20 FOOD SUPPLY

20.1 Introduction

20.1.1 Food supply is classified in the UK Trade and Investment (UKTI) classification of sectors as 'food & drink' and 'agriculture, horticulture and fisheries' and this includes manufacturing, processing and export of processed food and drinks products. In terms of activities, this sector covers agriculture (for crops and meat), aquaculture[205] and fishing. For the purposes of the assessment, this sector is split as follows:

- **Agriculture** – terrestrial production of crops and meat
- **Aquaculture** – marine production of fish and shellfish
- **Fishing** – marine fishing of wild fish and shellfish.

20.1.2 In order to assess possible biodiversity impacts the UK might have through this sector, we have addressed in the main the quantities of food entering the UK. It is accepted that the UK may also have impacts through the exporting of technology such as biotechnology, genetic engineering and chemical engineering. Where applicable this is also referred to.

20.1.3 Insofar as commodities tracking is concerned, within agriculture, aquaculture and fishing, they are split according to HS2002 classification as:

- Agriculture:
  - 01. Live animals
  - 02. Meat and edible meat offal
  - 04. Dairy products, eggs, honey, edible animal product
  - 07. Edible vegetables and certain roots and tubers
  - 08. Edible fruit, nuts, peel of citrus fruit, melons
  - 09. Coffee, tea, mate and spices
  - 10. Cereals
  - 17. Sugars and sugar confectionery
  - 18. Cocoa and cocoa preparations
  - 19. Cereal, flour, starch, milk preparations and products
  - 22. Beverages, spirits and vinegar
- Aquaculture / Fishing
  - 03. Fish & crustacean, mollusc & other aquatic invertebrate

[205] Note that these headings come under the wider heading of 'Food Supply' and as such does not cover agriculture for pharmaceuticals or biofuels (for biofuels please see the energy chapter)

20.2 Statistics

Consumption

20.2.1 UN Comtrade provides import data into the UK for all the above classifications. For agriculture, the UK imported 30,909,566,842206 (USD) in 2005, and for aquaculture and fishing the UK imported 2,095,056,832.

Table 24: Top ranking countries[207] for food & drink commodities (source: UN Comtrade)

Commodity	Country	Trade value (USD)
Agriculture		
01. Live animals	United Arab Emirates	194,366,717
02. Meat and edible meat offal	Brazil	220,953,427
04. Dairy products, eggs, honey, edible animal product	Argentina	9,975,154
07. Edible vegetables and certain roots and tubers	Kenya	129,075,635
08. Edible fruit, nuts, peel of citrus fruit, melons	South Africa	423,213,594
09. Coffee, tea, mate and spices	Kenya	128,578,730
10. Cereals	India	76,435,123
17. Sugars and sugar confectionery	Mauritius	346,313,179
18. Cocoa and cocoa preparations	Ghana	83,652,168
19. Cereal, flour, starch, milk preparations and products	China	33,745,803
22. Beverages, spirits and vinegar	South Africa	236,951,296
Aquaculture / Fishing		
03. Fish & crustacean, mollusc & other aquatic invertebrate	Faeroe Islands	177,817,428

[206] Including 6,916,619,261 for Beverages, spirits and vinegar
[207] Non-OECD / EEA

20.2.2 The tables below provide a further breakdown of trade partner ranking for each of the commodity codes given in Table 24.

Table 25: Live animals (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	818,359,319
1	United Arab Emirates	194,366,717
2	Argentina	1,276,971
3	Chile	628,561
4	Brazil	510,782
5	Guyana	273,201
6	Belize	170,991
7	South Africa	139,941
8	Indonesia	119,421
9	Ghana	111,410
10	Uzbekistan	109,221

Table 26: Meat and edible meat offal (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	5,135,151,360
1	Brazil	220,953,427
2	Argentina	61,480,362
3	Uruguay	48,710,194
4	Chile	40,746,715
5	Namibia	38,735,435
6	Botswana	20,637,640
7	Falkland Isds (Malvinas)	1,120,715
8	South Africa	124,613
9	Viet Nam	41,273
10	Israel	40,097

Table 27: Dairy produce, birds eggs and natural honey (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	2,990,489,683
1	Argentina	9,975,154
2	Brazil	6,282,096
3	Mexico	4,276,325
4	China	1,215,110
5	Guatemala	1,004,568
6	India	683,595
7	Chile	445,822
8	Cuba	440,793
9	Zambia	434,015
10	Viet Nam	326,756

Table 28: Edible vegetables and certain roots and tubers (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	3,541,848,107
1	Kenya	129,075,635
2	Israel	98,248,274
3	China	40,035,479
4	Thailand	29,730,391
5	Egypt	26,850,239
6	Peru	25,904,931
7	Ghana	20,172,116
8	India	16,327,091
9	Zambia	14,374,778
10	Morocco	13,015,367

Table 29: Edible fruit and nuts; peel of citrus fruit or melons (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	4,343,129,383
1	South Africa	423,213,594
2	Chile	204,484,355
3	Costa Rica	167,463,274
4	Brazil	133,932,095
5	Cameroon	121,759,694
6	Dominican Rep.	74,321,278
7	Israel	67,357,826
8	Colombia	67,283,224
9	India	67,224,333
10	Belize	59,149,451

Table 30: Coffee, tea, mate and spices (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	749,042,230
1	Kenya	128,578,730
2	India	76,086,606
3	Colombia	41,787,494
4	Indonesia	39,047,918
5	Brazil	28,588,329
6	China	27,195,189
7	Viet Nam	26,307,667
8	United Rep. of Tanzania	13,702,702
9	Malawi	12,688,242
10	Peru	11,662,595

Table 31: Cereals (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	874,555,452
1	India	76,435,123
2	Pakistan	26,667,254
3	Thailand	11,918,923
4	Argentina	6,881,046
5	Egypt	4,813,795
6	Ukraine	1,540,656
7	China	1,351,122
8	Russian Federation	683,639
9	Viet Nam	403,543
10	Bangladesh	200,208

Table 32: Sugars and sugar confectionery (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	1,647,291,411
1	Mauritius	346,313,179
2	Fiji	112,599,969
3	Jamaica	72,098,617
4	Guyana	68,444,730
5	Swaziland	45,734,958
6	Belize	26,280,896
7	Zimbabwe	23,794,209
8	Barbados	22,108,517
9	Trinidad and Tobago	21,784,556
10	China	19,407,897

Table 33: Cocoa and cocoa preparations (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	1,565,418,638
1	Ghana	83,652,168
2	Côte d'Ivoire	57,432,421
3	Nigeria	32,869,181
4	Indonesia	18,548,741
5	Malaysia	16,850,315
6	Israel	6,883,748
7	Brazil	5,699,275
8	Cameroon	4,964,784
9	China	3,297,056
10	Papua New Guinea	2,428,978

Table 34: Preparations of cereals, flour, starch or milk; bakers' wares (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	2,327,661,998
1	China	33,745,803
2	Thailand	14,119,788
3	Singapore	9,948,761
4	India	8,327,888
5	Malaysia	7,758,884
6	Israel	4,739,846
7	Viet Nam	3,924,405
8	China, Hong Kong SAR	3,536,543
9	Rep. of Korea	3,141,935
10	Indonesia	2,159,911

Table 35: Beverages, spirits and vinegar (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	6,916,619,261
1	South Africa	236,951,296
2	Chile	197,025,252
3	Bahamas	79,394,951
4	Brazil	53,599,434
5	Argentina	50,475,992
6	Georgia	22,652,895
7	Singapore	14,706,086
8	Jamaica	11,957,352
9	Thailand	5,773,079
10	China	5,569,644

Table 36: Fish and crustaceans, molluscs and other aquatic invertebrates (source: UN Comtrade)

Rank	Partner	Trade Value (USD)
	World	2,095,056,832
1	Faeroe Isds	177,817,428
2	Russian Federation	150,067,935
3	China	112,087,771
4	Bangladesh	97,367,271
5	India	78,488,334
6	Indonesia	55,273,081
7	Sri Lanka	27,929,351
8	Ecuador	18,980,638
9	Viet Nam	18,435,779
10	Maldives	12,992,448

Agriculture, Horticulture and Fishing - exports

20.2.3 In recent years the application of economic, environmental and consumer pressures has greatly influenced the development of the agriculture and food industries in the UK. As a result, UK agro-food production and processing technologies are amongst the most advanced in the world. The industries which support them have also developed to an advanced state and the sector as a whole has both the expertise and the technology to satisfy the most exacting needs of

overseas markets. The International Agriculture & Technology Centre (IATC) has identified the following eight target markets[208]:

- Brazil
- China
- India
- Malaysia
- Poland
- South Africa
- Thailand
- Turkey

Food & Drink - exports

20.2.4 Exports of food and drink in 2004 totalled **£9.4billion** and registered a 4% growth in the first 6 months of 2005. The beverage sector[209] represents over 20% of exports but there is also growth in food products with cereals, bakery products, confectionery, meat, fish and other food products such as ingredients and species all contributing significantly to exports[210].

20.2.5 Both developed markets such as the EU, Canada and the US, Far Eastern markets and the Gulf and developing markets such as China are showing interest in products from the UK. The key drivers are the number of UK tourists and expatriates living overseas but also foreign nationals coming to the UK and sampling the increasing variety of products and cuisines available in UK supermarkets and restaurants.

20.2.6 Key growth areas are in value added products such as ready meals and non-European recipes and private label both in the retail and food service sector has become significant as UK producers expand from the domestic market overseas. The key markets identified by the UKTI are:

- Ireland
- France
- Spain
- USA

[208] See: https://www.uktradeinvest.gov.uk/ukti/appmanager/ukti/sectors?_nfls=false&_nfpb=true&_pageLabel=SectorType1&navigationPageId=/agriculture
[209] Principally Scotch whisky but also other spirits, beers and non alcoholic drinks
[210] See: https://www.uktradeinvest.gov.uk/ukti/appmanager/ukti/sectors?_nfls=false&_nfpb=true&_pageLabel=SectorType1&navigationPageId=/food

- Other major EU markets

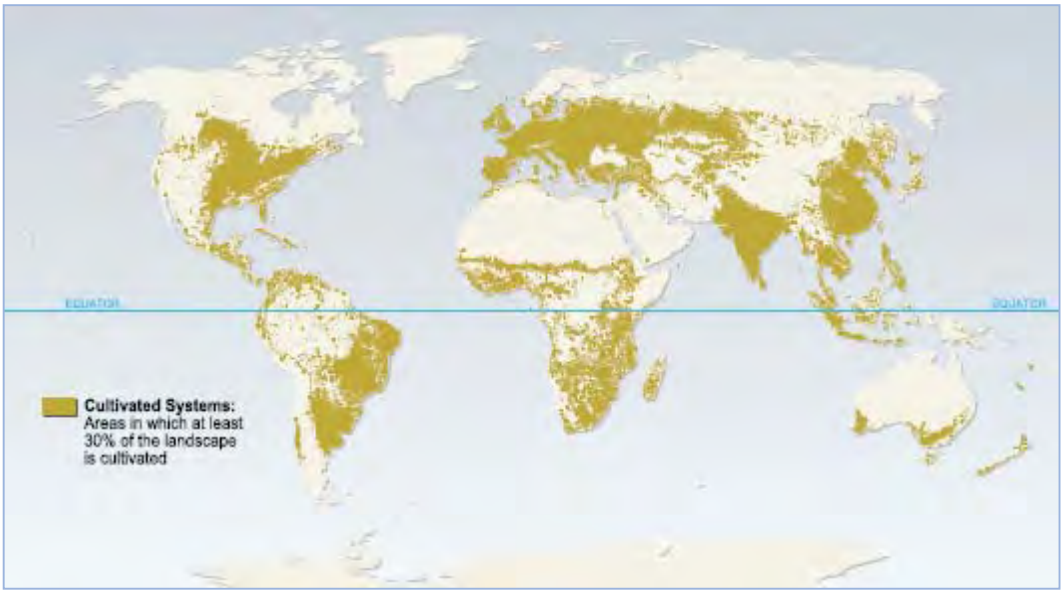
20.3 Impacts on key biodiversity drivers

20.3.1 In order to assess the impacts of different aspects of food supply, it is necessary to split this substantial sector into smaller, assessable portions. With this in mind, we have split the sector into agriculture and aquaculture / fishing. Each sub-sector is assessed against the five direct drivers of biodiversity loss as identified in the MA.

Agriculture - crop and meat production

20.3.2 Cultivated systems (defined by the MA as areas in which at least 30% of the landscape is cultivated) cover 24% of the earth's surface. This figure is given as 40% by the FAO. Roughly, it is the equivalent to 3.3 x 10^9 acres of cropland and 8.4 x 10^9 acres of pastureland and is illustrated in the figure below.

Figure 19: Global area under cultivation



20.3.3 This section addresses the impacts that occur through the production of meat and crop products. This includes:

- 01. Live animals
- 02. Meat and edible meat offal
- 07. Edible vegetables and certain roots and tubers
- 08. Edible fruit, nuts, peel of citrus fruit, melons
- 09. Coffee, tea, mate and spices
- 10. Cereals

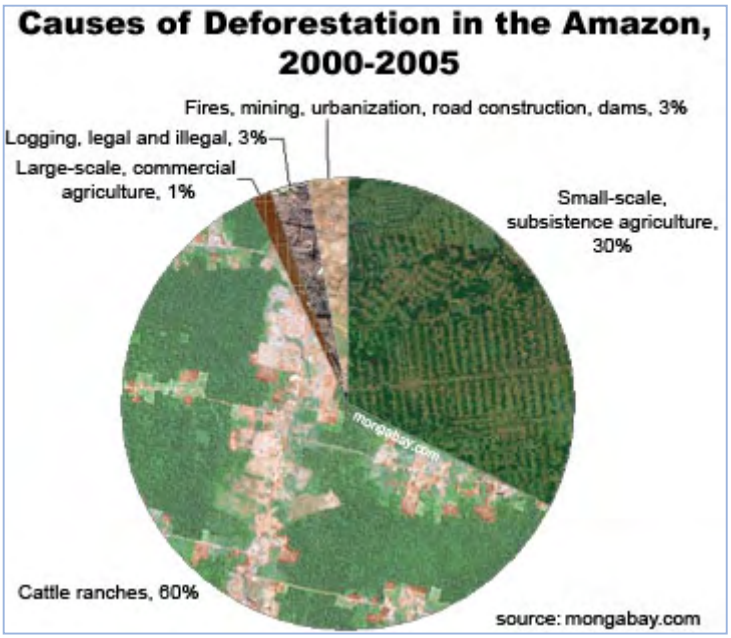
- 17. Sugars and sugar confectionery
- 18. Cocoa and cocoa preparations
- 19. Cereal, flour, starch, milk preparations and products

20.3.4 The production of meat draws on a range of resources. Not only do the animals need areas of pasture on which to graze but they also require feed supplements such as soya. This adds to the overall energy and land requirements to produce meat products.

Habitat Transformation (moderate-major[211])

20.3.5 The MA particularly identifies **land use change** for agricultural use as the key activity behind biodiversity loss. For example, conversion for cattle ranching is one of the key drivers of forestry loss in Brazil, said to be responsible for some 60% of deforestation – see Figure 20.

Figure 20: Causes of deforestation in the Amazon[212]



[211] Identified by the MA as the most significant source of biodiversity loss and as such of major importance, however, as is common with assessments at this level, the lack of spatial certainty can create ambiguous findings.
[212] See: http://www.mongabay.com/brazil.html

20.3.6 Additional impacts occur through the change in the landscape causes by cultivation. Habitat **fragmentation** can occur through the provision of infrastructure to service cleared areas, in addition to the loss through change if use. Clearance and use for cultivation will result in **direct mortality** of species. The MA notes that only biomes *unsuited* to crop plants are relatively intact, although.

20.3.7 The sequence of land conversion is also important, in particular, the change from primary habitat to pasture and then to crops. Indirect impacts of soya cultivation have been contributing to habitat clearance due to conversion of land from cattle ranching to soya cultivation. The demand for land for soya cultivation is such that in many cases, cattle ranchers sell their land and use the money to set-up new cattle ranching areas in frontier regions such as mountain slopes and forests[213]. This puts pressure on the cleared land, resulting in pressure for the cattle farmers to move further into the forests. Furthermore, soya bean farming and indeed most framing provide an impetus for new highways and infrastructure projects, which accelerate deforestation[214].

Over exploitation (moderate[215])

Water use

20.3.8 Terrestrial agriculture is a resource intensive activity. In particular, irrigation can lead to the over-exploitation of water. This is felt particularly in areas already experiencing water stress. Clearly there are some areas where a large amount of water is being used where there is relatively little available (e.g. Western United States, North Africa, Arabian Peninsula, Asia and South East Australia).

Case study – Livestock water use in Botswana

In an example used by the FAO, it was shown than in Botswana (a country experiencing water stress), many ranches have installed more boreholes than permitted in order to provide drinking water for their livestock. The result has been a substantial fall in the water table and a limited abstraction lifetime of decades rather than generations.

20.3.9 Drinking and servicing animals for livestock requires a demand for water (particularly given that like humans, they have a requirement for a 60-70% of body weight to be water). In some cases, water demand is met through foliage. However, it is clear that to support the farming of livestock, irrigation will also be needed for feed crops and pasture. It could be argued that in some areas this could lead to a doubling up of water demand (for livestock and livestock pasture and feed) placing increased stress and demand on water resources[216].

[213] Dros, K.M. (2004). *Managing the soy boom: Two scenarios of soy production expansion in South America*, AIDE Environment, Commissioned by WWF Forest Conservation Initiative accessible via: http://www.aidenvironment.org/soy/06_managing_the_soy_boom.pdf
[214] See: http://www.mongabay.com/brazil.html
[215] There is the potential for very severe conflicts between human health and agriculture in areas of water scarcity.
[216] FAO (2006). *Livestock's long shadow*. Environmental issues and options (accessed 15/03/2007 at: http://www.virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf

20.3.10 In arid and semi arid regions, **desertification** will occur where unsustainable water management practices are implemented. This is discussed further in Box 5 drawing on a recent study[217].

Box 5: Virtual Water and Water Footprint[218]

Case study – Virtual Water and Water Footprint

A recent study discuses the links between water use and production and consumption, exploring the concept of Virtual Water (VF) and Water Footprints (WF).

VW is defined as the amount of water that is required to produce a certain product, including 'blue' water (from lakes, rivers and reservoirs), 'green' water (effective rainfall) and 'grey' water (the amount of water required to dilute pollutants to agreed, safe levels). The term 'virtual' is used because it refers to the total amount of water used, rather than the more insignificant amount of water in the final product. WF is a quantification of the water used in *consumption* accounting for both internal and external country use of water.

The virtual water theory goes that trade of water intensive products to regions/countries of low water availability relieves the need of those import countries to use their own (more scarce) water to produce the same product.

As an example, fresh tomatoes grown in Spain have a virtual water content of approximately 70.5 litres per kilogram (14 litres of green water and 61 litres of blue water).

It should be noted that whilst a WF tells us the resource required, it does not correlate directly to impact significance; this needs to be calculated on a local scale, based on water scarcity and hydrology.

So how does this help us? Firstly, the study points out that it shows that some water resources are being used unsustainably. Secondly, it indicates where **intervention points** are in the product's production (the study points out that consumers are the driving force for production, and that a reduction of consumption levels could minimise the WF) and finally, it provides with a **spatial component** for production, sourcing from areas where the WF is made up mainly from green water, reducing the burden on blue water resources.

Bushmeat

20.3.11 In areas such as sub-Saharan Africa, the use of indigenous fauna for bush meat, whist a relatively small impact in terms of numbers, is playing a significant role in biodiversity loss in these areas (although this is in no way attributable to the UK).

Biotic exchange (minor)

20.3.12 Agriculture is responsible for invasive species only in the sense that crops and livestock are unlikely to be indigenous. However, agriculture itself is often threatened by invasive species (e.g. insect pests).

[217] Chapagain, A. K. & Orr, S. (2007). *The water footprint of EU fresh tomato consumption form Spain: Refining methods for intensive plastic covered agricultural systems*.
[218] See: http://www.mongabay.com/brazil.html

Pollution (moderate[219])

20.3.13 Conversion of the land for anthropogenic uses will create disturbance through compaction of soils, air pollution, dust and noise that will affect the behaviour of flora and fauna in the surrounding ecoregions.

20.3.14 Additionally, the use of water for irrigation / servicing and drinking will create sources and pathways for pollution to the environment. In particular, livestock waste (containing nitrogen, phosphorus and potassium amongst others) contribute to nitrification of the soils (also exacerbated through fertiliser use and planting with nitrogen fixing plants) will result in nitrogen fixing to the soils and leaching into surface and ground water. This pollution by nutrients can lead to eutrophication of water ways, the adverse effects of which can include[220]:

- Shifts in habitat characteristics owing to change in the mix of aquatic pants
- Replacement of desirable fish by less desirable species
- Production of toxins
- Infilling and clogging of canals/other waterways with weeds

20.3.15 Additional sources of water pollution include: drug residues, heavy metals from feed, pesticides, and material resulting from soil erosion.

Climate Change (moderate-major[221])

20.3.16 Livestock contributes approximately 18 percent to anthropogenic greenhouse gas emissions from a group of key emitters (energy, industry, waste, land use, land use change and forestry)[222]. Key factors that contribute to climate change and the emission of greenhouse gases include[223]:

- Burning fossil fuels to produce fertilisers used in feed production
- Methane released form fertiliser breakdown and animal manure
- Land-use change for feed production and grazing
- Land degradation
- Fossil fuel use during feed and animal production and in production

[219] May have more significant effects as relates to habitat transformation through eutrophication.
[220] FAO (2006). *Livestock's long shadow. Environmental issues and options* (available at: http://www.virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf)
[221] Note that if only the last two sectors are considered, the contribution form livestock is over 50%, with livestock making up 80% of the agricultural sector's emissions of GHG.
[222] FAO (2006). *Livestock's long shadow. Environmental issues and options* (available at: http://www.virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf)
[223] *Ibid*

20.3.17 In addition, there are considerable CO_2 emissions attributable to the transport of goods, particular refrigerated goods in what can be called the 'chill chain' such as cut flowers and vegetables from Kenya.

Aquaculture / Fishing

Habitat Transformation (moderate – major)

20.3.18 Impacts relate to unintended catch of non-target species and damage to ocean ecosystems from trawling. Pelagic trawling entails dragging a net through the middle of the ocean column, while bottom trawling involves dragging a net directly along the ocean floor. Since the bottom trawlers tow heavy fishing gear over the seabed at a speed of several knots it can be highly destructive[224].

20.3.19 One of the most significant impacts in regard to shrimp aquaculture has been the widespread loss of mangrove forests in coastal regions across the world. Estimates vary but it is thought that between 35 and 50 percent of mangroves have been removed over the past few decades and much of the remaining area is degraded[225,226]. Valiela *et al* (2001 cited by Thornton *et al*[227]) report that 38 percent of mangrove removal can be attributed to shrimp farming. This figure is disputed however by the Global Aquaculture Alliance who suggest 4 – 10% is more accurate[228]. Conversion of habitats are not just restricted to mangrove forests, other ecosystems, particularly wetlands habitats have also been removed or severely degraded due to conversion to shrimp aquaculture[229]. Examples include the Melaleuca forest in Vietnam[230], lagoons, salt marshes[231] and grasses, all of which have biodiversity value and provide a number of important services.

Over Exploitation (major)

20.3.20 The FAO, in its biannual report "*The State of World Fisheries and Aquaculture*"[232], provides details on world production and trends. In relation to world stocks, it takes a rather optimistic outlook, indicating that the *"overall state of exploitation of the world's marine fishery resources has tended to remain relatively stable",* and that over the past 10-15 years, the **proportion** of overexploited and depleted stocks has remained unchanged. Note that this does not indicate whether the absolute number of stocks being depleted has remained the same. Given that there has been an upward trend in world capture and aquaculture production since 1950, it could be inferred that there are more stocks being depleted *even though* the proportions have remained the same.

20.3.21 In terms of world stocks that are under threat, the FAO identifies that a quarter (of those monitored by the FAO) "*are under exploited or moderately exploited and*

[224] See: http://en.wikipedia.org/wiki/Trawling
[225] Mangrove Action Project. Available at: http://www.earthisland.org/map/index.htm
[226] Mumby *et al* (2004)
[227] Thrornton C., Shanahan M., & Williams, J. (2003). From Wetlands to Wastelands: Impacts of Shrimp Farming, *EJF*, London
[228] www.gaalliance.org/issu4.html
[229] Paez-Osuna, F. (2001). The environmental impact of shrimp aquaculture: Causes, effects and mitigating alternatives, *Environmental Management,* 28 (1) p131-140.
[230] EJF (2003). *Risky Business: Vietnamese Shrimp Aquaculture Impacts and Improvements*, London
[231] Thrornton C., Shanahan M., & Williams, J. (2003) From Wetlands to Wastelands: Impacts of Shrimp Farming, *EJF*, London
[232] FAO (2006) *The State of World Fisheries and Aquaculture* (available at: http://www.fao.org/docrep/009/A0699e/A0699e00.htm)

could perhaps produce more"; half of the stocks are *"fully exploited and at, or close to, their maximum sustainable limits, with no room for further expansion".* The remaining quarter are *"either overexploited, depleted or recovering from depletion and thus were yielding less than their maximum potential owing to excess fishing pressure".* It is also interesting to note that approximately *"95% of world marine production originates from coastal ecosystems, such as estuaries, marshes, shallow bays and wetlands, mangroves, coral reefs and sea-grass beds*[233]*"*.

20.3.22 UK fish stocks present a mixed picture. *"The pelagic and shellfish sectors, with good economic and stock levels, are currently healthy. The whitefish sector (cod, plaice, haddock, etc) however is suffering from low stocks due to over-fishing, possibly combined with adverse environmental factors"*[234]*.* By value, 13% of the EU waters to which the UK has access are classified as being in danger while another 23% are considered at risk[235].

20.3.23 As demand for fish increases, it does so in an environment that encourages the consumption of fish for omega 3 and other important nutritional components. In the UK, the Food Standards Association advises that we should consume at least two portions of fish per week, one of which should be an 'oily' species, as part of their "Eat more Fish" tips for healthy eating[236]. Indeed, they highlight species which have been classified by the FAO has having low stocks (such as cod, plaice and haddock). It should be noted that the FAS website does include reference to a 'sustainability assessment' on their advice, in conjunction with Defra.

20.3.24 The demand for feed for livestock also results in a demand for fish and fishmeal (currently around 53% of global fishmeal production is used by the livestock sector[237]). By far the dominant environmental impact of fishmeal production is the consistent over harvesting of feed fish stocks. All of the major feed fish stocks are fished at or over capacity and hence exhibit stressed reproductive capacity. The table below, compiled from several sources, provides a commentary on the status of the major feed fish stocks and includes references for further information.

[233] FAO See: http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=2889

[234] FAO Fisheries and Aquaculture Department: Fishery and Aquaculture country profile – United Kingdom. See: http://www.fao.org/fi/website/FIRetrieveAction.do?dom=countrysector&xml=FI-CP_GB.xml&lang=en

[235] FAO Fisheries and Aquaculture Department: Fishery and Aquaculture country profile – United Kingdom. See: http://www.fao.org/fi/website/FIRetrieveAction.do?dom=countrysector&xml=FI-CP_GB.xml&lang=en

[236] FSA See: http://www.eatwell.gov.uk/healthydiet/eighttipssection/8tips/#cat294239

[237] FAO (2006). *Livestock's long shadow. Environmental issues and options* (available at: http://www.virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf)

Table 37: Major feed stocks and information sources

Species	Commentary on status of fish stocks 2006	Source of status information
Anchovy	In Peru, anchovy is by far the most important species for fishmeal. According to FAO, anchovy is fully fished. Measures need to be in place to reduce fishing fleet overcapacity. Anchovy stocks are highly susceptible to El Niño events and will be greatly impacted as climate change occurs. A 2006 IMARPE scientific report has indicated that anchovy biomass is down, distribution scattered and anomalous distribution of juveniles due to dynamic environmental conditions.	http://www.gafta.com/fin/sustainability.pdf http://www.imarpe.gob.pe/imarpe/image/Info_ejecut_0602-04-Ing.pdf
Jack Mackerel	FAO has determined that the stock is being fully fished, and has some concerns about the state of the stock.	http://www.gafta.com/fin/sustainability.pdf
Horse Mackerel	No information on status of stock. The fishery is managed by closed seasons & company catch limits.	http://www.gafta.com/fin/sustainability.pdf
Sardine	FAO has concluded that the stock is fully fished. The fishery is managed by closed seasons & company catch limits.	http://www.gafta.com/fin/sustainability.pdf

Biotic exchange (moderate)

20.3.25 A major threat to the health and survival of all coastal ecosystems arises from the introduction of exotic species via the ballast water of ocean-going ships, intentional and accidental releases of aquaculture species, aquarium specimens or bait, and other means. Foreign invaders like the *green crab*, *zebra mussel* and *Pacific jellyfish* have displaced native species and diminished biodiversity, resulting in huge economic impacts and fundamental disruptions of coastal and Great Lakes ecosystems.

20.3.26 With the expansion of worldwide shipping, the transport of invasive species via ballast water tanks on ships is now the most significant pathway of introduction of aquatic invasive species into marine ecosystems[238].

20.3.27 In terms of aquaculture, salmon farming provides an example of a species, bred for aquaculture, which has created a number of problems in regard to invasive species. Firstly, the stock densities and general husbandry of salmon farms has lead to the spread of a parasitic sea lice from salmon farms to wild salmon[239]. Secondly, the escaping of farmed salmon results in the breeding with wild stock, reducing the gene pool of wild salmon.

[238]National Oceanic & Atmospheric Administration (NOAA) http://www.research.noaa.gov/oceans/t_invasivespecies.html
[239]BBC, available at: http://news.bbc.co.uk/1/hi/sci/tech/4391711.stm

Pollution (moderate)

20.3.28 The main pollution impacts associated with aquaculture are high seawater consumption, use of energy, and the discharge of effluent with high organic content. Depending on the technology employed, noise, odour and solid wastes may also be concerns[240].

20.3.29 In addition, the use of antibiotics and feed in a mobile aquatic environment results in the spread of these substances beyond the targeted stock.

Climate Change (minor-moderate)

20.3.30 Industrial fisheries require considerable amounts of energy to reach distant fishing grounds, set or drag their nets, cool their fish storage tanks and provide power for onboard heating and lighting.

20.4 Geographical factors

20.4.1 The table below outlines links with the UK's key food suppliers.

Table 38: Links with the UK's key food suppliers

Country identified	Key trade partner	Sustainable Development Dialogue	Ecoregions	UKTI	Common-wealth	Top 20 DFID investment (million 2005 / 06)
Argentina	✓		8			
Bahamas	✓		1		✓	
Bangladesh	✓		3		✓	123
Barbados	✓		N/A		✓	
Belize	✓		1		✓	
Botswana	✓		2		✓	
Brazil	✓	✓	18	✓		
Cameroon	✓		9		✓	
Chile	✓		9			
China	✓	✓	19	✓		35
China, Hong Kong SAR	✓		N/A			
Colombia	✓		13			
Costa Rica	✓		1			

[240] United National Environment Program (Unknown) *Overview of Fish Processing*. In Cleaner Production Assessment in Fish Processing (available at: http://www.agrifood-forum.net/publications/guide/f_chp2.pdf)

Country identified	Key trade partner	Sustainable Development Dialogue	Ecoregions	UKTI	Common-wealth	Top 20 DFID investment (million 2005 / 06)
Côte d'Ivoire	✓		2			
Cuba	✓		4			
Dominican Rep.	✓		4		✓	
Ecuador	✓		11			
Egypt	✓		3			
Faeroe Islands	✓		N/A			
Falkland Isds (Malvinas)	✓		N/A			
Fiji	✓		2			
Georgia	✓		1			
Ghana	✓		2		✓	95
Guatemala	✓		3			
Guyana	✓		3		✓	
India	✓	✓	14	✓	✓	253
Indonesia	✓		21			58
Israel	✓		3			
Jamaica	✓		2		✓	
Kenya	✓		9		✓	63
Malawi	✓		4		✓	69
Malaysia	✓		7	✓	✓	
Maldives	✓		1		✓	
Mauritius	✓		1		✓	
Mexico	✓	✓	12			
Morocco	✓		4			
Namibia	✓		4		✓	
Nigeria	✓		7		✓	78
Pakistan	✓		5		✓	97
Papua New Guinea	✓		9		✓	
Rep. of Korea	✓					

Country identified	Key trade partner	Sustainable Development Dialogue	Ecoregions	UKTI	Common-wealth	Top 20 DFID investment (million 2005 / 06)
Russian Federation	✓		19			
Singapore	✓		2		✓	
South Africa	✓	✓	6	✓	✓	
Sri Lanka	✓		3		✓	
Swaziland	✓		1		✓	
Thailand	✓		8	✓		
Trinidad and Tobago	✓		2		✓	
Ukraine	✓		1			
United Arab Emirates	✓		2			
United Rep. of Tanzania	✓		11		✓	113
Uruguay	✓		1			
Uzbekistan	✓		2			
Viet Nam	✓		6			58
Zambia	✓		4		✓	48
Zimbabwe	✓		1			

20.4.2 The figures below show the global distribution of the UK's top import partners (this includes OECD / EEA countries).

Figure 21: Aggregated agricultural imports to the UK and their relative global significance (source: UN Comtrade)[241]

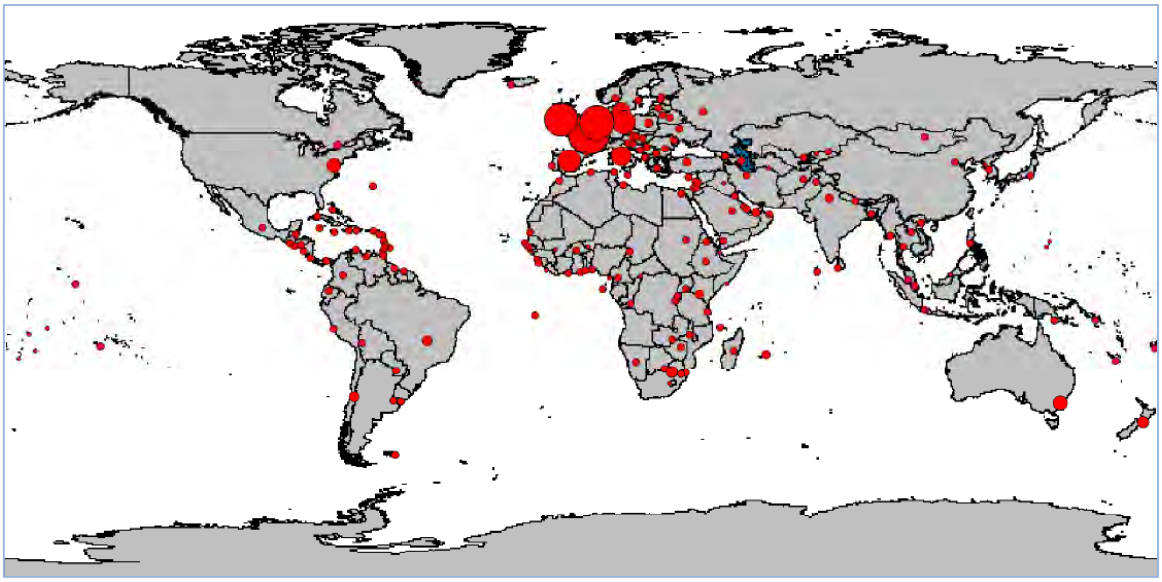
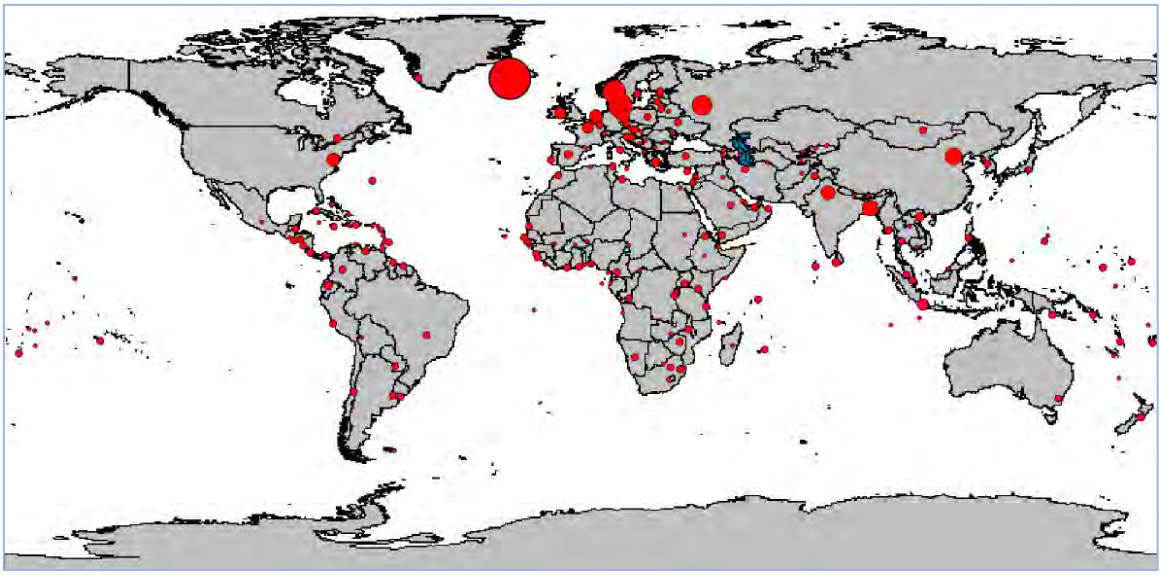


Figure 22: Aquaculture/fishing imports and their relative global significance (source: UN Comtrade)



[241] Inclusive of all but 03 - Dairy products, eggs, honey, edible animal product

Figure 23: Meat and live animal imports and their relative global significance (source: UN Comtrade)[242]

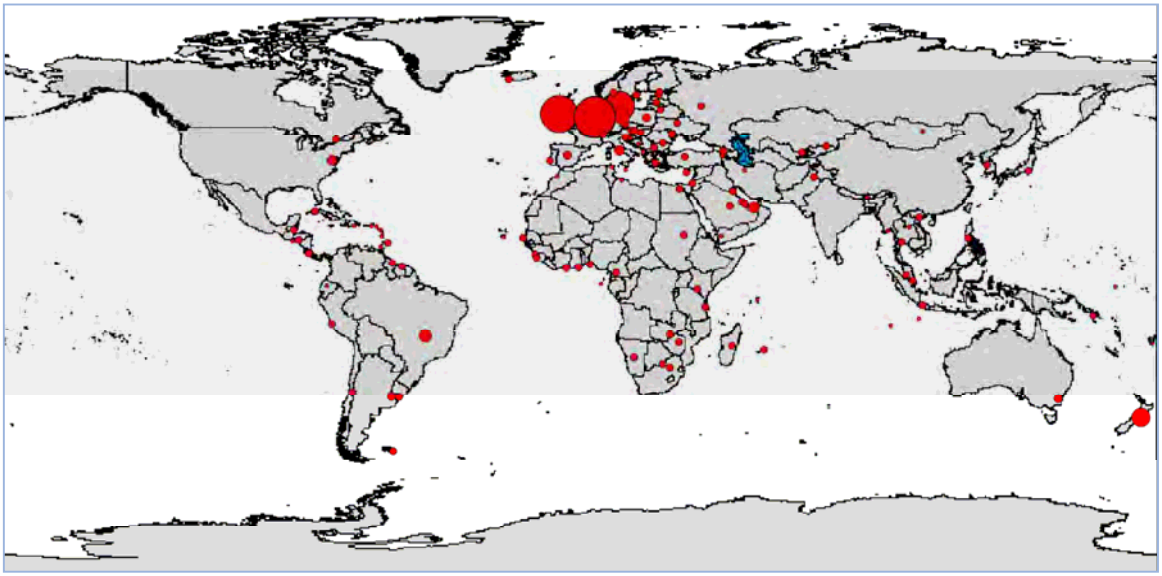
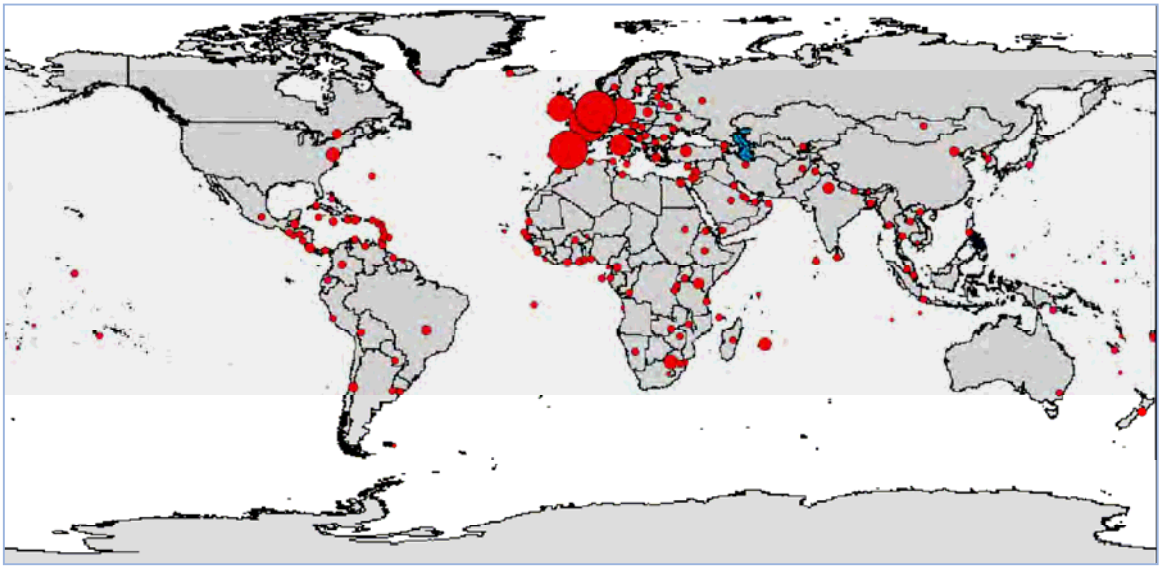


Figure 24: Vegetable crop imports and their relative global significance (source: UN Comtrade)



[242] Includes 01 and 02 - live animals and meat and edible meat offal

20.5 Policy levers

20.5.1 There are large ranges of policy levers for the food supply sector, some regulatory and others voluntary. Additionally, the policy levers differ in regard to the targeted point in the food supply chain where they are relevant / applicable. For example, a consumer-focused policy lever could be an eco-labelling scheme while a producer-focused lever could be an ISO 14001:2004 accreditation for an individual farm.

20.5.2 For the food supply sector as a whole it is not possible to list all the relevant policies / initiatives as many are commodity / product specific. Table 39 outlines some of the initiatives that have been identified during the course of our work.

Table 39: Food supply-related initiatives

International Code of Conduct for Cut Flowers (ICC)
International Flower Label Programme (FLP)
Fairtrade
EUREPGAP standards for the horticulture sector
FAO Code of Conduct for Responsible Fishing
Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas
Marine Stewardship Council (MSC) Fishery Assessment and Certification Process
Roundtable on Sustainable Palm Oil (RSPO)
Global Agriculture Alliance "Best Aquaculture Practices" and Aquaculture Certification Council
FAO Code of Conduct for Responsible Fisheries
Roundtable for Sustainable Soya
Sustainable Agriculture Network - The Rainforest Alliance
IFC/WWF-US; Better Management Practices Sugar Initiative
EU Sustainable Development of Aquaculture Strategy
Ethical Trading Initiative (ETI)