

Moving food forward

Helping build food systems resilience through food processing technology and packaging solutions

White paper
in collaboration with SYSTEMIQ Ltd.

About this document

At Tetra Pak we believe that science, technology and innovation are essential contributors to a global food system that is safe, nutritious, equitable, sustainable and resilient. Our company vision, “We commit to making food safe and available, everywhere” is an aspirational goal that drives our organisation.

Our brand promise “PROTECTS WHAT’S GOOD” defines us and influences everything we do. We believe that the right safe and nutritious food needs to be balanced with environmental considerations, namely the necessity to fight deforestation, protect biodiversity, and halt global warming, while guaranteeing the availability of natural resources to future generations. Such a reconciliation can only succeed, if we use innovative solutions and technologies along the food value chain.

As a UN Global Compact advocate and contributor to Sustainable Development Goals, Tetra Pak is committed to the targets of the UN Food Systems Summit and actively engaged in the UN Food Systems Summit process both at global and national level. We also welcome the G20 Matera Declaration and call for action on food security and safety, nutrition, and food systems.

As we have seen again in recent times, global challenges and crises have no borders and therefore we strongly believe in international cooperation and multilateral responses to the food system crisis. Shared approaches are particularly critical, as the world transitions to the post-pandemic recovery era. More transdisciplinary research on food system transition pathways is needed to inform policy development and practice. It is important that such analyses are forward looking and adequately informed by technologies, innovations and solutions that can advance system transitions.

Our intent is to start the dialogue and conversations about the contribution that food processing technologies and packaging solutions can make to building resilient food systems. Through engaging with others, we will identify the challenges and define the opportunities where we can help to improve food systems. Initial thoughts are outlined in the next few pages, and we welcome input as we refine our thinking, articulate our ambition and create a road map in support of building resilient food systems to achieve the Sustainable Development Goals.

The document has been prepared by Tetra Pak in collaboration with SYSTEMIQ Ltd.

Executive summary

Our food systems have delivered major human development benefits in recent decades, but we need to work harder if we are to meet the Sustainable Development Goals (SDGs) and the objectives of the Paris Agreement. On the surface food systems have been doing well in recent decades. Despite a growing global population, more people have enjoyed affordable, safe and plentiful food. However, food systems have struggled to deliver healthy diets and nutrition, decent livelihoods for many, and they incur “hidden” environmental, health and poverty costs which amount to some \$12 trillion each year¹ according to research by the Food and Land Use Coalition (FOLU). These hidden costs can cause irreversible damage to key ecosystems, fundamentally undermine food security in certain regions, and increase public health costs. The FOLU report concludes that current food and land use systems generate up to 30% of global greenhouse gas (GHG) emissions and are the leading cause for ecosystem degradation and biodiversity loss.¹

The first United Nations Food Systems Summit comes at a critical time and offers all actors in the food systems a unique opportunity to work together to address these challenges. The Covid-19 pandemic has ravaged economies, with profound impact on human development². At the same time, countries are making bold commitments to tackle climate change and biodiversity loss. This offers a unique opportunity for the UN Food Systems Summit to mobilise all stakeholders, from farmers to consumers, to chart a course towards sustainable food systems. Everyone across food systems should and can rise to this challenge.

Well-designed food processing technologies and packaging solutions can strengthen food supply chains and support the Food Systems Summit objectives. Food processing needs to be done well to avoid health and environmental costs. Similarly, poor food packaging solutions can have environmental costs, particularly through the increase in plastic waste and unsustainable use of materials. On the other hand, well-designed processing technologies and packaging solutions are key enablers of innovation in food value chains and can make critical contributions towards the UN Food Systems Summit objectives. Success will depend upon close collaboration with farmers, producers, consumers, governments and other stakeholders, as well as further investments in science and innovation.

At Tetra Pak, we have tentatively identified six impact opportunities for food processing technologies and food packaging solutions to support the Food Systems Summit objectives. They are briefly outlined in this paper:

- **Food innovation for healthy diets** that makes healthier food more easily available and at lower cost
- **School Feeding Programmes** that improve nutrition and school attendance and create a market for local food products
- **Minimised Food Loss and Waste** through improved food processing technologies and packaging solutions, particularly for highly nutritious and perishable fruits and vegetables
- **Sustainable dairy production**, particularly for smallholder dairy farmers
- **Sustainable food packaging solutions** to reduce the environmental impact of the food system
- **Supply chain transparency and traceability** to improve food safety, enable decision making and support a circular economy

Our intent is to start a dialogue and conversations about the contribution that food processing technologies and packaging solutions can make to building resilient food systems. Through engaging with others, we will identify the challenges and define the opportunities where we can help to improve food systems. We welcome input as we refine our thinking, articulate our ambitions and create a road map in support of building resilient food systems to achieve the Sustainable Development Goals.

We are confident that progress can be achieved to support the UN Food Systems Summit objectives if we work together holistically and collectively. Transforming food systems will require radical interventions respecting the planetary boundaries. Tetra Pak as a company is committed to this journey.

1

The food systems summit opportunity

In September 2021, UN Secretary-General António Guterres will convene a Food Systems Summit as part of the Decade of Action to achieve the Sustainable Development Goals (SDGs) by 2030. The Summit will launch bold new actions to deliver progress on all 17 SDGs, each of which relies to some degree on healthier, more sustainable and equitable food systems.

The Summit will awaken the world to the fact that we all must work together to transform the way the world produces, consumes and thinks about food. It is a summit for everyone everywhere – a people’s summit. It is also a solutions summit that will require everyone to take action to transform the world’s food systems.

Guided by five Action Tracks, the Summit will bring together governments and key players from the worlds of science, business, policy, healthcare and academia, as well as farmers, indigenous people, youth organisations, consumer groups, environmental activists, and other key stakeholders. Before, during and after the Summit, these actors will come together to bring about tangible, positive changes to the world’s food systems.

Global food systems have delivered major human development benefits and in many respects, they have never performed better than in recent decades: food supply has outgrown population growth, prices have declined in real terms, and improvements in food safety have occurred across the world. However, at the same time the current food systems need to be advanced and transformed to provide decent livelihoods to all, offer healthy diets and nutrition to all and reduce the environmental costs of the system.

The cost of the current food system



Source: Based on Food and Land Use Coalition GB (2019), Pew Charitable Trust and SYSTEM IQ (2020)

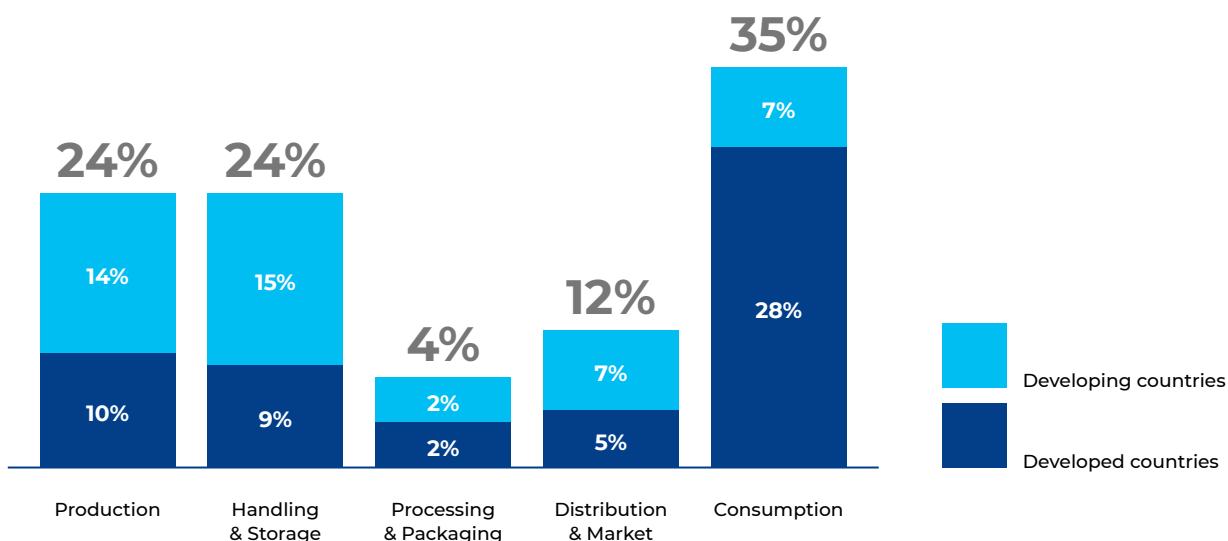
The landmark report released by the Food and Land Use Coalition (FOLU) is one of the first to quantify the benefits of transforming global food and land use systems, as well as the mounting costs of inaction. **Food systems generates \$12 trillion of hidden costs¹ that far exceed the market value of agricultural commodities.** These hidden costs or “externalities” include:

- Malnutrition and unhealthy diets.** Some 2 billion people are malnourished – they do not have access to a diet that meets minimum levels of energy intake and/or essential nutrients³. In 2020, 690 million people regularly go to bed hungry³, a figure that has risen as a result of the Covid-19 pandemic². At the same time, one in three people are overweight or obese⁴, placing a massive burden on health services and our economies through higher disease incidence and lower life expectancy.
- Climate change and biodiversity loss.** More than one-third of human-induced GHG emissions can be attributed to the way we produce, process, package, distribute and consume food⁵. Food and agriculture are also the major driver of nature and biodiversity loss, including 2 billion hectares of degraded land⁶, 62% of species threats⁷ and over 70% of freshwater withdrawals⁸. Meanwhile, biodiversity is critical for safeguarding global food security, underpinning healthy and nutritious diets, and protecting plants and animals from pests and disease⁹.
- Food loss and waste.** UN Food and Agricultural Organisation (FAO) estimates that one third of all food produced worldwide is not consumed, accounting for 8% of global GHG emissions¹⁰. The amount of cropland used to grow this lost and wasted food is equivalent to the size of Mexico¹¹. The total global food loss and waste across the food supply chain is estimated to be 1.3 billion tons¹². The majority of it occurs at the production, handling and storage, and consumption stages of the value chain¹².
- Poverty and inequality.** Many farmers and their families live a precarious existence, in which hunger is a daily threat and access to basic services, education, health and water supplies is even more difficult than for the urban poor. World Bank data suggests that 65% of poor working adults make their living through agriculture¹³. Among other factors, markets are structurally concentrated, and smallholders - with limited skills, assets, power, or market access - receive a minimum share of the final value of products. This creates a lock-in effect that makes escaping the cycle of poverty extremely difficult. These are all exacerbated by rising risk of food insecurity, including in response to climate change¹.

Food loss and waste

Share of Total Food Loss and Waste by Stage in the Value Chain

100% = 1.5 quadrillion kcal (2009)



Source: World Resources Institute, based on FAO 2011 data (2013)

The 2019 Growing Better report of the Food and Land Use Coalition¹ identifies 10 critical transitions to transform the current food and land use system.

Together, these transitions can secure a better environment, better health, inclusive development, and food security (see Appendix). They require an estimated \$300-350 billion in annual investments and could result in avoided costs of \$5.7 trillion by 2030, while generating business opportunities of \$4.5 trillion¹. There is a strong case for investing in our food and land use systems, and we need to start now.

The first United Nations Food Systems Summit comes at a critical time and offers all actors in the system a unique opportunity to address these challenges. There are less than 10 years of action remaining to deliver on the SDG's and transforming food systems will help to bring climate change under control, ensure healthier diets for all, improve food security and create more inclusive rural economies.

A well-designed approach can provide critical support for the SDGs and make food systems part of the solution. As countries have made and continue to make bold commitments to tackle climate change and biodiversity loss, there is a unique opportunity for the UN Food Systems Summit to mobilise stakeholders, define priorities and actions and chart a course towards achieving resilient and sustainable food systems. Everyone in the system should rise to this challenge. This will require collaboration across value chains and stakeholders.



2

Food processing technologies and packaging solutions that deliver the UN Food Systems Summit objectives

Well-designed food processing technologies and packaging solutions can strengthen food supply chains and build resilience in the food systems to help meet the objectives of the UN Food Systems Summit.

Food processing needs to be done with certain safeguards to avoid health and environmental costs. Food processing can increase the availability of nutrient poor foods that if overconsumed can contribute to malnutrition impacting human health and environmental sustainability^{14,15}.

Similarly, poor food packaging solutions can have environmental costs, particularly through the increase in plastic waste¹⁶, and GHG emissions and unsustainable material use¹⁷. At the same time, processing technologies and packaging solutions are key enablers of well-functioning and effective food value chains that can produce safe, nutritious foods and can make critical contributions towards the UN Food Systems Summit objectives. The food processing industry is aware of the potential role of these technologies as well as their pitfalls. We must all step up to support science-based approaches to deliver the objectives of the five UN Food Systems Summit Action Tracks.

Food processing technologies can advance access to safe and nutritious food, sustainable consumption patterns, and equitable livelihoods.

Food processing technologies – the conversion of raw materials into safe, healthy, functional, and culturally acceptable food products – is critical for sustainable and healthy diets¹⁸, particularly in low- and middle-income countries^{14,15}. It can improve nutritional value (e.g., through cooking), preserve nutrients that otherwise would be lost during storage (e.g., through freezing), and ensure food safety (e.g., pasteurisation of milk).

New processes are being explored to boost the efficiency and sustainability of the operations¹⁸, maximising food safety and maximising nutrition entering and minimising nutrition exiting the food supply chain. Food processing technologies can support UN Food Systems Summit objectives in critical ways to enable:

- **Food access and availability:** By slowing down or stopping the natural processes of decay, food processing can extend shelf-life and ease the storage and distribution of food (e.g., without the need for cold chains). This in turn will enable equitable distribution of food, increasing food availability and access in all countries. Food processing also allows food to be stored as a reserve against times of shortage, increasing food security ensuring that sufficient food is available and that essential nutrients can be eaten throughout the year¹⁹.

Further benefits can be created if food processing also focuses on maintaining and/or enhancing nutrient quality of foods.

- **Healthy diets and food safety:** A major impediment towards healthier diets is the high cost as well as the food loss and waste associated with fruits, vegetables, meat, dairy products, and other highly perishable foods^{14,15}. Food processing can be an enabler for healthy diets by use of technologies that increase protein content, enhance nutrient density, improve digestion and reduce nutrients of concern. Food processing contributes to safe food by stabilising perishable food products and preventing or reducing negative changes in quality. For example pasteurisation and sterilisation of milk allows it to be consumed past the farm and has enabled a long shelf life that facilitates transportation and storage of milk in homes. Food processing can also increase the variety of foods in the diet as foods can be stored, transported and consumed in areas that may not grow/produce those foods. Well-designed food processing can therefore support these critical UN Food Systems Summit objectives, particularly for lower-income families as well as countries where food distribution systems are ill equipped to transport nutritious perishable food to urban consumers²⁰.
- **Reduced food loss and waste:** Food processing is critical for curbing losses and waste in the food value chain, particularly for highly perishable foods, such as fruits and vegetables. Also, steps should be taken towards more circular food systems by recovering and reusing edible biomass and by-products currently wasted to make them a new source of raw materials for food production and processing²¹.
- **Resilience of food systems:** By making perishable food easier to store, and by curbing food loss and waste, processing technologies can increase the resilience of the food system. This is becoming increasingly important, as climate change, other environmental change and the Covid-19 pandemic put pressure on fragile food production systems²².
- **Protein substitutes and other novel foods.** Food processing technologies open up opportunities for designing new forms of sustainable food, including plant-based protein substitutes or other alternative forms of protein.

- **Potential for better and stable incomes for smallholder farmers:** Food processing generates added value to crops, curbs post-harvest food loss and food waste, reduces income instability, and generates employment opportunities. Food processing enables food to be sold out of season when prices are higher; and adds value to low value crops, lifting income.

New potential food processes

- Combination processes
- Diverse pulsed energy processes
- Gravity and magnetism (low/high)
- Wavelengths (all)
- Gasses (all)
- Robust, scalable, and flexible processes
- Appropriate/intermediate technologies
- Food structuring for property generation
- Consumer-driven technologies

Source: Knorr et al (2009)

By improving the shelf-life and nutritional quality of food, food processing also has the potential to improve market access for perishable, high-value products. Concerted efforts are needed to extend these benefits to smallholder farmers in equitable ways, as has happened successfully in some dairy industries, such as India's "white revolution" that made dairy products widely available in the country²³.

Packaging separates food from the external environment and allows for food protection, food safety, reduction of food waste, consumer convenience, and communication²⁴. To be clear, inadequate packaging can generate high environmental costs through waste, GHG emissions and resource use. On the other hand, optimised packaging solutions can support UN Food Systems Summit objectives in the following ways:

- Reduced food loss and waste:** It is estimated that 35% of food loss and waste is generated by the final consumer¹². When food is lost or wasted, all of the natural resources that were expended in the supply chain are also lost. Food loss and waste can be reduced through innovative food packaging solutions. Through a system of traceability, for example, intelligent packaging solutions monitor and display the quality status from the point of manufacture up to the consumer. This not only helps reduce food loss and waste, but it also increases food safety^{25,26}.
- Food access and availability:** Well designed packaging solutions complement sound food processing technologies to increase the shelf-life and durability of food, which in turn can increase food access and availability. Aseptic packaging solutions enable transport and storage of otherwise perishable foods in ambient conditions, benefiting particularly low- and middle-income countries that would otherwise need to invest massively in cold chains. Optimised packaging solutions (e.g., in small portions) can reduce cash outlays and increase food availability to the poor at the “bottom of the pyramid”²⁷.
- Healthy diets and food safety:** Food packaging solutions extend the above-described benefits of sound food processing, particularly for fragile, perishable nutritious foods, enabling distribution and consumption in communities often many miles from the food source. Packaging also provides a vehicle to communicate the health benefits and costs of food to every consumer through national food labels and other messaging. Similarly, the example of School Feeding Programmes using dairy products shows how good packaging can improve access to nutritious but perishable food in order to promote healthy diets and nutritional outcomes. In many areas around the world that lack adequate infrastructure and cold chains, the benefits of aseptic packaging solutions plays a critical role in providing children access to safe nutrition in schools.
- Materials recycling and circularity:** The food packaging industry recognises that we must use scarce materials more efficiently through more environmentally friendly packaging components and circular approaches. This is one of the greatest challenges for our industry that must be seized to enable healthy diets and environmental sustainability.

The UN Food Systems Summit action tracks and the food supply chain

UN Food Systems Summit Action Tracks



Action Track 1
Ensure access to safe and nutritious food for all



Action Track 2
Shift to sustainable consumption patterns



Action Track 3
Boost nature-positive production



Action Track 4
Advance equitable livelihoods



Action Track 5
Build resilience to vulnerabilities, shocks and stress

Food supply chain



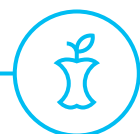
Producing



Processing & Packaging



Distribution & Retail



Food Consumption & Waste Disposal

Source: United Nations (2021), Food supply chain inspired by Ericksen (2008)

We need more investments into science and innovation to seize the potential of processing technologies and packaging solutions to support the five UN Food Systems Summit Action Tracks.

Science, innovation and new technologies are critical for transforming our food systems in sustainable and equitable ways²⁸. Novel processing technologies are needed to facilitate access to nutritious perishable food without undue loss of nutritional qualities. Similarly, we need to reduce the environmental impact of packaging solutions and move towards truly circular systems in every country whilst maintaining the integrity of packaging in keeping food and drinks safe from farm to consumer.

Many advances in digital innovation and engineering - such as artificial intelligence, big data, blockchain, and robotics - have the potential to enhance processing and packaging, including through product traceability. Yet, there is a research gap on these areas and a comprehensive assessment of the potential benefits associated with innovation for food processing technologies and packaging solutions is missing. Above all we need to understand better how solutions can be adapted to local contexts and how they can be taken to scale in partnership with stakeholders. It is for these reasons that the consultative approach of the UN Food Systems Summit and its Action Tracks is so important.

Active, intelligent and smart packaging

Active packaging: Active packaging technologies embed components into the packaging that can release or absorb substances from or into the preserved food or the surrounding environment to sustain quality and prolong shelf life.

Intelligent packaging. Intelligent packaging is mainly used to monitor the condition of packaged foods such as meat to capture and provide information on the quality of the packaged goods during transport and storage. Examples of intelligent packaging are:

- Data carriers store and transfer data, allowing product tracking (e.g., barcodes, QR codes, Radio Frequency Identification - RFID - Technology)
- Indicators determine the presence of a substance, the extent of a reaction among substances or the concentration of a specific substance. Examples are **(1)** Time Temperature Indicators (TTI) which show information on the temperature progression and can increase food safety, by flagging if products have been exposed to excessively high or low temperature; **(2)** freshness indicators supervise the quality of products based on their microbiological properties; **(3)** gas indicators indicate the quality condition of the food depending on indoor atmosphere.

Smart packaging solutions: Through a system of sensors, smart packaging solutions enables tracking and tracing products throughout its lifecycle and to analyse and control the environment inside or outside the package to inform its manufacturer, retailer, or consumer on the product's condition at any given time. Smart packaging technology has a wide variety of potential application from monitoring food safety and drug use, to tracking postal delivery of items via embedded security tags and represents a value-add for all the actors in relevant value chains.

Despite their ability to increase food safety and reduce waste, the use of these packaging solutions is not widespread. This is due to several reasons, including the high costs to develop and manage the technology, the acceptance of brand owners and customers, the costs connected to their waste management, and the restrictions imposed by regulation in specific geographies, such as the European Union.

Source: Müller and Schmid (2019), Schaefer and Cheung (2018)

3

How Tetra Pak seeks to contribute to the UN Food Systems Summit objectives

Tetra Pak is a world leading food processing technologies and packaging solutions provider.

Working closely with our customers and suppliers, we seek to provide safe, innovative, and environmentally sound products that meet the daily needs of hundreds of millions of people. There are more than 100,000 Tetra Pak food processing units operational around the world and in 2020 alone, we provided more than 183 billion carton packages to customers.

We seek to support the UN Food Systems Summit outcomes through our “Moving food forward” objectives:

- **Access to safe, nutritious food:** We want to use our expertise, knowledge, processing technologies and packaging solutions to help increase access to safe and nutritious food that is good for people and the planet.
- **Reduce food loss and waste:** We are committed to develop processing technologies and packaging solutions that reduce food loss and waste.
- **Sustainable supply chains:** Together with our suppliers and partners, we want to promote solutions that encourage sustainable production, processing, packaging, distribution, and consumption of food in support of a truly circular economy.

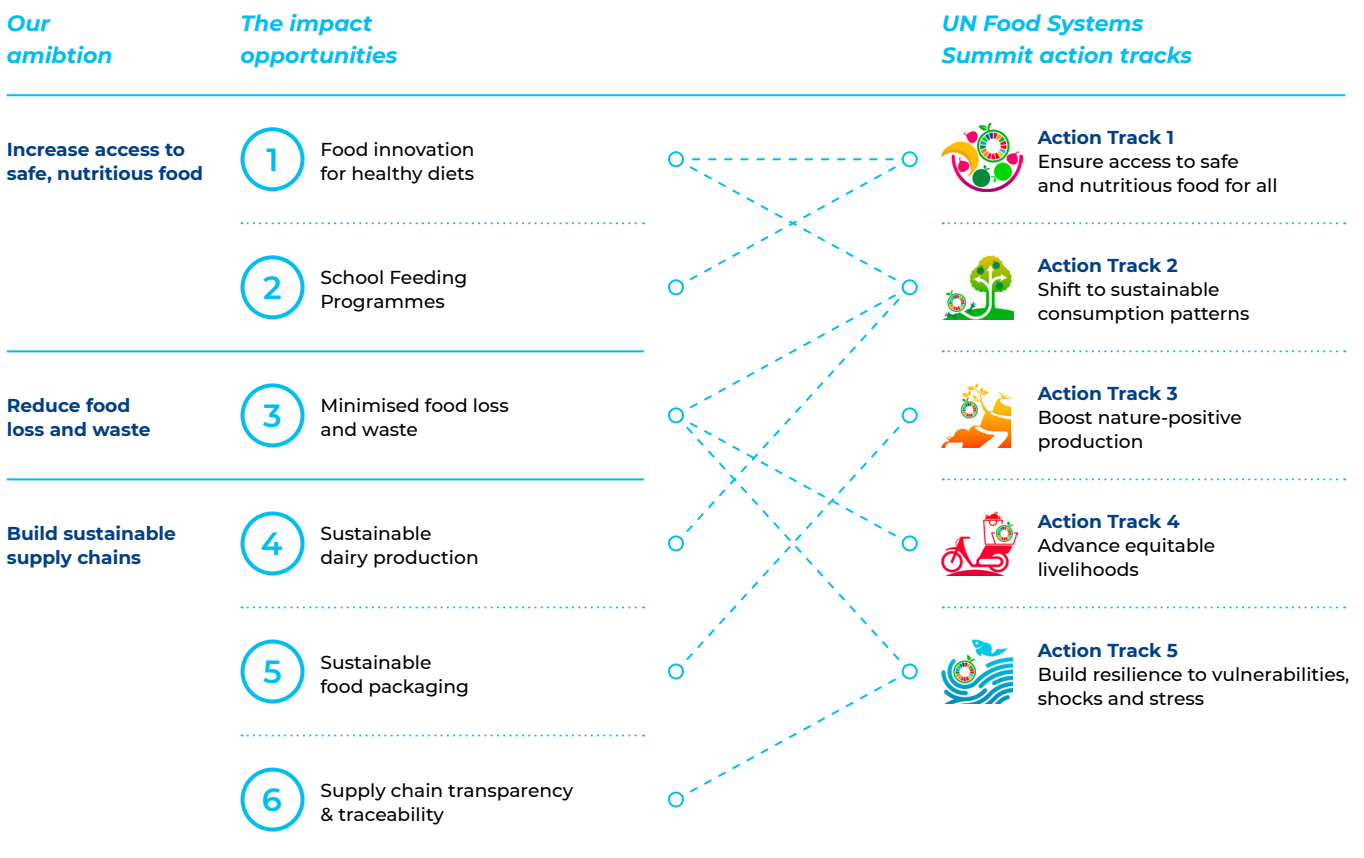
Over the last decades, we have been supporting the objectives of the UN Food Systems Summit.

Our aseptic packaging solutions protect the quality of food in terms of nutrient density as well as taste without the need for preservatives or additives. As refrigeration is not needed, safe food can be made available to billions of people, even in remote areas or countries with insufficient cold chains. Our technologies strive to increase efficiency along the entire food supply chain and to reduce food loss and waste. We are committed to sustainable sourcing of our carton packages, which have a lower carbon footprint than glass, plastic, or metal packages²⁹. For over 60 years, we have supported our customers and collaborated with Governments, NGOs, UN Agencies and other development organisations, in the development with partners to support School Feeding Programmes. More than 68 million children in 56 countries receive nutritious beverages in Tetra Pak packages in schools (2019). Through our Dairy Hub model, we help to build sustainable value chains by linking smallholder farmers with dedicated processors in selected areas. As part of our contribution, we provide technical assistance and “hands-on” practical knowledge transfer through our international dairy experts.

We enable more than 54,000 dairy farmers to increase their production and get access to markets, improving their livelihoods and the development of local supply chains. By providing smallholder farmers with training and setting up appropriate cooling infrastructure and technology, dairy processors in developing markets can increase their stable supply of locally produced high quality milk. More than 54,000 smallholder farmers are now delivering milk to our customers through Dairy Hub projects and getting access to markets whilst improving their livelihoods. The Appendix shows how our activities map against the 10 critical transitions identified in The Growing Better report¹.

Much more must be done over the coming decade, and the food processing and packaging industry has a role to play in strengthening its contribution towards the UN Food Systems Summit objectives. We have tentatively identified six areas where we believe we can help drive system change. These build on our long-standing global experiences, but they remain initial opportunities that will require more research, critical discussion, and collaboration. We are keen to engage with others in these areas to identify the challenges and define the opportunities where we can help to improve food systems. We welcome input as we refine our thinking, articulate our ambition and create a road map in support of building resilient food systems to achieve the SDGs. Some of these opportunities have already been submitted to the UN Food Systems Summit call for Game Changer ideas and into the Game Changer Labs from the Rockefeller Foundation, EAT Foundation, IDEO and Thought for Food. We have seen these concepts come through in the emerging coalitions for the UN Food Systems Summit. We are also actively participating in the Game Changer Labs that are turning the ideas into action. We continue to develop these ideas to help make the next ten years a decade of action to build resilient food systems.

The six impact opportunities for food processing technologies and packaging solutions



Source: Tetra Pak

1

Food innovation for healthy diets

Challenge: Dietary transition to healthier food products.

Global diets need to converge towards locally appropriate variations of a “human and planetary health diet” that improves health outcomes and reduces food’s environmental impact. Improved diets often require increased consumption of plant-based foods – including fruits, vegetables, nuts, seeds, and whole grains – and alternative proteins¹⁴. The shift to healthy diets presents an economic opportunity estimated at USD 2 trillion by 2030¹.

Opportunity: Leverage science, innovation, and technology to support the shift towards healthy diets.

Food processing technologies and packaging solutions can enable consumers to access a broader range of healthy products. In collaboration with the other actors of the food value chain, Tetra Pak is committed to collaboration and developing innovative solutions that address challenges in ways that are locally appropriate and respect local food traditions to:

- contribute to healthy, tasty and convenient food alternatives which are cost-efficient to produce
- improve accessibility and convenience to ensure that better food products are accessible and easy to purchase everywhere
- improve food systems performance by guaranteeing the same or better health and environmental properties while lowering food loss and waste

2

School Feeding Programmes

Challenge: Resilience of global school feeding programmes.

In 2019, 144 million children under-five were stunted, 38 million were overweight, and at least 340 million suffered from micronutrient deficiencies². According to the World Food Programme (WFP), school feeding is the largest and most widespread social safety net in the world, benefitting one in two school children, or 388 million children globally in 163 countries³⁰. School Feeding Programmes are critical for achieving learning outcomes and improving the nutritional status of children, particularly girls and the most vulnerable. They can increase school enrolment rates, reduce absenteeism, and improve food security at the household level³¹. Prior to the Covid-19 pandemic, some 73 million vulnerable children were missing out on meals³⁰. This number has dramatically increased following the restrictions imposed by Covid-19, which left 370 million children deprived of what for many was the only nutritious meal of the day³². To enable expansion and sustainability of School Feeding Programmes, there are four challenges that need to be overcome: sustainable funding mechanisms, education about the nutrition benefits of foods provided (e.g., Dairy), need for local production and sourcing of safe, nutritious, high quality foods and development of solid data collection and impact evaluation mechanisms.

Opportunity: The food processing and packaging industry can support the scaling-up of school feeding programmes.

By collaborating across stakeholders and innovating on solutions and finance, we can provide cost-effective packaging solutions, food processing technologies, and logistical support tailored to the local context. Tetra Pak has gained a lot of experience in this domain over the last decades and is committed to sharing good practices used in School Feeding Programmes worldwide and expanding collaborations with all relevant stakeholders as well as technical assistance where relevant.

Collective programming approaches with comprehensive monitoring and evaluation frameworks are key to demonstrating the role School Feeding Programmes have played in improving health, education and local agriculture development around the world. For further information, please see the Tetra Laval School Feeding Handbook³³.

3

Minimise food loss and waste

Challenge: World hunger is on the rise and yet, an estimated 1/3 of all food produced globally is lost or goes to waste.

The drivers of food loss and waste vary across countries and the stages of the food value chain. For example, high-income countries have a relatively high share of food waste during the consumption stage. Low-income countries, on the other hand, experience a higher share of food loss during production, harvesting, handling and storage. The shift towards healthier diets will exacerbate the risk of food loss and waste, because healthy and sustainable diets tend to comprise higher shares of perishable food¹⁴. There is also an environmental benefit of reducing food loss and waste. According to the FAO, food loss and waste contributes to 8% of the world's GHG³⁴. Reducing food loss and waste will enable more food to be available to help reduce hunger and help reduce GHG emissions.

Opportunity: Develop technical solutions to reduce food loss and waste, focusing on the top and the bottom of the food supply chain.

At Tetra Pak, we are committed to help curb food loss and waste and we propose that the food processing technology and packaging solutions industry can contribute in two principle ways:

- **Avoid food loss by strengthening food supply chains:** In collaboration with local milk processors, over the last ten years, Tetra Pak has been working with smallholder dairy farmers to empower them through training and access to assets and markets. Such efforts can reduce food loss, especially for high value and highly perishable crops, support the establishment of supply chains and enhance local economies. To this end, we look to collaborate with customers, governments and other stakeholders to improve access to locally appropriate technologies for food handling, storage, processing and packaging.
- **Reduce food waste through advanced processing technologies and packaging solutions for perishable food:** We will use our experiences in dairy and other markets to support advanced processing technologies for vegetables, fruit, and other highly perishable, nutritious food products in order to curb natural processes of decay. This can reduce costs of storage and transport, increase availability, and ultimately reduce costs for such products. Importantly, this will also help reduce food loss and waste – a central objective of the UN Food Systems Summit.

4

Sustainable dairy production

Challenge: Increasing access to dairy products where relevant for human health, while simultaneously reducing the environmental impact. Moderate dairy consumption plays an important role to achieve good health¹⁷.

Some industrialised countries consume too much milk, but many other parts of the world should increase per capita dairy consumption¹⁵. Moreover, livestock plays a crucial role in the livelihoods of an estimated one billion smallholder farmers in developing countries and frequently generates up to 40% of agricultural GDP³⁵. Demand for dairy products is expected to grow by as much as 50% by 2050, driven largely by Africa and Southern Asia³⁶. These supply chains will require effective food processing technologies and packaging solutions to ensure efficiency and low costs for consumers. At the same time, though, livestock accounts for 15% of global GHG emissions³⁷ and has major impacts on soil, water, and air quality³⁸. Fortunately, we know that the environmental impact of the smallholder dairy industry can be reduced by at least a third if best practices are adopted widely³⁹. Working with farmers and our partners in the food industry, we seek to support this transition.

Opportunity: Supporting solutions for sustainable smallholder dairy production.

Tetra Pak works with customers, civil society partners, development organisations and governments to boost the productivity of more than 54,000 dairy smallholder farmers in mid- and low-income countries and to improve market access for their products, which can in turn improve livelihoods. We know smallholder farmers often do not have the capacity to transition to more sustainable practices. For this reason, we want to explore how a transition towards sustainable dairy could be enabled, including through access to improved technologies and long-term market access through processors that incentivise sustainable dairy practices.

5

Sustainable food packaging

Challenge: Minimising the environmental impact of packaging while maximising food safety and protection.

Packaging maintains the benefits of food processing technologies after the process is complete, enabling foods to travel safely for long distances from their point of origin and still be safe and wholesome at the time of consumption. However, packaging solutions must balance food safety and protection with other issues, including energy and material costs, heightened social and environmental consciousness, and strict regulations on pollutants and disposal of municipal solid waste.

Opportunity: Together we must drive innovation on materials and recycling solutions.

At Tetra Pak, we are working to deliver by 2030 carbon neutral packaging from materials that are responsibly sourced, renewable or recycled whilst delivering safe, nutritious food. We are investing heavily in the research and development of carton packages that are made with a simplified material structure and increased paper-based content. We recognise the best way to drive innovation is through collaborative approaches. For this reason, we look for partnerships to design disruptive solutions for renewable materials and recycling operations. Our goal is to deliver packaging solutions that can overcome the trade-off between food security and environmental sustainability. This will help make the entire food system more environmentally sustainable whilst maintaining food safety and help achieve another critical UN Food Systems Summit objective.

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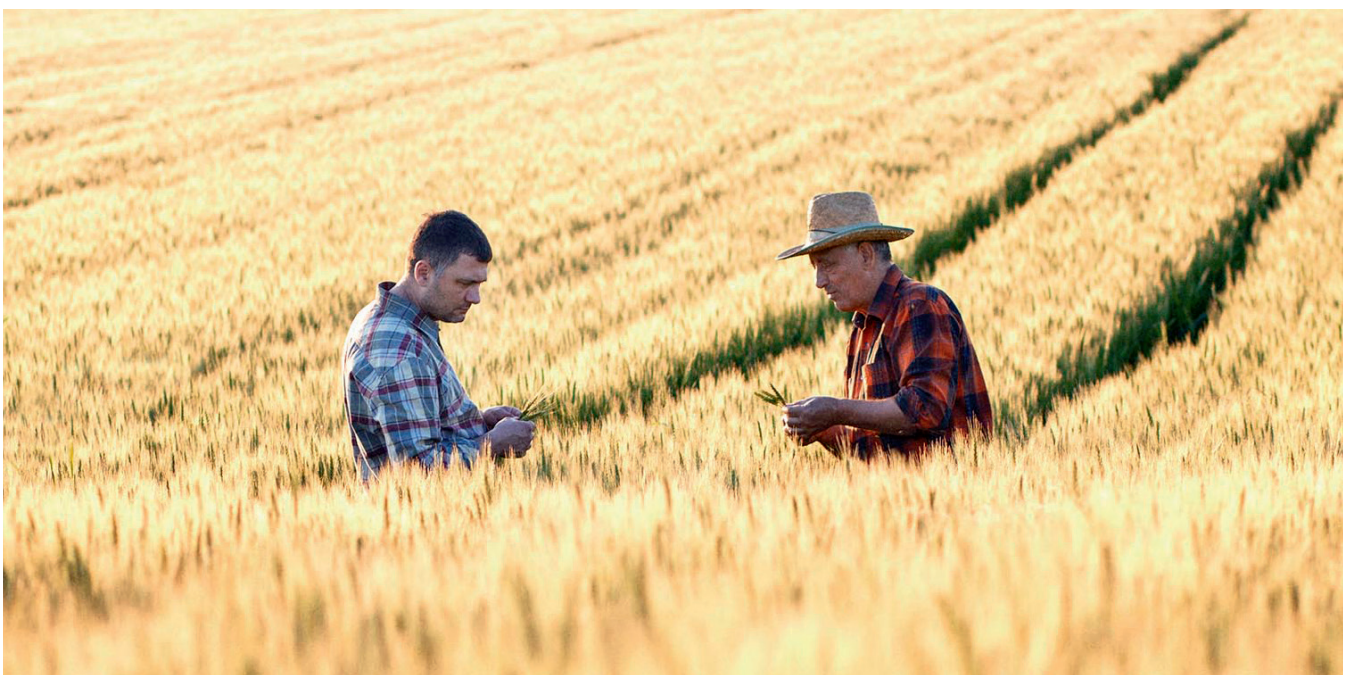
Supply chain transparency and traceability

Challenge: Transparency and traceability in food and beverage supply chains.

Transparent supply chains can enable all actors to deliver safe, nutritious, and healthy food in a sustainable way. The supply chains of today are instead stretched, inflexible and dangerously opaque⁴⁰. Transparency can also reduce operational risks and increase supply chain resilience, while traceability is essential for building circular supply chains.

Opportunity: Coordinated efforts on supply chain traceability.

We want to support end-to-end transparency in food chains and are keen to investigate how digital technologies, such as, analytics and artificial intelligence, the Internet of Things, advanced robotics, and digital platforms can **(1)** enable a sustainable and circular economy and create closed loop recycling systems to fulfill the Extended Producer Responsibility (EPR) principles; **(2)** strengthen supply chain efficiency and resilience; and **(3)** support customers' buying decisions, by sharing detailed information on the environmental, social and health profile of products. We recognise that the only way to deliver systems change is by defining standards at the industry level that are developed in a collaborative way and have strong support from industry, governments, civil society and consumers. In parallel, we can explore labelling options for sustainable food products.



4

Next steps

In preparation for the UN Food System Summit, we have engaged with different stakeholders within the UN Food Systems Summit actions tracks and beyond, to discuss the contributions that the food processing technology and packaging solutions industry can make in building resilience in the food systems. Our intention now, in the lead up to the UN Food Systems Summit, is to actively pursue further dialogues with more stakeholders and also with the relevant coalitions that are emerging from the UN Food Systems pre-summit. Through this process we seek to assess the challenges as well as potential for collaborations to tackle these to help improve the food systems. We welcome constructive and concrete inputs to the suggestions we have put forward in this paper. Our goal is to formulate and pursue an action plan and roadmap for the impact opportunities – either as a leader or contributor – in building resilient food systems to achieve the SDGs.

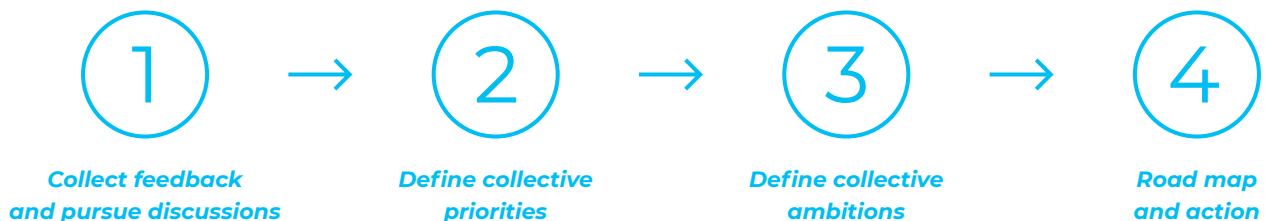
The steps to pursue will include the following:

- **Collect feedback and pursue discussions:** We will reach out to stakeholders for feedback on the proposed impact opportunities. To this end we invite civil society, farmers, science, business, and governments convened under the UN Food Systems Summit to share their views and recommendations.

- **Define collective priorities:** Based on discussions with interested partners, we will define the priority impact opportunities and geographies based on the highest potential for building resilience in food systems.
- **Define collective ambitions:** We will formally consult partners through global and regional roundtables and define the implementation strategy for the priority impact opportunities. The strategy will outline objectives, deliverables, and means of implementation.
- **Road map and action:** We envision this process to result in the creation of a road map and the formalisation of the collaboration across the impact opportunities (e.g., the creation of coalitions) and the formal launch of the activities.

The UN Food Systems Summit provides a good basis to kick off these discussions and solid progress can be achieved in supporting the UN Food Systems Summit objectives if we work together over the coming months.

Next steps

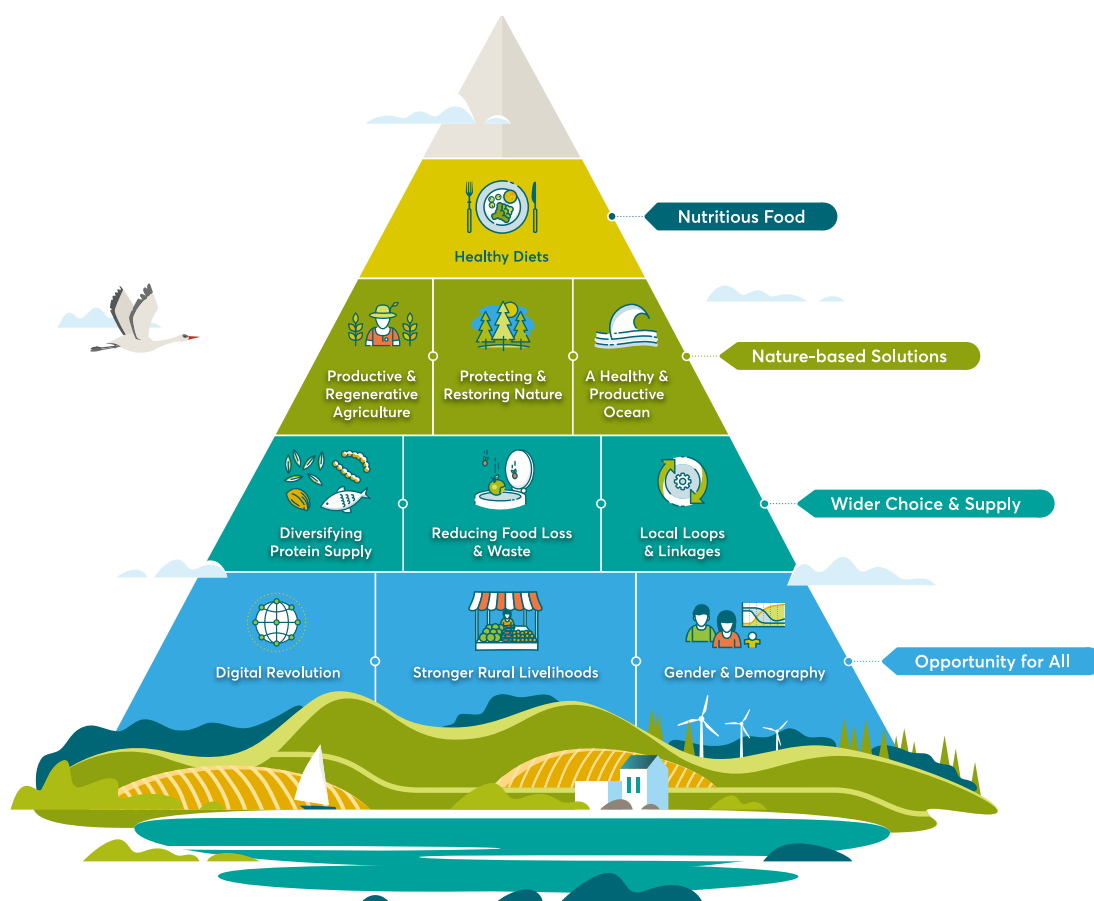


Source: Tetra Pak

Appendix

The Food and Land-Use Coalition (FOLU) has identified ten critical transitions towards sustainable food systems that deliver for people¹. Together, these transitions can address the hidden environmental, social, and economic costs of food systems and generate an estimated \$5.7 trillion per year in societal benefits by 2030. These benefits might rise to \$10.5 trillion a year by 2050. FOLU estimates that the required investments might amount to \$300 to \$350 billion per year, which would generate a return ratio of 15:1 by 2030.

The ten Critical Transitions



 **Economic Prize**
\$5.7 trillion economic prize by 2030 and \$10.5 by 2050 based on avoided hidden costs


 **Investment Requirements**
\$300-\$350 billion required each year for the transformation of food and land use systems to 2030


 **Business Opportunity**
\$4.5 trillion annual opportunity for businesses associated with the ten critical transitions by 2030

Source: Food and Land-Use Coalition (2019)

At Tetra Pak we have begun to map our work across the ten Critical Transitions. We have identified positive contributions to almost all transitions and will use this framework to strengthen our support for the objectives of the 2021 UN Food Systems Summit.

How Tetra Pak contributes to the ten Critical Transitions

 Transitions currently **directly** supported by Tetra Pak

 Transitions currently **indirectly** supported by Tetra Pak

Our ambition

Today's contribution

The ten Critical Transitions

Increase access to safe, nutritious food

Processing & packaging technologies which preserve food and beverage nutrition value and guarantee long shelf life with no preservatives.

Food concept & reformulation to support customers improving the nutrition value of their products.

School Feeding Programmes, since almost 60 years using Tetra Pak packages, providing 68 million children access to nutritious beverages at school.

Reduce food loss & waste

Enabling local supply chain, with the Dairy Hub model which empowers smallholder farmers in emerging economies (more than 54,000 farmers reached so far).

Packaging for efficient operations, designed to be transported and stored without refrigeration and to reduce food loss and waste.

Build sustainable supply chains


Sustainable sourcing of raw material for packaging, with 100% paper sourced from FSC compliant sources


Limited carbon impact packaging, with lower emission through the life cycle than glass, plastic, or metal packages.


Resource efficiency, through better and more efficient equipment which minimise energy and water usage.


Packaging waste recycling, with direct investment in recycling operations and product design to simplify recycling process.


Traceability, traceable and connected packages that increase transparency and thereby help increase knowledge and improve sustainable practices.

1 Healthy diets 


2 Productive and regenerative agriculture 


3 Protecting & restoring nature 


4 A healthy and productive ocean 

5 Diversifying protein supply 

6 Reducing food loss & waste 

7 Local loops & linkages 

8 Harnessing the digital revolution 

9 Stronger rural livelihood 

10 Gender & demography 

Source: Tetra Pak

Endnotes

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