



MOVING FOOD FORWARD

# How can the dairy sector participate in the transition to more sustainable food systems?

White paper series in collaboration with EY-Parthenon

# Foreword

In our white paper, ‘How could global food systems better sustain our planet and its people by 2040?’, we highlighted how current food systems cannot sustain our planet and its people in the long term, unless they transition towards more ecologically, socially, and economically viable conditions.<sup>1</sup> This transition requires us to reimagine the ‘art of the possible’ by bringing policymakers, farmers, businesses, communities, and consumers on a journey that is safe and just.

The dairy sector is facing challenges to support farmers’ livelihoods and to decarbonise, while ensuring food safety and healthy nutrition for people. Based on our capabilities and global reach, Tetra Pak has chosen to tackle these challenges through two distinct focus areas: 1) decarbonising dairy processing, and 2) working with smallholder farmers through customer dairy hub projects in order to develop safe, sustainable and economically viable dairy value chains.

We’re working continuously to develop innovative technologies and solutions to drive down the climate impacts of dairy processing by reducing energy and water use and losses. To support the transition, we have launched the Global Dairy Processing Task Force, under the auspices of the Global Dairy Platform, an initiative that aims to bring in stakeholders from across the sector to improve approaches to decarbonisation within dairy processing. Our efforts in the area are part of our contribution to ‘The Pathways to Dairy Net Zero’ initiative, where we seek joint collaborations throughout the value chain to support the transition to more sustainable dairy.

To address global challenges related to food security and nutrition, we work actively to support our customers through the Dairy Hub Model to provide smallholder farmers practical knowledge and access to formal markets. By providing adequate cooling infrastructure, training services and tools, these farmers can focus on improving productivity and profitability on their farms. This leads to improved livelihoods, better outlook for the next generation of farmers, in addition to safer and higher quality milk for consumers.

We recognise that the transition requires transformation across geographies and value chains, which we cannot achieve alone. Hence, in this paper we aim to:

- Increase awareness of the key challenges ahead and highlight the urgency for action
- Provide perspectives on the key transition enablers that decision makers should acknowledge
- Invite decision makers to take collective actions across the value chain to advance the transition

## Tetra Pak white paper series: Actions to drive the transition



This pathway paper is the second part of a white paper series focused on the safe and just transition towards more sustainable food systems<sup>19</sup>.

By examining each pathway, we identify the critical actions and collective efforts needed to drive meaningful change.

In this paper, we discuss the sustainable transformation of the dairy sector and highlight key enablers to make the needed transition.

<b>White paper</b>	Global focus areas and collective actions to drive safe and just transition
<b>Pathway paper</b>	Enabling transition towards more sustainable dairy
<b>Pathway paper</b>	Innovating for new food sources
<b>Pathway paper</b>	Reducing food loss and waste
<b>Pathway paper</b>	Scaling access to safe nutrition via sustainable food packaging

# The challenge: Decarbonising the dairy sector while securing its economic, nutritional, and social viability

**Dairy plays an important role in human nutrition. At the same time livestock and dairy systems are significant contributors to GHG emissions. However, they are also part of the solution through carbon sequestration at farm level<sup>8</sup>. Recognising and quantifying the role of livestock and dairy production systems in the process of carbon sequestration, and the biogenic carbon cycle is difficult, but needed in order to understand how to better direct decarbonisation activities at scale<sup>20</sup>.**

Millions of people globally depend on the dairy sector for their livelihoods and nutrition. Over 600 million people live on ~133 million dairy farms<sup>2</sup> and over 1 billion people depend on their livelihoods supported by the dairy sector<sup>3</sup>. Vast amount of evidence also places dairy as an important part of human nutrition, playing a key role in healthy diets.<sup>4,5</sup>

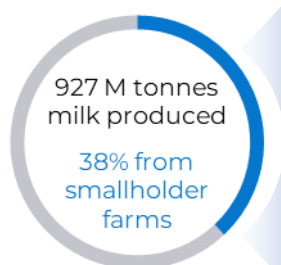
Today, the dairy sector faces significant challenges, being among the largest agriculture related emission sources, with up to 1.7 Gt of atmospheric GHG emissions generated, of which over 58% from enteric fermentation.<sup>6,8</sup> Key areas where emissions should be reduced along the value chain relate to methane from enteric fermentation, manure management, disease prevention<sup>9</sup>, and fuel and electricity consumption in feed production, processing, and transportation. While the shift towards renewable energy supply accelerates decarbonisation, this change alone will not be enough to meet the aspiration to achieve dairy net zero by 2050.

Today ~38% of the global milk produced is sold unprocessed into the informal market, where milk is often produced by small holder farmers<sup>7</sup> who lack the knowledge, equipment and technologies to produce, harvest, and store milk in a safe, hygienic way. The low productivity often results in lower incomes and higher emission intensity<sup>13</sup>, which also makes it challenging to attract youth and a sustainable workforce to continue operating the farm for generations.

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## Key figures on global dairy system

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**600 million** people live on **133 million** dairy farms around the globe

**1-2% annual increase** in global demand expected by 2050

**1.7 Gt CO<sub>2</sub>e** emissions in 2015, **increase of 18%** from 2005 level

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Source: International Dairy Federation; FAO Dairy Market Review; FAO Dairy Sector Facts<sup>4,5,10,11</sup>

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**The transition to more sustainable<sup>19</sup> dairy systems is possible, and the time to take action is now.**

Studies have shown clear correlation between improving yields and low GHG emissions<sup>12</sup>. Today, technologies and levers exist, through which significant emission intensity reductions in a short time frame can be reached by implementing changes in dairy farming and processing practices.

The sector must take collective action to address food security and nutrition, enhance resource use and sustainability, and foster livelihoods and rural development. In this pathway paper we aim to present some of the available mechanisms that can help policymakers, businesses, and consumers contribute to the transition by describing a range of key enablers under 1) Policy, 2) Partnerships, 3) Technology, and 4) Financing categories.

# Enabling the transition: Policy mechanisms






**Robust, inclusive, and periodically reviewed policy interventions play a critical role in driving and enabling a safe and just transition.**

Public policy interventions are needed to implement actions for sustainable progress in the dairy and livestock sector. While policy approaches have to vary across regions, dairy production and livestock systems, and socioeconomic contexts, the integration of five types of policy approaches are needed to advance transformative actions at scale.



Implementation of low to no carbon practices in the livestock sector requires first and foremost transfer of technology and knowledge, together with the right incentives and an effective regulatory framework. In the below table, we present examples of potential policy approaches.

Examples of policy approaches

					
Including livestock in Nationally Determined Contributions	✓				
Incentivisation of production efficiency to optimise sustainable production	✓	✓			
Accelerate approval for methane and nitrogen additives for cattle to incentivise safe but effective new additives	✓	✓			
Incentivise baselining and improvement actions, particularly for largeholder farmers	✓	✓			
Zero deforestation commitments from governments and large companies to improve land management strategies	✓				
Tax credits, grants, or low interest loans for projects supporting sustainable practices	✓	✓			
Producer support programmes to help boost smallholder farmer market competitiveness, production efficiency					✓
Pricing adjustments to account for externalities, such as carbon taxes			✓		
Effective and evidence-based voluntary carbon market policies to incentivise and ensure the sector is recognised for emission reductions, e.g. moving towards carbon insetting	✓	✓			
Centralisation of national disease management strategies	✓				
Certification schemes for “climate smart” products, linked to product traceability and labelling	✓	✓	✓	✓	

Sources: Adapted from FAO: Five practical actions towards low-carbon livestock<sup>13</sup>

## Collective actions needed

Policymakers have several tools to influence significant shifts in dairy and livestock systems. Today, dairy farming best practices and technologies are available to reduce environmental impacts of dairy production. However, measures to implement these options need to be considered as an inherent part of the global climate policy and financing dialogue.



# Enabling the transition: Partnerships

**The transition requires cross-value chain collaboration and knowledge sharing to achieve systemic results. Partnerships provide a significant opportunity to accelerate the transition.**

To ensure sustainable development of the livestock sector and contribution to ending hunger, malnutrition, and poverty, a holistic approach, which mobilises the public and the private sector is needed. Knowledge sharing and capacity building across value chains and sectors are central themes in partnerships that can drive system wide change.

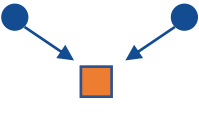
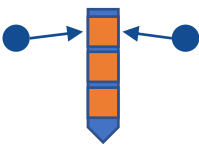
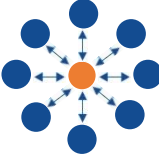

The dairy sector has a substantial depth of scientific and practical knowledge, and technologies, which could be cascaded to less developed dairy systems via partnerships and strategic alliances to achieve meaningful change. On the other hand, sectors outside of dairy sector have technologies and knowledge (e.g. in relation to renewable energy, bio-based fertilisers<sup>14</sup>) where cross-sector partnerships could help the dairy sector to increase efficiency and decarbonise more effectively.

## Examples of partnership approaches towards more sustainable<sup>19</sup> dairy

**Public-private partnerships (PPP)** have the potential to improve agricultural productivity and drive sustainable transition in the dairy and livestock sector. PPPs can play key role in scaling up essential resources and technical expertise, training programmes to smallholder farmers, driving the sector towards adaptation of more sustainable measures.

**Multi-stakeholder partnerships (MSP)** can be leveraged in e.g. knowledge sharing platforms, technical assistance, facilitation of policy reforms to support adoption of more sustainable practices. Fostering dialogue between dairy farmers, governments, private sector and academia can lead to system wide impacts.

Typology of multi-stakeholder partnerships

Goal	← Address a defined problem		Address systemic change →	
Setup				
	<b>Joint project</b>	<b>Joint programme</b>	<b>Strategic alliance</b>	<b>Collective impact</b>
Description	Short-term, one-time collaborative effort among a small set of partners, often to develop pilots or projects	Collaboration among a small set of partners to implement a programme addressing a specific aspect of a larger problem	Platform for ongoing collaboration around one or more related social issues, aligning partners in support of a common agenda and joint investments	Initiative based on long-term commitments to a common agenda by the group of cross-sector actors needed to realise system wide change around a social problem

Source.: Adapted from Hazlewood, 2015<sup>15</sup>

## Collective actions needed

The dairy and livestock sector benefits from a number of public-private and multi-stakeholder partnerships. Key levers to address with partnerships include policy development and knowledge and capacity building. Cross-sector measures should be fostered to make sure awareness of all available technologies and best practices are made available to dairy farmers. To reach system level impact, collective measures and alliances should be formed to address the most pressing issues in improving livelihoods and phasing out unsustainable practices in dairy farming.

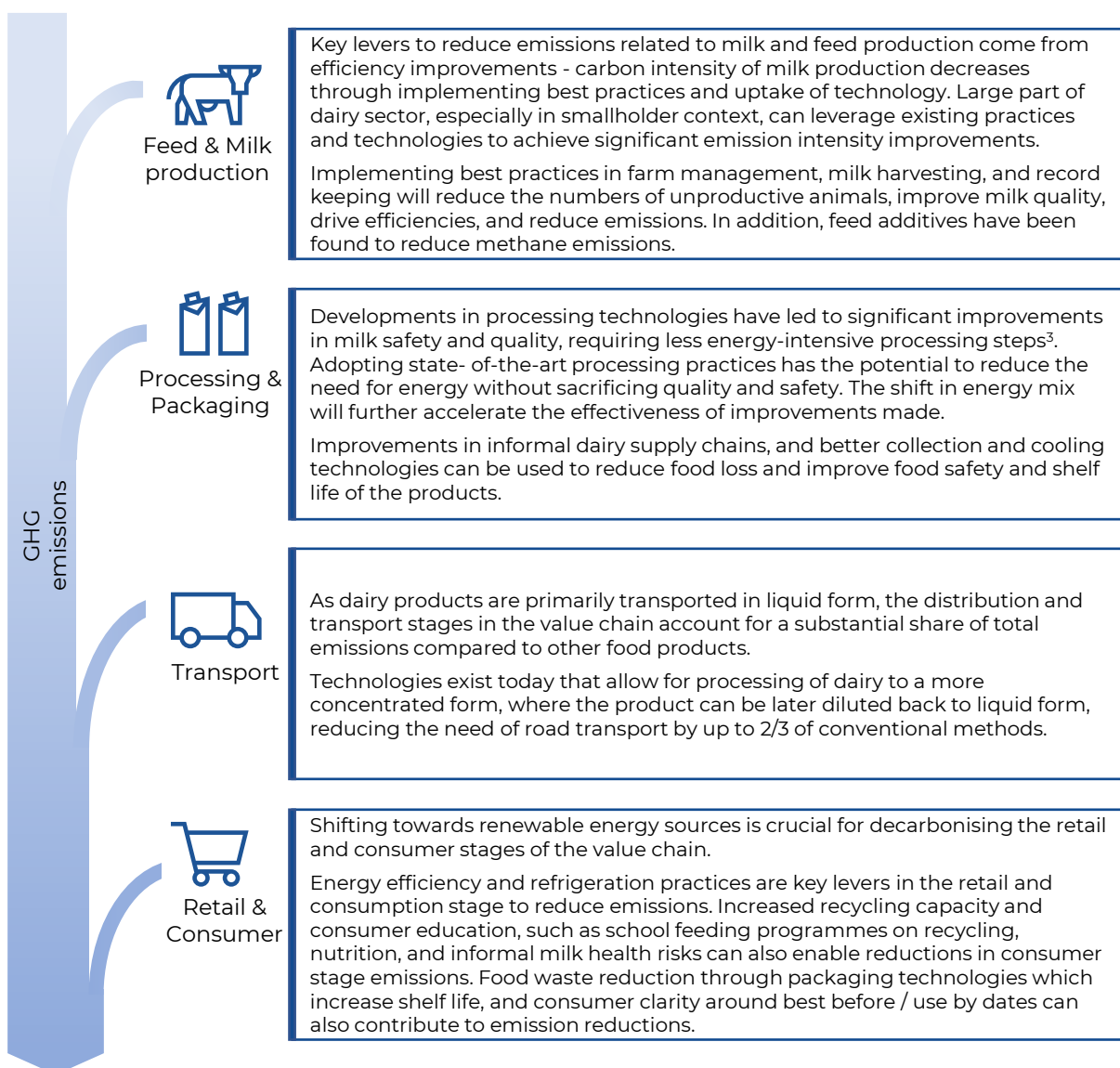
# Enabling the transition: Technology

To achieve emission reduction targets, implementing best practices with known levers, scaling up technologies, and conducting long-term fundamental and applied research.

Emissions in dairy systems could already be significantly reduced by adopting existing technologies and best practices<sup>8</sup>. Reliance on development of new and emerging technologies will take too long to achieve the needed reductions by 2030.

The FAO estimates that 30-35% reduction in GHG emissions in livestock supply chains could be achieved if producers in any given system, region, or climatic zone implemented the technologies and practices currently used by their least emission intensive peers.<sup>16</sup> The inconsistency of knowledge, competence and available technology in dairy production impacts emissions everywhere, but is highlighted by the share of emissions in dairy systems from developing regions and informal milk supply chains. Spreading available best practices, technologies, knowledge, and developing competence, especially to smallholder farmers will be key to achieving meaningful change.

## Areas for technological interventions in dairy supply chains



Sources: Adapted from Peterson and Mitloehner (2021)<sup>17</sup>, FAO<sup>8</sup>

# Enabling the transition: Financing

**Scaling the adoption of existing and emerging technologies requires financing and economically viable models. Various mechanisms exist that can help accelerate the transition.**

One of the most important enablers for transforming dairy systems is access to capital and functioning and efficient financial mechanisms for dairy farmers. The basis for transformative actions is securing the farmers' livelihoods and ensuring dairy farms can operate profitably, which may mean funding support for farm emission reduction strategies from processors and retailers.

To accelerate the dairy system transition, expenditures in dairy and livestock systems should be directed towards activities that promote farm profitability, implementation of best practices for more sustainable ways of production, efficiency, and access to nutrition in vulnerable areas.

## Intervention areas for financial resource mobilisation

Sources of financing include those through internal flows of capital within food systems, originating from consumption and production, and those through external flows, which can be influenced by public policies.<sup>18</sup> In the below table, we list examples on how different financial intervention areas can be mobilised for dairy systems transition.

Areas for financial intervention in dairy systems

Source of capital	Examples of financial intervention for sustainable dairy systems
Consumer expenditures on food	<ul style="list-style-type: none"><li>Awareness and education campaigns on diversification of diets and the benefits of dairy consumption</li></ul>
Agrifood business profits and savings	<ul style="list-style-type: none"><li>Subsidies to support nutritious and sustainable dairy production</li><li>Funding to support knowledge and capacity building through technical assistance and extension programmes</li></ul>
Public sector finance	<ul style="list-style-type: none"><li>Public expenditure reviews with an expanded focus on dairy system sustainability</li></ul>
International public finance	<ul style="list-style-type: none"><li>Budget support to developing countries</li><li>Loans and grants to sustainable projects to mitigate risk of private sector investments</li></ul>
Banking system	<ul style="list-style-type: none"><li>Use of blended finance mechanisms to mitigate risk of lending for sustainable investments</li></ul>
Capital markets	<ul style="list-style-type: none"><li>Support and acceleration of projects to develop investment options for private sector ESG investors</li><li>Arrangements to link potential investors with opportunities</li></ul>

■ Internal flow   ■ External flow

Source: Adapted from IFPRI (2021)<sup>18</sup>

## Collective actions needed

Financing can be leveraged to influence significant shifts in dairy and livestock systems. Today, extensively researched best practices, and technology options are available to reduce environmental impacts of dairy production. However, inclusion of these intervention areas needs to be considered in funding conversations and ensure financial intervention is timely and directed towards activities that promote profitability and sustainability.

## Endnotes

- 1) Tetra Pak: How could global food systems better sustain our planet and its people by 2040? Global focus areas and collective actions to drive safe and just transition
- 2) Pathways to Dairy Net Zero, <https://pathwaystodairy.netzero.org/>
- 3) Global Dairy Platform, [Globaldairyplatform.com](http://Globaldairyplatform.com)
- 4) FAO: Contribution of terrestrial animal source food to healthy diets for improved nutrition and health outcomes <https://www.fao.org/3/cc3912en/cc3912en.pdf>
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- 6) FAO: Climate Change Mitigation Options in Agrifood Systems – Summary of the Working Group III contribution to the Intergovernmental Panel on Climate Change Sixth Assessment Report (AR6) <https://www.fao.org/3/cc4943en/cc4943en.pdf>
- 7) Food for Development, <https://www.tetrapak.com/sustainability/focus-areas/food-access-availability-and-resilience/food-for-development>
- 8) FAO: Climate change and the global dairy cattle sector, <https://www.fao.org/3/ca2929en/ca2929en.pdf>
- 9) Health for Animals: Animal health and sustainability: a Global Data Analysis, <https://www.healthforanimals.org/wp-content/uploads/2023/04/AH-and-Sustainability-Report-Summary.pdf>
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- 13) FAO: Five practical actions towards low-carbon livestock, <https://www.fao.org/3/ca7089en/ca7089en.pdf>
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- 15) Hazlewood P. (2015) Global multi-stakeholder partnerships: scaling up public-private collective impact for the SDGs. Background paper 4. World Resources Institute/Independent Research Forum. Retrieved from: [https://www.irforum.org/sites/default/files/publications/Retreat%20%236\\_BP%204\\_Final%20for%20website.pdf](https://www.irforum.org/sites/default/files/publications/Retreat%20%236_BP%204_Final%20for%20website.pdf)
- 16) FAO: Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities, <https://www.fao.org/3/i3437e/i3437e.pdf>
- 17) Peterson and Mitloehner (2021), Sustainability of the Dairy Industry: Emissions and Mitigation Opportunities, <https://doi.org/10.3389/fanim.2021.760310>
- 18) Diaz-Bonilla et al (2021) Financing the Transformation to Healthy, Sustainable, and Equitable Food Systems, <https://ebrary.ifpri.org/utills/getfile/collection/p15738coll2/id/134343/filename/134557.pdf>
- 19) Tetra Pak: Our four pathways to drive change, <https://www.tetrapak.com/sustainability/acting-for-sustainability/moving-food-forward>
- 20) Rotz A. (2018) Symposium review: modelling greenhouse gas emissions from dairy farms, [https://www.journalofdairyscience.org/article/S0022-0302\(17\)31069-X/pdf](https://www.journalofdairyscience.org/article/S0022-0302(17)31069-X/pdf)



