

# The illusory promise of the livestock revolution

Meatification of diets, industrial animal farms and global food security

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Thomas Fritz | FDCL | January 2014

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# Introduction

The recent worsening of the global food crisis, which had been sparked by sharply rising and extremely volatile food prices in 2007-2008, triggered a heated debate about its potential drivers. Among the factors singled out commodity speculation and the growing diversion of crops to biofuels ranked high on the list of suspected culprits. Yet, the long-time trend of increasingly 'meaty' diets driven by industrial livestock production received far less attention, although the channeling of enormous amounts of cereals and oilseeds into feed troughs represents an important share of global harvests and is known to be a highly inefficient way of using plant protein and the land needed to grow these crops. But even though the rapidly expanding system of industrial factory farms draws so heavily on harvests and increasingly scarce natural resources like land and water, it continues to be portrayed as a means for furthering global food security and for providing livelihoods for poor smallholders in the developing world.

Back in 1999, the United Nations Food and Agriculture Organisation FAO, together with the International Food Policy Research Institute IFPRI and the International Livestock Research Institute ILRI, argued in a joint report that global agriculture underwent a profound transformation, dubbed the 'Livestock Revolution'. Unlike the earlier Green Revolution, which the report's au-

thors described as supply-driven, the Livestock Revolution was understood as demand-driven. Population growth, urbanisation and income growth in the developing world would be fueling the growing demand for animal-based products like meat, milk and eggs.<sup>1</sup>

The joint report suggested that the Livestock Revolution will be associated with major benefits for consumers and producers alike. While consumers could improve their nutrition by eating more animal protein, producers would be offered valuable new income opportunities. The report claimed that growing demand for animal products would hold promise "for relieving widespread micronutrient and protein malnutrition"<sup>2</sup>, and that the changing diets of billions of people "could provide income growth opportunities for many rural poor"<sup>3</sup>, provided that proper policies are put in place.

The question being explored over the following pages is if the perceived benefits of the Livestock Revolution for the world's poor have actually materialised so far. What will be undertaken is a kind of reality check of some of the expectations and promises surrounding the global trend towards mass production of animal-based food and increasingly meaty diets. The lens through which this transition is being analysed is its impact on food security in the Global South.

## Uneven development of the Livestock Revolution

Although on a global scale production and consumption of meat indeed grew considerably in the last decades, this trend actually exhibits very uneven patterns. Between 1961 and 2011, global meat production has been risen from 71 million tonnes to almost 299 million tonnes, with the sharpest increase reported for poultry and

pork, while beef production grew at a more modest rate (see figure 1). Beginning in the 1980ies, China's output climbed rapidly so that the Asian country is now the largest producer in the world, followed by the EU and the US (see figure 2). Yet, when assessing these figures, it has to be taken into account that China with its 1.35 billion

Figure 1

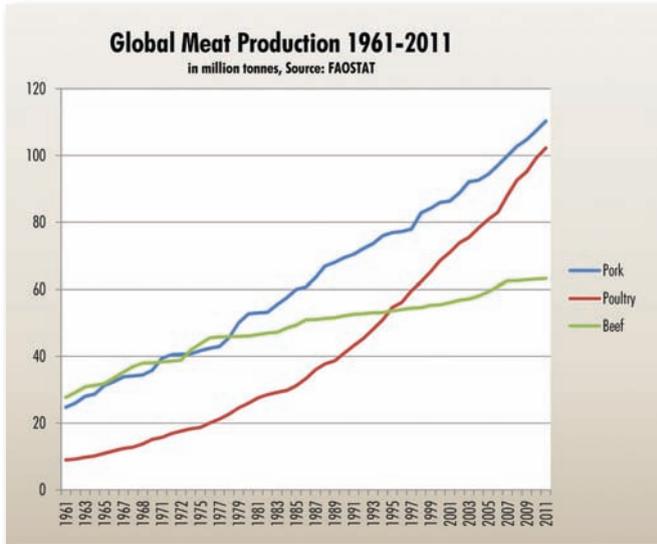


Figure 2

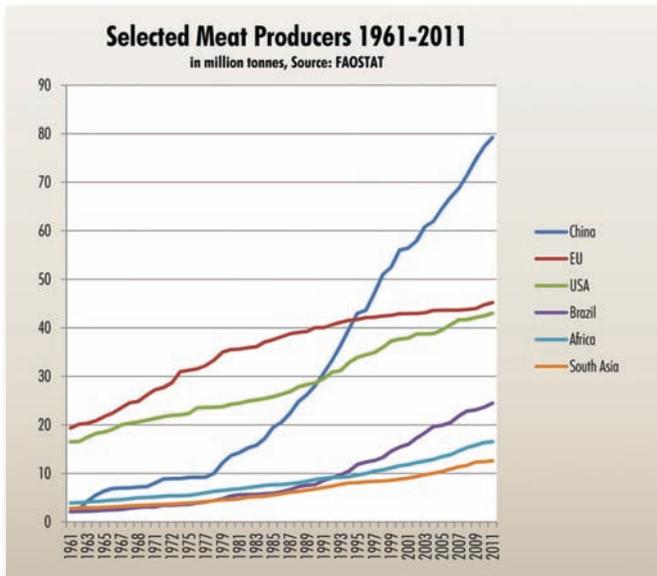
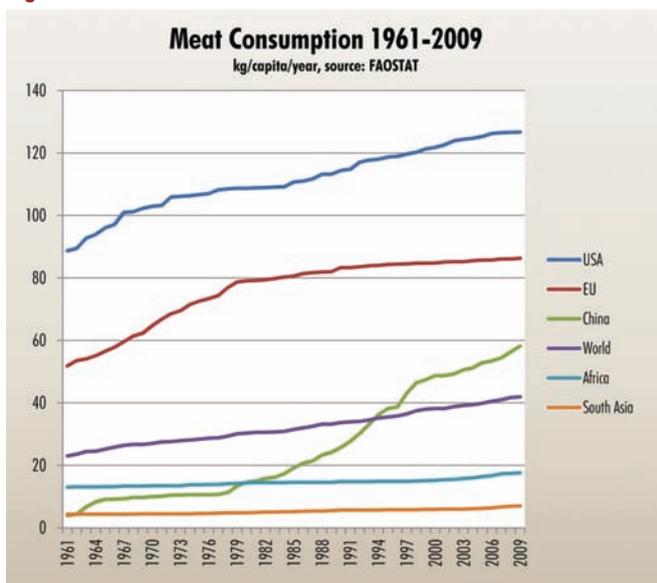


Figure 3



people is far more populous than the EU (507 million) and the US (317 million). Africa and South Asia still register pretty low meat outputs given that the African continent is home to more than one billion people, and India alone, as the biggest South Asian nation, counts some 1.2 billion people.

When it comes to consumption, the geography of meat stills shows a significant North-South divide, irrespective of countries like China where per capita meat consumption has been catching up throughout the last decades. According to FAO estimates, in 2012 per capita meat consumption in developed countries on average accounts for 79 kilogramme per year, compared to 33 kilogramme in the developing world.<sup>4</sup> But a closer look reveals even larger disparities (see figure 3). While the US consumes about 120 kg of meat per capita annually and Western Europe more than 80 kg, African consumers have to make do with less than 18 kg and South Asians with a meagre 7 kg. Meanwhile, Chinese consumers started to eat considerable amounts of meat with roughly 60 kg per capita and year, though this still equals only half of US consumption.<sup>5</sup>

So, in fact, the Livestock Revolution in the developing world, measured in production and consumption growth, has mainly been concentrated in a couple of faster growing emerging economies like China or Brazil, whereas large parts of Africa and South Asia haven't yet participated. While Latin America, East and Southeast Asia witnessed significant increases in per capita meat consumption, Africa's and South Asia's consumption remained almost stagnant and in some cases is even declining.<sup>6</sup>

But despite the concentration on emerging markets, it has to be kept in mind that these are highly populated countries whose changing diets have a strong impact on world agricultural markets, the structures of the global livestock industry and the natural resources needed for the production of animal-sourced foods. The growth rates of meat production and consumption in the Global South are also far

higher than in the North. In the period 1991-2007, meat production and consumption in developing countries grew by more than 4 percent annually, compared to 0.7 percent in industrialised countries.<sup>7</sup>

Though FAO predicts considerably lower future growth rates of meat consumption in the South (yearly rates of 1.7 percent in the period up to 2050), the ongoing growth would still pose a huge challenge for agriculture and eco-systems given that industrialised countries' meat demand would also continue to grow by an estimated 0.7 percent annually until 2050. If these predictions come true, this would mean that global meat production, which amounted to 299 million tonnes in 2011, could climb to at least 455 million tonnes by 2050.<sup>8</sup>

It is expected that this growth will almost exclusively be accounted for by industrial animal farms which already dominate the global production of poultry and pork. Industrial production systems contribute more than two thirds of global poultry meat production and more than

half of the world's pork output.<sup>9</sup> Despite mechanisation proving to be more complex for cattle farming than for poultry or swine, intensive cattle production systems are also on the rise, as can be seen by the growing number of feedlots where thousands of cattle are densely confined in large outdoor installations.

Unlike mixed farming systems where feedstuff and livestock production are locally linked, be it on the same farm or in a limited geographical area, industrial livestock systems strongly depend on feed purchases on national and international markets. The concentrated compound feeds fed to the special breeds of high-performing animals mainly consist of grains and oilseeds which have frequently been shipped across long distances, with maize and soybeans the most important feed crops traded internationally. Due to their import dependency, animal farms also shift the social and environmental impact of feed cultivation to those countries where the required amounts of crops are being produced.

## Inefficiency of industrial animal farms

As global livestock systems are increasingly shifting from using food waste, harvest residues, and grasses to farmed crops as main feed components, growing amounts of cereals and oilseeds have to be directed to feeding animals. Of the estimated 2.3 billion tonnes of cereals such as wheat, maize and barley produced globally in 2012/13, more than 800 million, some 35 percent, end up in feed troughs.<sup>10</sup> Similarly, more than half of harvested oilseeds such as soybeans and rapeseed also find their way into animal stomachs.<sup>11</sup> Oilseed meals, the residues of oilseed crushing, have become the most important protein sources in industrial compound feeds, with soybean meal the most frequently used protein. However, in industrialised countries with high levels of meat consumption the cereals proportion fed to animals is significantly higher. In the European Union, about 60 percent of the cereal harvest is used for animal feed,<sup>12</sup> while farmers in sub-Saharan Africa and South Asia only divert between 10 and 15 percent of cereal harvests to livestock feeding.<sup>13</sup>

Yet, the conversion of feed crops into meat is highly inefficient, as a large proportion of the plant energy contained in feed crops gets lost because animals use the biggest part of the acquired energy for their own metabolism. A recent study at the University of Minnesota (US) calculated the global losses of calories caused by the diversion of a group of 41 crops to animal feed.<sup>14</sup> Of the calories produced globally by these crops, 55 percent directly feed humans, 36 percent feed animals and the rest are being used for biofuels and other industrial purposes. Of the 36 percent of calories diverted to animal feed, the largest majority, some 89 percent, gets lost due to animals' metabolism, so that only about 4 percent of all crop-produced calories will be available for human consumption in the form of animal products like meat, milk and eggs. Adding these 4 percent to the 55 percent of crop calories directly feeding humans makes 59 percent of all crop calories serving human nutrition either in the form of plant-based or

animal-based food. This means, conversely, that 41 percent of crop calories are lost to animals (32 percent) or industrial purposes (9 percent).

Due to the inherent inefficiency of feeding crops to livestock, a reduced consumption of animal-sourced foods could free enormous amounts of crop calories for human consumption. The University of Minnesota stu-

dy, for example, estimates that “reducing the consumption of grain-fed animal products by 50% would increase calorie availability enough to feed an additional 2 billion people.”<sup>15</sup> In addition, reducing the demand for animal-based food may also have a dampening effect on the prices of those cereals and oilseeds which currently serve as main feedstuffs for animal farms.

## Meaty diets’ land demand

The growing global livestock population greatly increases the demand for land, either in the form of grazing land or in the form of arable land dedicated to producing feed crops. Of the roughly 5 billion hectares of agricultural land currently available on earth, some 1.5 billion hectares are being used as arable land for crop cultivation, and about 3.4 billion hectares are grasslands like meadows and pastures.<sup>16</sup> It is estimated that one third of the cropland is devoted to producing animal feed.<sup>17</sup> But the world’s grasslands are also largely used as grazing grounds, many of which still for extensive livestock farming where animals graze across large areas, as for example in the savannahs of Africa, South America or Central Asia.

Adding the grazing grounds to the croplands devoted to animal feed shows that almost 80 percent of all agricultural land is used for raising animals, according to FAO.<sup>18</sup> However, as Idel and Reichert argue, “the major issue is not whether livestock is the world’s largest user of land, but rather how the land and livestock are managed”.<sup>19</sup> Indeed, extensive livestock farming where grasslands are used as grazing grounds for ruminants like cattle, sheep or goats may be a largely sustainable production system, as long as overgrazing and deforestation by cattle farms can be avoided. Due to ruminants’ ability to digest grass and hay, they also do not by themselves compete with humans for food, provided that farmers refrain from feeding them cereals and oilseeds to boost their output.

Idel and Reichert maintain that “the data indicating livestock as the world’s largest user of land are average values that also include a relevant part of sustainably used grasslands.”<sup>20</sup> Thus, from a food security perspective, the problem is not animals’ usage of land per se, but factory farms’ growing demand for animal feed occupying large chunks of global cropland and reinforcing deforestation as well as the conversion of grassland to cropland. In fact, it is the “industrial grain-oilseed-livestock complex”, as Tony Weis has called it, that is drawing so heavily on natural resources, thereby contributing to biodiversity loss, global warming and increasingly fierce land-use competition.<sup>21</sup>

It also cannot come as a surprise that behind many of the current land conflicts occurring across the globe meat consumption emerges as a dominant cause. One of the hotspots of these livestock-induced land-use conflicts is South America where large-scale monocultures of soybean and maize plantations as well as cattle farms advance into highly biodiverse ecosystems such as the Amazon rainforest or the Brazilian Cerrado provoking sometimes violent conflicts with indigenous peoples and small farmers trying to defend their customary land rights and their traditional modes of food production.<sup>22</sup>

However, a diet change towards reduced consumption of animal-based foods could certainly contribute to defuse the tensions associated with growing land-use competition. Several scenarios have already been calculated assessing the potential impact of ‘less meat’-diets

on global land-use. A study of PBL, the Netherlands Environmental Assessment Agency, for instance, examined the impact of a 'healthy diet' with lower global meat consumption (52 percent less beef, 35 percent less pork and 44 percent less chicken meat and eggs until 2050) compared to a 'business as usual'-reference scenario assuming a doubling of livestock production. The scientists estimate that a transition towards the 'healthy diet' could reduce the global cropland requirement by 135 million hectares by the year 2050.<sup>23</sup>

Another scenario has been calculated by scientists of Chalmers University of Technolo-

gy in Gothenburg (Sweden). The Swedish scientists assumed a 25 percent decrease in per capita meat consumption only in high-income countries such as the US, EU and Australia, combined with a slightly lower food wastage rate at retail and household levels for the year 2030. According to this scenario, the required global agricultural area would be reduced by 170 million hectares.<sup>24</sup> These and other studies show that already comparatively modest changes of consumption patterns in societies with highly meaty diets could lead to significant freeing up of land resources currently occupied for feeding animals.

## Volatile food prices and the competition between feed and food

The inventors of the Livestock Revolution notion were pretty optimistic that the huge diversion of cereals and oilseeds for animal feed wouldn't be a threat for the food security of consumers depending on cereals as their most basic food item. In their 1999 report, FAO, IFPRI and ILRI wrote that despite growing feed-stuff demand, "real cereal prices, however, are not likely to rise very much by 2020".<sup>25</sup> The reason for their assumption of continuing low cereal prices was that "the world is thought to have considerable reserve capacity for additional cereal production". The important cereal producers Australia, Canada and the US were believed to have the ability to bring additional amounts of land into cereal production and to considerably boost yields by increasing fertilizer use. And in the

system of global markets, the report argued, "individual shocks are smoothed out over time through myriad adjustments throughout the system".<sup>26</sup>

Yet, contrary to the belief of the experts, beginning in 2007, food prices reversed their three-decades-long depression and shot up sharply, with two peaks in 2008 and 2011 (see figure 4). Cereal prices followed the same

Figure 4

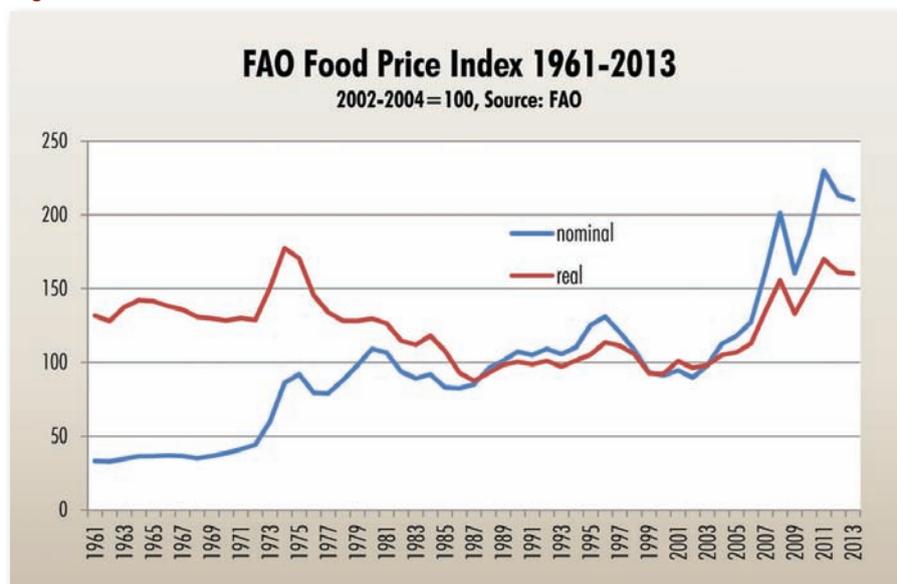


Figure 5

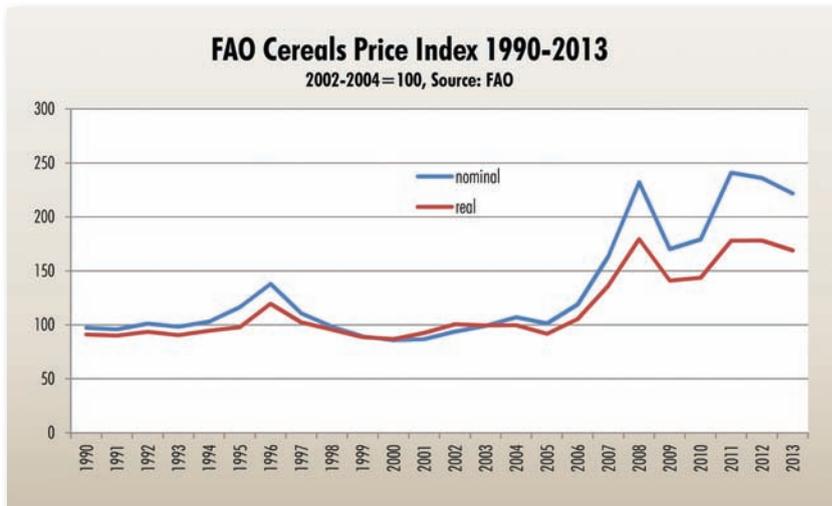


Figure 6

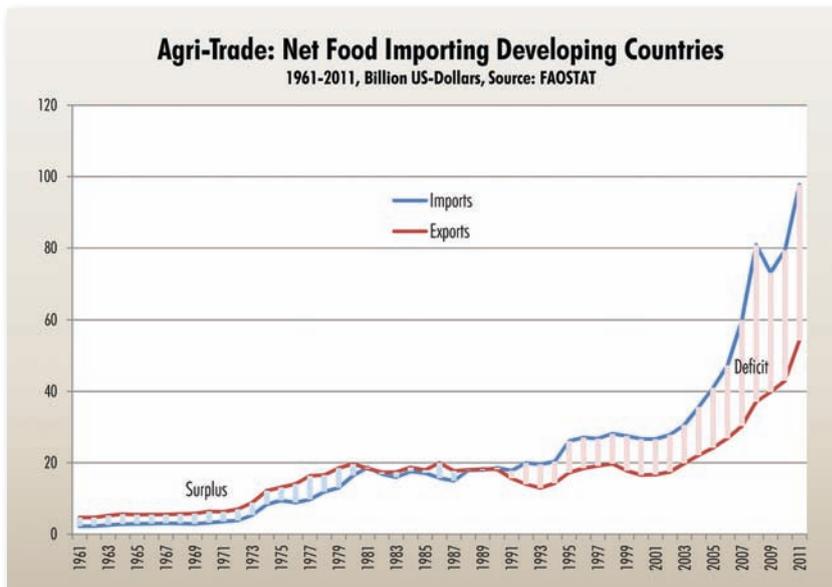
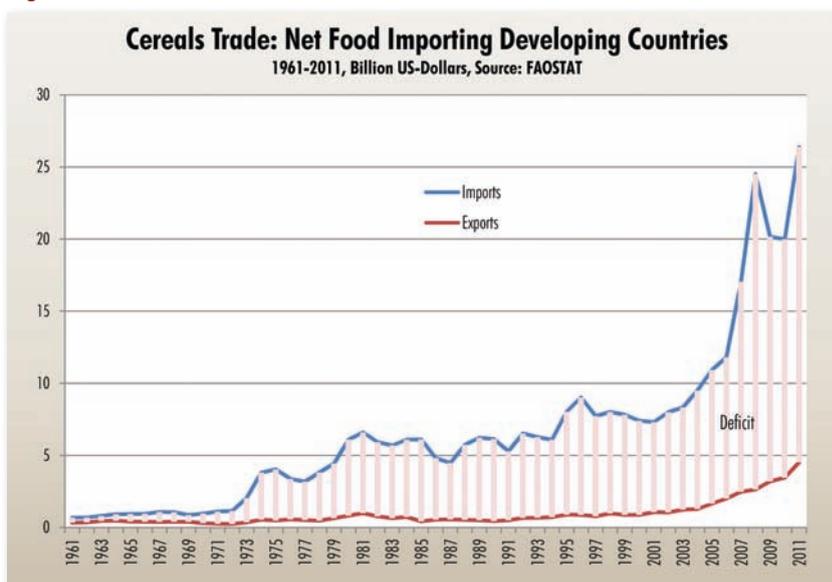


Figure 7



general trend of spiking food prices (see figure 5). Although it is difficult to forecast future price trends, most analysts now expect that at least in the medium term prices will remain higher and volatility may become a more common feature of agricultural markets. The recent OECD-FAO Agricultural Outlook to the year 2022, for instance, confirms this assessment: "Slower production growth in combination with strong and rising demand, are projected to hold agricultural product and fish prices collectively at historically high levels." Sluggish production growth, in turn, would also "slow-down the replenishment of stocks making commodity markets more susceptible to high price volatility".<sup>27</sup>

The trend towards higher and more volatile food prices threatens the food security of all those developing countries who became net food importers. With the outbreak of the debt crisis in the 1980ies many developing countries turned from net exporters to net importers of agricultural products. Trade liberalisation and structural adjustment programmes imposed by the World Bank and the IMF led to the erosion of their traditional surplus in agricultural trade. The international financial institutions forced Southern governments to cut support for domestic agriculture, open markets for food imports, and to switch from staple food production for local mar-

kets to cash crop cultivation for export markets. But due to stagnating demand and declining prices for tropical products (such as coffee, cocoa, tea or bananas), the switch to cash crop exports did not result in sufficient trade revenues to compensate for the growing imports of basic food items such as cereals, vegetable oils and fats.<sup>28</sup>

Due to their growing agricultural trade deficit, Net Food Importing Developing Countries (NFIDCs: 79 countries) are particularly vulnerable to price spikes on the international markets (see figure 6). Cereals are the most important item in the food import basket of these countries, accounting for more than 40 percent of the value of all food imports. Particularly in the last couple of years, their cereal import deficit increased rapidly approaching almost 22 billion US\$ in 2011 for all NFIDCs (see figure 7). As a consequence of their lost self-sufficiency, NFIDCs on average are relying on imports for 30 percent of their cereal consumption; in several countries the import share is even higher.<sup>29</sup>

Many of these countries are now paying a heavy price for their import-dependency, what is being reflected in their rising import bills. Although NFIDCs also increased the volumes of cereal imports in the last years, the “increase in the cost of cereal imports has been much

more pronounced than that of the quantities imported, especially in recent years in view of soaring food prices”, as trade expert Panos Konandrea showed.<sup>30</sup> While NFIDCs’ volume of cereal imports grew by 70 percent, their cereal import bills increased almost four-fold in the period 1994-2012. Konandrea estimates that the soaring prices have been responsible for 56 percent of the increase in the import bills.

Since higher cereal prices on the international market may translate into price increases on the domestic markets, albeit to a varying degree, poor consumers might be forced to cut back on staple food purchases, as was already the case during the global food crisis of 2008. The diversion of growing amounts of cereals into feed troughs belongs to the important causes putting upward pressure on global cereal prices. Rising meat consumption is thus intimately linked to the current price trend and the ensuing food security risks for poor consumers in the developing world. By contrast, a more generalised transition towards a low-meat diet could have a dampening effect on food prices, as an IFPRI study suggests. In its low-meat scenario assuming a 50 percent reduction of meat consumption in high-income countries by 2030, prices for cereals, meat and meal drop significantly, particularly if the diet change would also occur in China and Brazil.<sup>31</sup>

## Meat production, trade and export dumping

The Livestock Revolution would not have been possible without accompanying growth of global trade in feedstuffs and animal products. On the input side, industrial livestock farms depend on cheap supplies of cereals and oilseeds for animal feed which are provided by only a handful of global suppliers; on the output side they need low trade barriers to export their surplus production of meat and milk given that rich countries’ markets are widely saturated.

Exports of feedstuffs and animal products are both highly concentrated among a few key players. Major exporters of wheat are the US, EU, Canada, Australia and Russia, while maize and soybean exports mainly originate in the US, Bra-

zil and Argentina. The US, the EU and Brazil are heading the list of the world’s largest meat exporters, while the EU and New Zealand dominate the global dairy export market. Whereas only a small group of developing countries managed to increase feedstuff and meat exports, notably in South America, the large majority of developing countries depends not only on imports of cereals but also of animal products like meat and milk. In fact, as long as these countries’ consumption continues to grow faster than production, their import-dependency is also due to grow. What is more, in the near future cereals and oilseeds imports in food-deficit developing countries may not only be driven by direct human consumption

Figure 8

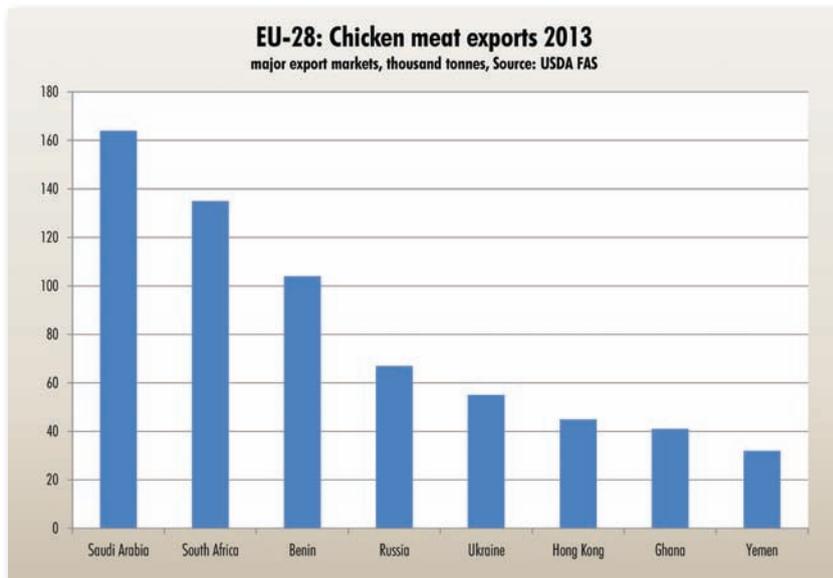
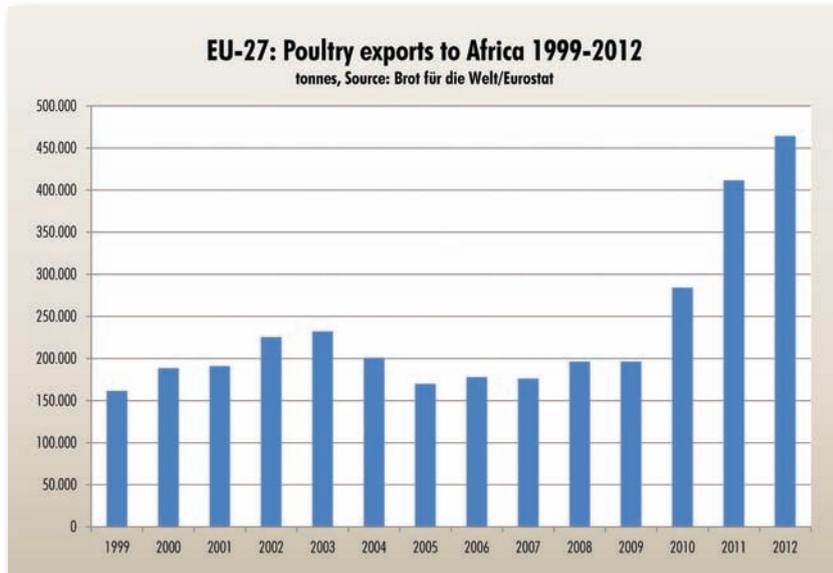


Figure 9



needs but also indirectly by increasing demand for animal feed, depending on the speed and extent of factory farms' expansion in the Global South.<sup>32</sup>

Referring to the concentration among the main suppliers, scientists of the French National Institute for Agricultural Research INRA provide an image of the 2050 global landscape with regards to agricultural trade: "a world divided into two groups of regions with one group (OECD, Latin America, and the former Soviet Union) enjoying an agricultural surplus and supplying the three regions with a deficit (Asia, Middle East and North Africa, and sub-Saharan Africa)."<sup>33</sup> Basically, the perspective is even worse as the concentration among the main agricultural exporters

concerns only a handful of countries, and the trade between surplus and deficit countries is expected to grow. This situation implies "a vulnerability of a large number of developing countries, notably African countries, to any world market disturbances and the crucial need for securing access to world imports", as the INRA researchers emphasize. But the challenge for the large majority of developing countries doesn't stop here, because it also has to be ensured "that trade rules do not penalize local agricultural production growth, which is required for reducing poverty and malnutrition".<sup>34</sup>

Yet, unfortunately, global trade policies largely fail to protect smallholders in the developing world from the surplus production of animal-based foods generated by the Livestock Revolution. The European surplus production of poultry meat is a case in point. Although internal demand is largely saturated, domestic poultry production continues to grow together with ex-

ports. In the period 2006-2012, EU-27 chicken meat exports more than doubled from 690.000 tonnes to 1.4 million tonnes, with the main exporting Member States being France, the Netherlands and Germany.<sup>35</sup> The African continent belongs to the main export destinations absorbing more than a third of all EU broiler exports, with South Africa, Benin and Ghana the main markets (see figure 8). Especially in the last three years, EU poultry exports to Africa soared strongly reaching more than 450.000 tonnes in 2012 (see figure 9).

However, many African countries suffer severely from the import surges of cheap chicken meat disrupting the market for thousands of smallholders breeding chickens in their backyards, on small-scale poultry farms or on the few

semi-industrial farms in urban and suburban areas. Small-scale poultry farming is very widespread in Africa as poultry and egg production serves as an important complementary source of nutrition and income for millions of poor households.<sup>36</sup>

EU exports to Africa consist mainly of frozen chicken pieces like wings, legs, necks and giblets. The growing trade with these minor broiler parts is a result of changing consumption patterns in Europe, where consumers prefer easy to prepare fresh chicken pieces, particularly chicken breast, instead of whole birds. Due to these changes, the poultry industry makes high profits with breast meat sales in Europe, enabling the sale of other chicken parts at extremely low prices on African markets. Often the imported chicken meat is sold at prices about 50 percent lower than meat derived of local chickens. As a consequence, lots of small and medium-scale producers in countries like Ghana, Senegal or Cameroon already lost market share or were forced to close down in the last decade following import surges of cheap chicken meat.<sup>37</sup>

European chicken dumping, however, has also provoked resistance by African poultry breeders and farmers prompting some governments to impose import restrictions (import quotas, higher tariffs, or outright import bans), as in the cases of Nigeria, Cameroon and Senegal. But in the future application of such measures may violate liberalisation commitments contained in the Economic Partnership Agreements (EPAs) currently being negotiated between the EU and 75 African, Caribbean and Pacific region countries (ACP).

The policy prescriptions requested by the European Commission include tariff standstill commitments, restrictions on the use of tariff rate quotas and prohibitions of import licenses.<sup>38</sup> In most EPAs the Commission demands the inclusion of a so-called 'standstill clause' prohibiting the introduction of any new tariffs or the raising of existing tariffs.<sup>39</sup> Thus, the policy space of African governments to protect domestic poultry breeders against floods of cheap EU chicken imports may be severely constrained.

The difficulties of South Africa, which suffers from chicken imports originating mainly in Brazil and the EU, could be a warning to all the ACP countries currently negotiating an EPA. To protect the domestic poultry industry, which is made up of a larger industrial and a more limited smallholder sector, South Africa raised tariffs on five categories of chicken products in September 2013. But due to a free trade agreement with the EU, the so-called Trade, Development and Cooperation Agreement (TDCA) of 1999, the tariff increases will only hit suppliers from outside the EU, as the import duty for EU chicken had to be phased out.<sup>40</sup> But South African producers maintain that European chicken causes the main problem because EU producers largely dominate the imports of frozen chicken pieces. According to the South African Poultry Association (SAPA), "in the three years from 2010, the EU has gone from a market share of 0.5% in chicken pieces to 70%".<sup>41</sup> The South African government is now investigating the possibility of applying anti-dumping measures on chicken imports from the EU.

## Livestock's contribution to climate change

Industrial meat production may also impair food security by contributing to climate change. The impacts of global warming on agriculture tend to be more severe in the Global South with its higher initial temperatures and lower levels of development. As the UN Conference on Trade and Development UNCTAD warns: "Particularly hard hit will be areas with marginal or already

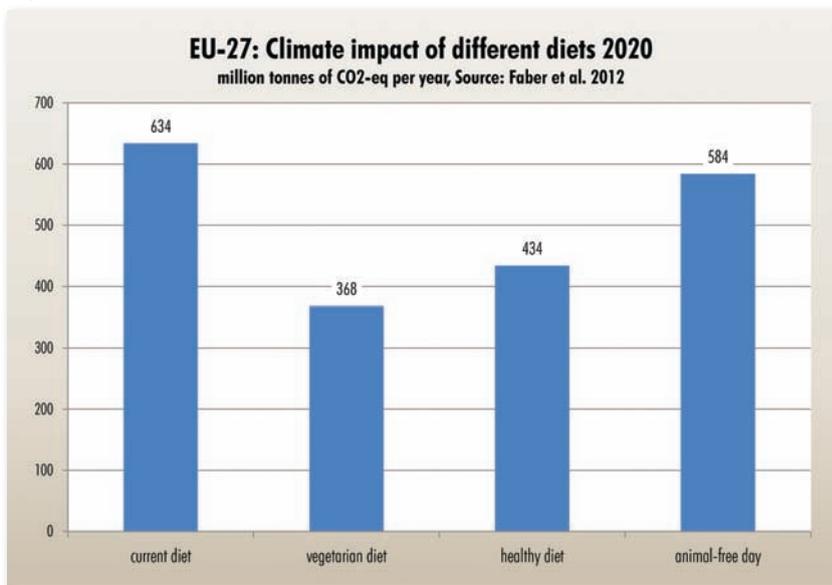
degraded lands and the poorest part of the rural population with little adaptation capacity."<sup>42</sup>

A study by economist William Cline provides an estimate of the potential agricultural output changes assuming a 5°C surface temperature increase of the land area by 2080.<sup>43</sup> According to Cline's calculations, agriculture's output would drop most sharply in developing

	Without carbon fertilisation	With carbon fertilisation
<b>Industrial Countries</b>	-6.3	7.7
<b>Developing Countries</b>	-21.0	-9.1
<b>Africa</b>	-27.5	-16.6
<b>Asia</b>	-19.3	-7.2
<b>Latin America</b>	-24.3	-12.9

Source: Cline, William R, 2008: *Global Warming and Agriculture*.  
In: *Finance & Development*, March 2008, pp. 23-27

**Figure 10**



countries, even when carbon fertilisation effects are being factored in (see table 1). Carbon fertilisation refers to the phenomenon that, although warming generally tends to reduce crop yields, the growth of some plants (so-called C3 crops) may actually increase due to certain levels of higher carbon dioxide concentrations in the atmosphere. As can be seen in table 1, while industrial countries' yields could either moderately decrease or, when including carbon fertilisation, even increase due to climate change, developing countries would suffer significant output losses, also when carbon fertilisation is accounted for.

Livestock production, especially in intensive systems, contributes considerably to global warming, although the extent is subject of some debate.<sup>44</sup> In its 2006 report 'Livestock's long shadow', FAO estimated that livestock activities contribute 18 percent to total human-induced greenhouse gas emissions.<sup>45</sup> However, in its 2013 report 'Tackling climate change

through livestock', FAO revised its previous figure downwards, now estimating livestock's share of total anthropogenic emissions at 14.5 percent (yet, livestock's absolute emissions of 7.1 gigatonnes of CO2-eq (carbon dioxide equivalents) remained constant in both reports).<sup>46</sup>

Despite livestock's large contribution to global warming, FAO's recommendations focus exclusively on mitigation options in the production process without considering the option of reduced consumption – a deficit which provoked some criticism because changes in consumption patterns could be more effective.<sup>47</sup> Nevertheless, some studies already calculated the potential impact of a diet change on global warming. The study of the Netherlands Environmental Assessment Agency PBL, for instance, examined the impact of its 'healthy diet' scenario (52 percent less beef, 35 percent less pork and 44 percent less chicken meat and eggs) compared to a reference scenario assuming a doubling of livestock production until 2050. Greenhouse gas emissions in the healthy diet variant are about 10 percent lower than in the reference scenario.<sup>48</sup>

Another assessment commissioned by the European Commission calculated the impact of three different scenarios of dietary changes in the EU-27 for the year 2020: 1) a vegetarian diet; 2) a recommended healthy diet (reducing daily intake to 2,500 kilocalories and eating 500 grams of fruits and vegetables); 3) one day per week without animal products (amounts to a reduction of 14 percent).<sup>49</sup> If all EU citizens shift to the vegetarian diet, total food-related emissions in 2020 would drop by about 40 percent compared to the current diet. Shifting to the healthy diet reduces emissions by roughly 30 percent, and the weekly animal-free day drops emissions by 8 percent (see figure 10).

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Similar examinations on national levels confirm this outcome. A report for the United Kingdom's Committee on Climate Change estimates that a 50 percent reduction in livestock product consumption (36 percent less meat, 60 percent less milk and eggs) would

reduce greenhouse gas emissions from primary production by 19 percent.<sup>50</sup> These and other assessments show that a global diet change could indeed contribute to considerable emissions reductions and would certainly help in the endeavour of cooling the planet.

## Inclusive business models: leaving the poor behind

While not denying the considerable environmental and social risks of the Livestock Revolution, the authors of the landmark 1999 FAO, IFPRI and ILRI report were nevertheless upbeat about the possibility of spreading its benefits more broadly. They claimed that the risk for poor livestock keepers of being driven out of their traditional markets could be minimised by integrating them into the supply chains of large livestock processors through contract farming or the creation of producer cooperatives. This strategy would be promising since the Livestock Revolution represented "one of the few dynamic economic trends that can be used to improve the lives of poor rural people in developing countries".<sup>51</sup>

More than a decade after the proclamation of the Livestock Revolution, FAO continues to spread an optimistic message about its potential benefits, yet its contradictions are also becoming more visible. A book of its Pro-Poor Livestock Policy Initiative, published in 2012, asserts on the one hand that the expanding markets for animal-sourced food in developing countries "represent enormous income potential for the rural poor, many of whom own livestock".<sup>52</sup> Yet on the other hand, the authors are pretty frank about the limits of this trend by acknowledging that livestock's potential for poverty reduction "remains largely untapped". Among the reasons for this rather disappointing outcome they mention market imperfections, the lack of public services and a "systematic bias towards industrialization and concentration favouring large- over small-scale operators".<sup>53</sup>

It might appear even more surprising that the FAO scientists openly dismiss the idea that contract farming and other supposedly 'inclusive' business models – one of the preferred interven-

tion strategies of Western development agencies – could provide pathways out of poverty for those most in need. "It must be recognised", the authors admit, "that the majority of agricultural and rural households in developing countries are unlikely to be recruited directly into agrifood industrialisation; even intermediate stages of sector consolidation, such as contract farming, appear to be undertaken at a scale well beyond that of the average smallholder farmer."<sup>54</sup>

Indeed, the as yet rather scarce evidence on smallholders' ability to stay in business and to link up with integrators or processors in fast modernising countries is disillusioning. "The study results in almost all the cases involving pigs and poultry suggest that the smallest independent livestock farms will increasingly have a hard time remaining in business", an IFPRI report analysing the cases of Thailand, the Philippines, India and Brazil concludes.<sup>55</sup> For commodities such as broilers and eggs "smallholders in all four countries have been rapidly losing market share".<sup>56</sup> In the Thai case, the number of smallholders engaged in livestock production "has significantly decreased over the last 15 years".

Evidence from Brazil shows that high levels of indebtedness drove many contract farmers out of business. Small-scale swine farms exited the livestock sector "after they took out loans to increase the size of their operations at the request of integrators who refused to renew contracts with producers with only a few animals, and then were unable to repay". The IFPRI report suggests that integrators such as slaughterhouses or dairies "have a financial incentive to contract with larger farms" which will "eventually capture market share from smallholders".<sup>57</sup> Summing up the experiences made so far, FAO expert Jeroen

Dijkman asserts that the idea traditional smallholders could climb up the 'livestock ladder' by gradually scaling up their production "is largely a myth."<sup>58</sup>

Having read this finding one would expect FAO experts to start devising alternatives to the apparently inadequate contract farming strategy. But far from it. They rather recommend that "reforms in the livestock sector should preferably target the 'not-so-poor' farmers"<sup>59</sup>, the so-called 'upper' smallholder livestock keepers, "who have the minimum asset base for engaging sustainably in market-oriented livestock production, rather than focusing on marginal livestock keepers".<sup>60</sup> Apparently aware of the social consequences of their advice, FAO scientists acknowledge that "this strategy is likely to increase rural wealth disparities". Given that their highly selective integration strategy excludes the large majority of poor livestock keepers, they recommend

to complement this approach "with safety net programmes to support the most vulnerable".<sup>61</sup>

The livestock development strategy promoted by international organisations like FAO, IFPRI and ILRI actually resembles more a declaration of surrender to the forces of the industrial livestock complex than a poverty-sensitive approach where the most vulnerable smallholders take centre stage. After admitting that the highly praised linkages of contract farmers with commercial livestock processors won't work for the large majority of poor smallholders, they are taking recourse to the unconvincing option of social protection. Their advice effectively boils down to putting the poorest off by proposing safety nets which in many cases may never materialise given either the precarious state of governments' budgets or the unwillingness of ruling classes to invest in social programmes at all.

## Conclusion

In contrast to the rather optimistic expectations some international organisations associated with the Livestock Revolution, it seems that the evidence collected so far requires a more skeptical view, particularly with regards to the poverty impact. What is true is that the Global South indeed witnessed a growing production and consumption of animal-sourced food, albeit more concentrated in faster growing emerging economies like China or Brazil, whereas large parts of Africa and South Asia haven't yet participated in this process. But despite the concentration on emerging markets, it has to be kept in mind that these are often highly populated countries whose changing diets have a strong impact on world food markets and on the related demand for natural resources. In addition, it cannot be ruled out that other developing countries will also experience a similar transition in the years to come.

The most crucial problem, however, is that growing livestock production will almost exclusively be accounted for by industrial animal farms which already largely dominate the global production of poultry and pork. Due to the breeding of high-yielding animals and the decoupling of crop and livestock production, the

se factory farms strongly depend on growing supplies of farmed feed purchased on world markets. But the conversion of feed crops into animal products such as meat is highly inefficient, as a large proportion of plant energy gets lost to animal's own metabolism. This inherent inefficiency is often overlooked by those claiming the potential nutritional benefits of growing meat consumption.

The fierce land-use competition driven by feed demand, causing deforestation and land grabbing, further calls into question the perceived benefits of the Livestock Revolution for global food security, as does livestock's large contribution to global warming. Furthermore, the diversion of growing amounts of cereals into feed troughs belongs to the important causes putting upward pressure on global cereals and food prices, already expected to be higher and more volatile for the foreseeable future. Rising meat consumption is thus inextricably linked to the current price trend and the ensuing food security risks for poor consumers in the developing world.

Another risk for food security is factory farms' surplus production, large parts of

which is being dumped on developing countries' markets, thereby pushing smallholders and less competitive commercial producers out of the business. This risk for poor livestock holders is being compounded by free trade agreements restraining the protection of local markets against import surges, as is the case with the Economic Partnership Agreements currently being negotiated between the EU and ACP countries. The hope that sizeable amounts of poor smallholders might eventually benefit by linking up with livestock processors through contract farming has also not materialised. Generally, it is only a minority of larger farmers which is being contracted, while smallholders increasingly face the risk of being driven out of their traditional markets.

Given the enormous social and environmental risks associated with the Livestock Revolution, a dietary change reducing the consumption of animal products, particularly among the more wealthy income groups, emerges in many respects as one of the most effective remedies. But despite the benefits of

'less-meat' diets for cooling the planet, defusing land conflicts and dampening the food price increase, this option is either not pursued with the required vigour or entirely disregarded, particularly by some of the influential international organisations as well as official agricultural and consumer policies.

So it is up to civil society, NGOs and social movements to reverse the trend towards the meatification of diets and to challenge the 'industrial grain-oilseed-livestock complex' fiercely defending the profits extracted out of this socially and environmentally destructive production system. This priority also requires to question widespread dietary aspirations among societies, as Tony Weis reminds: "While the meatification of diets has long been held as a goal and measure of development and a marker of class ascension, it should instead be understood as a vector of global inequality, environmental degradation, and climate injustice."<sup>62</sup> Indeed, the perception of meat consumption as a sign of a desirable wealthy western lifestyle belongs to the challenges to be overcome.

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