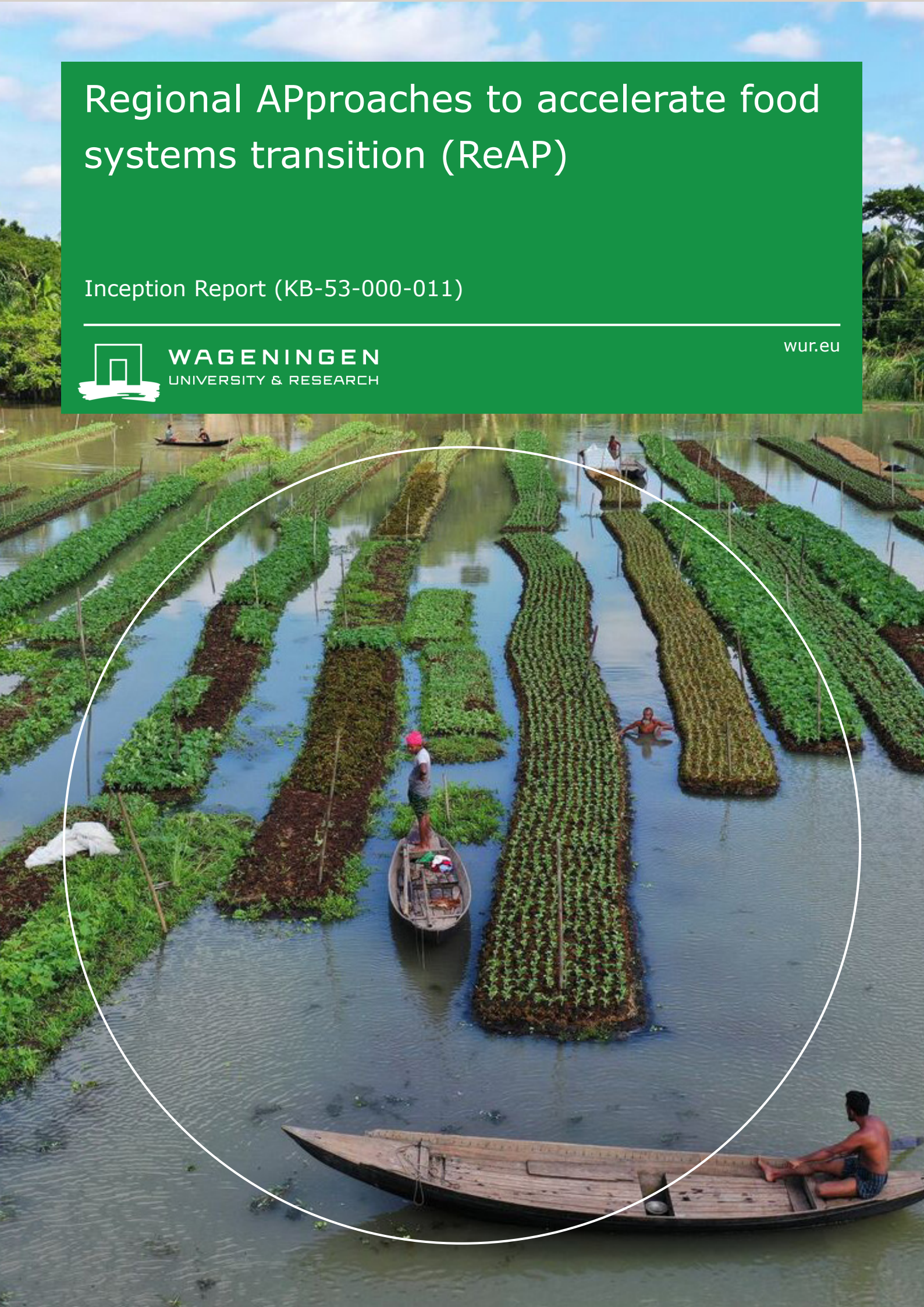
Regional APproaches to accelerate food systems transition (ReAP)

Inception Report (KB-53-000-011)

WAGENINGEN
UNIVERSITY & RESEARCH

wur.eu



Regional APproaches to accelerate food systems transition (ReAP)

Inception Report (KB-53-000-011)

Wenny Ho, Alwin Gerritsen, Joris Gort, Heleen van Kernebeek, Catharien Terwisscha van Scheltinga, Daniel Puente, Annemarie Klaasse, Feroz Islam, Bram Bos, Remco Kranendonk, Yawei Wang

Wageningen Environmental Research & Wageningen Livestock Research
Wageningen, August 2025

The authors would like to acknowledge funding from the Wageningen University and Research Knowledge Base programme: KB53 Future Food Systems (project number KB53-000-011) - that is supported by the Dutch Ministry of Agriculture, Fisheries, Food Security and Nature".

De auteurs zijn erkentelijk voor de financiering via het WUR Kennisbasisprogramma: KB53 Future Food Systems (projectnummer KB53-000-011) - dat wordt ondersteund door het Ministerie van Landbouw, Visserij, Voedselzekerheid en Natuur.

Reviewed by:
Joyce Zwartkruis, Researcher, Wageningen Environmental Research
Karin Andeweg, Team leader Water & Food, Wageningen Environmental Research

Approval for Publication:
Bertram de Rooij, Team leader Regional Development and Spatial Use, Wageningen Environmental Research

Table of Contents

Chapter 1. Introduction 5

1.1 Inception phase 8

1.2 Overview of the inception report 8

Chapter 2. Desk study findings (Work Package 1) 9

2.1 Conceptual findings 9

2.1.1 Regional Approaches to (food) systems transition 9

2.1.2 The region in a regional approach 10

2.1.3 Sustainable food systems 11

2.1.4 Transitioning food systems 13

2.1.5 The coordinative role of missions in transitioning food systems 15

2.1.6 Key elements of a mission-driven regional approach 16

2.1.7 Reference list 18

2.2 Findings regarding methodology for complex systems change or transformative change methodologies 20

2.2.1 Setting the methodological scene: societal challenges 20

2.2.2 Methodological implications when taking on societal challenges 21

2.2.3 What then are the overall guiding methodological principles for ReAP? 25

2.2.4 Transformative change methodology for ReAP with bonus references and examples 26

2.2.5 Reference list 30

2.3 Twinning Key Concepts and Transformative change methodologies: towards a conceptual model 31

Chapter 3. Summary of research cases (Work Package 2) 32

3.1 Introduction to the cases 32

3.2 Netherlands case 33

3.3 India: Value chain transformation to multi-agency food systems transition. The case of Tempeh as a business-led regional approach 34

3.4 Bangladesh case 38

3.5 Building Back Better Ukraine 42

3.6 Reference list 45

Chapter 4. ReAP Project Organization (Work Package 3) 46

4.1 Project organization and team 46

4.2 Data Management Plan 46

4.3 Learning and reflection in ReAP 46

4.4 Deliverables 2025 46

Annex 48

Chapter 1 Introduction

Worldwide, climate change, disappearing biodiversity and overexploitation of resources urge system changes to safeguard people's livelihoods on the planet. In that regard, food systems are both a source of problems as well as an entry point for solutions. This makes it urgent to move towards future food systems that are based on food sovereignty principles, such as democratic and transparent food systems, agroecology, and local market prioritization, and operate within planetary boundaries (KB Future Food Systems Vision document). Such food systems transition demands multi-scalar and multi-actor interventions to connect international, national, and local policy-making and implementation.

It is important to note, that food systems and interventions for food systems transitions can be conceptualized and operationalized at different scales. For example, international food systems differ from local food systems in terms of, among other, stakeholders, interests, knowledge systems, mechanisms and dynamics. To support a transition, the regional scale is thought to play a special role. The regional scale is defined as the level that focusses on specific regions (e.g. territories or areas) in relation to higher (e.g. national, global) or lower (e.g. local) scales and other regions. It is a scale where challenges, institutions and actors come together to develop and implement sustainable future directions and solutions under influence of those other scales. It is also the scale where policy-making meets the reality (biophysical, cultural, etc.). Additionally, the regional scale is seen as essential when scaling up, down and out, and to create alternative governance, socio-economic approaches, strategies, and solutions that can have critical mass while still being sufficiently relatable for local stakeholders.

> Importantly, the regional scale in food systems transition is therefore not a fixed, static scale, but needs to be conceptualised and operationalised in relation to the (scale of) food systems transition that is being pursued.

Regional APproaches to accelerate food systems transition (ReAP) is a four-year strategic research project (KB). In this project, a regional approach in food systems transition refers to the working from the mechanisms and processes that shape food systems at the regional scale, under influence of forces from higher or lower scales and other regions. Therefore, related domains such as, agriculture, landscapes, ecosystems, etc. are part of the (transitioning) analytical focus. Importantly, such an approach is actively being shaped through practices and interactions of actors. Applying a regional approach will enable us to understand and influence the mechanism, trends and processes that shape food systems and their outcomes. Crucially, whereas transition research stresses the importance of multi-actor approaches, there is little knowledge about employing regions and regional innovation as the focus for multi-scalar food system transition. This goes beyond the scope of earlier concept of integrated landscape management (Pedroza et.al., 2022). This knowledge gap is even more acute when it comes to creating actionable knowledge to not only analyse regional food systems transition, but also to possibly guide and/or facilitate transition processes in connection with other scale levels and challenges.

In consequence, ReAP's central objective is to strengthen knowledge about approaches at the regional scale to accelerate food system transition.

> Crucially, whereas transition research stresses the importance of multi-actor approaches, there is little knowledge about employing regions and regional innovation as the focus for multi- scalar food system transition.
> In consequence, ReAP's central objective is to strengthen knowledge about approaches at the regional scale to accelerate food system transition.

This objective is translated into the following overarching research question:

Research Question: *How can regional approaches effectively influence the pace and direction of food systems transition?*

We can break this question down into two working hypotheses.

Hypothesis 1: *Regional approaches enable a transition towards sustainable food systems.*

This hypothesis builds on the idea that a region is the level that people can still identify with, while being a scale that goes beyond isolated pilots. Sustainable food systems relate to principles of food sovereignty, such as democratic and transparent food systems, agroecology, local market prioritisation, and more.

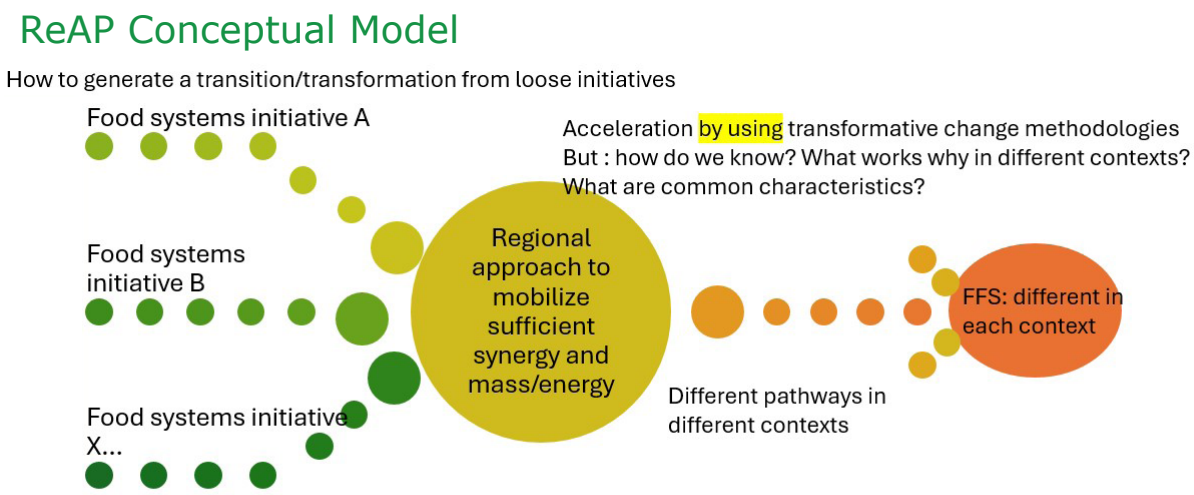
Hypothesis 2: *Sustainable food system transition is accelerated by using transformative or systems change methodologies accelerate.*

Transformative change methodologies and systems change methodologies are sometimes used interchangeably in the literature. In the first, the emphasis lies on 'transformative', in the second on 'systems'. Although both 'transformative' and 'systems' are needed, in this inception report, we will use the term transformative change methodologies, also to emphasise the deep and fundamental changes that are required. These methodologies are used in a process design that is continuously and iteratively tailored to the 'who', 'how' and 'what' of a particular moment in a change process[1].

The ReAP project's objective of accelerating food systems transition will be achieved by twinning regional approaches that emphasize coordinative mechanisms (such as missions) with transformative change methodologies that can support deep change (WP1). This knowledge, initially collected through desk studies, is then used, tested, challenged and enriched in empirical research initiatives (four in year one) (WP2). By learning from the cases in combination with deepening our conceptual work, we aim for further insights into regional food system transition (WP3).

[1] See D2.1 A scheme on conceptual framework on transformative change in the biodiversity nexus — BIONEXT: especially page 29

We can visualise our approach in a conceptual model.



ReAP central research hypotheses:

1. ***Hypothesis 1:*** *Regional approaches enable acceleration of a transition towards sustainable food systems.*
2. ***Hypothesis 2:*** *Food system transition can be accelerated by using transformative or systems change methodologies.*

Figure 1 ReAP conceptual model

As current food systems are unsustainable, many initiatives have emerged to change that. These often offer glimpses of a future food system that is sustainable. However, they are too small scale, and unconnected to one another to achieve sufficient mass and energy to synergise towards or into a transformation of current food systems.

A region can be 'territory' (see 2.1.2) where relations (between humans, and between humans and their environment) can cohere and synergise thus generating sufficient mass and energy to accelerate a transition, at the same time that a region allows actors to identify and connect with. Food systems transition requires not only working on the what, but also on the how. ReAP therefore envisions combining regional approaches, that emphasise coordinative mechanisms, such as mission and region-formation (see 2.1.6), with transformative change methodologies focused on continual process (re)design.

As the ReAP project works with cases situated in different contexts, these generate knowledge about how in these contexts particular combinations of regional approaches and transformative change methodologies may evolve that offer pathways towards a future food system. Thus, the findings from the case studies will allow us to validate, correct and refine the conceptual model and the hypotheses. Doing so across different contexts, will strengthen the reliability and validity of the knowledge generated.

1.1 Inception phase

The ReAP project started in 2025. The first period was set up as an inception (project start-up) phase with the aim of understanding the current state of conceptual and methodological body of knowledge, and setting up the case studies.

The inception phase consisted of two activities: undertaking desk studies and holding team meetings.

The desk studies review key concepts related to the research question. We outline our findings in Chapter 2. The first section (2.1) presents the findings on regional approaches to food systems change and the second (2.2) presents those on transformative change methodologies. Together, these sections provide an overview of key concepts and methodological process design as building blocks for the initial conceptual framework.

The team meetings provided the space to connect those building blocks with the case studies, and collectively reflect on the operationalisation of the building blocks in the different case contexts. The preliminary conceptual and methodological findings were discussed in relation to the work plans of each case study that were being developed. Below follows an overview of the meeting highlights.

> During the project launch on 8th January, four key concepts in ReAP were discussed (Sustainable Food Systems; Transitions/Transformations; Regional Approaches; Telecoupling) an overall project planning for 2025 was elaborated, and a first start with the case work plans was made.
>
> During the second meeting of 11th February, the first versions of the case workplans were held against the preliminary findings of the desk studies, especially regional mission-driven innovation.
>
> During the third meeting of 11th April, we worked on 'building blocks' for a future food systems vision, especially in terms of values and principles of fairness that should underline a future food system. We also discussed the food systems transitions concepts as applied in previous projects (KB Deltas). The case studies then compared their assumptions to the entry points of the Nature Positive Food Systems framework as possible pathways of change. This framework was developed in an earlier strategic research project. In this way, a first joint case study framework was developed (see Chapter 3).
>
> In two further meetings, we finalized and discussed the case workplans for 2025 and the findings of the desk studies drawing the inception phase to a closure.

In this inception phase, we have thus collectively created a conceptual, methodological and empirical foundation for the ReAP project, and identified the knowledge gaps on which to focus the project. This will allow us to position our learnings, understand our progress and follow the furthering of our knowledge base over the course of the project.

1.2 Overview of the inception report

This inception report contains the highlights of the desk studies, on regional approaches to food systems and on transformative change methodologies, and brief outlines of the case studies. The findings of the desk studies are presented in Chapter 2, while Chapter 3 introduces the workplans of the case studies in Netherlands, India, Bangladesh, and Ukraine. Finally, chapter 4 describes how ReAP is organized.

In this way, the inception report functions for the ReAP team as a 'baseline', capturing the conceptual and methodological state at the start of the project, and sets the scene for the cases. In conjunction with the learning documentation, it is hoped that readers can follow the processes of knowledge generation and articulation over time.

Chapter 2 Desk study findings (WP1)

2.1 Conceptual findings

2.1.1 Regional Approaches to (food) systems transition

A desk study has been conducted in Work Package 1. Here we outline key discussions as relevant to the inception phase of ReAP, including the key concepts deemed relevant to the project at this point.

A regional approach is not a singular solution to the challenges surrounding food systems. With the multitude of problems in a complex setting such as food systems, which can be seen as a 'wicked problem', given differing contexts, no single approach can be possible. Thus, taking a general regional approach as a starting point may be helpful, to gain insight in accelerating food system transitions. Such insight is urgent, in light of planetary boundaries being exceeded.

The ReAP project is about "Regional APproaches to accelerate food systems transition". Subsequently, we focus on four key concepts: **1) the region; 2) A sustainable food system; 3) transition theories; and 4)** the role of **missions**.

These four key concepts warranted equal attention in the inception stage of the ReAP project. Considering earlier work at WUR on food systems and food systems transition, the team members wanted to focus on the regional approach as ReAP's primary concept. Thus, we ground the conceptual elaboration in work on regional geography and regional innovation, as cutting-edge regional theorisation lies at the forefront of these communities of practice. Our contribution is to place these insights in the context of accelerating food system transitions.

At the project development, telecoupling[2] was a potentially important concept. However, the choice was made to leave it out of the approach. The theoretical foundation of the concept is rooted largely in global trade flow accounting and takes a somewhat instrumental view of environmental change. This, in contrast to the relational geographic foundations, used to elaborate on regional approaches, and as such integrating it at this point was deemed problematic. If relevant at a future stage, we might elaborate on the concept at a later stage[3].

[2] Telecoupling is a concept stemming from commodity flow mapping, to highlight the push and pull aspects of socioeconomic and environmental interactions. It's appeal is in quantifying distant coupled human and natural systems, and has become more extensive and intensive in the globalized era. Telecouplings have five major components- systems, agents, flows, causes, and effects. Its instrumentalist worldview does not fit with our approach to the region or sustainable food system, and as such has been left out.

[3] For example, the concept of intracoupling may emerge as a relevant sensitizing concept.

2.1.2 The region in a regional approach

The region in regional approaches

An ever-changing constellation of practices, relations (networks) and discourses, where actors appropriate and transform their surrounding social and biophysical space and are shaped by space.

Aspects of a 'region'

- A relational entity that is shaped by social interactions (ideas) and social-environmental practices, not static or topographic
- Appropriation and transformation of space and the biophysical world
- Connected to and influenced by dynamic social and biophysical aspects of space
- Focused on a specific place, or moving through space, crossing scales and distance

The most important starting point of so-called "regional approaches" is to avoid any uniform definition of "the region" or "territory", to recognize that these concepts are constantly contested, deployed and debated (Paasi et al., 2018). Firstly, there exists a plurality of definitions of the region, regionality or regional. To start any approach that alleges to consider the region is to appreciate this fact. And, secondly, it is to be reflective and explicit of one's own use of the concept 'regional'.

Definition of a 'Regional Approach'

A regional approach can be defined as the study and practice that see "regional formations as partial, porous, hybrid condensations of entangled networks between human and non-human actants, each of different spans and with inconstant geometries" (Gregory, 2009: 635). This definition comes from work on regional geography with the understanding that regions hold both static and porous qualities, and that they are abstractions that hold temporary material qualities. As such, the study of 'regions' supposes that the region is a construct that is in flux but nevertheless can hold power. Thus, **the region needs "to be understood as a means to an end and not an end in itself**" (Henderson, 2009: 631).

To understand the region as a lens, that should be critically reflected upon throughout, we can highlight some key aspects of a 'region' based on advances in the rich field of geography (based on Jones, 2022: 49):

1. "Regions have no automatic promise of territorial integrity since they are made through ... relational connectivity"
2. Regional boundaries are produced and reproduced through practices, through existing and forming ideas
3. The abstraction of a 'region' always involves "an appropriation and transformation of space (the occurrence of relations) and the biophysical world" (Pred, 1984: 279).
4. Regions are dynamic, and … emerge as a constellation of "institutionalized practices, power relations and discourse" (Paasi, 2004: 540).

The result: the study of the region should critically examine the history of regional meaning making, which, in the recent words of Paasi (2022: 22), is to trace "How regional and territorial spaces are produced and reproduced and how such spaces and their borders are made meaningful in various contexts."

The region in the ReAP project

It is important to recognize that a whole history of debate in regional geography foregrounds this definition of a region. Particularly, refuted definitions of the regions see it as static and ordered units. This static view sees the region always neatly connected to a map and territoriality. **Therefore, we do not want to approach the region in such a static way**, as opposed to seeing separate, independent objects with fixed and inherent properties. Instead, based on the above, we recognise the "coming together of different perspectives to shape regions and regional thinking" (idem.: 6). This latter approach is where we propose to build upon for the regional approach within ReAP.

Regions are not 'just' what you see on a map. Instead, regions are alive and a central connection to the reproduction and transformation of nature and society. Through social interaction and collective decision-making, regions have the potential to be self-organising (Ostrom, 2019). Thinking about regional approach to food and agriculture, for instance, we could consider the way in which political economic processes such as production, transport and consumption of (agricultural) commodities are shaped by the binding of local processes – both social and material. Regional approaches can involve both the studying of and actively taking part in regional networks in order to achieve consistency and gain shape, or point to where regional networks might crumble (Malabou, 2010, 2012).

2.1.3 Sustainable food systems

Sustainable food systems

A *set of* interlinked activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and that drives on relationships to determine what, how much, by what method and for whom food is produced. Sustainable food systems are about a normative direction in food system development.

Aspects of a 'food system'

- Includes all steps from the production of inputs to disposal or reuse of outputs
- Includes a complex landscape of actors, processes and theories
- Involves dynamic social-environmental interactions
- Usually no biophysical demarcation
- A way to understand dynamics around food, not a 'location' that is set in stone

It is important to talk about the approach to **food systems** before continuing. Like with 'region', this concept is imbued with political meanings and particular views of social-environmental change. Different definitions apply different normative frameworks that determine what 'counts' as important within the abstraction of a food system. Especially with the different views of climate change and incremental or fundamental critiques, food systems are enrolled within very different and contending approaches. To use the words of Paprocki (2024: 692), agriculture, and food, are thus "deeply and inevitably shaped by *historical patterns of development*[4] that far predate contemporary climate change."

Definition of a 'food system'

While it was commonly established in 1990s to talk of "agro-food systems" (cf. Goodman and Watts, 1994; Guthman, 2008), this project has chosen to focus on 'food systems' instead. This reflects a trend to place food within a broader range of productive and consumptive relations. The common description of 'food system' by the FAO reflects this (Nguyen, 2018: 1):

[4] Or, in our words, historical path dependencies

> "Food systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded."

Still, approaches to **food systems** range from those that encourage more ('green') intensive production, to those valuing redistribution, just production and ecological balance. Importantly, these different interpretations change the conceptual and methodological focus. We do no go into detail here on the different approaches and continue this debate later within the project. For instance, some scholars stress that efficiency and increasing of production will mostly lead to increased ecological degradation and uneven distribution. For these scholars, focused on the production and distribution side of agriculture and food, as "the set of activities and relationships that interact to determine what, how much, by what method and for whom food is produced and distributed" (Whatmore 1996, 37). More recently, colleagues have stressed the relationships that exist beyond production focused approaches. Here, agricultural systems "include not only consumption dynamics, but a much more complex landscape of actors, processes and theories (Moragues-Faus and Marsden, 2017: 275; Goodman, 1999; Marsden et al., 1996; Winter, 2003).

Others, such as van Berkum and colleagues (2018) seem to emphasise increased production as a primary goal for sustainable food systems. Together with environmental limits, inclusivity and safe food, these authors propose an overarching approach that that suggests all these goals can be met in harmony. Nevertheless, as we will explore at a later stage, the motivation for increased production and efficiency is, as argued by others (McCarthy, 2012; Galt, 2013; Li, 2015), difficult to detach from environmental degradation and the dispossession of smallholder farmers. Still, there are many lessons to be learned from the diversity of food system thinkers, including van Berkum and colleagues, and this debate is crucial to the conceptual and normative rigidity of debates around food, regions and transitions. As such, this interesting discussion, in reference to other food system thinkers (i.e., HLPE, see Gitz and Meybeck, 2011; Terwisscha van Scheltinga et al., 2025; Verhagen et al., 2022), will be explored later on in this project.

Sustainable food systems

The above definition stresses attention to the contentious politics surrounding nature-society relationships, focusing on the interlinked relations of production, aggregation, processing, distribution as well as the more social-cultural aspects of food such as the normative aims within the food system and the production of knowledge. For sustainability, this means politicising and explicating one's normative political commitment in intervening in, and learning from, food systems. Particularly, this focuses on work around food systems on the political and ecological implications of agriculture, rooted in an understanding of the development of capitalism and the transformation of agriculture within this. The result, a critical view "of place and nature and a more politically sensitive approach to the asymmetrical character of nature-social relationships" (Moragues-Faus and Marsden, 2017: 276). Asymmetrical is understood not just in a vague metaphor of equality, but within the politics of agrarian politics. Key aspects to consider are thus:

1. The social relations of production. This relates to the role of social reproduction, the political economic foundations of agrarian formations, the livelihood status of (non-)workers, etc.
2. The production of food systems knowledge and the position of expertise. An appreciation of food system politics should attend to the role of (globalised) expertise that is always enrolled within a web of contentious politics of the direction of development in agriculture and surrounding food (Taylor, 2005). The researcher, as with the use of 'regions' has "an obligation to respond to questions of adequacy, accountability and authorization" (Gregory, 2009: 636).

3. The normative aims of using a food systems approach. Food systems are used by some actors seeking to drive forward development, seeking ever more intensification and extraction from the socio-natural environment (i.e. the FAO, see Nguyen, 2018; Jarosz, 2009). In political ecology and feminist studies, we see a very different commitment, where food system research is used to understand the functioning of food system and the consequences of (political or socio-cultural) decisions. For us, this touches much more concrete on the normative goals we want to achieve. In the words of Galt (2013: 648), sustainable food systems are:
"socioecological configurations based on greater equality, non-exploitation, re-valuing the commons and public goods, and decreased material consumption in industrial economies by continuing to produce critique, and aiming more for positive visioning and creative projects by working with social movements."

2.1.4 Transitioning

Here we detail the relevant approaches to transitioning. This section does not focus on the transitioning of food systems in itself, we will address this question in a next step.

In **transition theories**, there is an emerging common understanding about the nature of desired change, which is to challenge the status quo and contribute to fundamental changes. Notions of complexity, wicked problems and 'emergence' occur across most transition theories and associated methodologies, but important differences persist (see Feola, 2015; Patterson et al., 2016). Importantly, transition thinking has previously originated from technological innovation and is increasingly used to denote sustainable development (Blythe et al., 2018). With sustainability having broad definitions, such transition thinking is pushed to consider institutional and political economic matters, something rather novel to the approach.

While there are different transition approaches, there is a shared attention to transition experimentation, with piece-meal approaches that somehow have transformational potential. ***Transition approaches*** are thus rooted in technological foci, but are now themselves transitioning to broader socio-environmental challenges (cf. Geels and Schot, 2008; Geels et al., 2017; Loorbach, 2010). For instance, Blythe et al., (2018: 1209) describe their focus on decarbonization and transitioning, as a field with "roots in social-technological studies, complex systems, thinking, and institutional economics ... [which] largely characterize transformation as multi-scalar, socio-technological transitions towards low-carbon futures (e.g. engineering innovations)" (Blythe et al., 2018: 1209). These approaches take a systemic perspective in order to examine how shifts toward more sustainable sociotechnical systems unfold, e.g. through processes of substitution, transformation, re-configuration or decline. Systemic approaches usually emphasize non-linear and complex dynamics among institutions, technologies and actors that reinforce system lock-ins, and thus seek to break down undesirable systems and simultaneously make space for more desirable innovations (Loorbach et al. 2017).

Another field is that on ***transformative change***, which questions the structural and ideological foundations of a system, hereby paying attention to conflicting values and political aspects. Achieving an outcome of transformative change fundamentally depends on the process of working together in different, more transformative ways through processes of pluralizing, empowering, politicizing and embedding (Chambers et al, 2020). On the other hand, can we learn from political science that institutional change is also dependent on endemic processes within dominant regimes and that external pressure often is not sufficient to bring about systemic change (Streeck & Thelen, 2005; Lowndes & Robberts, 2013). Some kind of collaboration or at least interaction between incumbents and transformative change agents will be required to be able to induce change. This collaboration is far from being a given as transitions often face coordination failures, such as a lack of directionality, policy coordination, demand-articulation or reflexivity (Weber and Rohracher, 2012). In the words of Schot and Steinmueller (2018: 1563)

such "transformative change requires addressing coordination failure by integrating coordination improvements during the construction of transformative change pathways.

In economic geography and spatial economics researchers are exploring the **geographies of transitions**. The geography matters because transitions happen somewhere and both shaped by geography as they are shaping it. Moreover, regions can function as a transition niche (Fuenfschilling, 2019: p. 232) in the sense that what does not fit within globally dominant regimes (and global innovation system) can be feasible in specific regions and developed from there towards a transition. To understand these geographies, we need to analyse "… the particular settings (places) in which transitions are embedded and evolve, while at the same time paying attention to the geographical connections and interactions (i.e. the spatial relations) within and between that place and other place" (Hansen & Coenen, 2015, p. 95). Secondly, places or regions can walk different transformative paths. De Propris & Bailey (2021) distinguish in four types of transitions paths that can be followed in response to the confrontation of generic transition trends and the specific characteristics of (industrial) regions, notably: 1) endogenous, 2) hyper-transformation, 3) importation and 4) regional obsolescence.

Moreover, we learned there is literature on **the traveling of socio-technical innovations through geographical scales** (e.g. Miörner & Binz, 2021). This literature describes both the function of regions as niche environment as well as the region as implementation arena for transition innovation that emerged globally or in other regions. Therefore, we conclude that we need to address the multi-scalarity of transitions and their institutional make-up.

Knowledge and learning play core roles in transitions, because a transition means moving to something new and the process towards this new stage involves much knowledge and learning (e.g. Gerritsen, Stuiver & Termeer, 2013) and to overcome coordination failures. Knowledge development, dissemination and learning are often institutionalized practices. Those can be relatively fluid, informal and temporary arrangement (as in a niche environment), but also more structural innovation systems, possibly organized regionally. Such innovation systems function in the way that the system in which knowledge and learning about a transition takes place and is organized. Innovation system literature traditionally has a focus on specific sectors, such as food. There is also an established literature about ***regional*** **innovation systems** which is of particular interest to our search for a regional approach in accelerating food system transitioning and which highlights the connections between different sectors within a regional context and between regions and geographical scales. This is relevant because the geographical aspects of innovation systems and ecosystems co-determine "… the nature and trajectory of evolution of the economic system" (Boschma and Martin, 2010, p. 6). Moreover, innovation policy thinking is adopting transformative change thinking as well, stepping out of a focus on innovation for growth and content neutral innovation as transformative innovation policies have become an major analytical focus for studying innovation and innovation policies (Schot & Steinmueller, 2018). We delve into this when addressing the role of missions in transitioning food systems in the next paragraph.

2.1.5 The coordinative role of missions in transitioning food systems[5]

IV. Missions in the coordination of transitioning food systems

Missions are measurable, ambitious and timebound objectives, suitable for engaging diverse stakeholders and establishes coordination in planning and implementing activities to achieve transitioning goals in, for instance, food systems.

Aspects of 'missions in the coordination of transitioning food systems'

- Is aimed at societal challenges
- Is by definition directional – visioning and planning in a (multi-)actor network
- Is formed in institutional settings, such as regional innovation systems
- Varies between clear-cut 'moonshots' and 'corridors of acceptable development pathways'
- Missions coordinate the mobilisation, alignment and coordination of a variety of distributed actors
- Travel of missions through space involves framing and re-framing and tuning to regional capabilities, processes and cultures

Increasingly **missions** are regarded as a means to facilitate societal transformations and, thereby, tackle societal challenges (Mazzucato, 2018; Foray et al., 2012; Wanzenböck et al. 2020; Schot & Steinmueller, 2018). This holds particularly for persistent societal challenges labelled as wicked due to their complex, contested and uncertain nature (Wanzenböck et al., 2020), such as sustainable food system transitions. A mission's key characteristic is a measurable, ambitious and timebound objective, suitable for engaging diverse stakeholders in mission governance and in the development as well as the diffusion of innovative solutions (Kattel and Mazzucato, 2018). Literature on mission-oriented innovation policy has recognized the importance of a clear direction when tackling grand societal challenges and, as such, the term "directionality" has been used in the literature to define this direction of change (Mazzucato 2016; Kattel and Mazzucato 2018; Schot and Kanger 2018; Yap and Truffer 2019). "While in the case of clear-cut 'moonshot' accelerator missions it is possible to envisage a top-down approach, transformative missions necessitate the mobilization, alignment and coordination of a variety of distributed actors" (Edler et al., 2025; In: Uyarra et al, 2025: 4).

Mission oriented innovation is not an exclusively regional concept and its applications are often "spatially blind" endeavours that are "disconnected from the intricate geographies of innovation and the socio-spatial contexts in which they unfold" (Uyarra et al, 2025:1). It is highly relevant to a regional approach to accelerating a food system transition. Uyarra et al (2025) describe three requirements for anchoring of missions to place (or regions): 1) the active framing, translation and re-framing of global challenges into locally relevant goals, strategies and actions, and building legitimacy through place-based leadership. 2) the tuning to place-specific capacities, political processes, and innovation cultures that shape implementation. 3) careful navigation between different spatial levels.

Moreover, there is an extensive tradition of research into regional innovation systems (e.g. Lundvall, 2016), of which a mission driven innovation system is the latest branch (Elzinga et al. 2023). Although innovation systems exist at national and global scales, they often are at the regional nature, because of cultural, practical, network or other reasons. While a mission-oriented regional approach can go hand in hand with an 'objective' or give identity of a certain region, it regards the region as a relation phenomenon that emerges out of social interactions, and potentially also in human-nature interactions.

[5] For regional approaches we focused on the coordinative role of missions in transitioning food systems. Of course there are other ways to establish coordination. In literature on transitions, science & technology and economic geography (incomplete sentence?). As well as in European and national policy discussions there is ample attention to missions. Following on a period in which most actors trusted on market and network forces, again following a time of more centralized decision making. So it is not by chance that we focus on missions, but there are other modes of governance we might need to consider later on. See for instance PhD thesis Alwin Gerritsen (2019).

An open discussion in the literature is whether directionality is more important than diversity in transitions and how these should be balanced. In addition to missions. As stated in the above, recently there is much attention to directionality which is enabled through the formulation of missions. These missions provide focus and in economic development terms can be seen as part of a regional specialization strategy in which a region develops a socio-economic profile, which might be different from other regions.

Scholars have also highlighted the importance of fostering diversity in transitions (Stirling, 2007; 2009; 2010; Köhler et al., 2019) and mission-oriented innovation systems (Bulah et al, 2024). Diversity can be defined as "the value of nurturing more plural discourses and cultures around deliberate choice of portfolios of pathways for innovation, sustainable and development – allowing greater variety, dynamism and context-sensitivity in technological and institutional trajectories" (Stirling 2009: 5; in: Bulah et al 2024).

We mention this discussion because using a mission-oriented approach does not mean simply setting (policy) objectives. Because transitions face wicked problems and complexity that is often not an effective way to establish coordination, or it favours certain perspectives too strongly over others and is in danger of strengthening the incumbent instead of a transition. More promising is finding some kind of middle ground by using 'corridors of acceptable development pathways' (Weber & Rohracher, 2012), which leaves some options open while still offering directionality. This formulation of missions in a somewhat open-ended manner encourages experimentation and diversity, for which new forms of engagement and networks between actors are required (Schot & Steinmueller, 2018). This could enable new configurations of actors around a learning process towards transitioning.

2.1.6 Key elements of a mission-driven regional approach

The conceptual discussion so far explored the characteristics of a regional approach to accelerating sustainable food system transitions. It is the result of a first desk study and will be used to support the cases and to reflect upon them. Moreover, it is foreseen that the case reflections and further desk study will lead to adjustments and elaborations of the first conceptual framework that will be described in this section.

In a mission oriented regional approach to accelerating food system transformation, we distinguish the following key elements:

1.**The mission**. A mission's key characteristic is a measurable, ambitious and timebound objective, suitable for engaging diverse stakeholders in mission governance and in the development as well as the diffusion of innovative solutions (Kattel and Mazzucato, 2018). While it might be regarded as questionable whether these objectives really need to be measurable, the important takeaway is that they need to have a certain concreteness and that during its implementation it is regularly assessed and reflected upon whether the outputs, outcomes and impacts of the regional process is sufficiently going into the right direction and / or if the mission needs readjustment. The mission has as its key function to provide directionality to the activities undertaken, but also embraces diversity: '… missions are formulated in an open-ended way that encourages experimentation and diversity' (Schot & Steinmueller, 2018: 1564). Depending on the context a balance is needed between focus and variety in the mission so that the process can be transformative while enabling actors to cope with the complexities and wickedness of food system transitions. This touches in this particular context on what will be regarded as a sustainable food system and how this relates to the currently dominant regimes.

2.**The actor network**. A region is constituted by the individuals and organizations that participate in it. It consists of the relations between actors and possibly also between humans and biophysical material objects. These networks that can have multiple functions, such as learning and exploring, policy implementation, creating communication lines, etc. Regarding societal and technological innovation these networks are expected to be of a multi-actor nature, notably a Quadruple helix (Carayannis & Campbell, 2009) constitutes by representatives of businesses, public authorities, societal actors and knowledge and education. The exact composition will vary because of contextualities. Moreover, the regional actor network can partly be a given because of path-dependencies, the co-creation of a mission and the engagement in implementation activities can act as a region formation process.

3.**Coordination**. Regarding the acceleration of a transition, actor networks are coordinated in a learning-oriented manner in which (transdisciplinary) knowledge production, embedding and anchoring are of key importance, as well as the continuous review and adjustment of the mission (Gerritsen et al, 2018), e.g. through monitoring, learning and evaluation activities. The mission is a central element in this coordination. Within these networks, coordinating actors or groups, intermediaries, or transition teams can emerge to provide validation, comparison, and structuring of transition pathways (Elzinga et al, 2023). These enable other actions, such as changing regulations and policies, decisions to invest in the development and commercialization of certain solutions, etc. These networks are of a largely self-organizing nature, but will be influenced by other coordinating forces, such as those coming from public authorities and businesses, from within and from outside of the region.

4.The **regional characteristics**, current and future. The mission and actor network are anchored in a regional context. This context can variate enormously, but will be of great importance both from the perspective of the mission as of the actors that pursue them. The regional scope can be on bio-physical characteristics of a region and its interplay with society and food systems, on cultural, social or economic aspects, etc. This scope can overlap with the mission, but not necessarily. The regional characteristics include the coupling of the region to developments in other regions, to localities within the region and to national or global arenas.

5.**Pathways for change**. In relation to both the mission and the regional characteristics certain development directions will be identified. Again, these can be quite diverse in content, ranging from water management solutions to setting up novel value chains or governance mechanisms. As noted before, the regional approach that is proposed here has a direction, but leaves largely open what pathway will be the one that will create a transition. Pathways for change are directed at traversing the route between abstract ideas and sense of urgency into the domain of real-life testing in living labs and finally into adoption, upscaling and impact. This process is supported by systems change methodologies. Along the way new challenges will emerge, such as the capacity to implement innovations, for example in relation to the availability of educated professionals, or the availability of resources, such as data, funding, and regulatory obstacles.

2.1.7 Reference list

Andueza, L., Davies, A., Loftus, A., & Schling, H. (2020). The body as infrastructure. Environment and Planning E, 4(3), 799-817. https://doi.org/10.1177/2514848620937231 (Original work published 2021)

Brown, T. (2016). Sustainability as empty signifier: Its rise, fall, and radical potential. Antipode, 48(1), 115-133.

Bulah, B., K. Beumer, van Mierlo, B.C., Klerkx, L.W.A., Gerritsen, A.L., Hekkert, M. (2024). Friend or foe in sustainability transitions?: The interplay of diversity and directionality in the Wageningen-based Alternative Protein Innovation System (APIS). Science and Public Policy 51(6): 1075-1092.

Carayannis, E.G., Campbell, D.F.J. (2009). "'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem". International Journal of Technology Management. 46 (3/4): 201.

Chambers JM, Nel JL, Hille Ris Lambers R. (2020). 71 Visions on our role in social-environmental transformative change. Wageningen University & Research, Wageningen.

De Propris, L. & Bailey, D. (2021). Pathways of regional transformation and Industry 4.0. Regional Studies, 55:10-11, 1617-1629, DOI: 10.1080/00343404.2021.1960962

Edler, J., Matt, M., Polt, W., Weber, M. (2025). Transformative Mission-Oriented Innovation Policies. Edward Elgar.

Elzinga, R., Janssen, M.J., Wesseling, J., Negro, S.O., Hekkert, M.P. (2023). Environmental Innovation and Societal Transitions. Environmental Innovation and Societal Transitions 48.

Feola G (2015) Societal transformation in response to global environmental change: A review of emerging concepts. Ambio 44(5):376–390

Foray, D., Goddard, J., Morgan, K., et al (2012). Guide to research and innovation strategies for smart specialisation (RIS 3), S3 smart specialisation platform. Seville: Institute for Prospective Technological Studies (IPTS)-Joint Research Centre (JRC) of the European Commission.

Fuenfschilling, L. (2019). An institutional perspective on sustainability transitions. In: Boons, F. & McMeeking, A. (Ed.). Handbook of sustainable innovation. Elgar OnlineL 219–236.

Galt, R. E. (2013). Placing food systems in first world political ecology: A review and research agenda. Geography Compass, 7(9), 637-658.

Gerritsen, A.L., Kranendonk, R.P., Cofino, M., Lagendijk, A., (2018) Beyond the blind spot of knowledge-based territorial development: the mission of Metropolitan Food Clusters, European Planning Studies 27(1), p. 1-20.

Gitz, V., & Meybeck, A. (2011). The establishment of the High Level Panel of Experts on food security and nutrition (HLPE). Shared, independent and comprehensive knowledge for international policy coherence in food security and nutrition.

Goodman, D. (1999). Agro-food studies in the 'age of ecology': nature, corporeality, bio-politics. Sociol. Rural. Blackwell Publishers Ltd. 39 (1), 17-38.

Goodman, D., & Watts, M. (1994). Reconfiguring the rural or fording the divide?: Capitalist restructuring and the global agro□food system. The Journal of Peasant Studies, 22(1), 1-49.

Gregory, D. (2009). Regional Geography. In Dictionary of Human Geography (pp. 623-638). London: Wiley-Blackwell.

Guthman, J. (2008). Thinking inside the neoliberal box: The micro-politics of agro-food philanthropy. Geoforum, 39(3), 1241-1253.

Guthman, J., & DuPuis, M. (2006). Embodying neoliberalism: economy, culture, and the politics of fat. Environment and planning D: Society and Space, 24(3), 427-448.

Henderson, G. (2009). Region. In Dictionary of Human Geography (pp. 623-638). London: Wiley-Blackwell.

Jarosz, L. (2009). The Political Economy of Global Governance and the World Food Crisis: The Case of the FAO. Review (Fernand Braudel Center), 32(1), 37–60. http://www.jstor.org/stable/40647788

Jones, M. (2022). For a 'new new regional geography': plastic regions and more-than-relational regionality. Geografiska Annaler: Series B, Human Geography, 104(1), 43–58. https://doi.org/10.1080/04353684.2022.2028575

Kattel, R. and Mazzucato, M. (2018). Mission-oriented innovation policy and dynamic capabilities in the public sector.Industrial and Corporate Change, 27 (5), pp. 787-801.

Levins, R. (2008). Dialectics and systems theory. In Dialectics for the new century (pp. 26-49). London: Palgrave Macmillan UK.

Li, T. M. (2015). Can there be food sovereignty here?. Journal of Peasant Studies, 42(1), 205-211.

Loorbach D, Frantzeskaki N, Avelino F. 2017. Sustainability Transitions Research: Transforming Science and Practice for Societal Change. Annual Review of Environment and Resources 42:599–626.

Lundvall, B.A. (2016). The Learning Economy and the Economics of Hope. Anthem Press: London/New York.

Malabou, C. (2010). Plasticity at the Dusk of Writing: Dialectic, Destruction, Deconstruction. New York: Columbia University Press.

Malabou, C. (2012). Ontology of the Accident: An Essay on Destructive Plasticity. Cambridge: Polity

Marsden, T., Morley, A., 2014. Sustainable Food Systems: Building a New Paradigm. Routledge, London.

Marsden, T., Munton, R., Ward, N., Whatmore, S., 1996. Agricultural geography and the political economy approach: a review. Econ.

Geogr. 72 (4), 361-375
Mazzucato, M. (2018). Mission-oriented innovation policies: challenges and opportunities. Ind. Corp. Change 27, 803–815.
McCarthy, J. (2012). Political ecology/economy. The Wiley-Blackwell Companion to Economic Geography, 612-625.
Mommer, Liesje & Nel, Jeanne & Van Apeldoorn, Dirk & van Hattum, Tim & Jones-Walters, Lawrence & Polman, Nico & Richter, Andries & Westerink, Judith. (2023). Nature-positive futures Food systems as a catalyser for change. 10.18174/574286.
Moragues-Faus, A., & Marsden, T. (2017). The political ecology of food: Carving 'spaces of possibility' in a new research agenda. Journal of rural studies, 55, 275-288.
Neumann, R. P. (2010). Political ecology II: theorizing region. Progress in Human Geography, 34(3), 368-374.
Nguyen, H. (2018). Sustainable food systems: Concept and framework.
Paasi, A. (2009). Regional geography I. International encyclopedia of human geography, 9, 214-227.
Paasi, A. (2022) Examining the persistence of bounded spaces: remarks on regions, territories, and the practices of bordering, Geografiska Annaler: Series B, Human Geography, 104:1, 9-26, DOI: 10.1080/04353684.2021.2023320
Redclift, M. (2005). Sustainable development (1987–2005): an oxymoron comes of age. Sustainable development, 13(4), 212-227.
Schot, J. & Steinmueller, W.E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. Research Policy 47 (9), 1554-1567.
Terwisscha van Scheltinga, C., Reinhard, S., Kieu, N. D., & Verhagen, J. (2025). Deltas under pressure–addressing complex water and food challenges in deltas using a food systems approach. International Journal of Water Governance, 12.
Uyarra, E., Bugge, M.M., Coenen, L., Flanagan, K., Wanzenböck, I. (2025). Geographies of mission-oriented innovation policy. Environmental Innovation and Societal Transitions: https://doi.org/10.1016/j.eist.2025.100970
Van Berkum, S., Dengerink, J., & Ruben, R. (2018). The food systems approach: sustainable solutions for a sufficient supply of healthy food (No. 2018-064). Wageningen Economic Research.
Verhagen, J., Elzen, B., Koopmanschap, E., Reinhard, S., Verburg, C., Naranjo Barrantes, M., Beekmann, K., Creusen, R., Debrot, D., Klapwijk, L., Siegmund-Schultze, M., Veldhuizen, A., Wilbers, G., Nguyen Hong Tin, Dang Kieu Nhan, & Terwisscha van Scheltinga, C. (2022). Deltas under pressure, guidelines to facilitate transition pathways. (Report Wageningen Plant Research; No. WPR-1121). Wageningen Plant Research. https://doi.org/10.18174/557946
Wanzenböck, I., Wesseling, J.H., Frenken, K., Hekkert, M.P., Weber, K.M. (2020). A framework for mission-oriented innovation policy: alternative pathways through the problem–solution space. Science Public Policy 1–29.
Winter, M., 2003. Geographies of food: agro-food geographies-making reconnections. Prog. Hum. Geogr. 27(4), 503-13.

2.2 Findings regarding methodology for complex systems change or transformative change methodologies

2.2.1 Setting the methodological scene: societal challenges

The previous section introduced the project's understanding of key concepts and the choices made with regard to its perspective on regional approaches that ReAP has developed in the first half of 2025. It stresses the importance of missions in coordinating the transitioning towards sustainable food systems. For transitioning towards sustainable food systems, of course, processes of deep change are required. Hence, this section deals with methodologies that can be used in mission-oriented regional approaches to accelerate food system transitions. The findings presented here derive from two connected streams of literature: complex system change and transformative change. Both streams of literature start from the assessment that food systems are facing a number of great challenges that are oftentimes interconnected and coupled, and for which there are no clear-cut answers or solutions. These challenges are therefore sometimes called wicked problems requiring complex system change or transition. Wicked problems are first coined in 1973 by Ritter and Webber[6], and because of their likeness, are often used interchangeably with complex adaptive systems[7]. However, notwithstanding their resemblance, it is their complementarity rather than overlap that helps think through the methodological consequences. This is because each concept points to different traits or aspects that need to be addressed in a methodological approach. We will come back to this in the section on *Methodological implications*.

Wicked problems[6]	Complex systems[7]
• They do not have a definitive formulation. • They do not have a "stopping rule", that is, these problems lack an inherent logic that signals when they are solved. • Their solutions are not true or false, only good or bad. • There is no way to test the solution to a wicked problem. • They cannot be studied through trial and error. Their solutions are irreversible so, as Rittel and Webber put it, "every trial counts." • There is no end to the number of solutions or approaches to a wicked problem. • All wicked problems are essentially unique. • Wicked problems can always be described as the symptom of other problems. • The way a wicked problem is described determines its possible solutions. • Planners, that is those who present solutions to these problems, have no right to be wrong. Unlike mathematicians, "planners are liable for the consequences of the solutions they generate; the effects can matter a great deal to the people who are touched by those actions."	• Multiple stakeholders • No definite definitions • Absence of linear causality • No optimum solutions • Liminality • Uncertainty • Path-dependency

Table 1: Characteristics of Wicked Problems and Complex Systems

[6] In 1973, design theorists Horst Rittel and Melvin Webber introduced the term "wicked problem" in order to draw attention to the complexities and challenges of addressing planning and social policy problems. Unlike the "tame" problems of mathematics and chess, the wicked problems of planning lack clarity in both their aims and solutions. In addition to these challenges of articulation and internal logic, they are subject to real-world constraints that prevent multiple and risk-free attempts at solving. As described by Rittel and Webber, wicked problems have 10 important characteristics.
What's a Wicked Problem? | Wicked Problem

[7] Systems Change - Observatory of Public Sector Innovation. For quick read see: CST_Policy_Complex Adaptive Systmes-Web

Given their innate characteristics, such the involvement of multiple stakeholders and the absence of definite solutions and linear causality, food systems are complex adaptive systems. Food Systems transition (or transformation) entails engaging with wicked problems as, for example, there are no definitive formulations or stopping rules.

> In food systems, there are many actors and variables at hand. These interact with each other in unpredictable, and uncontrollable ways. As different actors have different perspectives, interests, values and encounter different obstacles and risks there is no one solution, or pathway to change. There are -positive and negative- couplings between different levels or scales in food systems. Hence, a food systems analysis or mapping helps to broaden the scope of analysis and action.

Positioning the ReAP project: regional approaches to take on Food systems as a societal challenge

The ReAP project is about using regional approaches to accelerate Food Systems Transition.

Food Systems transition?

Regional Approaches to accelerating FST

1. Unstructured - Need for knowledge development + changing-on-the-go
2. Region formation, but no agreement on values and pathways, maybe on direction and mission (dot-on-horizon)
   a. Need to strengthen ownership
   b. Valuing and including different knowledge
   c. No one truth and no one solution: process as important as dot-on-horizon in region formation

Box 1 Food systems transition

A short recap:

The central working hypothesis with which the ReAP project started out is that the region is the scale that allows actors to feel connected with and can encourage agency and ownership. At the same time, the regional scale is also hypothesized where enough 'mass' and energy can be mobilized to accelerate a food systems transition.

We see region formation or strengthening as the basis for regional Food systems transition as it entails multi-stakeholder processes of co-creation which strengthen agency and ownership, as well as mobilize mass and energy. By definition, this cannot be designed or planned in a linear way, but should evolve along an iteratively, adaptive path. Underlying this path are the methodological principles of transformative change methodologies. This is the subject of the next section.

2.2.2 Methodological implications when taking on societal challenges

However, whatever term – complex adaptive systems or wicked problem - you use is less important than the characteristics of those societal challenges (including food systems transition) and the methodological implications they bring. First hint of those implications for the methodology come from two frameworks that are often used when dealing with complex adaptive systems or wicked problems, and that can act as lenses to understand what is going. These two frameworks are:

1. Hisschemoeller and Hoppe
2. Cynefin framework

The first framework (Hisschemoeller and Hoppe, 1996) describes two axes, which are: the degree of agreement on norms and values; and the degree of certainty on required and available knowledge. With these two axes four quadrants are created of structured, moderately structured and unstructured problems. Wicked problems and complex adaptive systems both pertain to the quadrant of unstructured problems. The second, the Cynefin framework also describes four quadrants of situations at hand, ranging from simple to chaotic. The framework also provides generic guidance to steps to follow in a methodological approach.

Figure 2. The Cynefin Framework (Kurtz & Snowden, 2003)

Especially, the Cynefin framework can help bridge the characteristics described above by the concepts of Complex Adaptive Systems and wicked problems, and the implications for the methodology. This is presented in the below table in the form of "If…then questions" and "So, therefore…" answers.

If...then	So, therefore...
If there are multiple stakeholders and no definite definitions of a wicked problem, then…	We need to approach societal challenges as multi-actor processes and take into account that what is a problem and what a possible solution (and what can be a road towards that) differs from actor group to actor group
If there is an absence of linear causality, then….	An emergent approach makes more sense than using a linearly planned process. Hence, there is a need to design an adaptive and iterative way of working in which collective reflection and learning has a central role. Also, past knowledge is only of limited applicability for a desired future as the assumption "I have done this with that result, therefore if I do it again then…" is generally false. The future is unknown. So, you need to probe and innovate as you go.
If uncertainty rules, then…	One cannot roll out a process. Hence, learning plays: a key role understanding what works, why and whether you are moving in a desired direction .
If path-dependency dominates, then…	Path-dependency requires an acute awareness and understanding of the context, among others, its historical and cultural aspects.

If...then	So, therefore...
If there are no optimum solutions, then…	With the diversity in perspectives and interests, the methodology needs to build in ways to bring out multiple voices, and balance interests (and power). There are various methods that can do that.
If problems, pathways and solutions are characterised by liminality, then….	Conventional M&E systems that are based on measurable indicator-oriented data collection are of little use compared with situations where a road is clearly visible and results are tangible. Collective reflection and sense-making, bringing together joint wisdom and knowledges, charting a path as you go is a better option. This should be built into the methodology as the backbone component: of collectively monitoring what is going on (and why), learning what works and what not (and why), and making sense of what that means for a course-correct or charting a new route.

Table 2: Translating Complexity Traits into Methodological Responses (Table by Wenny Ho, 2025)

Summarised in one simple line:

> When engaging with systems change (e.g. transition, transformation) the methodology has to generate and support emergent practices by stringing together methodological components of: Probe - Sense – Respond.

Methodological implications for ReAP approach

Implications for methodology:

Regional approaches

- Methodology is to support the process:
  a. Dot-on-the Horizon (Mission)
  b. Region formation: strengthening collectivity - ownership, learning, understanding, etc.,

(Food systems) Transition

- Transition = More than plan-Do-Act-Check: towards Deep Change - Niche/Experiment + Enlarging + Breaking down

Accelerating

- Action-oriented research implies action-reflection cycles building on increased understanding

Box 2 Implications for methodology

In the previous section, we have seen how regional approaches are thought to accelerate food systems transition. For that to really happen, a process design is needed that strengthens acceleration. This is essential as the **What** needs to be accompanied by the **How** in order to contribute to transformative change. Such process design brings with it three methodological implications (see box 2):

1. For a methodology to support ***regional approaches***, it needs to unequivocally generate a progressive process by:
   a. working with the concept of a collectively defined mission. This means that the methodology is to have an innate iteratively cyclical character, instead of a linearly phased design (e.g. from phase 1 to 5);
   b. supporting region formation through enabling collectivity (ownership, understanding, collaboration etc.). This means that the methodology has to build in collective principles, such as, collectively building a mission or a theory of change, instead of outsourcing this to a core team, or a consultant;

2. For a methodology to support a ***transition or transformational change***, it needs to:
   a. Generate an implementation process beyond a simple PCDA or Plan-Do-Act-Check cycle by explicitly incorporating and organizing for collective learning, and reflection and sense-making.
   b. The guiding question for learning, and reflection and sense-making is how to generate and enlarge deep change from a niche space. The How relates both to what should be done more, and what should be done less (or not at all).

3. For a methodology to support accelerating food system transition, it needs to:
   a. Support researchers in designing and implementing action-oriented research that generates closely connected cycles of increased collective understanding of how acceleration of food system transition can work in a certain context.
   b. This is intimately connected with what is stated under #1 and #2, as insights emerging through the collective learning and reflection and sense-making are then to be used for intermediary course adaptation towards a mission. In fact, this concretizes the idea of a progressive process (see #1). The mission can be expressed in a shared theory of change, with adaptations applied to revise hypothesized pathways.

So, three extra collective steps are to be incorporated in the cyclical process of Probe-Sense-Respond, to turn it into a progressive transition process towards a mission.

Those three collective steps are: learning, reflection and sense-making, and course (pathway) adaptation.

Required: three extra collective steps

Actionable knowledge?

This all has implications for the roles of researchers and research, and their supporters. Research findings will not only have to find their way into peer-reviewed journal articles, but will also be explicitly used in collective learning, reflection and sense-making. Of course, the 'collectivity' changes according to the region formation process for food systems transition acceleration. It will differ in time and from region to region. For researchers, the above implies that they cannot remain 'pure' scientists (as in: objective and distanced observers) all the time, and will include action research methods principles in the (re)design of their research methodology[8].
This is elaborated further in the next paragraphs.

[8] There is an impressive body of literature on action research, see among others:
Choice and Quality in Action Research Practice - Peter Reason, 2006. For a good introduction, see: front_tab_request_v3.pdf

2.2.3 What then are the overall methodological principles for ReAP?

With the above, we can now accompany the key concepts of Regional approaches, Food Systems, (accelerating) Transition with general methodological principles for the research that is to be undertaken in the four case countries (Netherlands, Bangladesh, Ukraine, and India).

How these general methodological principles will guide the research in each case will depend on the context in which the case is situated, the region selected and the process of region formation, the stakeholders involved and their perspective on food system transition. Hence, for each case, these general methodological principles will need to be further contextualized. E.g. the differences in stakeholders involved in Bangladesh and India will need to be operationalised in how collectivity is shaped in the reflection and sense-making design. At the same time, how that contextualization plays out will needs to be captured, so it can feed into the theory and methodology building of the ReAP project's overall goal of strengthening understanding about regional approaches to accelerate food systems transition.

A quick scan of the literature on transformative change methodologies surfaced a bewildering range of methods, tools and instruments emerges. They include many lists of principles and criteria. By crossing out the overlap in these many lists, we have brought it down to the three foundational and mutually reinforcing methodological principles (Box 3):

1. **Iteration** Rather than following a linear process, iteration refers to a progressive process of continuous design and redesign to incorporate emerging lessons and insights. A progressive process requires building on collective sense-making of insights from learning and reflection of what works or not in the region formation. To know what works or not, and why, monitoring plays an important role as it provides the input for learning and reflection. Such process focuses on enlarging and scaling niches or experiments with transformative potential (rather than creating lock-ins). Iterative is intimately linked with adaptive.

2. **Co-creation** Importantly, food systems transition has a strong normative component, among others, based on values of justice and fairness. This means, for example, that supporting the collectivity dimension of region formation requires strengthening space for and inclusion of multiple perspectives of stakeholders. Co-creation is therefore not just a buzzword. While selection of stakeholders to involve depends on the process and context, special care has to be taken to include voices of unusual or unseen actors. Even though co-creation, for example, of future food systems vision, pathways or solutions, is a key methodological principle, co-creation and ***inclusiveness*** need to go hand-in-hand.

3. **Scaling** The central proposition of the ReAP project is that the regional level allows for accelerating food systems transition, by converging and synergizing otherwise isolated pilots and initiatives, thus mustering energy and mass to accelerate. Scaling and ***enlarging*** are therefore two sides of the same coin, and together support ***accelerating*** transitions.

Transition into methodological principles

Regional approaches

- Design and redesign - as you go and learn about the mission and region formation process

Food System transition

- Co-creation, multiple perspectives (including unusual vs entrenched voices)
- Enlarge (scale) experiment with transformative potential

Accelerating

- Monitoring where you are heading = dot-on-horizon;
- (Collective) learning what works and what not, and what should disappear (adaptive iterative design)

→ **Mutually reinforcing principles**

Box 3 Translation into Methodological principles

2.2.4 Transformative change methodology for ReAP with bonus references and examples

Some useful references (and there are many, many more)

Below are some useful references, to read at your leisure. It provides further background and context to what has been described in the previous pages.

Nevertheless, the choices that the ReAP project is making including about our two working hypotheses, about regional approaches and about the accelerating potential of using a transformative change methodology, those are ours. Inasmuch as possible, we ourselves will also apply the three foundational transformative change methodological principles to how we aim to work in order to follow the effects of these choices, and course-correct when necessary (see Chapter III).

Systems Change - Observatory of Public Sector Innovation A site to wander around with a clear definition on Systems change (from OECD perspective) many definitions, and links to useful toolkits. Also, a playbook, toolkit navigator (compendium), a case study library, and a knowledge hub. Other links accessible via the site that are of special interest and relevance are:

1. Cookbook for systems change – Nordic innovation strategies for sustainable food systems) Focused on food systems change, from a mission-driven innovation approach. Food systems change examples from Nordic countries
2. Transformative Innovation Policy Resource Lab - Observatory of Public Sector Innovation A wealth of resources on tools, interactive canvasses and narrative guides on: 1/ Systems, anticipation and transformative theory of change, 2/ Experimentation in policies and programmes; 3/ Evaluation using transformative outcomes; 4/ Capabilities - personal, organization, and facilitating contestation; 5/ Knowledge communities and infrastructures

designing-missions.pdf A clear and concise practice guide on mission driven innovation

rsa_from-design-thinking-to-system-change-report.pdf A site on design thinking and the link with systems change, with a range of resources, on creative tools and more conceptual work.

Transformation Guidance_GIZ_02 2020.pdf Description of transformative interventions, and of design principles. Includes clear figures, and examples of transformations.

CoP guidebook – wenger-trayner The ultimate guide on Communities of Practice from the founders of CoP thinking and practice

Examples of transformative change methodologies that will be used in ReAP

In situations that are very complex (wicked) there is a need to use methodological tools that contribute to transformative change. Here we present four examples of which examples 2 and 3 are tools that have been specifically developed and applied for use in regions:

1. Reflexive Interactive Design
2. Regional canvas
3. Societal readiness assessment framework
4. Guidelines for agricultural system change in Deltas.

Example 1: Reflexive Interactive Design

Reflexive Interactive Design (RIO) will be used in the Netherlands case[9]. As RIO has not been developed for use in regional approaches, the aim of the case is to lay the foundation for that. A detailed description can be found there (Chapter 3).

Example 2: Regional Canvas

The regional canvas, was proposed by Kranendonk & Schrijver (2021) under the name of Cluster canvas and was inspired by the business model canvas, but adjusted to use for mission driven regional development processes. Its use is most effective in settings where different actors each have objectives and activities, but because of a fragmented ecosystem no one really has an overview while coordination of activities is at a low level. The canvas can also be used to identify key topics for strategizing how to handle new developments, threats or opportunities.

<table>
<tr>
<td rowspan="2">Actors
Who are the key actors dealing with sustainable food systems in your region?
What actor domains are present? Public, private, knowledge, education, society
Whch actors are missing?
What are the formal responsibilities and competences of involved partners
How is interaction between different actors coordinated? Is there a network or cluster organization?
Is a network or an organization available for coordinating and implementing SFS and the regional mission?
How is this organization acting and how is this organization discovering how to optimally manage the transformation?</td>
<td>Initiatives and activities
To what extend regional partners are interacting (dialogue) and collaborating on SFS design and implementation?
What activities are initiated to foster the NBS in your region? By whom, which scale?
Phase of development of NBS implementation (idea, exploration, testing/ demonstrating, implementation)</td>
<td rowspan="2">Mission
What SFS objectives do regional actors share and what are the differences?
Do your region have a shared mission on climate adaptation?
What are the elements of the mission?
How well is the mission (policies, strategies) strategy anchored in civil society and within the strategies and activities of other partners</td>
<td>Pathways
What is needed in your region to become resilient for climate change?
How can regional characteristics and qualities being optimally used and utilized?
Which are the strategic options for developing the pathways?</td>
<td rowspan="2">External influences
What kind of external influences will impact your near and more distant future? (Climate change effects, EU or national policies etc)
ARE SFS’s embedded in society?</td>
</tr>
<tr>
<td>Resources
How are SFS activities financed? Is funding available for initiatives and investments in climate adaptation?
What capacities are available for NBS design and implementation, in terms of human capital, knowledge, skills?
Availability of facilities and infrastructure for SFS testing, demonstration and implementation.</td>
<td>Channels
Which means do you have to communicate, and strengthen the relationships with your mentioned key partners and citizens?
Is the mission or the regional strategies for SFS visible to core actors and citizens? And outside the region?
How are these key messages disseminated?</td>
</tr>
<tr>
<td colspan="3">Challenges and obstacles
What are the current challenges and obstacles for NBS design and implementation?
Please list at least 3 challenges/obstacles providing some contextualization.
Please provide relevant example at different level, such as policy, strategic planning, funding, participation, community support, etc.</td>
<td colspan="3">Opportunities and enablers
What are the regional strengths, opportunities and comparative advantages for NBS design and implementation in your region? What are the main enabling factors of regional climate adaptation, its mission and supporting activities?
What are the opportunities to develop further the regional transformative adaptation journey, its pathways and supporting activities?
What are needed outputs and outcomes for the short term?</td>
</tr>
</table>

Table 3: Regional Canvas (NBRACER version, modified for sustainable food systems) (Kranendonk et al., 2021)

[9] Reflexief Interactief Ontwerpen (RIO)

Example 3: Societal Readiness assessment framework

The Societal Readiness (SRL) assessment framework has been developed as an addition and partly replacement of the Technological Readiness Level framework and with the bioeconomy in mind. It was proposed by Kranendonk & Schrijver (2021) and further elaborated in the Horizon Europe BIOLOC project. In contrast to other proposals for societal readiness approaches, it doesn't start from the Technological Readiness Framework but builds upon the Multi-level transition framework (Geels, 2002). It distinguishes five domains of societal readiness: Regional Network Readiness (RNR), Market Readiness (MR), Public Support Readiness (PSR), Skill Readiness (SR) and Ethical and Cultural Readiness (ECR). The bioeconomy is a domain in which the focus is very much on technological solutions, but hardly any innovations reach maturation. Adoption of innovations by the market is very limited. The SRL framework is meant to explore the key issues that need to be arranged to reach maturation. It has been tested in the BIOLOC project and it was concluded that it is of high value for actors do know where they stand, to identify key issues to arrange and to identify potential future bottlenecks (Schrijver, Gerritsen & Kranendonk, in prep.).

Questions				
Network	**Market**	**Support**	**Skill**	**Culture**
Are (required) conditions satisfied regarding the organization of Q-helix? - If not: what needs to change? - Is a mission formulated?	- Are enterprises within the region already involved in the technology? - If so: to what extent/ at what scale?	- Need there be regulatory changes? - Need there be changes in business climate in order to attract more business? - If so: which?	- Are education and training facilities within the region up to the required level? - Is enough skilled labour available?	- How often does the innovative technology appear in the media?
- What are the terms to acquire access to the Q-helix network? - How is the network connected to other networks (both horizontally in the region as vertically to global networks)	- How difficult (or easy) is it to attract external capital for investments? - Does the mission / initiative encounter a level playing field with traditional products? - Are there any problems with the pricing of the produce?	- Does the support that is being offered match with what the mission asks for? - How much support is offered and in what form? E.g. payments for services, subsidies, knowledge support, with rules and regulations, taxes on less sustainable practices	- Are necessary education and training facilities within the region established? - How are the job opportunities?	- How can the debate be interpreted? (controversial or not)
- How much protection or lobbying does the network (still) need against traditional counter forces? - Are any changes foreseen in the current mission or network composition? - Are there barriers for further expansion of the network?	- Are there any scale issues? - If so: Is the cause of these issues known and resolvable in the near future? - Is there a valid business model without unsecured long term public support?	- To what extent are new arrangements (rules and regulations) evolving around the new technology?	- To what extent are education and training facilities directly involved in the mission?	- Is a regional specialization developing or evolving around the new technology or technologies?

Questions				
Network	**Market**	**Support**	**Skill**	**Culture**
- Is the network still growing? - When was the network established? - How many changes do occur?	- Is regional technology uptake still growing? - At what pace? - what share of the regional market is foreseen once the technology is fully matured? Do people make a living with the technology?	- Is the system of rules and regulations regarded as fitting? - To what extent are sanctions deemed necessary? What are the transaction costs to uphold the system?	- In terms of educational level (i.e. regarding requirements for handling the technology): Where does the region stand in comparison with other regions?	- Are ethical issues still in discussion? - Are people identifying with the technology?
- What is the scale of the network? - Can it be considered an established niche or even mainstream?	- does technology encounter better alternatives and is it out-competed?	- Is there still a societal request for an urgent system change?	- How to prevent falling behind? - Is proper monitoring in place?	- Are people looking forward to new technology?

Table 4: Societal Readiness Assessment framework (Schrijver, Gerritsen & Kranendonk, in prep.)

Example 4: guideline for agriculture system change in Deltas

The Guidelines for agricultural system change in Deltas describes a process of searching and formulating possible transition pathways for food systems in a delta environment. The aim is to provide a framework that clarifies the linkages between the different disciplines in analysing such pathways. The framework may also be helpful for other stakeholders, like policy makers, private sector parties, NGOs, farmers groups and individuals involved. By placing research in context, the framework helps researchers to increase the impact of their activities, as the connections between the different research activities and critical intervention points become evident (Verhagen et al., 2022).

Guideline for agriculture system change in deltas

1. Analyse
2. Understand
3. Prioritise
4. Develop pathways for transition
5. Strategic action
6. Implement
7. Monitor, adapt and learn (cross-cutting)

Box 4. Guideline for agriculture system change in deltas

2.2.5 Reference list

Conway, R., Masters, J., & Thorold, J. (2017). From Design Thinking to Systems Change: How to invest in innovation for social impact (pp. 1–33). RSA. Retrieved from https://www.thersa.org/blog/2017/07/from-design-thinking-to-system-change

Cook, J. W. (2015). Observatory of Public Sector Innovation. OECD. Retrieved from https://oecd-opsi.org

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (2020). Getting ready for transformational projects: Guidance on transformative interventions and design principles (GIZ Guidance Document No. 02/2020). GIZ. Retrieved from https://www.giz.de/expertise/downloads/Transfomation%20Guidance_GIZ_02%202020.pdf

Halloran, A., Wood, A., Aguirre, F., & Persson, M. (2020). Cookbook for systems change: Nordic innovation strategies for sustainable food systems (Nord2020:048). Nordic Council of Ministers. https://www.norden.org/en/publication/cookbook-systems-change-nordic-innovation-strategies-sustainable-food-systems

Hill, D., Eno, B., Glaser, P., Halloran, A., Mazzucato, M., Isaksson, D., Melander, A., Steinberg, M., Trollbäck, J., & Wood, A. (2022). Designing missions: Mission-oriented innovation in Sweden – A practice guide by Vinnova (Vinnova Publication No. 2022:02). Vinnova. https://www.researchgate.net/publication/360723193

Hisschemöller, M., & Hoppe, R. (1996). Coping with intractable controversies: The case for problem structuring in policy design and analysis. *Knowledge and Policy, 8*(4), 40–60. https://doi.org/10.1007/BF02832229

Kranendonk, R. P., & Schrijver, R. A. M. (2021). Regional bioeconomy: From conceptual frameworks to management approach. In Proceedings of the 1st International Conference on Water Energy Food and Sustainability (ICoWEFS 2021). Wageningen Research.

Kranendonk, R. P., Bos, H. L., Gerritsen, A. L., Kootstra, A. M. J., Harmsen, P. F. H., van den Eijnde, J., & Veenhoven, T. (2023). D1.1 - Section 1 - Theoretical Framework Engage4Bio. Engage4BIO.

Kurtz, C. F., & Snowden, D. J. (2003). The new dynamics of strategy: Sense-making in a complex and complicated world. IBM Systems Journal, 42(3), 462–483. https://doi.org/10.1147/sj.423.0462

Schrijver, R., Gerritsen, A.L., Kranendonk, R.P. (in prep.). Description, uses and guidelines of the Societal Readiness framework. Annex to BIOLOC report.

The Cynefin Co. (n.d.). Field guide to managing complexity (and chaos) in times of crisis. Cynefin.io. Retrieved July 16, 2025, from https://cynefin.io/wiki/Field_guide_to_managing_complexity_(and_chaos)_in_times_of_crisis

Miörner, J., & Binz, C. (2021). Agricultural transition: Niche and regime knowledge systems' boundary dynamics. *Environmental Innovation and Societal Transitions, 40*, 104–123. https://doi.org/10.1016/j.eist.2021.07.004

OECD Observatory of Public Sector Innovation (OPSI). (n.d.). Systems Change. Retrieved August 15, 2025, from https://oecd-opsi.org/guide/systems-change/

Observatory of Public Sector Innovation. (n.d.). Transformative Innovation Policy Resource Lab. OECD. https://oecd-opsi.org/toolkits/transformative-innovation-policy-resource-lab/

Pielke, R. A. (2012). *The honest broker: Making sense of science in policy and politics*. Cambridge University Press. https://doi.org/10.1017/CBO9780511818110

Reason, P. (2006). Choice and quality in action research practice. *Journal of Management Inquiry, 15*(2), 187–203. https://doi.org/10.1177/1056492606288074

Wenger-Trayner, E., & Wenger-Trayner, B. (n.d.). Communities of practice: A guidebook. Retrieved from https://www.wenger-trayner.com/cop-guidebook/

2.3 Twinning Key Concepts and Transformative change methodologies: towards a conceptual model

An important starting point and reference for food system transition is the 'Cookbook for systems change: Nordic innovation strategies for sustainable food systems' (Nordic Council of Ministers, 2020). Important for ReAP, because low and behold, it focuses on mission-driven innovation strategies for working with food systems as complex and dynamic systems. It provides great examples and explains the central role of experimentation, or probing as we have seen in previous sections. However, it does not provide good insight into regional approaches, which is where ReAP comes in, by generating insights from different contexts and food systems transitions, and twinning that with further strengthening of our conceptual and methodological basis that we have laid out in this inception report.

In the next chapter, we present a brief description of each case workplan.

Chapter 3 Summary of research cases (WP2)

3.1 Introduction to the cases

The ReAP team engages with a variety of case studies to address the research question of the project, to explore in which way regional approaches can lead to acceleration of food system transitions. Also, the different case studies and contexts encourage us to continuously exchange and learn from each other. In order to enable the reader to position these different cases in one glance, the below table 5 presents them in relation to our main concept of regional approaches in food system transition, and the methodological approach proposed.

	Regional approach (In combination with the next column)	**Regional approach in food system transition**	**Methodological approach**
NL (WLR)	A regional interactive design approach	Scaling food system transition, multistakeholder; design of future vision of food system (in peat meadow areas.	Upgrading/developing the Reflexive Interactive Desing (RIO) approach as a regional approach. Reflection and formulating ways forward
India	Regional social-economy ecosystems	Business led Protein transition	Among others Canvas
Bangladesh		Scaling water and food system interactions, public sector	Creating vision and pathways, based on reflection
Ukraine		Food system transition after (war) interruption	Creating vision and pathways, use of data

Table 5: The overview of case studies

3.2 Netherlands case[10]

The Netherlands case focuses on the development of a regional interactive design approach. It builds on the Reflexive interactive design (RIO) methodology. In 2010, RIO was developed mainly within the livestock domain and applied at different levels, e.g. the barn, the sector, the region, etc. This case will serve for upgrading of it as an approach that can support food systems transitions from a regional perspective. Insights from the regional approach applied in the Topsectorproject Perspective in the Polders (Perspectief in de Polders) will be used to enrich the reflection on this upgrading. Empirical analyses are conducted through the analysis of four processes in which multistakeholder networks designed sustainable future visions for the Dutch peat meadow areas.

Activities planned for 2025:

Time Period	Activities
Q1-2	Synthesis and analysis of results of previous process in 2023-2024, among others description the four areas, of the process approach, future visions, lessons Interviews with key stakeholders.
Q3	Interviews with key stakeholders, or (focus) groups workshops on opportunities, obstacles and challenges for future perspectives.
Q3-4	Participate in 8th International Farming System Design Conference - August 25-29th Reflection with researchers of sister project Perspectives in the Polders to further Rio as an approach Analysis of results: organising for regional food systems transitions using a design approach, and validation interviews Enrichment of desk studies (undertaken in inception phase) WLR report and workplan 2026 within KB ReAP

Table 6: Dutch case activity plan 2025

[10] For more information, see Annex

3.3 India: Value chain transformation to multi-agency food systems transition. The case of Tempeh as a business-led regional approach

Case background

Regions form the scale where sufficient energy and critical mass for a transition could be generated while being less 'abstract' than, for example, international food systems. Regions face challenges on Food system transition and are looking for promising directions. These are starting points for exploring how a regional approach to food systems transition can work, and the roles that knowledge could play in that process.

In general, Food Systems transition in India involves a transition from carbohydrates to protein and from low to high protein foods. How that can be achieved sustainably through a shift to tempeh as a plant-based protein dense food product, while addressing also some inequalities of the food systems, will be explored in this case. It explores the shift from a (international) value chain approach to food systems transition. It connects the local with the regional, state, and international scales, taking the Bengaluru regional food system as a start. With CFSS and associated companies at its centre, as a business-led development process it stands separate from the other ReAP cases, and is therefore expected to contribute different knowledge.

Figure 3. TempehTech containers being loaded (Source: Schouten Europe)

Mission: Transitioning to a food system from carbohydrates and low protein to protein dense food products through a regional ecosystem built around a socially-oriented business-led development process.

Case problem analysis and objectives

Schouten Europe BV is a leading provider of innovative Business to Business (B2B) products with novel plant-based protein food commodities. It services worldwide food manufacturing, retail and food services companies. Henk Schouten, its chairman, started exploring opportunities in India to manufacture and market meat analogues. After a number of unsuccessful attempts, he founded Community Food Systems and Services (CFSS)[11] to embark on the manufacturing and marketing in India of Tempeh, a fermented soy-bean product, originated in Indonesia that has potential to replace the popular Paneer cheese and become part of Indian/Karnataka food culture. While soy is a well-known food product in India, it is mainly used as edible oil and the application in Tempeh is a new one. Through food influencers as chef cooks (marketing) Tempeh is being positioned as an Indian food that can be prepared as the consumer prefers.

While combining food manufacturing quality with sustainable production is Schouten Europe's hallmark, in India, CFSS aims to distinguish itself from domestic players in the market, by engaging with issues related to SDG 2 (End Hunger) and SDG 12 (Responsible Production and Consumption). Rather than following a conventional linear value chain approach, CFSS is moving its business approach towards a multi-scalar (eco)system approach. This process of experimentation and innovation is characterized by localization and regionalization (in India) to enable it to make inroads at the national level, while at the same time being part of the global value system and maintaining linkages with the Netherlands through safety standards and Research & Development.

[11] CFSS B.V. is the company behind Tempeh Today: Tempeh today - Tempeh today

CFSS has been experimenting with ways to create a regional production, manufacturing and marketing ecosystem in which it experiments, among others, with trained female entrepreneurs operating so-called Micro Fermentation Units[12]; testing product lines for local, domestic, and international markets; engaging soy-bean producers and reaching out to state-level government agencies. However, the scaling from small and rather patchy and diverse pilots to a cohering growth path towards a viable multi-scalar ecosystem and network with outreach at national and international level, has posed challenges that CFSS on its own has been unable to surmount. Over time, CFSS has proactively mobilized and engaged a number of Dutch, international and domestic partners for its work on tempeh in India, such as Marel, Sparkapps, IDH, and Vegolution. Although these organizations have been working together, more often than not, this has been in smaller settings, on-and off, and issue-oriented. Support provided by Dutch organizations, such as Larive or RVO has been on a piecemeal basis. For the envisaged upscaling of activities, a well-structured roadmap is required that helps foster structural collaborations within a solidly improved international and multi scalar consortium setting.

For this business-led case, we understand 'region' as the set of existing and emergent relations between actors that are engaged or potentially engaged in the business of increased protein consumption as part of a sustainable food system, anchored within the Bengaluru territory. This ecosystem is not finished yet from a food system perspective. While the production of tempeh is an important part of the narrative, the primary production of soy is a somewhat neglected element. Soy is available in abundance and sourced through the market at relatively low price, but is not necessarily produced in a sustainable manner and has a high environmental food print. Moreover, the ecosystem largely consists of businesses and NGO's, with connections with the financial sector. While CFSS has been supported by both the Indian as well as the Dutch governments, the alignment with public authorities as well as with organizations from research and education is not optimal yet either. These are elements that could be developed further.
Although, CFSS starts from the Bengaluru food system in Karnataka state, it is apparent that relations and interactions with actors in other regions (states, national, international) exists and is actively being pursued. Moreover, tempeh as a business-led case is an example of how innovations can travel across scales and territories (from Indonesia, to the Netherlands, to India (first Bengalureu, later Lucknow), and (very recently) to Ethiopia). Each stage requires institutionalization, also from one region to another within India). This institutionalization is about becoming part of regional food cultures, establishing relations with public authorities and societal organizations, but in this case also establishing relations with companies down and up streams in the value chain.

Regional anchoring is an important concept in regional approaches. This should entail deep scaling which requires taking into consideration and build further on socio-cultural issues[13]. The challenge that is most relevant for ReAP is how the proposition for sustainable soy-based proteins can become integrated in a regional ecosystem and from there to other regions (mainly within India).

[12] https://youtu.be/XoutkPpep9k
[13] 449586

Case research questions and contribution to ReAP Research questions
For 2025, this case will contribute to ReAP research questions by looking into:

1.The **interplay** between different parties especially in developing an Indian tempeh value chain with CFSS transitioning from a 'simple' value chain towards a business-driven regional ecosystem. For CFSS the current challenges lie in strengthening its engagement with the public sector, the financial sector and with soy farmers. Also, in this business-led case, the dynamics and interplay with financial flows is important: that is Dutch (RVO, for SFU machines, MFUs by CFSS itself), Indian (micro-credits). Ultimately, the question is how CFSS navigates these interactions without reducing its entrepreneurial spirit and social focus.
The corresponding research question is: how does CFSS navigate the interplay between the different actors, especially public and financial parties, while maintaining it entrepreneurial spirit and social focus? What are strategies and practices that are being employed to engage stakeholders and partners, and what are the results of their use when focusing on the regional level to achieve multi-scalar food system transitions?

2.The **coupling**[14] processes of the emerging food system through different scales, starting from the regional level.

a. Downwards – e.g. with farmer cooperatives and self-help groups, women's entrepreneurs (MFU)
b. Horizontal – with financial and marketing actors, with
c. Upwards – how connect with state and national level in Indian context; how to connect with other regions, e.g. Europe (see also metacoupling)
The corresponding research question is how scalar coupling processes influence the pace and direction of multi-scalar food systems transition in the region and beyond?

3.The role of social sustainability and (food) culture in accelerating food system transitions. The Indian case showcases the deployment of social solutions in aligning actors and as a way to foster healthy and sustainable diets. The question is if this social focus contributes to environmental sustainability.
The corresponding research question is: What are the roles of social sustainability in accelerating food system transitions and how does it influence environmental sustainability?

This case study will contribute with conceptual/methodological findings on a socially oriented business-led acceleration of regional FST

Hypotheses

1. The social dimensions of CFSS approach interacts positively with a regional approach to FST.
   a. Which particular social dimensions?
   b.How will they interact – by strengthening the region forming, strengthening social fabric?

2. A business-led acceleration of regional FST can yield more sustainable results because of their attention to economic and financial aspects, other than social and environmental:
   a.How does the Black box van de business-led regional FST can be unpacked? What aspects, process?
   b.How is regional food system transition influenced by CFSS approach to tempeh, e.g. on financing, position of women (via SHG, via earnings, via ownership of MFUs

3. CFSS approach to introducing tempeh is changing Indian food culture, thus indirectly influencing how region forming in FSI is taking place.
   a.How is CFSS multi-prong approach influencing (positively or negatively) Indian food culture?
   b. How is that influencing region formation in FST?

[14] We will review the usefulness of the metacoupling concept – or relate later to scaling (up, out, deep). See also results of desk study.

Potential Case Entry Points in the food system used by CFSS

CFSS is working on a number of entry points into the food system, some for a longer time now, for others its engagement is relatively recent.

Inclusive Finance and trade:
- (Lack of affordable) Micro credits for MFUs
- (Inter)national trade

Connected communities:
- Education and training for entrepreneurship
- Family support with access to childcare and schools
- Autonomy of manufacturers (ownership of fermentation machine, guaranteed purchase for 5 years)
- Organization of SHGs
- Fortified school meals (social goals)
- Networking – engaging (Dutch and Indian) NGOs
- Food culture: influencers, cooks, restaurants, social media, manufacturing of Indian products and seasoning

Sustainable food and diets:
- Fortified school meals
- Protein rich food products

Tentatively, the above can be grouped in a number of interlinked pathways, as the possible groundwork for a preliminary Theory of Change:

1. A sustainable business model around a business ecosystem:
   a. Manufacturing: establishing, connecting and growing manufacturing of tempeh from MFU, SFU to a newer larger model, enabling upscaled servicing, at first by creating a regional manufacturing network
   b. Scaling and coupling: from a localized pilot ecosystem of MFUs around a SFU, to entering other states (UP), upscaling to national level as an ambition, and globalising by exporting to other regions (Europe, US). Replication is encouraged by other companies (IDH) and supported (e.g. scoping mission)

2. Social ecosystem:
   a. Enhancing region formation with connected communities, especially (networks of?) SHGs, connecting MFS (Individual female manufacturer) to SHGs that provide supply to an SFU
   b. Ownership of MFUs by female entrepreneur is enabled by providing training, and loans (after 5 years, ownership is transferred to the female entrepreneur)
   c. Civil Society organizations are engaged to provide the families/women with childcare, and fortified school meals for their children.

3. Sustainable diets:
   a. In first instance, the tempeh food products are oriented towards urban high-income groups, with the intention to move to lower income groups in rural areas when tempeh manufacturing and consumption has become more established
   b. Providing fortified school meals and balwadis can strengthen the well-being of children

Time Period	Activities
Q1	Exploration case outline and defining narrative with research questions
Q2	Literature study regarding Indian Food System (transition) to outline context of case study Construction of pathways of change within Case Theory of Change Interviews with Key informants; elaborate hypotheses regarding business-led region formation regarding acceleration of FST Co-creation case with CFSS; desk study Elaborate TOR for scoping mission
Q3	Scoping mission (Bengaluru)
Q4	Preliminary case report; plan 2026

Table 7: Indian case activity plan 2025

3.4 Bangladesh case

This case study focusing on Bangladesh is part of the second question of the overall project. We'll focus on the transition in the southwest delta of Bangladesh, more specifically on Khulna, Satkhira, Bagerhat districts, to sustainable water and food system pathways, to facilitate investments and achieve food security. A more specific focus will be defined in co-creation with stakeholders.

The southwest of Bangladesh has numerous polders which have diverse hydrological characteristics with different agricultural practices. There are polders facing high, medium, and low salinity during dry season. The vulnerability to natural hazards of these polders is different as well. The polders have sea-facing embankments vulnerable to cyclone induced storm surges, prolonged waterlogging due to siltation of the riverbeds, depleting ground water level, subsidence, monsoon flooding, increasing salinity and lack of freshwater availability for agriculture and livestock. These stresses are threatening the food security of the region. The land use within the polders varies (where in some polders farmers focus on growing rice, while in other polders rice, vegetables and fish cultivation are combined) and has over time changed from rice cultivation and catchment fisheries to combinations of crops with aquaculture and livestock. Climate change, urbanization and construction of infrastructure also influence land use change making less land available for food production while the demand is increasing and uncertainty higher. Moreover, change in food production in this region will challenge the national food security as well. Additionally, the stakeholders in polders have different interests and spatial claims, regarding agriculture, aquaculture, space for urban areas and industrialization, and linked to that are competing for resources such as water. However, the operation and maintenance of polder infrastructure and canals has so far been problematic (add reference). All the relevant stakeholders and their sometimes-conflicting interests are not well organized and mostly the design of water infrastructure has been flooding protection centric (and focused on rice cultivation). The water users, and even the government representatives in the agriculture sector do not have sufficient influence on the existing operational structure of the polders or their maintenance. To ensure sustainable future and food security in the region, inclusive water and agricultural management at polder level is required, an accepted common vision for future and transition pathways towards that future need to be co-created (add reference). Please note that this is sometimes referred to as 'whole polder approach' in agricultural sector (add reference). As the canal centric watershed requires an inclusive approach, at catchment/regional scale,

integration between polders and their operation is required too. At local, regional, and national scale there is a complex network of governance structures regarding water and agriculture which lack integration and involvement of stakeholders at different scales. The drafted national policies in agriculture and water lack input from different levels of stakeholders and their vision for the future which challenges the effective implementation of these policies for future. The national level vision (in Water Act 2013, People's participation guidelines, 1995, Integrated Coastal Zone Management Plan, 2004) differs from the vision of local scale stakeholders such as farmers inside the polders. Therefore, a flow of inputs from national to local scale is required. Bangladesh prepares 5-year plans which could be used as gradual steps of transition if they are inclusive, adaptive and sustainable. With this research, we intend to co-develop vision and transition pathways towards a sustainable future with active participation of stakeholders. Moreover, we would like to develop a methodology to interconnect local, regional and national level stakeholders in policy making, implementation, operation and maintenance to ensure effective and acceptable implementation and sustainable future.

Key stakeholders involved are: BWDB, DAE (government national, regional and local level), farmers, service providers (suppliers of seeds and fertilizers, buyers, NGOs), researchers (IRRI/ BARC/KU/PSTU). IFI/Banks: WB/ADB We'll do stakeholder analysis: different stakeholders at different levels with different roles and interests.

Case Study Objectives:

1. Develop vision and transition pathways for the future at regional scale with active participation of stakeholders
2. Deduce methodology to develop integration between local, regional and national stakeholders with national policies
3. Explore the interchange and inter-connection between spatial scales (local, regional and national) and temporal scales (sub-seasonal, 5 years and decadal activities and policies)

Case Research question(s):

The following are the research questions for the 4-year project, as we see them at this stage. We expect that in the course of year 1 we will be able to establish a work plan with partners in Bangladesh, to focus the question. Simultaneously, we contribute to the overall ReAP research question by achieving the above objectives.

1. What are the key issues (what is the complexity, uncertainty, wicked problem) (what is characteristic of the area, what is specific) for a specified water and food system (e.g. Polder31) (describe the **system**) and how these can be addressed. The exploration of key issues will assist to focus on relevant challenges to create vision and transition and develop the method to integrate different stakeholders and policies.

2. What is the food system **transition** regarding the southwest Bangladesh and what is the link of agriculture to water? To understand and develop transition pathways linking water and agriculture together, food system transition for southwest Bangladesh will be considered.

3. How to formulate **regional approach methodology** with reflection from stakeholders as well as with KB ReAP team and how can we co-create and learn? Observe, reflect on learning, co-creation with relevant stakeholders, be inclusive and adaptive. This will support the development of the methodology to integrate between local, regional and national stakeholders with national policies and explore interconnection between different spatial and temporal scales.

4. Which transformative experiment we focus on and connect with (e.g. CGIAR research experience, new government arrangements on water management in polders?) (polders of the future, Safal for IWRM, earlier experience Blue Gold, other). This will focus on development of methodology for in-polder water management and enrich up-scaling potential.

Components of Mission Oriented Approach for the case

1. Mission:

The mission of the Bangladesh case? is to focus on In-polder water management which needs urgent transformation in light of changed land use and adapting to climate change.

Bangladesh Water Development Board (BWDB) has plans to repair the water infrastructure in coastal Polder 31 that protect the land inside and provide drainage services. The coastal polders of Bangladesh were built in 1960s and 1970s to protect the coastal lowlands from tidal flooding. The polders increased food production of the area as more land became available for agriculture. Over the years, the polder dwellers have used the polder infrastructure such as control structures (gates) and canals for support irrigation of the area. This is beyond the purpose for which polder infrastructure was designed and constructed. Furthermore, due to climate change the rainfall pattern is changing which is causing unexpected flooding and damaging crop production. Sea level rise a consequence of climate change and upstream water withdrawal can potentially increase salinity intrusion where polder infrastructure can play a major role to reduce impact on agriculture. These are challenging the water management inside the polders, absence of inclusive participatory in-polder water management is questioning effectiveness of polder operation and negatively impacting food production. Therefore, the in-polder water management talking the land-use and climate change is urgently needed. To address the impact of climate change and land use change, in polder management needs to be re-designed with inclusive stakeholders' involvement and cooperation from both water and agriculture institutes using the food system approach. Bangladesh has about 140 polders and in-polder water management is challenge for most of them. A in-polder water management model developed for polder 31 can potentially be adapted adequately to reflect the bio-physical condition and socio-economic context to apply it in other polders. In polder water management not only influences areas within the polder but also interconnected to the regional water network. Along with climatic factors, the water management and agricultural practices are influenced by local, regional and national policies which are interconnected. Therefore, the interchange and inter-connection between different spatial and temporal scales will be explored as well.

2. Actor Network:

From stakeholders' engagement it was identified that the government agencies as well as NGOs, local government and local stakeholders are important actors. A joint vision for the future and transition pathways will be developed with local, regional and national stakeholders. The national and regional policies will be reflected to assist the transformation.

3. Coordination

At the moment, the roles, activities and participation of stakeholders to develop in-polder water management is unclear. Through co-creating and participatory activities with local and national level stakeholders, a structure for in-polder water management will be prepared. The national level policy makers should anchor the transformation driven by local stakeholders' active participation.

4. Regional Context

Similar to other polders, Water and agriculture are interconnected in Polder 31. To prepare an inclusive vision for the future, improve in-polder water management and explore upscaling potential stakeholders at different level from agriculture and water management will be engaged and different on-going initiatives such as Polder of the future – whole polder approach (CEGIS/ IWM/BWDB, IRRI, DAE, farmers, Uttaran) will be engaged as well. Engaging with other initiative

increases the upscaling potential of to be developed in-polder water management for similar polders of southwest Bangladesh.

5. Pathways for Change
Relevant stakeholder at local, regional and national level will be engaged to co-create joint vision for the future in-polder water management. Roles and responsibilities at sub-catchment, polder and regional level will be defined. Alignment of vision of the stakeholders and the future vision of institutes such as BWDB, DAE, BADC, DoF will be made and opportunities for future investment support this transformation will be explored.

Contribution to Overall ReAP research question:

This case mainly links to the second question (see introduction above) and explores strategies (practices) that are being employed to engage (co-create with) stakeholders, and the results of their use when focusing on the regional level to achieve multi-scalar food system transitions

Translation of the four key concepts

Food systems: Food systems refer in this case to the set of activities that stakeholders undertake to co-create vision for agriculture and water management for polder areas in southwest Bangladesh: rice, aquaculture, livestock, being produced for the local and national market, and supported by the government through water related infrastructure (BWDB, LGED, BADC) and agricultural extension (DAE)
Transition theories: We look at transition as a complex issue, with lots of uncertainties (Cynefin framework / wicked problem/Hebinck, 2022/Verhagen et al, 2022) and use the transition in food systems approach as used in Verhagen et al, 2022 and link to adaptive delta management (Haasnoot et al, 2013; Zevenbergen et al, 2018). By engaging with local stakeholders, we look forward to monitor and collectively learn from their process (observe, try, learn) and in this way, contribute to increased transformative capacity
Regional approaches: We focus on the polder and regional level, as the in-between level between farm level activities and national level activities.
Metacoupling: We do not actively use this concept in this case

Systems change methodologies that is proposed for use in your case

Methodology: Bring knowledge and stakeholders together. With reflection, try to contribute to joint vision and action. There is no one truth, but multiple opinions. Value all inputs. Analyse which stakeholders are taking part in the discussion. Focus on the polder/regional scale level.

Value creation proposed

- Interact with other researchers (CGIAR) on the methodology and the case (link to SEP2)
- and giving input to policy processes e.g. on nexus. Interact with NL Ministry of Foreign Affairs
- upscaling for the polders (which polders are similar/different), how polders operate (land use, water management inside the polder)

Activities

1. For the case description, we'll start by interviewing existing contacts in BD (government, CGIAR) and study literature, to link to food systems, transition, regional approach, meta-coupling; explore value creation

2. We'll work based on earlier research to make a quick inventory of stakeholders and issues, and to identify jointly the objective and focus of the case study research, while in parallel

through literature research and discussing with the KB ReAP team formulate the methodological underpinning of the case study approach, in connection with the main research question. (Q1)

3. Develop regional approach, collect data to assess food system transition (Q2)

4. Test scenarios and discuss with stakeholders the findings and formulate jointly further action research (Q3+4). Simultaneously: contribute to the methodological approach for regional approaches for food system transition.

Indicative timeframe	Deliverables (in bold) and Expected Outputs and Outcomes
Q1	Initial **case description**, including value creation (4 Feb 2025)
Q1	Stakeholder analysis and formulation of the case with stakeholders in Bangladesh (Feb 2025)
Q2	Reflection with ReAP team on case study set-up and findings so far in light of concepts and methodologies
Q3	**Workshop** in Bangladesh to validate developed approach and explore vision/scenarios (Sep/Oct 2025)
Q4	**Report** Case (regional characteristics, case description) (planning for the pilot, Y2-Y4)
Q4	Contribution to methodological approach report (planning 2026-2028)

Table 8: Bangladesh case activity plan 2025

3.5 Building Back Better Ukraine

Case background and context

Post-conflict recovery offers an opportunity to reform agricultural and water sectors, but demands immediate action without reliable data and without time for gradual implementation. Conflicts create significant information gaps regarding soil conditions, water availability, infrastructure damage, agricultural land status, and supply chain disruptions - making evidence-based decision-making and effective resource allocation challenging.

This case study focuses on Ukraine, a major global food exporter of wheat, corn, rapeseed and sunflower oil. The ongoing conflict has deeply disrupted these exports, intensifying global food insecurity and revealing the interconnected nature of regional and global food systems. Ukraine's previous reliance on large-scale monoculture farming with centralized logistics was particularly vulnerable to war-related disruptions. Ukraine already initiated strategic shifts toward a more resilient and decentralized agricultural system.

Figure 9. land cover map of Ukraine used to assess agricultural and water system conditions (Source: the ReAP team)

Key reforms include adopting the EU Water Framework Directive and institutional restructuring, which transferred water management authority from the State Agency of Water Resources

under the Ministry of Environment to the State Agency for Melioration and Fisheries under the Ministry of Agriculture, signalling a more agriculture-focused approach to water governance. The establishment of Water User Organizations (WUOs) supports this decentralization, promoting community-based governance in irrigation and resource management. International partners like the World Bank and FAO are backing these initiatives, helping to pilot localized irrigation approaches.

Ukraine's irrigation sector already faced structural vulnerabilities before the conflict, including qualitative and quantitative water scarcity and dependence on costly, energy-intensive infrastructure. The war damaged major water supply systems like the North Crimean Canal and Kherson Canal, while smaller irrigation systems struggle to maintain operations nationwide. Climate projections indicate intensifying water stress in Ukraine's central and southern regions, adding environmental pressure. This intersection of conflict, infrastructure collapse, and climate change underscores the urgency for transformative, integrated approaches to agricultural and water sector recovery.

Pilot interventions in central Ukraine, such as decentralized irrigation schemes in Cherkasy or Poltava powered by solar energy, could serve as models for sustainable food system transformation.

Case problem analysis and objectives

Ukraine's post-conflict recovery shows a challenge in regional food system transformation: enabling evidence-based investment in a data-scarce, rapidly evolving environment. The problem is the absence of reliable, up-to-date information to guide strategic investments in water and agricultural sectors.

Three interrelated challenges emerge:

1. Restricted data collection due to damaged infrastructure and limited physical access.
2. Compressed timelines for action, leaving no room for phased implementation or extensive piloting.
3. The need for sustainable, climate-resilient investment, ensuring recovery efforts are future-proof.

This research proposes a data-driven methodology using satellite-based observations to inform recovery investments. Objectives include:

- Building a regional inventory of geospatial datasets to analyse water-food system interactions.
- Assessing the current state of Ukraine's agricultural and water systems.
- Evaluating the potential impacts of various intervention strategies.

The goal is to provide scalable solutions that support both immediate recovery and long-term transformation. By translating satellite data into actionable insights, this case study contributes to the ReAP research question: how regional approaches can accelerate food system transition. The Ukraine case focusses on regional transformation through resource sovereignty (decentralized water management), climate resilience (solar-powered irrigation), and governance innovation (Water User Organizations).

Conceptual positioning using the mission-oriented approach

The Strategic Goal (**Mission**) is to rebuild back better by guiding post-conflict investments in Ukraine's water and agricultural sectors through a data-driven methodology. This approach aims to enhance the effectiveness, sustainability, and resilience investments by providing better insights into the current and future resilience of food and water systems. Due to the conflict,

on-the-ground data collection (e.g. interviews) is limited, and as a result, the research will use regional networks and satellite data to fill information gaps.

The **Actor Network** in the region include:

- Investment drivers: Financial institutions (World Bank, IFC, EBRD), government agencies (SAMF, Ministry of Agriculture)
- Knowledge brokers: NGOs (Primavera), research institutions
- Local implementers: Water User Organizations, farmers

Effective **Coordination** is required to bring together short-term versus long-term goals, local versus national priorities (e.g. food security versus food export), and private versus public sector interests (e.g. agriculture vs water management).

To identify locally appropriate interventions and determine their potential and impact, it is also necessary to understand the **Regional Context**, in particular the biophysical (water availability, irrigated/rainfed systems, conflict damage) and social (decentralization, climate adaptation pressures) drivers. Satellite data helps to capture cross-scale interactions, such as upstream-downstream water dynamics and land-use change.

Possible **Entry Points** for intervention include:

- Support investment planning with sustainability indicators such as key performance indicators (KPIs) for water use efficiency and water productivity
- Support Water User Organizations with data on water availability, needs, and distribution
- Protect natural habitats and telecoupled regions by showing impact of agricultural practices on water systems
- Use data to connect stakeholders

The identified entry points contribute to **Pathways for Change** by enabling actors to make evidence-based decisions and quantify impact of interventions. The satellite-based methodology supports this transformation by offering spatial context analysis, future scenario modelling, and continuous, scalable monitoring. This scalable, data-informed framework can be adapted and replicated in other regions facing similar challenges.

Activity plan

We identified the following Timeline and Milestones:

Time Period	Activities
Q1 Initial case description	Study literature Identify and consult key stakeholders Define scope Plan value creation
Q2 Inventory of geospatial datasets and indicators	First (geospatial) data collection on the water and agricultural sector[15] Further consultations with stakeholders to identify decision variables[16]
Q3 Assess the current state of water and food systems	Data analysis Assess regional approaches for water and food system transition
Q4 Evaluate the potential impact of water and food system interventions	Development of approaches (in collaboration with other case studies) Reporting and creation of value creation outputs

Table 9: Ukraine case activity plan 2025

[15] Such as spatial data on land use, soils, water resources, climate data on precipitation and temperature, and socio-economic data on yields and markets

[16] Such as type of investments (irrigation systems, crop diversification, decentralization, conservation practices), water allocation strategies, and sustainable agricultural practices suitable for Ukraine

3.6 Reference list

Haasnoot, Marjolijn, Jan H. Kwakkel, Warren E. Walker, Judith ter Maat (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world, Global Environmental Change, Volume 23, Issue 2, 2013, Pages 485-498, ISSN 0959-3780, https://doi.org/10.1016/j.gloenvcha.2012.12.006.

Hebinck, A., Diercks, G., von Wirth, T. et al. (2022). An actionable understanding of societal transitions: the X-curve framework. Sustain Sci 17, 1009–1021, 2022. https://doi.org/10.1007/s11625-021-01084-w

Van Berkum, S., Dengerink, J., & Ruben, R. (2018).The food systems approach: sustainable solutions for a sufficient supply of healthy food(No. 2018-064). Wageningen Economic Research.

Verhagen, J.; Elzen, B.; Koopmanschap, E.; Reinhard, S.; Verburg, C.; Naranjo Barrantes, M.; Beekmann, K.; Creusen, R.; Debrot, D.; Klapwijk, L.; Siegmund-Schultze, M.; Veldhuizen, A.; Wilbers, G.; Nguyen Hong Tin; Dang Kieu Nhan; Terwisscha van Scheltinga, C. (2022). Deltas under pressure, guidelines to facilitate transition pathways, Wageningen University and Research https://doi.org/10.18174/557946

Zevenbergen, C., Khan, S. A., van Alphen, J., Terwisscha van Scheltinga, C., & Veerbeek, W. (2018). Adaptive delta management: a comparison between the Netherlands and Bangladesh Delta Program. International Journal of River Basin Management, 16(3), 299–305. https://doi.org/10.1080/15715124.2018.1433185

Chapter 4 ReAP Project organization (WP3)

4.1 Project organization and team

The research institutes involved in the ReAP Project are Wageningen Environmental Research (teams Regional Development and Spatial Use, and Water and Food) and Wageningen Livestock Research (Animal Farming Systems)
The project leader is Wenny Ho. The deputy project leader is Catharien Terwisscha van Scheltinga. Project members are Alwin Gerritsen, Joris Gort, Feroz Islam, Annemarie Klaasse, Remko Kranendonk, Daniel Puente, Heleen van Kernebeek, Bram Bos, Yawei Wang. Marijn Gülpen was involved in the development of the ReAP Data Management Plan (DMP).

4.2 Data Management Plan

In consultation with the ReAP team, we developed an DMP and privacy plan. Both documents were sent to the data management and privacy officers. After incorporating their comments, both have been approved.

> In brief: the project collects and reuses qualitative and quantitative data (e.g. interviews, geospatial data) across case studies in the Netherlands, India, Bangladesh, and Ukraine. Data is stored securely on WUR systems (W: drive, Yoda, Teams), organized with structured folders and versioned filenames. Quality is ensured through triangulation and respondent validation, with documentation using WUR templates and Yoda metadata. Personal data is managed under GDPR and SmartPIA registration, with consent forms in place. Sensitive data is archived for 10+ years; open data will be published under CC BY where possible. Data management is a shared team responsibility, with costs covered by the project.

Example consent forms can be accessed: **Consent form.docx**

The full Data Management Plan can be assessed: **Data Management Plan_ReAP**

4.3 Learning and reflection in ReAP

Learning and reflection play an important role in the ReAP project. There are three major workflows related to learning and reflection. These continually enrich one another. First, the project is set up in an iterative way, with half-yearly learning events. These function as moments for collective reflection and articulation of lessons, and sense-making of what they mean for our thinking and approach. Second, the work packages 1 and 2 are designed to enhance interaction between the conceptual-methodological (WP1) and the empirical pillars (WP2: cases). Apart from constantly looking for linking the two pillars, we also organize ourselves in ways to support that, for example, by having team members who are members of both pillars, and by consciously organizing moments for team members working on a case to meet with team members who are part of WP 1. Third, the project proactively engages with the wider community within and outside WUR to validate and enrich its thinking and findings, for example, by engaging in (scientific) fora and networks.

4.4 Deliverables 2025

The ReAP project plan lists the following deliverables for 2025:

Activity/WP/UC	Milestones	Deliverables
Inception	Elaborated project plan and common ground to start	D.1 Elaborated project plan and preliminary cross-cutting conceptual framework
Analysis of methodological approaches for regional innovation and (food) systems transition	Report including broad range of relevant concepts related to regional food systems, to be further worked into a journal article	D.2 Report (possibly draft journal article)
Elaboration of case studies framework	Case study framework	D.3 Longread WUR website
Operationalization of cases	Case study descriptions	D.4 (internal) report per case
Learning and reflection	Insights articulated and shared	D.5 Reflection and co-creation workshop(s) D.6 Blog, or a whitepaper, or a policy brief
Synthesis year 1	Meeting bringing together – also creating plan for 2026-2028, covering knowledge management, dissemination, and value creation	D.7 Plan 2026-2028

Table 10: ReAP project activity plan 2025

Progress so far regarding the deliverables

Regarding D1, the project plan was approved on 30th January. Furthermore, chapter 2 of this inception report covers D1 and D2. A separate (methodological) report may follow later, two abstracts have been submitted and accepted. D3 (preliminary) and D4 are addressed in Chapter 3. Further operationalization will be iteratively as lessons will give rise to adaptations. With regard to D.5, a first learning event is planned for 8th of July. D.7 will be the result of the second learning event, planned for December 2025.

Challenges ahead

Over the past months, we have made great strides in developing a common conceptual and methodological foundation for the ReAP project. Based on desk studies, we also have identified the knowledge gaps on which to focus our project. In parallel, we are gradually becoming more of one team. The patience and interest in learning from and understand each other has grown with the number of meetings and exchanges.

The process is also a product: articulating how we learn, who learns and with whom, and how we use that most efficiently. It is our belief that this will lead to a richer knowledge generation process, however, the road to make that happen and strengthening a shared practice will not be straightforward.

Other challenges ahead that we see relate to how to make the interaction and feedback between our conceptual and methodological foundation and the empirical findings to be generated through the case studies effective and efficient. That is: how can conceptual-methodological and empirical knowledges feed into each other in processes of divergence (different case contexts) and convergence (among others: theory building, and articulation of general methodological principles) in ways that are creative, productive and generative. That concerns especially the operationalisation and contextualisation of the concept of regional approaches in the different cases. A last but certainly not less important challenge in any research project, is how to create space for and engage partners from different contexts in ways that is genuinely empowering.

Annex

A regional interactive design approach for developing and implementing future visions in peat meadow areas

1. Introduction

Despite the many efforts of different stakeholders in Dutch agriculture, many challenges remain, such as the impact on climate change, loss of biodiversity, or outdated business models and animal housing systems. Until 2024, a number of these challenges were addressed through the policy instrument National Program for Rural Areas (acronym in Dutch, NPLG). This research focusses on specific methodological aspects to facilitate some of these processes from a regional perspective. Empirical analyses are conducted in the form of four case studies in which farmers, together with other stakeholders, developed a future vision for their polders in the peat meadow areas of the Netherlands. The aim of this research is to produce generic knowledge on how to facilitate regional interactive design processes.

2. Methodology

The process in four polders, in three different provinces of the Netherlands, was facilitated by researchers of Wageningen University & Research together with ORG-ID (consulting firm) in a participatory co-design fashion – inspired by the Reflexive Interactive Design (Dutch acronym, RIO) methodology (Bos et al., 2009; Elzen & Bos, 2019; Puente-Rodríguez et al., 2019). In each polder a network of stakeholders was created, formed by local farmers (the majority of whom are dairy farmers), representatives of the industry and NGOs, researchers, civil servants of municipalities and provinces, etc. In each polder a series of activities and workshops were organized for about a year. Firstly, individual ('kitchen table') conversations took place and 'polder safaris' organized to explore the regional need for and willingness to engage in such a process – sense of urgency/relevancy and network formation. Afterwards, depending on the needs and availability of participants, and the complexity of content, network and processes, a series of design sessions in each region was organized. For example, in one region, three day-sessions and one half-day workshop; in another region one day session and four half days; in yet another region three day-sessions and two half days; and in yet another region five day-sessions. The first design session was used to facilitate a collective problem and system analysis. Then, objectives (timescale 2030-2050) were formulated. The facilitators explicitly pointed out the contradictions and mutual exclusion between some objectives in order to gain a better understanding of the definition of objectives and problems, and the analysis of functions[17] within the current and proposed system – i.e., social, ecological, economic, technical, landscape, etc. aspects. In subsequent workshops, the objectives were redefined, clustered and better articulated; also; specific actions/measures, responsibilities and steps were formulated that were required to achieve the objectives. The future-vision document was written by the facilitators and commented on and validated by participants. Formal and informal knowledge fed the process. At the beginning, a summary of socio-economic, water system and ecological information and figures (the baseline) was made and presented to the participants. Every time that a knowledge gap was identified, experts were consulted or invited to participate in one of the sessions. Some of the measures and objectives (ammonia deposition, etc.) were quantified to show the effect and scope of the future vision.

[15] A function is defined as a verb plus a noun (e.g., 'remove manure'). It describes what hast to be done, but not how, expanding the 'solution space'.

3. Results

In each polder a future vision document was written and made public. The vision included long-term objectives and specific measures and steps to reach those objectives, including specific responsibilities of stakeholders. It was supported by some calculations about the expected results of measures and by drawings to make it more attractive and tangible (see Figure 1). Moreover, a process manager was appointed to guide the follow up. For each polder, a cooperation agreement was signed by landowners (farmers), individual participants and decision-makers from participating organizations. In some provinces the future vision document was included in the provincial plans within the NPLG to guarantee funding and the implementation of the vision because it was aligned with the provincial future perspective. The objectives and future visions had an integral character:

- Circular agriculture and nature inclusive agriculture.
  - Aimed at a more extensive character.
  - Agreements with farmers that stop their activities to use their land for agricultural use by other local farmers and for nature conservation purposes. Among others, to meet the ammonia emission objectives of EU directives.
  - Taking care of biodiversity, particularly meadow birds and water flora and fauna.
- Improving the water system.
  - Quantity, hydrographic aspects (note that these regions lay below sea level; in one case even -6.5 m).
- Maintaining and improving the agrarian cultural landscape of polders.
- Engaging with and accelerating the energy transition.
- Living quality and prosperity in the polder: Development of new business models (short chains, producer-consumer; development of regional concepts); Improvement of accessibility; Facilitating hiking and cycling routes.

4. Discussion and perspectives

We are currently conducting a reflection/evaluation of the process, which has identified two success factors so far: (1) A structured design process, facilitated in an interactive fashion of knowledge brokering, which was able to bring relevant (formal/informal) knowledge and experts into the process. (2) Trust. In a context of distrust at national level, it was possible at local level to identify conflicting problem/goal definitions and to make agreements on long-term objective and short-term steps. At the time of writing the new government of the Netherlands has cancelled the NPLG. The NPLG was intended to guide and finance provinces and other stakeholders to achieve sustainable future-proof rural areas. Most processes in the rural areas are therefore in a stand-by situation. Nevertheless, some of the activities proposed in the vision documents have been initiated. From the perspective of our process design approach, a new research project has been initiated to reflect on the applied regional design approach in these polders, which are now approached as pilots within a broader territorial context. The aim is to scale up the structured approach to design more sustainable Dutch western peat meadow areas.

Colophon

Recommended citation

Ho, W., Gort, J., Gerritsen, A., van Kernebeek, H., Terwisscha van Scheltinga, C., Puente, D., Klaasse, A., Islam, F., Bos, B., Kranendonk, R., 2025. *ReAP inception report*. Wageningen, Wageningen Environmental Research.

Authors

Wenny Ho: Review and editing of the ReAP inception report; writing Chapter 1, Chapter 2 (Transformative Change Methodologies, Conceptualisation), Chapter 3 (Case India, Case Netherlands), and Chapter 4.
Joris Gort: Writing, review, and editing Chapter 1 and Chapter 2.
Alwin Gerritsen: Writing and review Chapter 2, and Chapter 3 (Case India, Case Netherlands).
Heleen van Kernebeek: Writing, review, and editing Chapter 2; writing annex.
Catharien Terwisscha van Scheltinga: Writing and review Chapter 3 (Case Bangladesh), review Case Ukraine, review Chapter 1.
Daniel Puente: Writing and review Chapter 3 (Case Netherlands); writing annex.
Annemarie Klaasse: Writing Chapter 3 (Case Ukraine).
Feroz Islam: Writing Chapter 3 (Case Bangladesh).
Bram Bos: Writing annex.
Remco Kranendonk: Review Chapter 3 (Case Netherlands).
Yawei Wang: Layout design and editing of the report; writing Chapter 4.

Contact

Wenny Ho
Wageningen Environmental Research
T +31317486049
E wenny.ho@wur.nl

Photography

Sk Hasan Ali (Cover front)
YueStock (Back cover left)
Sunshine Seeds (Back cover middle)
Jahangir Alam Onuchcha (Back cover right)

Wageningen Environmental Research (an institute under the auspices of the Stichting Wageningen Research), P.O. Box 47, 6700 AA Wageningen, The Netherlands, T +31 (0)317 48 07 00, www.wur.nl/environmental-research. Wageningen Environmental Research is part of Wageningen University & Research.

The work is licenced under CC-BY-NC-SA 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by-nc/4.0/

Wageningen Environmental Research assumes no liability for any losses resulting from the use of the research results or recommendations in this report.

The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,700 employees (7,000 fte), 2,500 PhD and EngD candidates, 13,100 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.

This document can be downloaded for free at https://doi.org/10.18174/696825 or via the website www.wur.nl/environmental-research (scroll down to Publications – Wageningen Environmental Research reports).

Wageningen Environmental Research
P.O. Box 47
6700 AB Wageningen
The Netherlands
T +31 (0) 317 48 07 00
wur.eu/environmental-research

The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,800 employees (6,000 fte) and 12,900 students, Wageningen University & Research is one of the leading organizations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.