



Case study: Kingdom of Saudi Arabia

How can we advance sustainable food systems¹ in the Kingdom of Saudi Arabia?

Opportunities to scale current impact in the Kingdom of Saudi Arabia

Foreword

Largely due to the hot and arid climate, the Kingdom of Saudi Arabia (KSA) is highly dependent on food imports and is faced with significant food loss and waste challenges.^{2,3} As part of the Saudi Vision 2030, the government focuses on identifying sustainable solutions to tackle these challenges.⁴ The dairy sector is an important contributor to livelihoods, food security, and nutrition. However, it is also a substantial user of land, water, and energy, and a generator of emissions. As the nation is an important producer of dairy products, with a production of ca. 2.9 million tonnes in 2020⁵, it is imperative to focus on improving sustainability in dairy production and leverage food packaging to improve food security and reduce food waste and spoilage.

At Tetra Pak we aim to ensure that our packaging and processing solutions, as well as our capabilities and global reach, are utilised to support sustainable growth within food systems. As solutions for dairy processing and sustainable food packaging are important elements of our offering, we aim to further increase our contribution to a sustainable food system in the Kingdom of Saudi Arabia. At Tetra Pak, our goal is to contribute to the transition through our four pathways:

- 1) Enabling transition towards more sustainable dairy⁶
- 2) Innovating for new food sources
- 3) Reducing food loss and waste
- 4) Scaling access to safe nutrition via sustainable food packaging⁷

This case study aims to address key questions on (A) KSA's current baseline within the four pathways today, (B) our contribution within two of these pathways, (C) key challenges to scale this contribution and (D) how regulators and potential collaborations can help accelerate growth.

Tetra Pak's four pathways

1.



Enabling transition towards more sustainable dairy⁶

Recognising the important role of dairy production and consumption in food systems, we focus on enabling the transition towards more sustainable dairy practices, by addressing the environmental impact of dairy processing, while also supporting smallholder farmers' productivity, profitability, and livelihoods.

2.



Innovating for new food sources

Working in collaboration our aim is to advance innovation in and development of alternative protein sources that require less resource-intensive supply chains than conventional proteins and to enable the scaling up of new food technologies for producing these new food sources at scale.

3.



Reducing food loss and waste

Our contribution to reducing food loss and waste is two-fold - developing food processing technologies that help reduce food loss during production, including new solutions to turn side-streams into value-added products. Our aseptic packaging solutions also help reduce food waste by keeping perishable products safe for longer.

4.



Scaling access to safe nutrition via sustainable food packaging⁷

Food packaging plays an essential role in ensuring food safety and accessibility. We are committed to scaling access to safe nutrition globally by developing and promoting sustainable food packaging solutions, that minimise environmental impact, preserve food quality, and enhance the circulatory of resources.

Current state in Saudi Arabia

Kingdom of Saudi Arabia context

Over the last 20 years, Saudi Arabia has seen significant economic changes, with a population growth of 2.4% per year since 2000, expected to continue at 1.3% per year over the coming decade.⁸ At the same time, real GDP per capita has fluctuated due to heavy reliance on the oil sector, historically contributing to ca. 40% of GDP.⁹ Following the 2008 global financial crisis, KSA achieved a steady GDP per capita growth of 1.6% p.a.,¹⁰ driven by the government's commitment to economic diversification. Initiatives from the transformative Saudi Vision 2030 aim to reduce oil sector dependency and foster growth in new sectors such as renewable energy and tourism.⁴ These efforts have contributed to make Saudi Arabia the fastest-growing G20 economy in 2022.¹¹

In order to support the expected growth through a sustainable food system, the Saudi Vision 2030 includes clear ambitions for transition within the four pathways, such as:

- 1 **Water management:** Aim to promote efficient water resource management through reduced consumption and the utilisation of treated and renewable water, e.g., by supporting dairy companies to adopt innovative water minimising technologies
- 2 **Waste management:** Seek to protect its environment through enhanced waste management efficiency by establishing comprehensive recycling projects and implementing legislative frameworks to reduce waste across Saudi Arabia
- 3 **Food security:** Contributing to build safe and sufficient strategic food reserves to better guard against emergencies, as well as supporting industries that improve self-sufficiency, e.g., by promoting new food sourcing options

KSA's current baseline within the 4 pathways

Pathway	Current baseline
Transition to more sustainable dairy⁶	Within the dairy sector, KSA boasts self-sufficiency and outpaces the other GCC nations in production. ^{5,12} However, water inefficiency is a pressing issue due to heavy reliance on non-renewable sources, worsened by the nation's issues with water scarcity ¹³
Innovate for new food sources	Saudi Arabia has witnessed a growing interest in alternative protein sources, aligned with the government's target to drastically reduce GHG emissions towards 2030 ¹⁴ . The country is also actively exploring alternative food sourcing options to enhance food self-sufficiency by reducing its dependency on food imports ¹⁵
Reduce food loss and waste	KSA has made significant strides in reducing food loss in production, achieving a score of 89.5/100 in the Global Food Security Index 2022. ¹⁶ Yet, there is room for improvement in creating a well-defined infrastructure for food circularity, reducing waste by upcycling side-streams into new and valuable resources
Scale safe nutrition via sust. food packaging⁷	In KSA household food waste at consumer level exceeds the global average by +42%. ³ Additionally, infrastructure for recycling is lacking, and KSA recently ranked 77 th globally on the EPI Recycling Index. ¹⁷ Increasing recycling and decreasing food waste is a key priority in KSA towards 2030

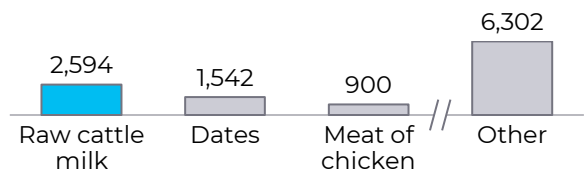
In this case study, the main focus is exploring **how Tetra Pak can scale the impact within (1) sustainable dairy⁶ and (2) safe nutrition⁷**, as water-inefficiency in dairy production is a substantial challenge to the nation's food systems, while recycling is lagging global averages

Enabling transition towards more sustainable dairy: Background and Tetra Pak contribution

Current state of dairy production in Saudi Arabia

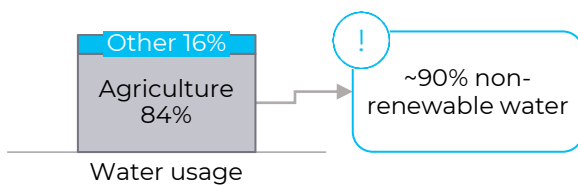
KSA stands out as a significant dairy producer surpassing its GCC neighbours by ca. 25 times. In KSA, the dairy industry excels in emission control with an emission intensity of 0.69 CO₂eq/kg for raw milk production in '20, and even lower for the main dairy production raw cattle milk (0.17 CO₂eq/kg). This is the second lowest in the world for cattle milk production, substantially lower than the global average of ca. 3.0.⁵

Food production in KSA (Ktonnes, 2020)¹⁸



Source: FAOSTAT (FAO)

Water usage in KSA (2019)¹³



Source: Ministry of Environment, Water & Agri.

Despite a relatively low-emission cattle milk production, the dairy industry is confronted by other challenges in KSA. As it requires ca. 1,020 liter water to produce 1 kg milk,¹⁹ the dairy industry is a substantial contributor to KSA's water scarcity. To maintain the country's production levels in a sustainable manner, new innovative technologies to enhance water efficiency within dairy production are needed.

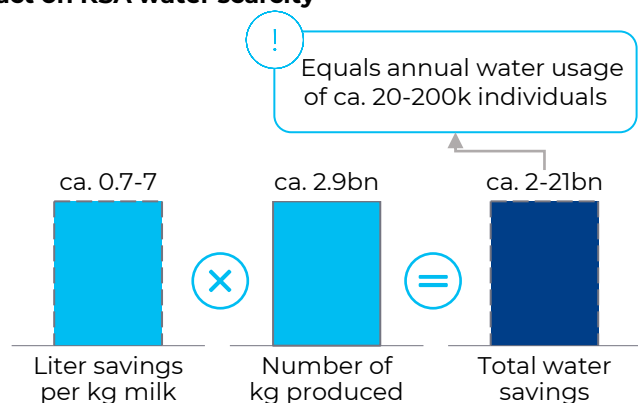
Tetra Pak's contribution to more sustainable dairy in Saudi Arabia

Tetra Pak's long-lasting history of innovation within dairy processing has led to technologies that can contribute to reduction of both waste and GHG emissions, but also has potential to reduce water need in dairy processing:²⁰

- 1. OneStep technology:** Combines separation, blending, standardisation, and heat treatment into a single step, which can increase efficiency and reduce water consumption
- 2. Water filtering:** Recovers up to 95% of water per filling machine hour,²⁰ while also concentrating some of the wastewater produced during production into milk, thus reducing product loss
- 3. eBeam sterilisation:** The innovative eBeam sterilisation technology sterilises packaging without the use of chemicals, potentially saving up to two-thirds of water used

Tetra Pak's impact on KSA water scarcity

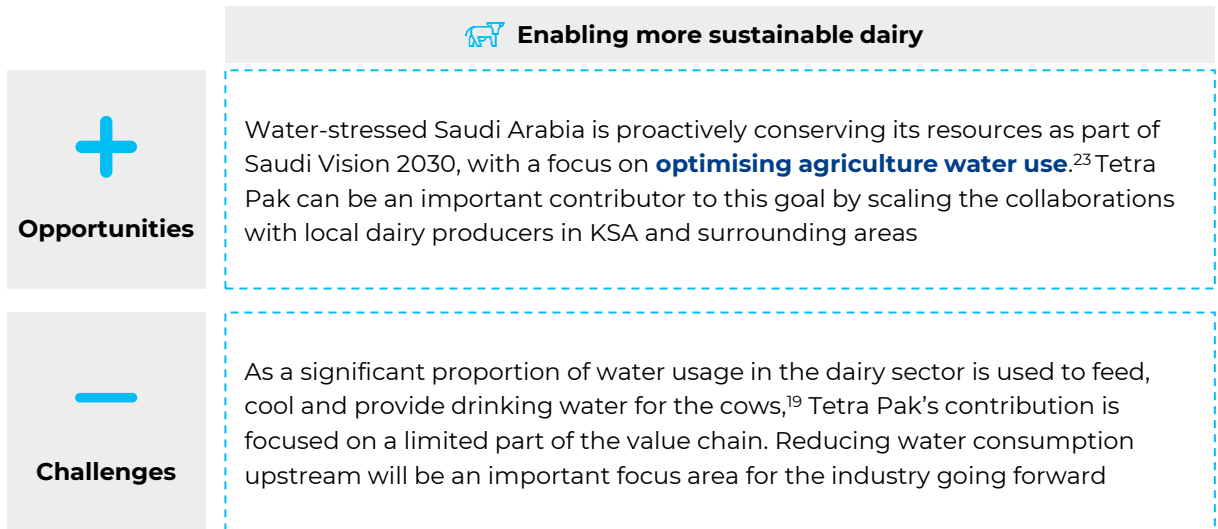
Through cooperations with leading dairy producers, Tetra Pak's innovative technology can contribute to reduce water usage up to 70% in the processing and packaging part of the value chain, compared to a conventional line solution.²⁰ Looking at the yearly water savings for the processing of dairy in KSA, this illustration equals the total water consumption of ca. 20-200 thousand individuals.^{21,22,5}



Enabling transition towards more sustainable dairy: Opportunities and potential collaborations

Key challenges and opportunities for Tetra Pak within sustainable dairy

In the context of dairy production in KSA, a range of opportunities and challenges are present:



It is crucial to tackle the identified opportunities and challenges to enhance water efficiency in dairy production in Saudi Arabia.

Key policy recommendations

In order to tackle the current water scarcity issues, and further work towards a more sustainable dairy production, policy makers could focus on the following:

- 1 Support innovative technology:** Allocate resources to promote and support implementation of innovative water saving technology solutions within dairy production
- 2 Support collaboration platforms:** Further enhance close collaboration with the dairy value chain to find joint solutions to ensure a more sustainable dairy industry
- 3 Drive improvement actions:** Incentivise improvement actions within the industry to drive sustainability

Potential collaborations for Tetra Pak

To promote the transition to more sustainable dairy in Saudi Arabia, Tetra Pak could collaborate with stakeholders that align with the key recommendations identified.

- Potential collaborations**
1. Collaborate with **governmental bodies** such as the Ministry of Environment Energy & Water to set up a regional chapter of the Global Dairy Processing Task Force, and governmental-led initiatives like Qatrah to increase awareness of new solutions
 2. Further scale the current collaboration with **dairy producers**, such as Al Rabie Saudi Foods, to jointly promote more sustainable dairy practices in the production part of the value chain
 3. Collaborate with **local food retailers** such as Panda Retail to increase consumer awareness of more sustainable dairy products, e.g., through packaging design and information

Scaling access to safe nutrition via sustainable food packaging: Background and Tetra Pak contribution

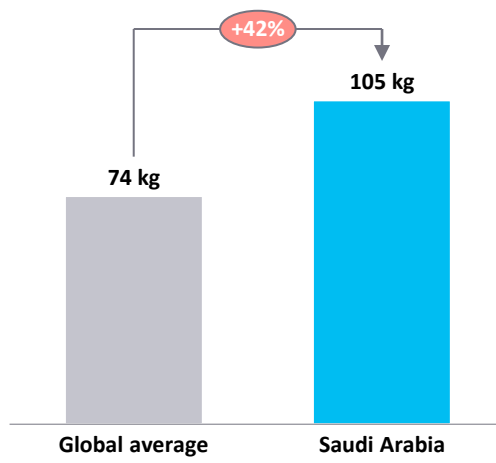
Current state of safe nutrition through sustainable food packaging in KSA

The hot and arid climate in KSA poses a critical challenge to food preservation, necessitating refrigeration at every step within the food value chain. Furthermore, as the 13th largest country in the world,²⁴ a food product often needs to travel long distances before it reaches the end-consumers. As such, KSA faces challenges of ensuring the quality and safety of its food products. In 2019, ca. 30 kg per person were lost during distribution,²⁵ underlining the difficulty of maintaining product freshness until it reaches the end-consumers.

In 2019, Saudi Arabia saw a household per capita consumer-generated food waste 42% above the global average,¹⁶ driven by 1) limited awareness of food waste issues in the population, and 2) customers overbuying and stockpiling food.²⁶ These factors highlight the need for prolonged shelf-life packaging solutions in various sizes.

There is also a notable absence of infrastructure, legislation and awareness for recycling in KSA, particularly regarding the collection of recyclable materials. The country ranked 77th in the world for recycling in the Environmental Performance Index 2022, with a recycling rate of 18.8%.¹⁷

Household food waste in the KSA (kg per capita, 2021)¹⁶



Source: UNEP Food Waste Index 2021

Tetra Pak's contribution to safe nutrition via sustainable food packaging

Tetra Pak is committed to working closely with local counterparts to develop and implement more sustainable solutions that address the region's unique challenges while ensuring food safety and availability for the growing population.



Packaging technology

Tetra Pak's aseptic food packaging technology **preserves food for over 6 months without the need for refrigeration and any preservatives.**²⁷ This technology can play a role in supporting the safety and availability of long-lasting products like milk and juice in a country like KSA, where food products need to travel great distances in hot climate before it reaches end-consumers. Beyond its potential to reduce food wastage by enabling long shelf life, this technology eliminates the need for refrigeration in both distribution and storage, **yielding energy and cost savings**



Recycling

Tetra Pak has cooperated with leading recycling companies, Obeikan Paper Industries and Saudi Top Plastic Factory, on the 'RIYcycle' project, representing a pioneering effort in the country. With a combined investment of over EUR 3 million, the project – a first in the country – aims to **increase collection and recycling by creating value for post-consumer cartons.** Its core mission is to **recycle all package components collected in Saudi Arabia** and neighbouring countries like the UAE. The new carton recycling line is projected to process up to 8,000 tonnes annually²⁸

Scaling access to safe nutrition via sustainable food packaging: Opportunities and potential collaborations

Key challenges and opportunities for Tetra Pak to scale safe nutrition in KSA

Scaling access to safe nutrition in KSA represents various opportunities and challenges:



Addressing the identified opportunities and challenges is vital to deliver safe nutrition through sustainable food packaging in Saudi Arabia.

Key policy recommendations

Key policy recommendations are identified below to further scale safe nutrition across the country:

- 1 Scale waste collection infrastructure:** Cooperate with other stakeholders in scaling the collection part of the waste mgmt. value chain to boost overall recycling in the country
- 2 Consumer behaviour:** Increase awareness among consumers about e.g. recycling benefits to increase recycling rates and reduce consumer-generated waste
- 3 Sustainable food packaging:** Recognise the benefits of technologies such as aseptic food packaging to increase food shelf life

Potential collaborations for Tetra Pak

To promote safe nutrition through sustainable food packaging in KSA, Tetra Pak could align with key recommendations and consider collaborating with counterparts that accelerate the change:



5. Appendix: Endnotes

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