

Trends in the livestock sector

The world food economy is increasingly driven by the shift in diet and food consumption patterns towards livestock products. In the last few decades, in the developing countries of Asia - where the bulk of the world population increase has taken place - consumption of meat has been growing at over 4 percent per annum, and that of milk and dairy products between 2 to 3 percent per annum. Aggregate agricultural output is being affected by these trends, not only through the increase in livestock production *per se*, but also through the linkage of livestock production to the crop sector that supplies feed-stuffs, mainly cereals and oilseeds, as well as the fisheries sector.

Globally, livestock production is the largest user of agricultural land. On the negative side, there are environmental implications associated with the expansion of livestock production. For example, through the expansion of land for livestock development, sector growth has been a prime force in deforestation in Latin America and the Caribbean, and in overgrazing in other regions. Intensive, large-scale livestock operations, mostly in the industrial countries but increasingly also in the developing ones, are a major source of environmental problems through effluent production. In parallel, growth in the ruminant sector contributes to greenhouse gas concentrations in the atmosphere through methane emissions and nitrous oxide from the waste of grazing animals.

The rapid growth in the **meat** sector has been underpinned by rising demand for poultry meat, which has consistently increased at around three times the rate of population growth over each of the past five decades. As for other meat sectors, per capita consumption growth has been stagnant or non-existent, especially in ruminant meat (cattle, sheep and goats) and pork (when China is excluded).

Moreover, in many developing countries, where the need to increase protein consumption is greatest, the productive sector has not participated in the “livestock revolution”. There are, for instance, still about 20 developing countries whose per capita meat consumption is below 10 kg, compared to an average of 80 kg among developed countries. Cultural or religious reasons may explain this feature in some countries, but low productive capacities are, by and large, to blame in many others.

Growth of world **milk** production and consumption has been far less buoyant. Until recently, per capita growth was largely stagnant, unchanged for several decades. Developing countries continue to have per capita consumption well below that of the industrial countries (partly reflecting consumption habits as well as low incomes and poverty), but the gap is gradually closing, especially in East and in South Asia. In East Asia, for example, per capita dairy intake has more than doubled in the past decade.

Map 46:



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.MT.QP, p. 273](https://www.fao.org/ess/mt/qp/p3-feed-fao-ess-mt-qp-p-273) 

- The world produced 293 million tonnes of meat in 2010
- The Americas lead the way as the highest producing region
- But growing industry intensification is boosting output to meet demand in other areas, particularly in Asia

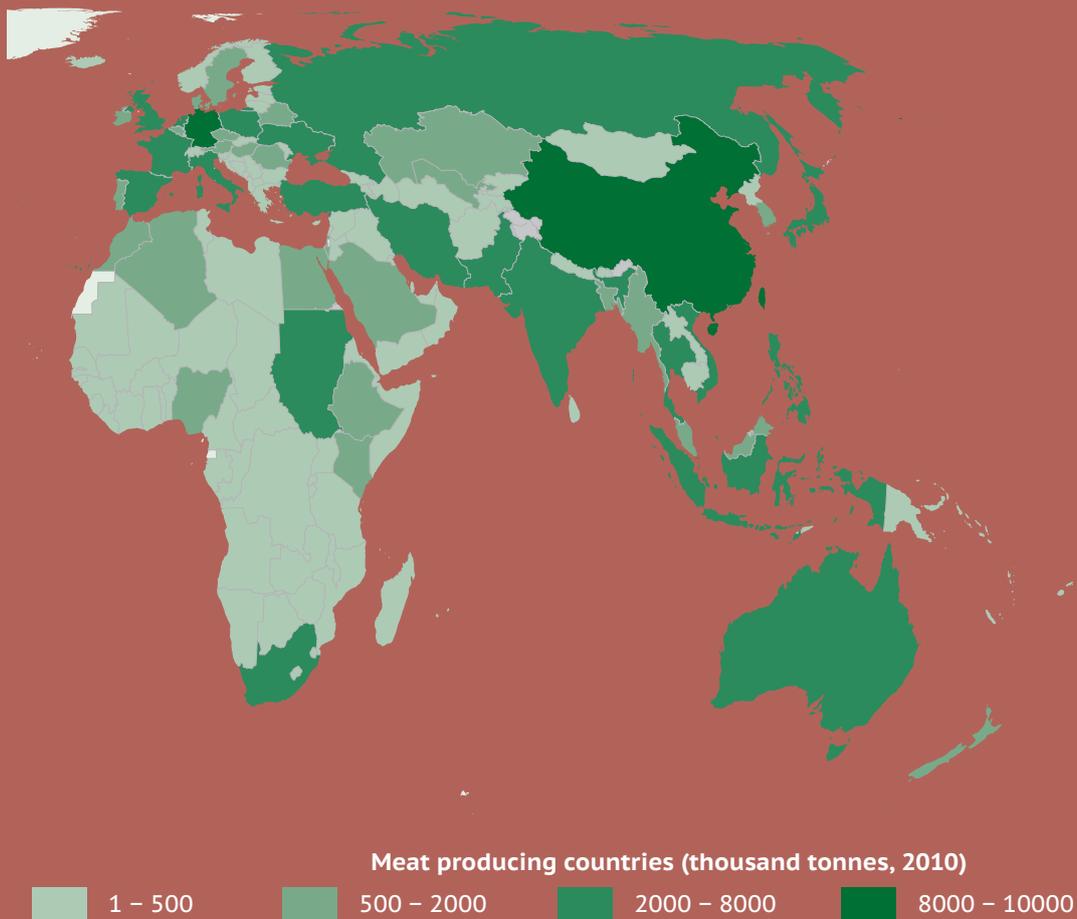
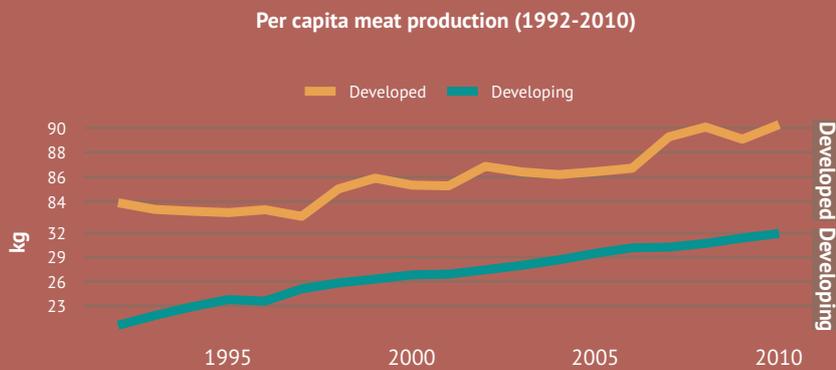


Chart 79: Meat production on the rise in developing countries, while developed countries approach saturation



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.MT.QPPC](https://doi.org/10.181256/P3.FEED.FAO.ESS.MT.QPPC), p. 273 

Feed demand for cereals is often considered a dynamic element that conditions the growth of the cereals sector, especially in developed countries. However, in recent times, particularly in developing regions, this dynamism has been largely absent from the sector, to the extent that growth in livestock production has by far outstripped the growth in compound feed demand. Therefore, the world is now obtaining more meat, milk and eggs per kg of cereal-based feed, which points to productivity gains in livestock production. Some of these gains are linked to changes in the composition of livestock production, as poultry requires much smaller quantities of cereals feed per kg of meat than, for instance, beef.

Other forces have also led to the reduced grain/meat ratios. Among them is the growing use of oilmeals in livestock feeding. World output of soybeans, which are mainly processed into oil and high protein oilmeal, grew at 4 percent per annum in the last decade and 5 percent in the 1990s.

By implication, the production and consumption of soybean meal as feed has also risen at these levels, which would suggest a relative increase in the feed rations of oilmeals at the expense of feed grains. But in fact, a principal factor has been the expansion of livestock production systems in developing countries with lower average grain/meat ratios.

The continued growth of developing countries' share in world livestock output is being associated with the gradual shift of their production from grazing and "back-yard" systems to stall-fed systems using concentrated feedstuffs. Consequently, changes in production systems tend to raise the average grain/meat ratios of these developing countries, compensating for the opposite trends that result from improvements in productivity.

Further reading

- [FAO Animal Production and Health Division \(www.fao.org/ag/againfo/home/en/\)](http://www.fao.org/ag/againfo/home/en/)
- [FAO World agriculture: towards 2030/2050 Interim report: Prospects for food, nutrition, agriculture and major commodity groups \(www.fao.org/fileadmin/user_upload/esag/docs/Interim_report_AT2050web.pdf\)](http://www.fao.org/fileadmin/user_upload/esag/docs/Interim_report_AT2050web.pdf)
- [FAO Food Outlook \(www.fao.org/giews/english/fo/index.htm\)](http://www.fao.org/giews/english/fo/index.htm)
- [FAO The State of Food and Agriculture 2009: Livestock in the balance \(www.fao.org/publications/sofa-2009/en/\)](http://www.fao.org/publications/sofa-2009/en/)

Map 47:



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.MK.QP, p. 273](https://www.fao.org/3/qa/qc/qc273/qc27301en.pdf) 

- Over 720 million tonnes or around 760 million litres of milk were produced globally in 2010
- Pasture land availability (e.g. the Americas) and cultural reasons (e.g. South Asia) determine the location of dairy industries
- Production is growing rapidly in many developing countries as a response to changing consumer demands, in East Asia for example, per capita dairy intake has more than doubled in the past decade

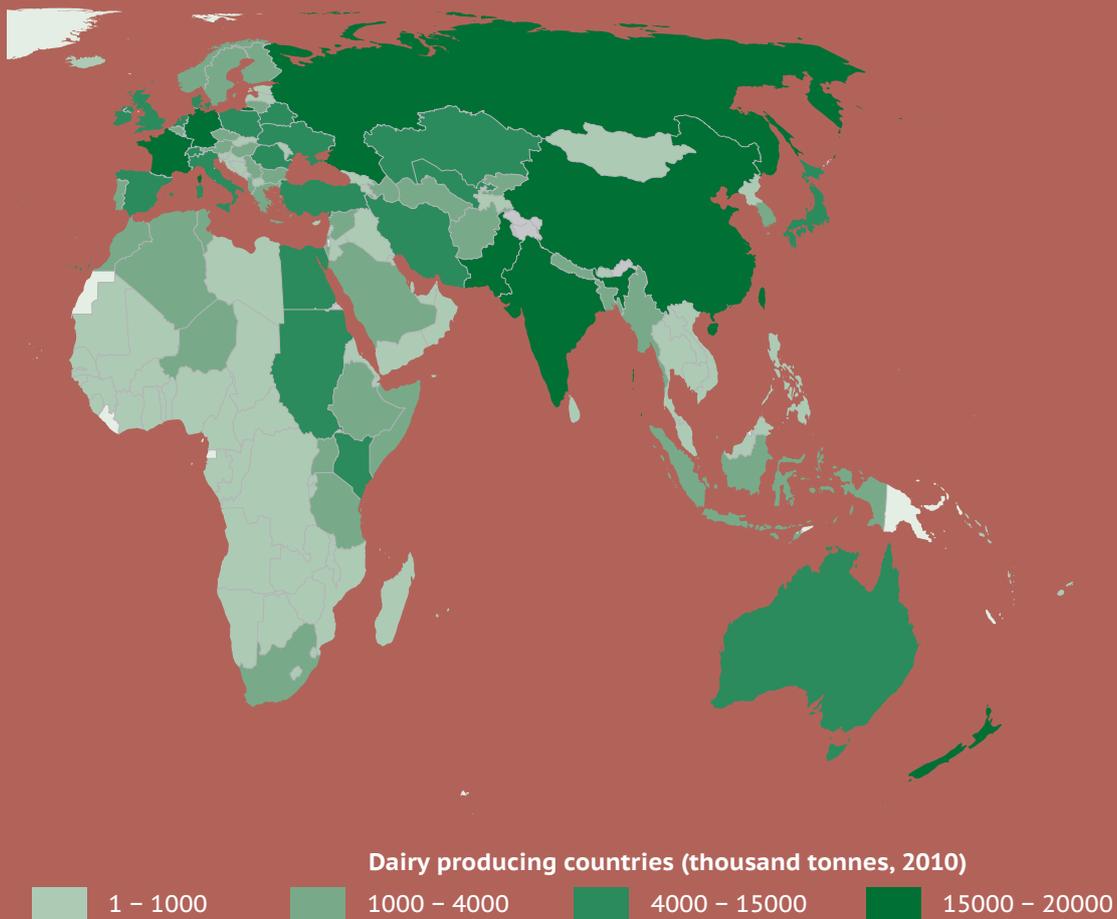
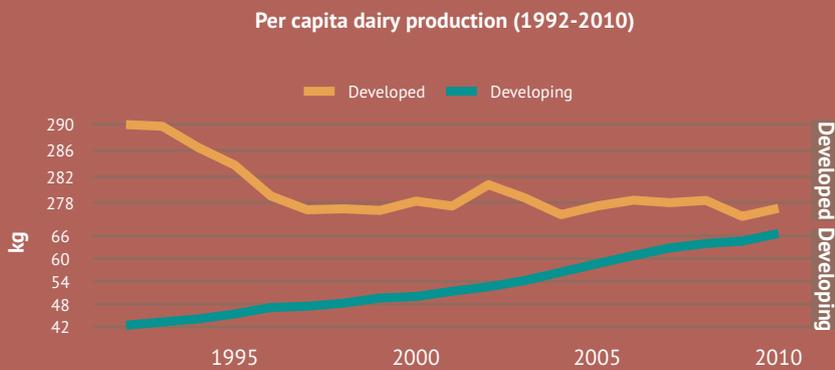


Chart 80: Dairy production growth slowing in developed countries, but rising in developing countries, albeit from a low base



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.MK.QPPC](https://doi.org/10.1017/9781107304543.003), p. 273

Trends in the fisheries sector

In 2009, capture fisheries and aquaculture supplied the world with almost 145 million tonnes of fish. Of this, 122 million tonnes were used as human food, providing an estimated per capita food supply of about 18 kg (live weight equivalent). Globally, fish provides about 2.9 billion people with almost 20 percent of their average per capita intake of animal protein. Fish is also very important in diets in developing countries, where current per capita intake is more than 16 kg per person per annum.

Although capture fisheries dominate world output, aquaculture accounts for a growing percentage of total fish supply, rising from a share of 4 percent in 1970 to 38 percent in 2009. Aquaculture provides close to half of all fish supplies destined directly for human food consumption.

Fish landed not used for direct human consumption is mainly processed in the form of fishmeal and oil, used as animal feed (around 18 million tonnes), mainly for raising carnivorous aquatic species (such as shrimp, salmon, trout, eels, sea bass and sea bream), but also for pigs, chickens, pet food and cattle, etc.

Worldwide, capture fisheries and aquaculture provide a source of income and livelihood for 45 million people through direct employment and provides more than 180 million jobs as a whole in the global fish industry. There are millions of rural dwellers, many of whom are women, particularly in Asia and Africa, involved in seasonal or occasional fishing activities with few alternative sources of income and employment. Employment in aquaculture is increasing at a faster rate than world population growth and now accounts for one-quarter of the total number of workers directly involved in the fisheries sector. Employment in fishing is decreasing in capital-intensive economies, in particular in most European countries, and in North America and Japan. The global fishing fleet is estimated to be around 4.3 million vessels with about 60 percent of all fishing vessels engine-powered.

According to the Big Numbers Project of FAO, the World-Fish Center and the World Bank, estimates indicate that small-scale fisheries produce close to half of the world marine and inland fish catch, while providing employment for more than 90 percent of the world's fishers. About half of the total workforce in the fishing and fish processing sector comprise women.

Map 48:



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.CAP.QP](https://doi.org/10.1017/9781107304648.003), p. 279 

- The global fish catch has remained at around 90 million tonnes per annum over the past 20 years
- Greater controls, scarcity and high costs have combined to lower production in the capture sector of developed countries
- The Pacific Ocean provides more than half of the global catch

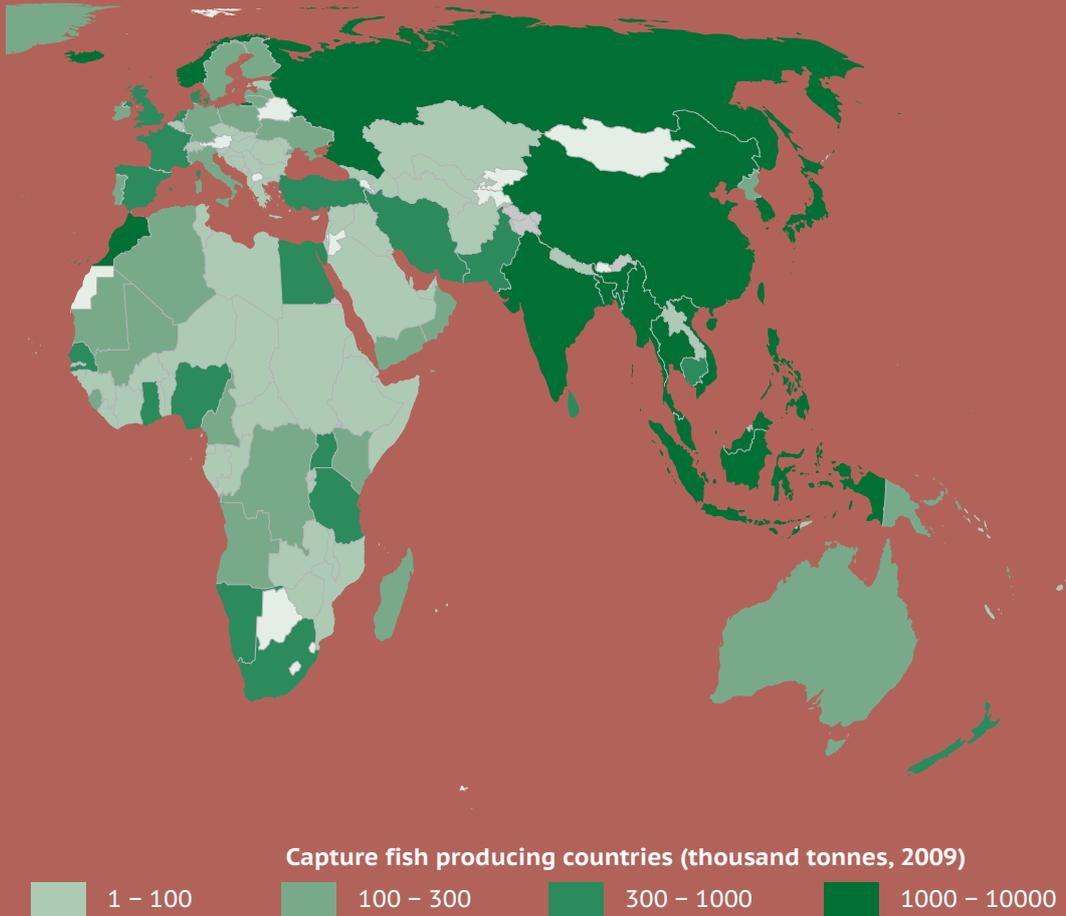
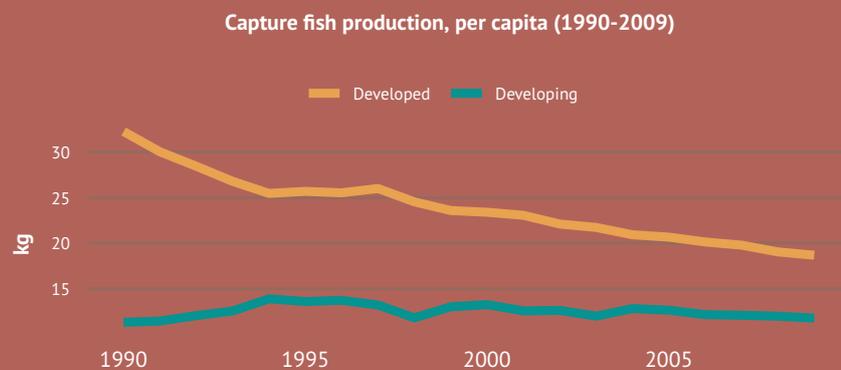


Chart 81: Rising controls, scarcity and costs have combined to lower production in the capture sector of developed countries



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.CAP.QP](#), p. 279 

During the last two decades, the production of capture fisheries fluctuated in a range between 85 and 95 million tonnes per annum. More than half of the global catch came from the Pacific Ocean. Global production is typically influenced by variations in catches of anchoveta – a species extremely susceptible to oceanographic conditions determined by the El Niño Southern Oscillation – in the Southeast Pacific. Fluctuations in other species and regions tend to compensate for each other to a large extent.

Regarding the state of major marine stocks, the proportion of stocks estimated to be underexploited or moderately exploited declined from 40 percent in the mid-1970s to 15 percent in 2008. In contrast, the proportion of overexploited, depleted or recovering stocks increased from 10 percent in 1974 to 32 percent in 2008. The proportion of fully exploited stocks has remained relatively stable at about 50 percent since the 1970s. As a whole, this indicates that global marine capture production is less likely to increase, unless effective management plans are put in place to rebuild overfished stocks. While the degree of uncertainty about these estimates may be somewhat high the apparent increasing trend in the percentage of overexploited, depleted and recovering stocks and the decreasing trend in underexploited and moderately exploited stocks do give cause for concern. At the same time, there are encouraging signs of steady progress in some areas in restoring overfished stocks and marine ecosystems through effective management.

Inland fisheries are vital for livelihoods in many parts of the world and also in diets by providing high quality protein, essential nutrients and minerals that are often difficult to obtain from other food sources. In recent years, inland water fishery production expanded to over 10 million tonnes, accounting for over 10 percent of global capture production. However, the state of inland fishery resources and the ecosystems that support them is generally not precisely known and the reliability of data on inland water catches reported by several countries remains questionable. There is, nonetheless, a growing appreciation of the need to improve inland fishery statistics.

Map 49:



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.ACO.QP](#), p. 279 

- 56 million tonnes of fish and fishery products were produced by aquaculture in 2009. Aquaculture represents the fastest-growing animal-based food producing sector
- Aquaculture production now accounts for around half of world supplies of fish and fishery products destined for human consumption
- China has a share of over 60 percent in world aquaculture production, while Asia as a whole accounts for almost 90 percent

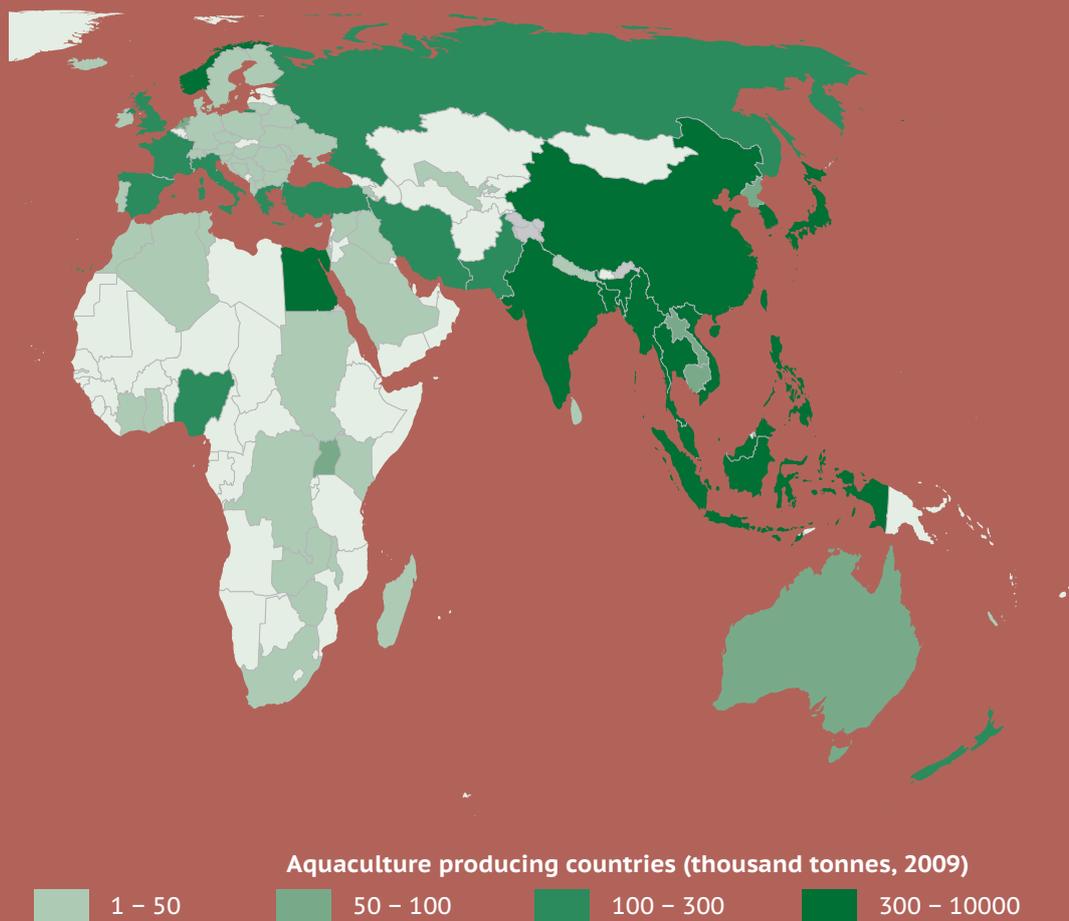
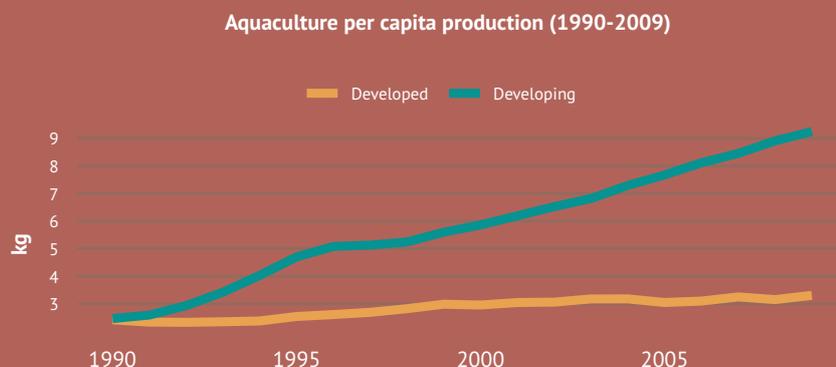


Chart 82: Exceptional growth in aquaculture production in developing countries is sustaining world fish supply



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.ACQ.QP](#), p. 279

Aquaculture represents the fastest-growing animal-based food producing sector with 56 million tonnes of production in 2009 and continues to outpace population growth. Great strides in breeding technology, system design and feed technology in the latter half of the twentieth century have enabled the expansion of commercially viable aquaculture across species and in volume. China alone produced over 60 percent of global aquaculture production, while Asia as a whole accounted for around 90 percent of worldwide aquaculture output.

Aquaculture production has been dominated in quantity terms by species that feed low on the food chain in their natural habitats, such as carp, characins and tilapias. Carp alone accounted for around 60 percent of world production of cultured finfishes in 2009. Aquaculture also provides a dominant share in the total production of several high-priced species such as salmon, shrimp, prawns, eels, oysters and scallops. The share of aquaculture products in international trade is increasing not only for high-priced products but for a broad range of species.

Further reading

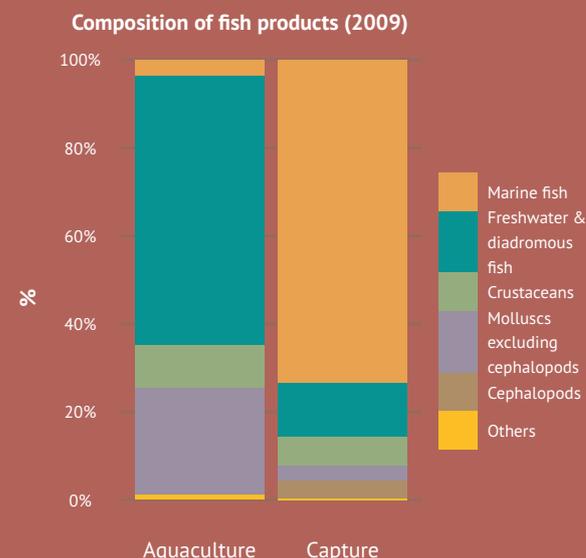
- FAO The State of World Fisheries and Aquaculture (www.fao.org/publications/en/)
- FAO Fisheries and Aquaculture Department (www.fao.org/fishery/en)
- FAO Food Outlook (www.fao.org/giews/english/fo/index.htm)

Chart 83: The scope for further increases in capture production is non-existent



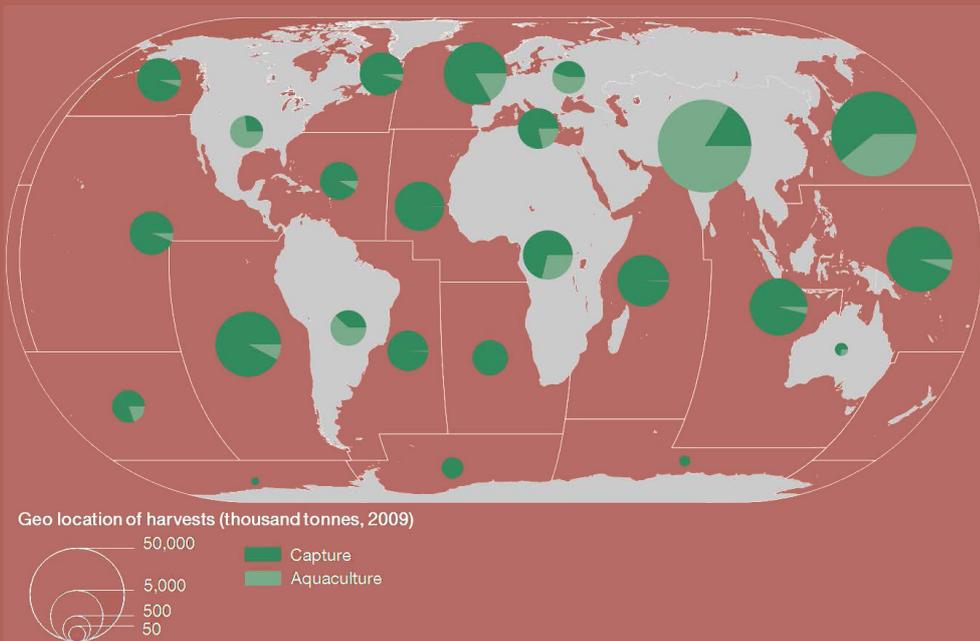
Source: FAO, Fisheries and Aquaculture Department
Metalink: P3.FTW.FAO.FI.STK, p. 279

Chart 84: Capture production is dominated by marine fish, while aquaculture mainly produces freshwater and diadromous fish, shrimp and shellfish



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)
Metalink: P3.FTW.FAO.FI.CFP, p. 280

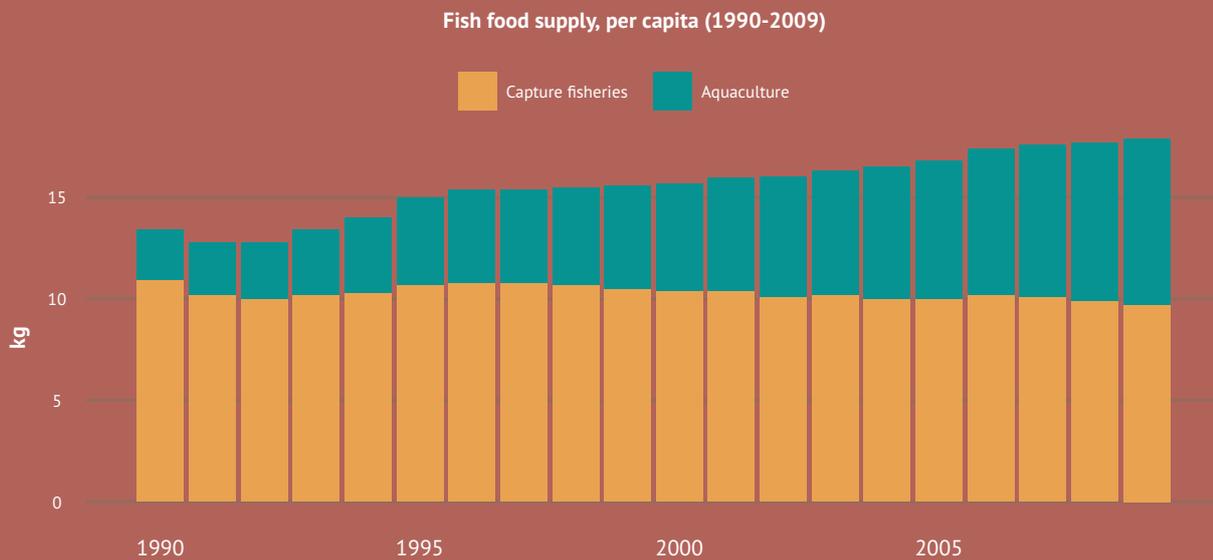
Map 50: Geo-location of harvests by capture and aquaculture



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.HARV](#), p. 280

Chart 85: Aquaculture supplies close to half of all fish consumed



Source: FAO, Fisheries and Aquaculture Department (Fishery and Aquaculture statistics)

Metalink: [P3.FTW.FAO.FI.TOT.QP](#), p. 280

Trends in agricultural trade

Although most of the food consumed worldwide is sourced locally, global trade has been instrumental for achieving food security, at least in those countries where it can be afforded. The scale of food and agricultural trade today is unprecedented: in real terms, international flows have increased around fivefold over the past fifty years, but the expansion has been unevenly distributed across regions. For much of this period, it would not be unreasonable to say that the rich world outpaced the poor world in the very area where developing countries are supposed to have a comparative advantage.

The evolution of the overall net agricultural trade balance of developing countries as a whole does not itself denote overall improvement or deterioration from a developmental standpoint. The aggregate of the developing countries is a composite of widely differing country and commodity situations. For some countries, a declining agricultural trade balance (or a growing deficit) is an indicator of progress towards improved welfare. This is the case for countries like the Republic of Korea, in which the growing agricultural deficit has gone hand in hand with high rates of overall economic development and increased food consumption. The declining balance also reflects the rapid growth in markets such as China's increasing importation of oilseeds and vegetable oils (a positive development in general that contributes to improved food consumption and is paid for by growing industrial export earnings).

Needless to say, a declining agricultural trade balance is also a negative developmental outcome in countries that still depend heavily on export earnings from agriculture and/or have to divert scarce foreign exchange resources to pay for growing food imports (eventually building up unsustainable foreign debt). It is an even more negative indicator from the standpoint of human welfare when such food imports are not associated with rising food consumption per capita and improved food security, but are necessary just to sustain minimum levels of food consumption. This is a not an uncommon occurrence.

At the world level, barring changes in stocks, agricultural production equals consumption, but differing growth rates can be observed for individual countries and country groups depending on movements in their **net agricultural trade** positions. In general, production growth rates in most developing regions have been slightly below those of demand, as their agricultural imports have grown faster than their exports, leading to a gradual erosion of their traditional surplus in agricultural trade (excluding fishery and forestry products). By the turn of the 1990s the trend was for the surplus to diminish and become a net deficit.

Map 51:



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FTW.FAO.ESS.IMPDC](#), p. 279 

- The global food economy increasingly relies on trade to meet food needs
- Higher import dependence can be indicative of economic development by way of diversifying out of agriculture into more value-added industries
- However, it can also be a sign of structural food insecurity

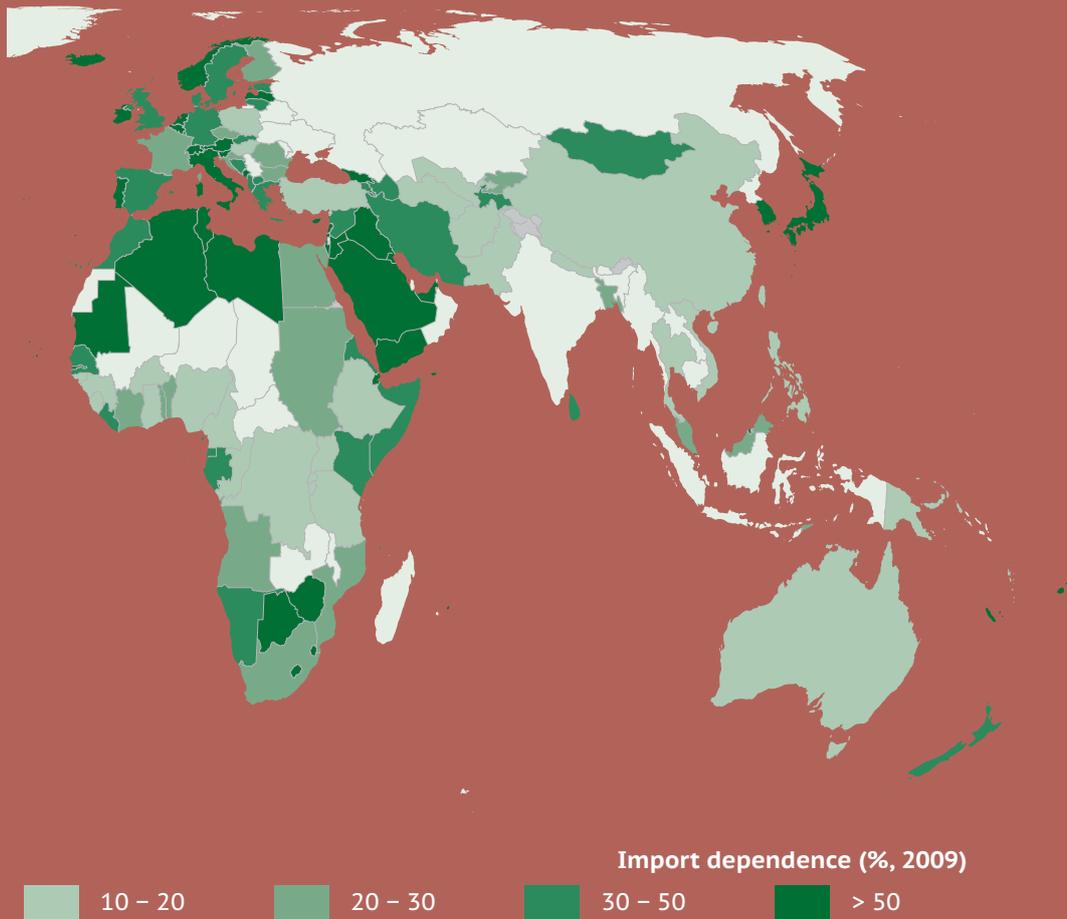
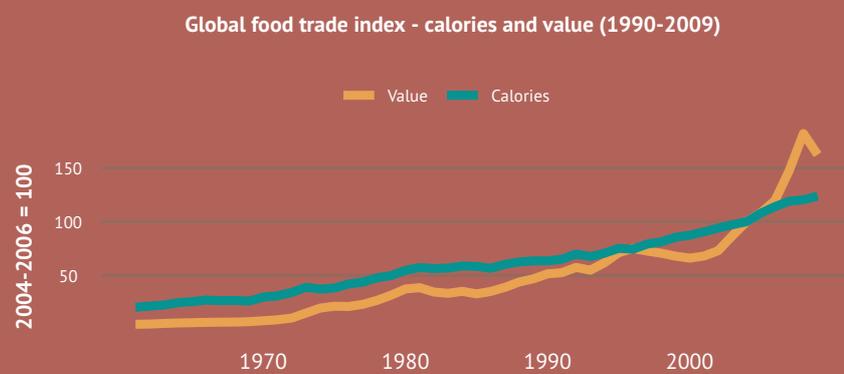


Chart 86: Growing reliance on trade to meet food needs



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.FD.IXc](#), p. 271

The overall net deficit in food trade of developing countries would have deepened much more were it not for the exceptional performance of several emerging agro-exporters, notably Brazil and its exports mainly of oilseeds and livestock products. But by the same token, China's large-scale imports of agricultural products in the last decade (especially raw materials and primary commodities) also places bias on this trend.

Even excluding Brazil and China, the deterioration of the net balance of the other developing countries as a whole is alarming – a US\$1 billion surplus towards the end of the 1980s became a deficit of US\$34 billion two decades later. In fact, sub-Saharan Africa has seen its share of world food exports drop from 11 percent to under 3 percent in the space of just 20 years. The region's half-a-billion US dollar trade surplus in food in the late 1980s has mushroomed into a 9 billion dollar deficit at present.

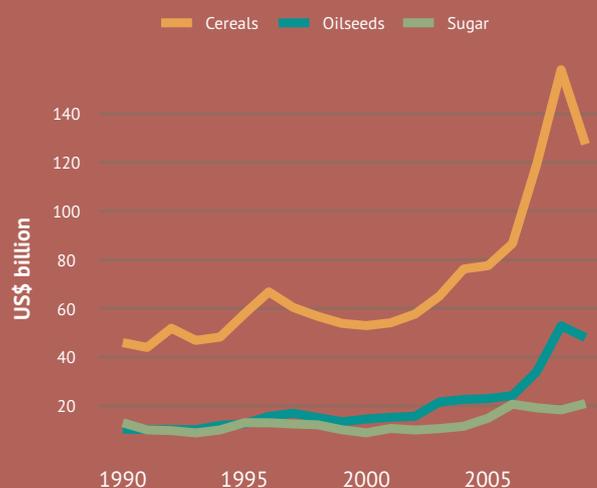
Growing net imports of **cereal** and **livestock** products have been dominant in shaping the growing deficit of agriculture in developing countries. Imports of products in the **oilseed complex** by several major developing countries other than China have also assumed importance, notwithstanding rapidly rising net exports of these products from other developing countries (e.g. Malaysia, Argentina, Indonesia).

Cereals as a group, notably **wheat**, is by far the largest deficit item in the developing country food basket. Over the period 1970 to 2008, over 70 percent of the increment in wheat consumption was met by increments in wheat imports. Moreover, several countries have depended entirely on imports for increasing consumption of wheat.

On the other hand, net exports of **fruit** and **vegetables**, and **tropical beverages** (coffee, tea and cocoa) are virtually the only significant items that have shown consistent improvements in the net trade positions of many developing countries, despite the fact that tropical beverage consumption is slowing in the traditional major markets of developed countries.

Chart 87: Rising dependence on international markets to meet food, feed and industrial needs for traditional "bulk commodities"

Global trade - cereals, sugar and oilseeds (1990-2009)

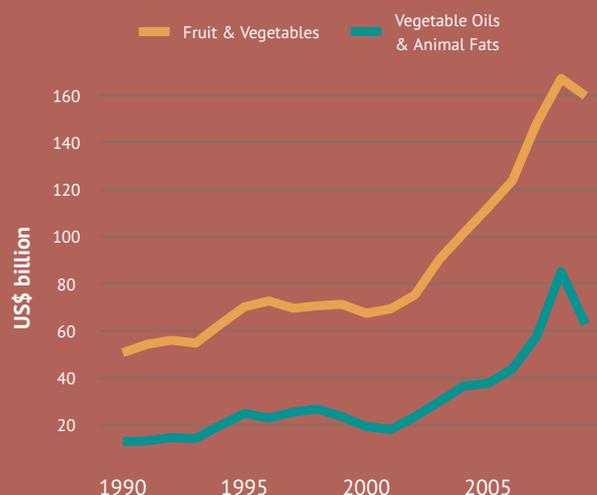


Source: FAO, Statistics Division (FAOSTAT)

Metalink: P3.FEED.FAO.ESS.CE.EXv, p. 270

Chart 88: The world market for vegetable oils on the rise, while improved freight technology and higher demand are boosting global fruit and vegetable flows

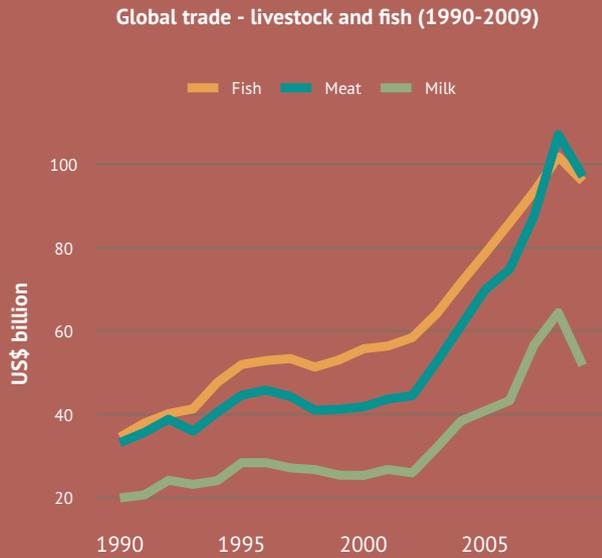
Global trade - vegetable oils and fruit + vegetables (1990-2009)



Source: FAO, Statistics Division (FAOSTAT)

Metalink: P3.FEED.FAO.ESS.VL.EXv, p. 278

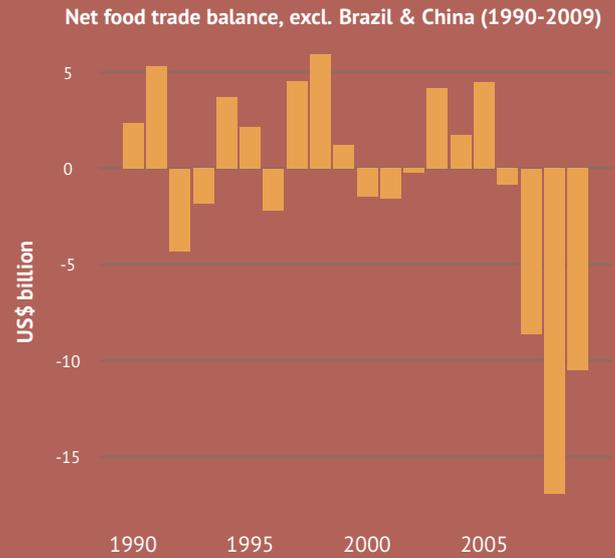
Chart 89: Better transportation technology and rising intensification have met demand in an expanded global market for livestock and fish products



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FTW.FAO.FI.TOT.EXv](#), p. 280

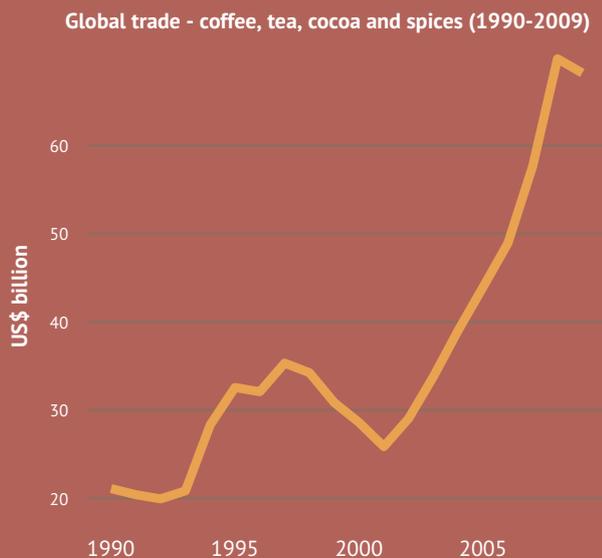
Chart 91: Despite growing export markets for them in some crops, developing countries, excluding Brazil and China, have become net buyers of food



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.FD.NTx](#), p. 272

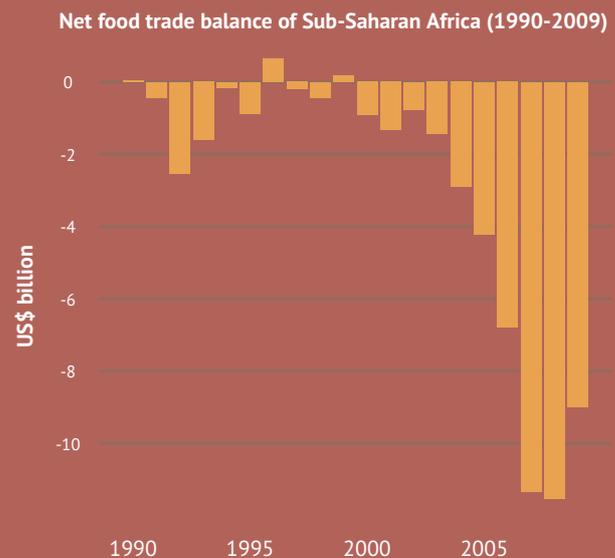
Chart 90: Trade in tropical beverages and spices, the mainstay of many developing country exports, on the rise



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.CF.EXv](#), p. 270

Chart 92: The overall situation for sub-Saharan Africa is even more alarming, with food import costs increasingly outpacing export earnings



Source: FAO, Statistics Division (FAOSTAT)

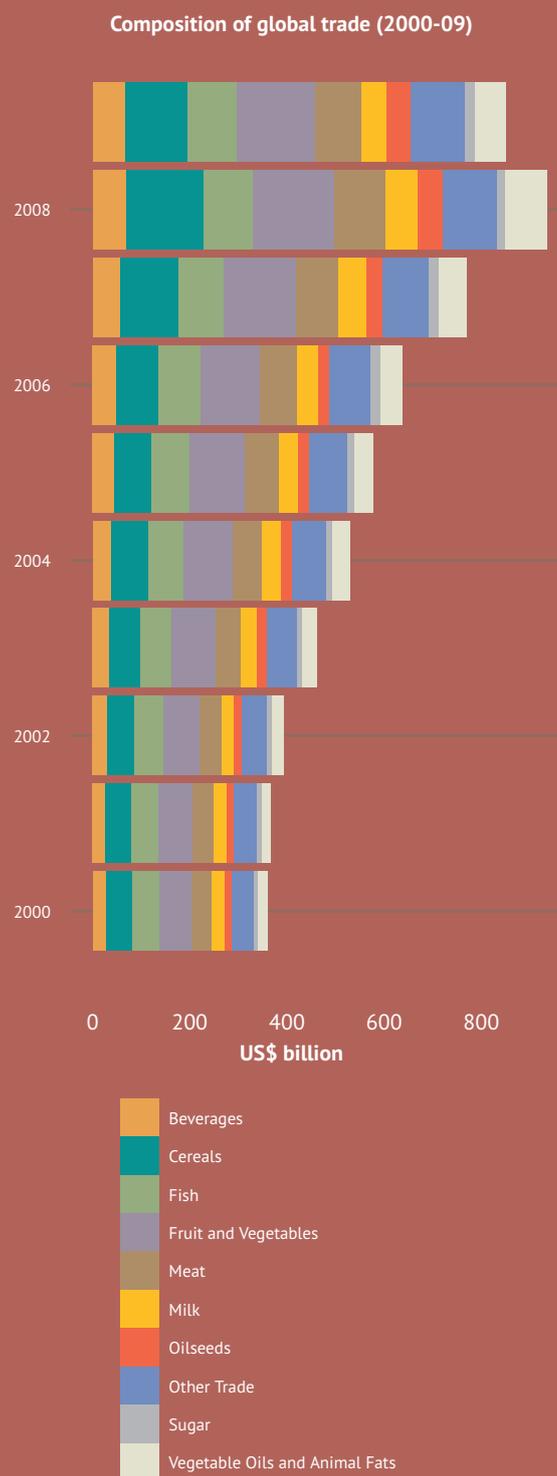
Metalink: [P3.FEED.FAO.ESS.FD.NTv](#), p. 271

As a whole, developing countries' traditionally large trade surplus of **sugar** diminished quickly after the early 1990s, as several of them became major importers. The shrinkage also reflects the effects of the heavy domestic support and trade protection in major sugar importing countries like the United States of America and Japan, or in formerly net importing countries like the European Union (EU), which lowered its dependence on imports as a result of these policies.

Within the agricultural sector of developing countries there has been a move towards commercialization of the high-value food production sector including **poultry, pork** and **fish**. In the case of poultry and fish, trade expansion has easily outpaced domestic consumption. The aggregate value of net fishery exports of developing countries now often exceeds the combined value of net exports of coffee, tea, cocoa, bananas and sugar – the traditional mainstay of developing country agricultural export earnings.

The potential of some developing countries to emerge as net exporters of certain products (meat, but also palm oil, soybeans and sugar) and to compete with industrial countries in a more globalized trading environment may eventually attenuate the broader trend of developing countries as a whole becoming growing net importers of food and agricultural products.

Chart 93: World trade in food is increasingly dominated by higher-value products



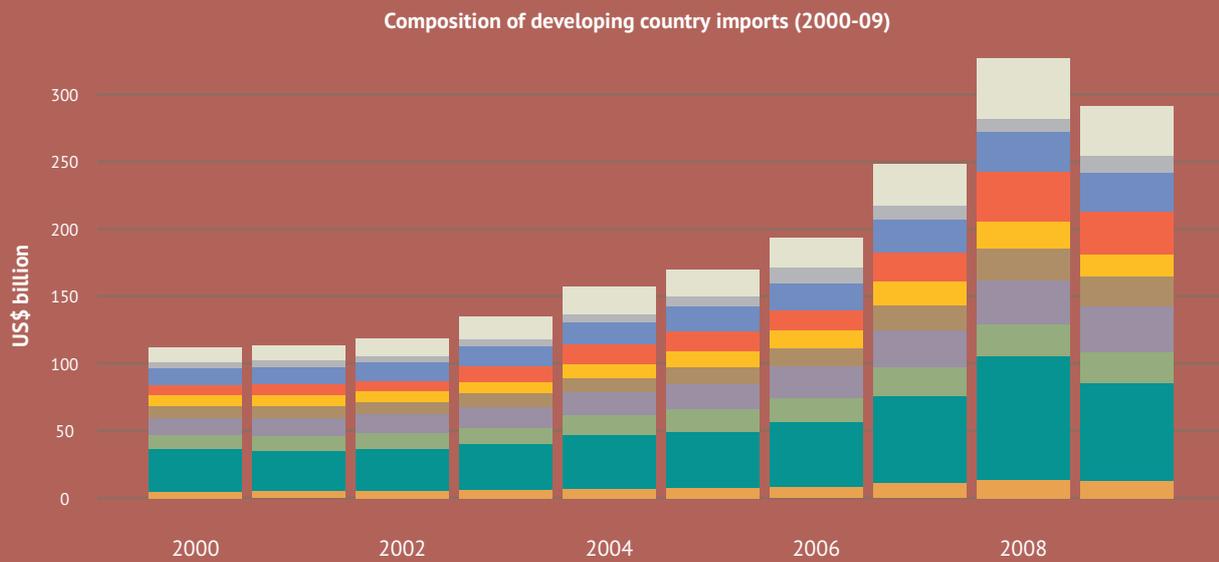
Source: FAO, Statistics Division (FAOSTAT)

Metalink: P3.FEED.FAO.ESS.FD.EXv, p. 271 

Further reading

- FAO Food Outlook (www.fao.org/giews/english/fo/index.htm)
- FAO Why has Africa become a net food importer? (www.fao.org/economic/est/publications)
- FAO World agriculture: towards 2030/2050 Interim report: Prospects for food, nutrition, agriculture and major commodity groups (www.fao.org/fileadmin/user_upload/esag/docs/Interim_report_AT2050web.pdf)

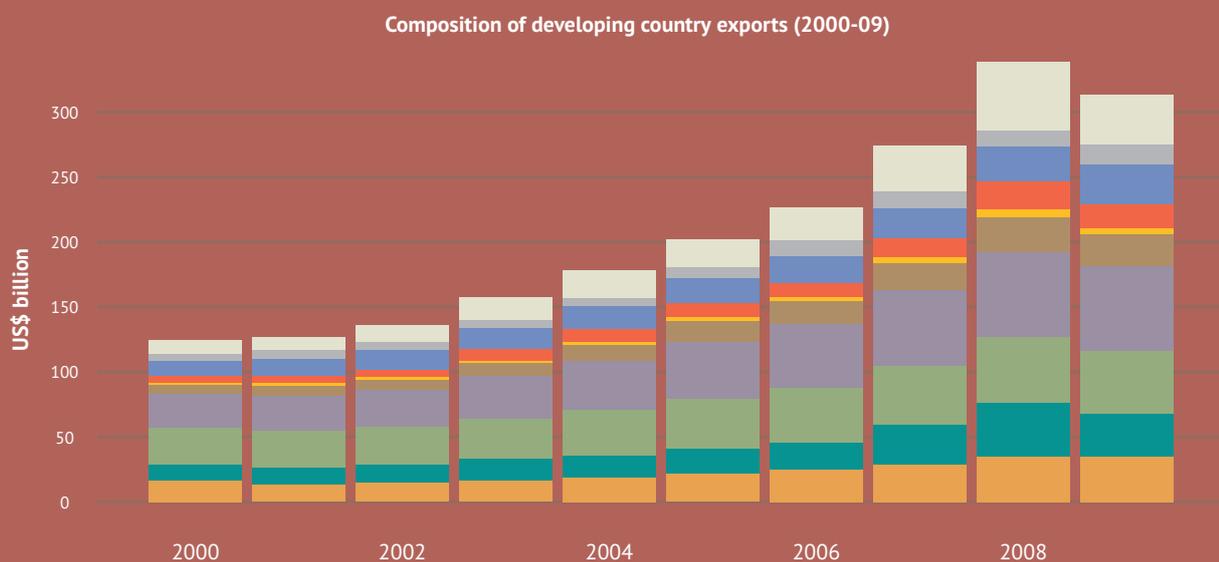
Chart 94: High value products form a growing share of developing country imports



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.FD.IMv](#), p. 271 

Chart 95: Fish, beverages, fruit and vegetables, and vegetable oils are fuelling growth in exports from developing countries



Source: FAO, Statistics Division (FAOSTAT)

Metalink: [P3.FEED.FAO.ESS.FD.EXv](#), p. 271 