

Sustainability Matters

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Reducing Food Waste - a Hidden Opportunity for Investors?

One third of food produced worldwide gets lost or wasted before it even reaches the end consumer. Reducing food waste across the entire food chain will be a critical part to sustainably and equitably at the same time feeding the growing world population. To get there, new approaches to food security are needed. To be implemented effectively, they require investments — but offer opportunities for investors, too. How can investors play a significant role in reducing food losses in the supply chain? And what challenges do investors face?

In this edition of the Inrate Sustainability Matters, we point out innovative approaches of investments in food waste reduction along the agricultural value chain, and provide examples of successful first steps taken by individual players. Furthermore, we talked with Dr. Bernd Schanzenbächer, a leader in Agricultural and Sustainability Investments, and captured his views and knowledge regarding environmental investments in the interview at the end of the publication.

Food Waste is of growing concern

30 percent of all food grown worldwide is lost or wasted before it even reaches the end consumer (UK Government Office for Science 2011): Recent studies commissioned by the FAO estimated yearly global quantitative food losses and waste at roughly 30 percent for cereals; 40–50 percent for root crops, fruits and vegetables; 20 percent for oilseeds, meat and dairy; and 30 percent for fish (FAO 2012). Such information is alarming, considering that pressure on food production to feed the world’s population is becoming huge: The FAO is forecasting a rise in food production of 70 percent over the next 40 years in order to meet the soaring demand of a world population, which is expected to grow by over a third between 2009 and by 2050 to 9.1 billion people (FAO 2009). Seen from this angle, reducing food waste and food losses to the minimum seems only logical. This is also pointed out by a recent report by the consulting company McKinsey, which ranks reducing food waste as one of the top three opportunities to improve resource productivity (McKinsey 2011).

Food waste is defined as the “throwing away of food” that still has value. Food losses refer to the decrease in edible food mass available for human consumption because it gets lost at different parts of the supply chain. Therefore, all food that was originally meant for human consumption but which does not reach the human food chain is considered as food loss or waste. Food waste is most often associated with the behaviour of retailers, the food service sector and consumers, but food waste and losses take place all along the entire food supply chains (FAO 2012). This can be illustrated by looking at the food value chain of Switzerland – a country with a food loss rate of 30 per cent (WWF 2012), similar to the global average.

Figure 1 shows that food lost during agricultural production accounts for 13% of total losses, while wholesale, processing industries and retail together account for another 37 percent of total losses and households cause 45 percent of all losses.

Food Losses and Waste

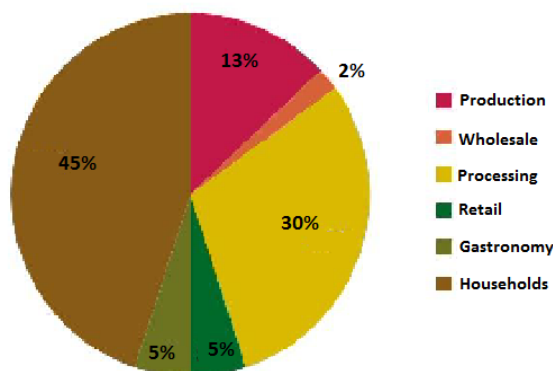


Figure 1 Distribution of food losses by sector in Switzerland. Source: WWF Schweiz 2012.

The UK Government Office for Science estimates that halving the current amount of food waste by 2050 could reduce the food needed to feed 9 billion people by 25 percent. However, in order to be able to reduce food waste, a better understanding of where the biggest losses occur and why is essential (Government Office for Science 2011). Thereby one should consider that food losses and waste are very much dependent on the specific conditions in a given country.

In low-income countries food is mostly lost during the production-to-processing stages of the food

Per capita food losses and waste, at different stages and in different regions

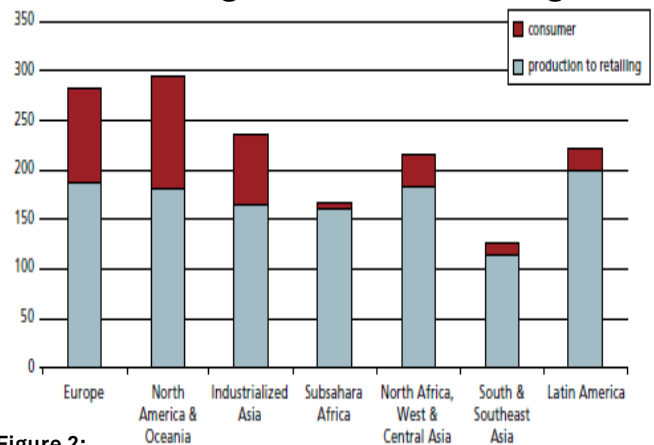


Figure 2: Per capita food losses and waste, at consumption and pre-consumption stages, in different regions. Source: FAO 2011: Global Food Losses and Food Waste, Rome.

supply chain, see figure 2. These losses result from wide-ranging managerial and technical limitations, from harvesting techniques, storage, transportation, processing, cooling facilities, infrastructure, packaging and marketing systems (FAO 2012). Food wasted at the consumer level on the contrary, is minimal in developing countries (figure 2). Poverty and limited household income – consumers in developing countries spend up to 70 per cent of their income on food (UNEP 2009) – make wasting food unacceptable (FAO 2011).

In industrialized medium to high-income countries the causes of food losses and waste relate to a lack of coordination between different players in the supply chain as well as to consumer behaviour (FAO 2011). Food losses are as high (or even higher) as in low-income countries, but more than 40 percent of the losses occur at retail and consumer levels. Although significant losses also occur at the beginning of the supply chain, in contrast to developing countries food is also wasted to a significant extent at the consumption stage (see figure 2) (FAO 2011). This may be the result of the fact that in industrialized countries the share of household income that is spent on food has been decreasing for years to become as low as, for example, 10% in Switzerland for an average household (NZZ 2012).

Food Waste Reduction fosters Sustainable Development

Given the facts and figures, an inevitable question rises: Does food waste hinder sustainable development? Or is it just an inevitable side-effect of global food trade and our consumer society and therefore a necessary evil? However, there is no doubt that the level of food wasted is unacceptably high. But that's not all: reducing food losses provides several advantages:

- Considering the fact that food security is still a major concern in large parts of the developing world, reducing food losses leads to more food being available for consumption, which is a preliminary step towards combating and reducing hunger. Globally food losses take place at production, postharvest and processing stages and amounts to 1.3 billion tons per year (FAO 2011). Food losses are indicative of poorly functioning and inefficient food value chains and contribute to food insecurity. Not only is the food lost not available for human consumption anymore, it can also lead to a loss of economic value of the food produced, which in turn has negative effects on income generation and economic growth (FAO 2012). In response to income losses and/or higher food prices, a rising share of food expenditure reflects the hardship poor people face when shortages of food arise (IFAD et al. 2012).
- The fast growth of the world population means that a huge amount of additional food will be required to satisfy demand. Food loss reductions offer the potential to reduce tensions between the necessary increase in consumption and the challenging increase in production.
- Furthermore, food loss reductions offer a huge potential to increase the efficiency of the whole food chain. Not only would the processing, wholesale and retail industries benefit from a more efficient food throughput, food losses also represent a waste of other resources used in production, such as land, water, energy, biodiversity and others (FAO 2011). These losses could be reduced by decreasing food losses.
- Last but not least, food waste reduction helps to reduce negative ecological impacts occurring during food production. Producing food that will be wasted instead of being consumed, is not only an inefficient use of ecosystem services and of the fossil fuel-based resources that go into producing them, but also a significant contributor to global warming once the wasted food is disposed of in landfills. In the USA for example,

organic waste is the second highest component of landfills, which are the largest source of methane emissions (UNEP 2009). Other releases of greenhouse gases (especially methane) occur during agricultural production: 30 per cent of global emissions leading to climate change are attributable to agricultural activities, including land use changes and deforestation. Furthermore, agricultural systems need 12 percent of the world's land surface and use 70 per cent of available fresh water worldwide (Rabobank 2012).

- Such negative ecological impacts are the food production's negative "externalities", which means effects on the environment that are not reflected in the food prices. The higher the level of processing and refining of the products and the later in the food supply chain the food is lost or wasted, the heavier these impacts will be (FAO 2012).

For the reasons mentioned above, food losses and food waste have repercussions on hunger, poverty alleviation as well as negative environmental impacts (FAO 2012). Therefore, the reduction of food losses and food waste needs to be encouraged by new strategies and approaches.

Policy makers take actions

As the food waste issue has gained more and more public attention, policymakers have started to take action and are looking more closely at the private sector – from agribusiness to supermarkets – which can help ensure food security by taking appropriate measures against food waste and losses. The outcomes might be promising, given that recent studies found a variety of targeted incentive schemes in high-income countries demonstrating significant potential for waste reduction, given the political will (Godfray et al. 2010).

The following table (Table 1) provides an overview about programs, action plans or initiatives concerning food waste that are ongoing at an international or national level and are led or supported by political institutions.

<p>Actions on international level</p>	<ul style="list-style-type: none"> * SAVE FOOD is a global initiative on food losses and waste reduction, led by the Food and Agriculture Organization of the United Nations FAO and conducted in collaboration with donors, bi- and multi-lateral agencies and financial institutions (United Nations Industrial Development Organization, African Development Bank, World Bank, International Fund for Agricultural Development, UN World Food Program, European Union) as well as private sector partners like the food packaging industry. The SAVE FOOD initiative focuses on systemic improvements of the efficiency and sustainability of food chains, and takes into account recent challenges like the influence of the private-sector led enterprise, global market integration, urbanization, growing south-south food trade and the associated “lengthening” of food chains. It aims at promoting a network among stakeholders in the food industry – including the packaging industry, policy makers and researchers – with a view towards developing solutions to reduce food losses and waste along food supply chains. An important component of the initiative is a worldwide media campaign that is aimed at increasing awareness of food losses and food waste at global level. The SAVE FOOD initiative takes into account the viability of business cases as an important prerequisite for the food loss and waste reduction measures: measures will only be implemented by the supply chain actors if they are economically at least cost-effective and preferably profitable. In addition to the economic costs, it is equally important that the costs for the environment, food security and nutrition are being recovered. This means that the positive impacts of food loss reduction interventions on profit, environment, food security and nutrition should be higher than the negative impacts of the food losses (SAVE FOOD Initiative 2012, FAO 2012). * The Joint Declaration Against Food Waste is an international declaration disclosed by academics and researchers from universities in different countries around the world, members of the European Parliament, politicians and representatives of international organizations and the civil society to the European Parliament and the United Nations in October 2010. It contains the explicit commitment to reduce the amount of food waste by 50% throughout the food chain at national, regional and global levels. It calls on all stakeholders involved in the food chain – from farm to fork, i.e. farmers, distribution, marketing system and consumers – to mobilize in order to make this goal achievable (Joint Declaration Against Food Waste 2010). * The issues of food security and safety are of importance also to the countries of the Asia-Pacific Economic Cooperation (APEC) – a forum for 21 Pacific Rim countries that seeks to promote free trade and economic cooperation throughout the Asia-Pacific region – because agriculture makes a substantial economic contribution to most APEC member economies. Therefore, the APEC’s Policy Partnership on Food Security mentions in its action plan for 2012-2013 (submitted by Russia) that post-harvest losses and food waste reduction is one of the top priority issues to tackle in respect to food security. * In the EU Parliament, a resolution passed in January 2012 that was calling upon the EU members to halve food waste by 2025. To achieve this drastic reduction in food wastage by 2025, new awareness campaigns should be promoted at both EU and national levels to inform the public how to avoid excessive wastage of food. Member States should introduce food education courses in schools and colleges explaining how to store, cook and dispose the food and exchange best practices to this end. Local authorities and media should provide information and support to citizens on how to prevent and reduce food waste. As a summary, the European Parliament’s Agriculture Committee focused on four main points: <ul style="list-style-type: none"> * Proper labeling and packaging * Better education to avoid excessive waste * Leftovers to feed people in need * Awards or recognition for responsible catering and hospitality companies * In order to further popularize the idea using food sustainably, Members of the European Parliament also called for 2014 to be desig-
<p>Actions on country-level</p>	<ul style="list-style-type: none"> * The Dutch government wants to cut food waste by 20% by 2015. This is the most important outcome of the Policy Paper on Sustainable Food in 2009, in which the Minister of Agriculture, Nature and Food Quality together with the Minister of Housing, Planning and the Environment as well as the Minister for Health, Welfare and Sport presented the Dutch food policy up until 2025. The instruments the Ministry wants to use are not direct intervention, but indirect inducement. The Ministry’s role is one of initiating, facilitating, and, where useful and feasible, supporting the processes of raising awareness and changing behavior throughout the sector, from producer to consumer. There are public information campaigns for consumers, and entrepreneurs are encouraged to come up with innovative ideas to limit or prevent food waste (Netherlands Ministry of Agriculture 2010). * The Waste & Resources Action Programme WRAP in the United Kingdom is funded by the UK Department for Environment, Food and Rural Affairs, the Northern Ireland Executive, the Scottish Government, the Welsh Government and the European Union and runs programs in England, Scotland, Wales and Northern Ireland. WRAP was set up in 2000 to help recycling take off in the UK, initially by creating markets for recycled materials, but preventing food and drinking waste is also one of the main areas of action in the WRAP 2011-2015 Business Plan. WRAP works with a wide range of partners, from major UK businesses, trade bodies and local authorities through to individuals looking for practical advice. The “Love Food, Hate Waste” campaign launched by the WRAP aims to reduce the UK’s growing food wastage and has already prevented the production of 137’000 tons of food waste since 2008. The WRAP promotes the following measures (WRAP 2009): <ul style="list-style-type: none"> * Work in partnership with manufacturers and retailers to reduce food and drink waste in their supply chains * Help individuals reduce food waste both inside and outside the home, leveraging the “Love Food Hate Waste”- brand to maximize impact. * Expand the food and drink waste prevention work to hospitality, tourism and public sectors, with particular focus on helping SMEs in these sectors to take action. * Work with the packaging sector to optimize the design and functionality of packaging to minimize food waste. * Stop Wasting Food is a non-profit NGO and Denmark’s largest movement of private consumers against food waste. It raises public awareness about food waste through campaigns, publicity, press, discussions, debates, events and other information channels. Stop Wasting Food also inspires consumers to act locally, for example by donating edible surplus food to shelters for homeless people. Stop Wasting Food is supported by several thousands of Danish consumers, Members of the Danish Parliament, Members of the European Parliament, top chefs and Michelin restaurants, as well as leading Danish food personalities. Among the prominent supporters of the movement is Denmark’s former Prime Minister Mr. Poul Nyrup Rasmussen (Website Stop wasting food 2012).

Table 1: examples of initiatives and strategies for food waste and losses reduction that are currently underway on a political level, internationally and in single countries.

Value chain in food markets



Figure 3 Value chain in food markets in a global food system. Every stage in the food value chain offers opportunities to reduce food waste and losses. Source: SAM 2012 / Inrate

Reducing Food Waste can be a Business Case

Given the political awareness of global food security and the rising political pressure to reduce food waste, the current economic and business models as well as even the long-term strategies and market positions of companies in the global food supply chain will be affected.

There are several steps in the food supply chain where waste and losses can occur and where measures can be targeted. Agricultural yield goes through several steps until it reaches the end consumer as a final food product, from being harvested to processing, packaging, transportation and finally retailing (Figure 3). Certain food items are produced, processed and consumed in very different parts of the world as the food supply chains of today are globalized as never before. Consequently, food commodities traded at international markets and wasted in one part of the world could affect food availability and prices in other parts (FAO 2012). Global food supply chains are among the world's most complex, taking into account everything from millions of smallholder farmers to large agribusinesses and packaging manufacturers. The challenges of reducing food's environmental impact should therefore not be underestimated. Of course, waste reduction measures will only be implemented by companies if

they make economic sense and perhaps also help increase profitability. Still, there are several options available to implement such measures. In developed markets, public awareness of an often unequal relationship between farmers in the developing world and the food industry has given a rise to the fair-trade and ethically sourced foods movement (Morris 2010). This creates new business opportunities for companies that address the issue. Additionally, regulations regarding waste or food waste – e.g. higher prices for waste to landfills – might be implemented in the long-run. New strategies and intervention approaches by the private sector to reduce food losses and waste could therefore become an advantage for the most progressive companies and first-movers could gain advantages, at all levels of the food supply chain.

Focusing at the upper end of the food supply chain, for example one can identify significant business opportunities: Food shrinkage and waste can cost retailers up to 4 percent of revenue. As the grocery sector is a highly competitive sector, this fact cannot be ignored (Planet Retail 2011). Therefore, food retailers at the end of the supply chain have already taken actions. They have organized themselves and committed to take actions at a Retail Forum and set up individual programs (see company actions in table 2).

Company actions	<ul style="list-style-type: none"> * Retailers Take Action: nineteen major food retailers – Ahold, Aped, Asda, Auchan, Colruyt Group, Delhaize Group, El corte ingles, Eroski, EuroCoop, Ikea, Kaufland, Lidl, Marks&Spencer, Marcadona, Marcaton, Metro Group, Rewe Group, Sonae and Tesco – have committed to taking voluntary action in waste prevention, particularly on food waste. The commitments were made during a Retail Forum, on 9 October 2012, which was set up to facilitate dialogue between the European Commission, retailers and key stakeholders, to generate a better understanding of the practical measures needed to promote sustainable consumption. The companies signed a voluntary agreement on actions to be taken between now and 2014. The agreement foresees regular monitoring of measures implemented, and the publication of a progress report in 2014 (European Commission 2012). * Actions of individual companies encompass a series of measures to reduce food waste. A few examples: <ul style="list-style-type: none"> * Walmart stores in China and the United Kingdom have decreased the amount of food waste by either composting or donating to charities. * Sainsbury's is sending its leftover food waste to biogas plants for conversion into renewable energy. * Ahold has put together a Group-wide waste management strategy in 2011, with the objective to minimize waste in its operations, while supporting our suppliers and encouraging our customers to do the same. Considering food waste, they set the target to develop a group metric to measure food waste by 2012.
Private actions	<ul style="list-style-type: none"> * Food redistribution programs like the Swiss non-profit association "Tischlein deck dich" or the UK-based "FareShare" collect food products, which are near to their expiration date (www.tischlein.ch; www.fareshare.org.uk). * Movies and Literature help to raise public awareness of the food waste topic, e.g. the film "Taste the Waste" by Valentin Thurn (2011) and the corresponding book „die Essensvernichter“, which address how more than half the food lands on the dump, most of it before it ever reaches the consumers (www.tastethewaste.com; www.essensvernichter.de).

Table 2: examples of corporate and private actions to reduce food waste.

At the forefront of those taking action are two retailers, the UK-based supermarket groups Tesco and Sainsbury's. They point out that altruism may play a part, but insist that there is also a strong commercial reason to take actions against food waste. David North, consumer and government director at Tesco states: "we think this will be an area of competitive advantage" (Tieman 2010). Tesco is striving to reduce waste "from farm to fork", through its supply chain model and to encourage sustainable farming. Additionally, it supports its suppliers with technical and hygiene improvements (Gresser 2010). Besides, Tesco uses marketing measures to raise the customers' awareness of the food waste problem and is considering using innovative packaging materials for an extended shelf life of fresh products (see company example in grey box).

Despite these good measures, certain amounts of food waste are unavoidable. To handle it reasonably, retailers focus on food donation programs, organic composting and recycling initiatives. The latter includes food waste that is diverted to biogas plants and converted into energy. Marks & Spencer for example transports 89 percent of food waste from its 511 stores to biogas facilities and thanks to these and other environmental activities saved more than 105 million euros within the last 12 months (Downing 2012). For other good examples, similar to Sainsbury, see the company actions in table 2.

Donation and food redistribution programs are often private action programs that occur in cooperation with retailers (see private actions in table 2). Although they are often managed by non-profit organizations, these actions might also be profitable for retailers because food waste can be avoided which otherwise would need to be disposed of.

To summarize, in an era of higher and more volatile resource prices, companies will need to pay greater attention to resource-related issues in their business strategies. As pressure on ecosystems and natural resources increases, changes in public policy, customer preferences, and technology will drive the market for improved environmental performance. Companies with the foresight to get in front of these changes will gain a competitive advantage. A statistical analysis of US companies listed on the Standard & Poor's

500 dataset has shown that firms with an improved environmental risk management experience less volatility in performance and are rewarded by lower costs of equity capital and ultimately a lower weighted average cost of capital (UNEP 2012).

Investing in a more efficient food supply chain can pay off

As mentioned at the beginning, there is a long-term need to secure global food supplies in the face of rising population, climate change and increasing food prices. Addressing the world's food problems means more than increasing the sheer amount of food produced: Food must be financially accessible and reach end consumers (onValues 2011b). Thereby, reducing food waste is identified as one of the top opportunities to improve productivity.

To feed and sustain a world population of 9 billion by 2050, massive investments not only in agriculture itself but also in better infrastructure and in a more efficient use of resources will be needed. Limits to arable land require us to close the gap between growing demand for food and production primarily through increases in productivity and efficiency. The FAO estimates that an additional \$83 billion of annual investment is needed along the entire value chain to improve substantial innovation, ranging from application technologies, to greater efficiencies in logistics, transportation, storage, processing and packaging (onValues 2011).

Therein lies a growing but largely hidden source of both risk and opportunity for global investors. According to Inflection Point Capital Management (2012), investors will need new ways of thinking to fully understand changing parameters of portfolio risk and to develop stock ideas that tap into emerging areas of opportunity.

The structural defects in the world food systems stem from decades of neglect and underinvestment. This is due to a legacy of historically low prices caused by domestic subsidies and trade barriers (onValues 2011). Rising food prices have attracted investor attention but have also raised questions about the responsibility investors have to contribute to the stability and sustainability of agricultural markets.

Company example: TESCO

Tesco is the world's fourth-largest food retailer that runs more than 6'000 stores in 14 countries in Europe, Asia, and the US, as well as 3'000 stores in the UK, where Tesco is the number one retailer. Considering food waste, retailers like Tesco are in general highly challenged to take action against this problem, because up to 10% of food waste is generated during retail and distribution. Tesco is aware of that and therefore has joined the voluntary international agreement "retailers take action". In the UK, Tesco is also a signatory to WRAP's (Waste and Resources Action Programme) Courtauld 2, an industry-wide commitment to reduce packaging and waste by 2012, against a baseline of 2009. The company's targets are to reduce product and packaging waste in the supply chain by 5% as well as lowering its carbon impact by 10%, and to reduce UK household food and drink waste by 4%. To reach these targets and to tackle the food waste problem, the company has taken several measures, for example the 'buy one get one later' promotion. Other than the commonly known promotion "buy one, get one free", which is suspected to provoke food waste at customer households, the promotion launched by Tesco offers the customers the chance to claim a second item during their next shop, rather than pick it out immediately. Consumers have two weeks to redeem the vouchers and only four items involved in the scheme can be used per transaction. The products considered in the program are short-code, live-perishable products like yoghurt, salads and vegetables. Another measure taken by Tesco to prevent food waste is the innovation of a special packaging material that leads to an extended shelf life of fresh products. The packaging contains a strip coated with a natural product that is able to absorb ethylene, the hormone that causes fruit to ripen and then turn mouldy. Initial trials have already been successful and suggest that the device could be used across a range of fruit and vegetables. According to a Tesco expert the packaging is a major breakthrough in the fight to combat food waste and could save the fresh produce industry tens of millions of pounds each year. Tesco estimates the new packaging could lead to a potential wastage saving of 1.6 million packs of tomatoes and 350'000 packs of avocados.

There are different ways of investing along the value chain of the agricultural sector. A first option is through **buying shares of companies** that offer solutions to overcome global inefficiencies in production, processing and distribution of food. This can be the retailers mentioned above that take action to prevent food losses, but also seed producers, agricultural technology companies or agricultural producers. Another example is through **investments in funds** that focus on sustainable agriculture investment. Or finally, through **direct investments in agricultural commodities**. While the concept of responsible investing is well developed for some asset classes, the debate about responsible investment for commodities has just begun. To highlight some of the key challenges, investment opportunities and risks by investing in the agricultural sector, we interviewed Bernd Schanzenbächer from Environmental Business Group (EBG).

Interview with Dr. Bernd Schanzenbächer, an acknowledged leader in Agricultural Investments, Sustainability and Socially Responsible Investments with over 20 years of experience in financial markets, business practices, and international public policy. He grew up on a winery in Germany, holds a Master in Agronomy (Dipl.-ing. agr.) and a PhD in Agricultural and Resource Economics from the University of Hohenheim in Germany. Additionally, he holds several Board / Advisory Board mandates in the agricultural sector including Sustainable Earth Forestry Fund PLC, VTB Capital Agriculture Fund, Ariya Capital and IFPRI Land Governance Initiative.

Even if the topic of food waste has not yet found its way into financial markets, developing countries definitively do offer potential for investors, says Dr. Bernd Schanzenbächer.

• **How can reduction of food waste contribute to global food security?**

Reducing food waste plays an important role in increasing food supply and in decreasing the environmental impacts of current food production. Food losses of between 20 and 30 percent occur on the way from the farm until it reaches the end consumer. By reducing these losses, the amount of food available for human consumption increases. Precisely where the losses occur should be taken into consideration. In developed countries the pre-retail losses are much lower than in developing countries. In developed countries, consumers have become accustomed to purchasing food of the highest standards. Hence, food distributors discard plenty of edible food by weeding out products with aesthetic defects. We are talking about carrots that are not bright orange, bendy cucumbers or spotted apples. It is important to stress that this is not only driven by consumer preferences but also by legisla-

tion that specifies for example the shape of vegetables that are allowed to be sold. Reducing this kind of food waste is desirable, but clearly, it does not solve the problem of food security since this food (because it is perishable) will not become available in food insecure areas.

In developing countries, on the contrary, the post-harvest losses are high, mainly due the absence of storage and transportation infrastructure and the lack of knowledge or investments in storage technologies. Rodents are responsible for huge amounts of food loss worldwide but using silos or other appropriate storage facilities would go a long way to protecting food.

• **Is food waste a topic for financial markets / for investors? Where do you see potential to make profits from investments in food waste reduction?**

Food waste definitively could be a topic, but it has still not found its way into the financial markets. It has not yet gained the importance it should in order to reach its full potential. There are potential investment opportunities for investors within developing countries. There is a lack of capital available, especially for transportation and storage infrastructure. Improving those factors could significantly add to food security. I would like to give an example such as Brasil: as the country needs greater efficiencies in transportation, logistics and storage, one interesting investment opportunity is through indirect investment funds that invest in agricultural infrastructure. There is for example the "Galtere Agriculture Storage Fund". In order to maximize productivity gains, Galtere intends to operate at strategic locations such as ports or inland areas where logistical bottlenecks have constrained grain warehousing. Returns for the storage facility are derived primarily from lease agreements, providing a steady stream of income to investors. Other examples of indirect investments that may benefit from the increasing attractiveness of food security as an investment theme are shares of listed companies that are building agricultural infrastructure, such as silos or loading stations.

• **Do investments offer the opportunity to contribute to stable and sustainable global food and commodity markets?**

Yes, definitely. In the future we will have too little food to feed the world's population. The question is not only how to produce more in the future, but how to increase the efficiency of food production by using existing resources more efficiently. The developing countries with the highest food insecurity have a high backlog demand. It is a matter of urgency that the available land should be used more efficiently. Look at for example the yield of maize per hectare in Africa compared to USA. Whereas in Africa a yield of 1 ton per hectare can

be harvested, the yield in USA is almost ten times greater. There is a lack of access to technologies, but also to seeds, fertilizer and pesticides. To reduce these problems investments along the entire agricultural value chain are needed urgently.

• **Can you give examples of success stories of win-win-investments made in connection with the reduction of food waste? With “win-win-win” we refer to benefits for local communities, profits for investors and gains for the sustainable development in general.**

I can only think of a few. There are some retailers, that endeavour to promote special packaging technologies that leads to an extended shelf life of fresh products. The greatest challenge in developing countries is the food loss that occurs immediately post harvest. Besides storage technologies, such as the above mentioned silos for example, low cost solutions also exist. For example, using a special plastic foil that protects harvested crops against rodents and moisture (which is the main cause of rotting).

In my opinion there is not enough of an integrated approach being taken by retailers. This leads to isolated actions being taken by certain players only. Additional incentives need to be provided so that the whole production chain acts together. In addition, I think retailers need to make their customers much more aware about the food waste issue.

• **Which investments should be avoided from your point of view, because they pose for example a risk to global food security or sustainable development? Could you give examples?**

In my opinion, there should be a focus on investments that have positive effects in terms of producing food sustainably and more efficiently. This will also include -but is not limited to- investments that contribute to a reduction of food losses, e.g. such as the “Galtere Agriculture Storage Fund” mentioned above. Caution is needed with investments that are not directly contributing to an increasing production of food. E.g. investing in Soft Commodities (e.g. through futures) can have adverse effects on low income population as they have to pay higher prices for their food. Although it has not yet been proven that rising soft commodity prices are a direct result of increased trading in these commodities, many experts believe that their greater importance as an asset class can only trigger higher prices and volatility.

It must be stressed that hedging of the future prices of an asset are of legitimate interest – they have existed for over 150 years already. They help farmers as well as buyers to hedge their prices because they sell or buy a commodity in the future at a pre-determined price. In my opinion it is very legitimate

for both, the farmer and the buyer, to protect themselves and reduce the price risks of their businesses.

But over the last decade financial investors have begun to invest in soft commodities as well. Trades in soft commodity indexes increased 50-fold in a decade, hitting \$376 billion by 2010. The lack of appropriate regulation in this investment area facilitated the entry of institutional investors into this markets.

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