

Is the protein transition missing a silver bullet?

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Abstract

The protein transition is both a subject of political discussion and a hot topic for large companies' strategy. Presented as a solution to the problems resulting from animal protein overconsumption and overproduction in high-income settings, the appropriation of the concept by actors of various sectors, including the state, market, and non-profit sector, has brought the protein transition to the border between a techno-centric and a politico-centric transition.

Based on a comprehensive literature review, we identified i) a diversity of definitions and interpretations of the protein transition, ii) the key challenges that it promises to address, and iii) claims associated with the protein transition outputs. We identified different narratives describing how to proceed with the protein transition (i.e., the driver of change, the target(s), and the potential transition pathways), showing that these narratives are embedded in different scientific paradigms, consisting of varying transition trajectories.

A key issue emerging from this process is a lack of integration between the production and consumption side.

The protein transition is mainly defined from a consumption perspective, implying a dietary shift from a diet with high animal protein intake towards more alternative protein intake. Only two articles include a production dimension in their definitions. The review allows us to highlight a lack of perspective on the future of protein production, especially animal protein. Articles either focus on consumption-based solutions, including animal-based product replacement or substitution, thus nurturing a consumer-driven protein transition, or on solutions targeted towards developing alternative proteins for feed and food, thus promoting a techno-driven protein transition. Solutions targeted towards an agri-food system transition are rarer.

The protein transition is promoted as a solution to three main challenges, namely i) environmental impacts of protein production and consumption and the overshoot of planetary boundaries, ii) the need to feed a growing population and provide healthy diets, and iii) impacts of industrialized and/or intensive livestock production systems. If opting for a consumer and techno-driven protein transition may contribute to the target, we argue that it will probably not be sufficient. Embedding these solutions in a systemic approach, including production and value chains, will be necessary to challenge the current meat regime.

Introduction

Proteins are fundamental components of human diets, providing essential nutrients and playing a central role in maintaining nutritional balance. Animal products have traditionally been revered for their high-quality proteins. However, the negative externalities associated with the overproduction and overconsumption of animal proteins have raised concerns about their long-term sustainability (Aiking & de Boer, 2020). This paradigm shift has given rise to the concept of a “protein transition” to transform current ways of producing and consuming proteins towards a more sustainable food system.

The Emergence of the Protein Transition:

In the past decades, scientific research has increasingly highlighted the environmental, health, and animal welfare impacts of animal protein production and consumption (Aiking, 2014; Aiking et al., 2006; Aiking & de Boer, 2020; Gerber et al., 2013; Steinfeld et al., 2006). This growing body of evidence has prompted discussions at various societal levels, including political agendas, public and private-sector investments, and media coverage (Hundscheid et al., 2022; Katz-Rosene et al., 2023; Tziva et al., 2023). Globally, initiatives such as the European Green Deal's Farm to Fork strategy, the Canadian Food Policy, the Brazilian National Plan for Agroecology and Organic Production, the Healthy China 2030 Plan, and the United Nations Sustainable Development Goals have integrated the protein transition into their visions for more sustainable food systems. Simultaneously, private investments, speculative finance, innovation, and product development have surged in response to the emerging demand for alternative protein sources (Adams et al., 2023; Guthman et al., 2022; iPES Food, 2022)..

Diverse Perspectives on the Protein Transition:

While there is a consensus that the protein transition entails a shift towards diets with increased alternative protein intakes, divergent viewpoints exist regarding the scope and strategies of this transition (van Mierlo & Klerkx, 2023). For example, some debates revolve around whether the focus should be solely on food or should extend to include feed and livestock production systems. Furthermore, discussions arise on the implications of trade and its contribution to inequalities at both regional and global level. These divergences in perspective give rise to many solutions, encompassing dietary changes, future foods, new feed formulations for livestock, and other innovative approaches. This diversity of solutions underscores the protein transition's multidisciplinary nature and reflects the stakeholders' values and perspectives (Katz-Rosene et al., 2023).

Narratives and Power Dynamics:

A systematic review of scientific literature shows that the protein transition has primarily been defined from a consumption perspective, emphasising shifts in dietary patterns. Production-focused definitions are scarce, and broader considerations of the entire food system are notably absent. The analysis reveals

the presence of three distinct narratives surrounding the protein transition. The first narrative is the consumer narrative, centred on consumer-focused solutions. Its main goal is to shift dietary habits from animal proteins to alternative protein sources and reduce food waste. The second narrative focuses on solutions aimed at developing alternative proteins for food and feed through investment in research, development, technology, and infrastructure. The third narrative is the most holistic and focuses on solutions to transition the agri-food system. This transition narrative is anchored in three main action pathways: redefining the food system regime, designing the transition, and implementing institutional changes.

The three narratives are not equally represented in the scientific literature, with some receiving more attention than others. This discrepancy in narratives' representation can lead to competition for allocated means, conflicting visions of the future, and power imbalances among actors involved in the transition. In their article, Vanloqueren & Baret (2009) discuss the concept of a lock-in situation in agricultural research systems, where one technological paradigm can become dominant and hinder the development and adoption of alternative approaches. An imbalance towards one narrative can result in a situation hindering the development of alternative solutions and transition paths. Therefore, a necessary but not sufficient condition is to establish an even playing field for fair competition, explore the potential relevance of different narratives and solutions to address current and future challenges, and manage coexistence by recognizing and collectively considering complementary needs and opportunities.

Path dependence and challenge of the current regime:

The narratives represent different perspectives, values, and visions for the future of protein consumption and production. Similar to past technological paradigms, the narratives associated with the protein transition can have profound and lasting effects on various aspects of the food system. As the development of renewable energy options shape energy infrastructure and policies, the narrative emphasising the development of alternative proteins seeks to transform the protein production and consumption landscape.

The narratives presented in the study do not equally challenge the prevailing ways of producing and consuming proteins. Following Geels' (2002, 2005, 2011) conceptualisation of a regime as the dominant and stable socio-technical system, shaped by cultural norms, and worldviews, and supported by physical and intangible infrastructures such as buildings, roads, laws, regulations, and policies, it becomes evident that the socio-technological transition narrative aims for a profound system reconfiguration. In contrast, the techno-centred narrative poses fewer challenges to the dominant regime.

The narratives associated with the protein transition, like past technological paradigms, exhibit path dependence. The initial conditions, including investment patterns, policy frameworks, and consumer preferences, can heavily influence the trajectory and outcomes of the protein transition. If one narrative

gain disproportionate support, resources, and investment, it may shape the dominant trajectory of the protein transition, potentially excluding or limiting the development of alternative approaches.

Challenges and Future Directions:

Despite the progress made in understanding the protein transition, several challenges and areas for improvement remain. The challenges identified include blind spots in the definitions and perspectives, an imbalance between narratives, and the inadequacy of current proposed solutions to meet the targets.

1) Tackle the blind spots

To overcome blind spots, it is crucial to acknowledge and address contentions and debates surrounding different perspectives. While the different narratives can coexist in the early-stage development of the transition, their conflicting visions regarding the future and the means to achieve it could hinder the implementation of a just transition (Katz-Rosene et al., 2023).

Expanding the scope beyond proteins alone to include, for example, other macronutrients, food matrix considerations, and broader aspects of the food system is essential. Such a holistic approach avoids oversimplification and acknowledges the multifaceted nature of the protein transition. For example, by reducing animals to meat and meat to proteins, we overlook the multifunctionality of animals, including their critical role in the circular flow of materials in agriculture through grazing and soil fertility management through dejections and manure disposal (van Zanten et al., 2019).

2) Imbalance

Furthermore, strengthening underrepresented transition narratives and ensuring the active involvement of diverse actors while considering power dynamics are critical to achieving a just transition that effectively addresses the initial problems associated with protein overproduction and overconsumption.

Specific stakeholders, such as current livestock farmers, are often excluded from the narratives, highlighting the need for comprehensive and inclusive dialogue. The existing power concentration in the food sector must be considered, particularly within the food processing sector. An overreliance on technology-oriented solutions may reinforce existing animal protein producers and processors, rather than fostering a just transition.

Evaluating the need of expanding protein production becomes crucial (Guthman et al., 2022). Some authors argue that current protein production levels are sufficient and that we are not facing a protein deficiency (Brouwer & Talsma, 2023). Therefore, it is essential to consider alternative approaches prioritising equity and sustainability, addressing distribution, access, and social justice in the food system. A comprehensive and inclusive strategy can shape a transition at the same time as minimising the unnecessary expansion of protein production.

3) Are solutions up to the challenge

Lastly, we need to make sure that the proposed solutions and narratives are up to the challenge. Solutions proposed within the current narratives should be evaluated given their potential contribution to solve current and future challenges driving the protein transition. An example illustrating the uncertainties surrounding the protein transition is the unresolved question regarding overproduction and the fate of current livestock production systems. Should we continue producing and exporting the same quantities of livestock-based product or reduce current production levels? What productions (e.g., pork or beef) and production systems (e.g., organic or agroecological) should be favoured? This crucial aspect remains inadequately addressed within the existing narratives.

Moreover, while tackling the overconsumption of animal-based products, the substitution of animal proteins for alternative proteins overlooks the total overconsumption of proteins in high-income countries. Whether protein substitutes can lead to a total decrease of protein consumption warrants scrutiny and examination as we navigate the complexities of the protein transition.

Conclusion:

In conclusion, the protein transition represents a crucial and evolving concept in pursuing sustainable food systems. Scientific evidence has driven its emergence and permeates political, economic, and societal spheres. However, challenges persist, such as narrative imbalance, the exclusion of specific stakeholders, blind spots in definitions and perspectives, and the need to evaluate the potential contribution of solutions to the current and future challenges. Acknowledging different perspectives, broadening the scope, ensuring ex ante assessment of long-term impacts of the different narratives' solutions, and providing inclusivity and fairness are essential to navigate these challenges. By embracing these principles, we can foster a transformative protein transition that addresses the pressing issues of our time and paves the way for a sustainable and equitable future.

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