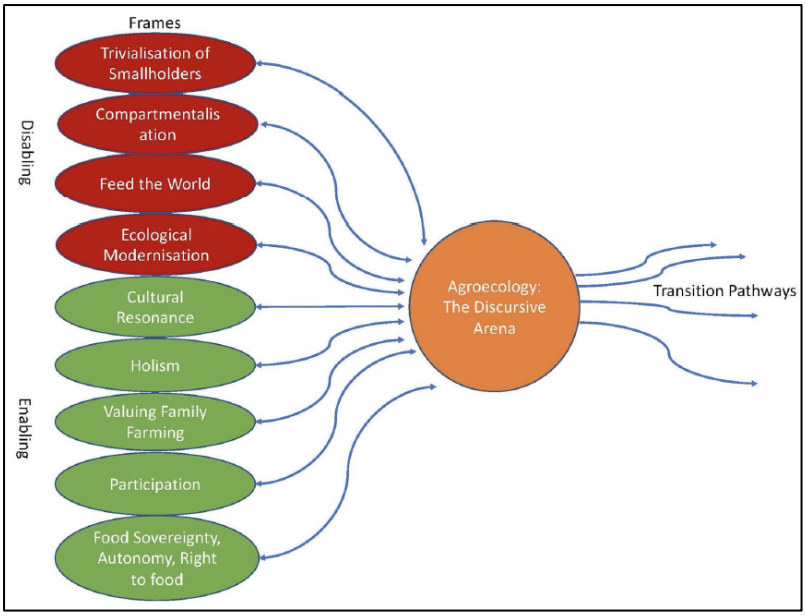


Figure 4.1 *An example of a transition approach guided by principles. Source: Anderson et al. 2020.*

Strengthening food system resilience

Food systems do not become more resilient by aiming for certain goals or visions, but through the application of resilience principles/characteristics in the process of working towards such goals/vision. It is easy to talk about goals. It is about things in the distant future. Scrutinizing transition pathways of choice should therefore not merely be on the basis of what they aim for, in terms of goals, targets, and objectives, but especially on the basis of the way in which they enhance resilience principles and characteristics. Monitoring and evaluation of transition pathways should then also focus on indicators related to such principles: to what extent are principles being applied and to what extent are (intermediate) outcomes in line with these principles? It also means that goal definitions need to be elaborated and unpacked. For example: zero hunger, SDG2, is not enough. It will need to look more like this: zero hunger achieved through processes which activate diversity (also of pathways, and also of "solutions"), flexibility, redundancy, robustness, connectedness, and participation; as well as zero hunger without having lost such diversity, flexibility, redundancy, robustness, connectedness, and participation. This creates a much stronger basis for working towards sustainable food systems.

Whether we like it or not, somehow people or groups of people will need to decide on a particular direction for transition. There is no way around this. So that is where the 'winners and losers' come in. What is more problematic, is that seemingly there is a shared vision, but the concrete actions are not agreed upon. Or worse, certain "solutions" are rigidly scaled up beyond what others consider as acceptable in terms of trade-offs it produces.

Exploring options instead of seeking "solutions"

As discussed in chapter 3.2, in practical application, transition pathways approaches often focus on "solutions". Whether they be certain chemicals for pest control, solar panels for emission-free energy generation, or anything else. In other words, means tend to become an end in themselves. Solutions-thinking tends to narrow our thinking. Pathways tend to be reduced to simple technical issues and risk adopting a political approach: everyone has to follow this line.

However in our view, transition pathways are about searching for and experimenting with options and opportunities that may turn out to solve something particular. But that remains to be seen. So the concept of transition experiments may be very useful not just for that which is already framed as an experiment, but for transition pathways in general. Transitions should not bet on one horse nor focus on silver bullets.

Theories of change and theories of constancy

Transitions often come with some sort of resistance. People generally do not like to change their habits and the comforts that they are accustomed to. And sometimes small compromises can turn out to suffice as well. Contia et al. 2021 have written about 'why are agri-food systems resistant to new directions of change?'. It is obvious that there are many reasons to give for why agri-food systems need to change. And yet, maybe too quickly we assume that change is needed and we focus on how change can happen. However, some things need to stay the same. We need theories of change as well as theories of constancy: how to keep what is good. If the focus is only on what needs to change, and that is often the case, we will forget about what stability and constancy will be needed in the midst of that as well. And that involves answering how that can be done. Partly because such questions are rarely asked, let alone answered, there is resistance to change. And some of that will have to do with the fact that a suggested transition pathway insufficiently addresses concerns regarding how stability and constancy can be adequately secured.

Scrutinizing what is behind transition narratives

Ideas on what would be appropriate transition pathways to a desired future are driven by transition narratives. Such narratives are about what are considered to be problems in society, what are considered to be causes for such problems, what is considered to make for sustainability (e.g. "new technologies"), whose interests are meant to be served, what are considered to be acceptable trade-offs, etc. Such narratives are often the basis for (political) agendas. This is illustrated in Figure 4.2.

It is therefore essential, prior to discussing options and opportunities regarding transition pathways, to create transparency regarding transition narratives which will serve as the canvas on which transition pathways will be plotted. It will determine what will and will not be part of considerations in identifying appropriate and responsible transition pathways. Therefore, we suggest to use the type of frameworks we presented in this report to unpack transition narratives, e.g., in terms of what type of sustainability is the focus and what type of sustainability may suffer because of that focus. It may also unpack such narratives towards the way in which is supports food system resilience, by looking at the way in which it supports (or not) resilience characteristics.

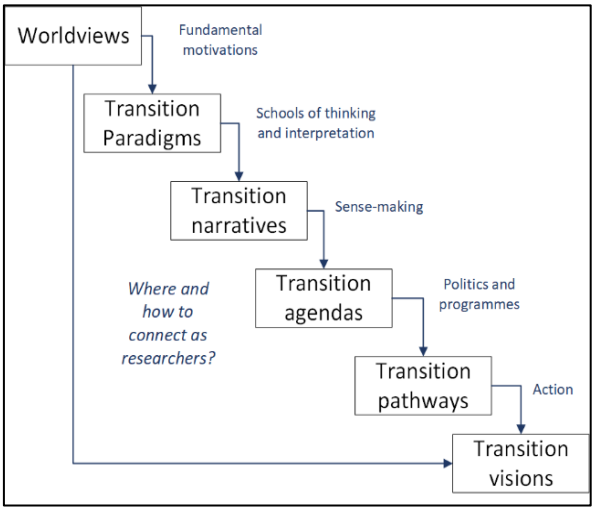


Figure 4.2 *Illustrating the importance of the need to understand deeper motivations and agendas involved transition narratives. Source: The authors.*

This points to the need for inclusive visions rather than exclusive visions. Exclusive visions focus on specific goals. Even the SDGs, though being a set of goals, can be aimed for in an exclusive way. Inclusive visions describe more than just goals. They include descriptions about the wider embedding of values and principles to be expressed. Moreover, inclusive visions also include perspectives on what values and principles are to be expressed on the way to achieving such visions. This idea is illustrated in Figure 4.3. We take SDG2 (Zero Hunger) only as an example. We could have used any agreed goal to present the argument.

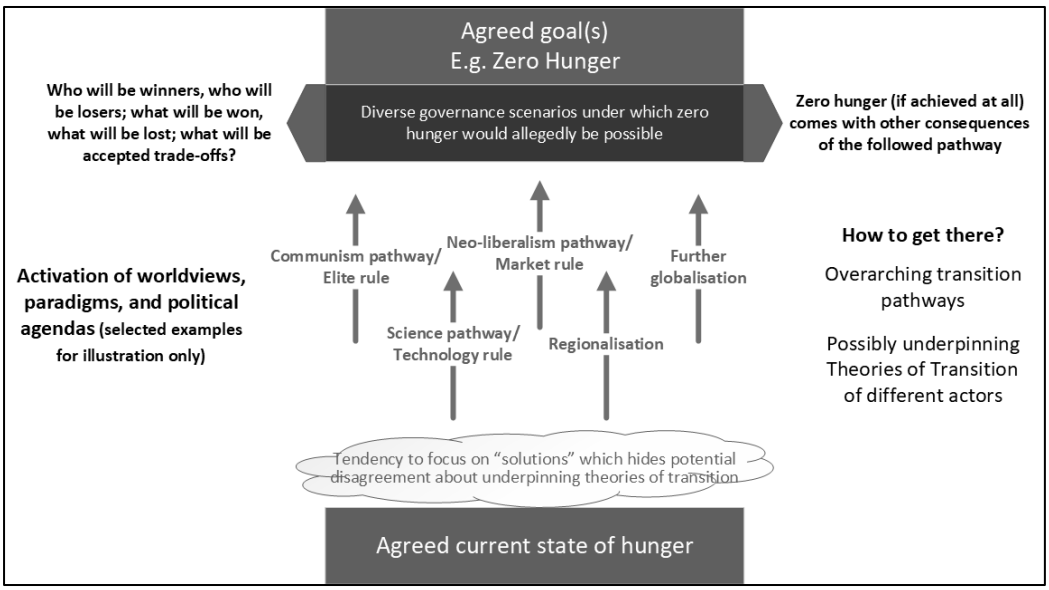


Figure 4.2 *Illustrating the idea of confounded transition pathways. Source: The authors.*

We would argue that working towards agreed goals without articulating values and principles that need to be expressed as we work together towards that goal (the transition) runs the risk of achieving the goals, but that the way in which the transition process was guided and governed means ending up with having lost out on other fronts. This directly relates to the saying that 'the end does not justify the means'. Put simply: there may be zero hunger in prison, but that does not make it an ideal situation.

Politics of information and communication

Related to the politics of transitions is the politics of information and communication. This closely

relates to the topic of transition narratives. Those who are able to control media (popular, scientific, and other) can influence perceptions to a very large degree. We tend to focus too much on "scientific evidence" in the context of transition ambitions. Not that scientific evidence is not important, on the contrary. But there is also something like the politics of evidence (Parkhurst et al. 2017). This is about advancing political agendas by claiming or disclaiming something as "evidences" and has little to do with science. A good example of the politics of evidence is what happened in relation to the tobacco industry when casting doubt on scientific evidence and constructing doubtful 'evidence' became a core strategy of business corporations (Oreskes & Conway 2011). Another set of examples is described in the study of the European Environmental Agency on "Late lessons from early warnings"[20]. Current policy developments in relation to the corona virus, or parts of it, may later turn out to fall into that same category as well.

Nobody escapes being influenced by information that is presented to them, most of which we cannot check. What we accept as reality or evidence is often based on trusting information sources. If transitions are about complex change processes, nobody will be able to check out all relevant information that is presented in relation to it. So we are all prone to situations in which we accept certain information as correct, while it is not and/or it involves selective use of data and information to manipulate recipients of the information. Hence the need for open debate and for giving dissenting voices a place at the table. Some of the late lessons were accepted only after early warnings had been dismissed for a long time and those who gave the early warnings were ostracized for a long time. For example in relation to the health effects of asbestos.

Since transitions and choices of transition pathways are often highly politically motivated (which is not a bad thing in itself), it is critical to establish a strong basis for having shared information and not be naive about manipulation of information. This is one of the big problems of these days, that data which is in itself correct, is communicated selectively. As in total cost accounting, leaving out certain costs which are considered irrelevant produces quite a different picture. A certain choice of focus in terms of transition pathway may seem logical on the basis of particular data, but not when presented while including other data/information.

Many will seek to make their case strong by selecting suitable information/data to make their case for a needed focus on particular transition pathways and for particular activities, technologies, etc. being part of that transition pathway. So besides the question of "who decides", there is the questions, 'based on what information/data', and 'how do we decide on the reliability of such information'?

Multi-stakeholder process are not a panacea

Multi-stakeholder processes (MSPs) can be misused to create legitimacy without really activating democratic voice. It is important to think carefully about how an MSP can be a truly empowering process and support true democracy. So it is about quality of MSP, not MSP as such.

There are so many points at which the MSP can become no more than a show, including:

1. Who decides on who will be on the table and who not? Are dissenting voices somehow given a place at the table as well?
2. What conditions are created that enable all those invited to participate meaningfully?
3. Who decides on the agenda and on the way in which conclusions are drawn from the interactions?
4. Who decides on what conclusions are taken forward to inform decision/policy making? How much different are these conclusions from what was already put forward (tentatively) by those with decision-making authority? In other words, did the MSP really make a difference in the process?
5. Who decides on how monitoring and evaluation of decision/policy implementation will be done and what it will focus on?
6. Who decides on what will be done with data/information/findings from such monitoring and evaluation?

[20] https://www.eea.europa.eu/publications/late-lessons-2

4.2 Towards a framework for responsible transition (pathways)

Considering the variety of topics we discussed in this paper, synthesizing critical reflections into an integrated perspective, we now present a tentative framework for responsible transition (pathways) (Figure 4.4). This framework is composed of five orientations that we think need to be considered simultaneously in relation to proposed transitions and transition pathways.

The first dimension 'balancing diversity of stakeholder interests', refers to the problematization of transition lock-ins, the politics of transition pathways and any possible (commercial) endorsements. We think that the concept of just transition offers a good point of departure for reflecting on such considerations. Our second dimension 'integrally sustainable approach' refers to the different typologies and pathway orientations discussed in chapter two, and in particular the possibilities that the theory of modal aspects offers. Identifying exactly which types of pathways are intended can be helpful to expose certain trade-offs and to make better deliberate decisions. Our third dimension 'expressing articulated values and principles' is a result of the problematization of the common visioning-back casting approach. Instead of mainly looking for practical solutions, we argue that it may be better to start by articulating principles, values, and premises from a systems perspective. Further, we have argued that transition pathways should work in favour of resilience building, the fourth dimension.

This means that some situations might also be worth to conserve, as long as attention has been paid to what is truly behind any transition narrative. Finally, a fifth orientation is the 'strategically system approach'. This is about applying perspectives such as (notably) Meadow's leverage points (Meadows, 2009) as presented by Leuphana University (see section 2.2). It offers a systems perspective, but in relation to it, also a strategic perspective by identifying possible leverage points for influencing system change.

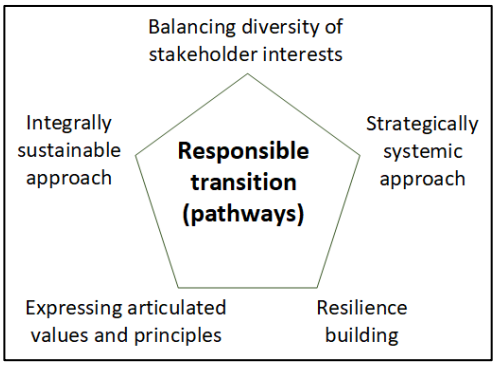


Figure 4.4 *Dimensions of an approach to responsible transition (pathways).*

Hereunder the five dimensions that can make for responsible transition (pathways) are listed:

- Balancing the diversity of stakeholder interests, which is to be expressed from conception of transition ideas through design, to implementation and monitoring and evaluation of the transition processes and outcomes;
- Considering (trade-offs) between different types of sustainability (see the characterization of transition pathways through the theory of modal aspects discussed in section 2.1);
- In terms of choice of interventions and actions, activate a systems perspective such as done in the leverage points approach;
- Considering how the transition (pathway) would influence resilience of actors, sectors, societies, etc.: e.g. how does it affect diversity, flexibility, redundance (buffers), robustness, etc.
- Bringing key values and principles to expression, both in the transition process and in the transition outcomes. Here, the characteristics of responsible innovation (Stilgoe et al. 2013) can be a useful way of activating principles.

These five dimensions would need to be considered in a coherent way. For example, values and principles will be different for the diversity of stakeholders. And what may look like an effective leverage point to influence system change, may not serve particular resilience characteristics. This framework could involve in-depth analysis, but it can also be used as a simple checklist that a variety of stakeholders are asked to score (after sufficient explanation of what is meant by the dimensions), see for example table 3.

Table 3 *Dimensions of a framework for responsible transition (pathways).*

To what extent…	Assessment Hardly or not	Somewhat	Adequate	Good
- are the interest of the diversity of *stakeholders* addressed in a satisfactory way?				
- is a variety of expressions of *sustainability* used in considering trade-offs?				
- are transition processes considered from a *system*-change perspective?				
- is *resilience* of relevant groups, systems, sectors built/sustained as a result?				
- are key *values and principles* (e.g. re: collaboration, participation, 'do no harm', sovereignty, etc.) 1) discussed and agreed as stakeholders, and 2) expressed appropriately from design through processes to outcomes?				
- are characteristics of responsible innovation (anticipation, reflexivity, responsiveness, inclusiveness) applied towards a perspective on responsible transition?				

Based on such quick scan, a discussion can be facilitated on the basis of a presentation of how different people scored the dimensions differently.

Further research

In this critical exploration we have outlined a number of considerations to be taken on board when engaging with initiatives that are framed along the lines of transitions and transition pathways. Since framing initiatives along such lines has become widespread practice, we suggest that further research is needed to problematize related approaches to better get to grips with relevant dynamics involved. We would also suggest to apply the type of critical perspectives we have outlined it more specifically and elaborately in the context of food system transitions to sustainability. This may very well link up with the suggestions of Hebinck et al. 2021b) who propose four avenues for research in the next decade of transition research on agri-food systems. We think the topics we discussed partly connect to those same avenues and partly suggest additional avenues.

It would also be useful to apply the framework for responsible transition (pathways) in a number of cases to explore how this could be further operationalized.

5 Conclusion

Transitions or transition pathways are no linear processes, yet some people tend to approach them as if they are. That does not mean that thinking ahead cannot be useful, but we should be aware that perspectives are always subject to what certain people want to envision or achieve. There is no 'one perspective' that will lead to a desired outcome. Transitions pathways can be found in all the dynamics of social life, therefore a rich view on transition pathways may offer the most potential.
However, most attempts to envision transition pathways do not seem to achieve the range of different things that define a certain state, nor can they serve everyone on an individual level. There is always a chance that unexpected things will occur that might lead to different pathways or ways in which transitions play out. Yet, most policy orientated work on transition pathways aims to look for general patterns. Transition also do not happen alone. They can be nested within each other or working next or against each other. They are also known under different interpretations and are therefore affected by the way we speak of them and of how we visualise them. Thus in conclusion, transitions are deeply complex, yet in the way we tend to handle them we seem to prefer to ignore the uncertainties.

Popular approaches such as visioning-back casting seem to focus on finding practical solutions instead of collaboratively rearranging certain principles and values that may underline current undesired worldviews and habits, albeit there are some pioneering examples that do dare to be positively deviant. There is also a need to acknowledge political and commercial leverage in transitions. Some agenda's might (unknowingly) be pushed forward, and some solutions might be sold as generally applicable while in reality they are only suited to a certain context. Most likely this is done with good intentions but the rise in attention to 'just transitions' rightly also points out that diversity and equity are concepts we should carefully consider.

Some propositions we make are to embrace multiple methodologies, increase attention to normative values and principles, and attempt to nuance dominant narratives by better awareness of our own bias and the possible deferring viewpoints of others. Also, some things may not have to change. If not carefully thought through, transition pathways can also eradicate structures that already exist under the preconditions of resilience and durability (i.e. the concept of 'development' is commonly associated with high-technological advancement, which does not have to necessarily benefit sustainability in a broader socio-economic way). These propositions are combined in our framework towards what we call: responsible transition (pathways). Further research is encouraged to elaborate on this framework.

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