Meat and fish

MEAT AND FISH are an increasingly important part of the world's diet. As countries and families grow richer, one of their first consumer choices is to increase their intake of these in preference to vegetables. The implications for landuse are profound, since growing biomass to feed animals takes far more energy and land than growing biomass for direct human consumption.

World meat production has more than quadrupled in the past half-century to some 220 million tons annually. The increase has more than doubled production per head of the world's population to 37 kilos a year[1]. The increase has been driven by rising incomes, population growth and urbanization[2], particularly in the emerging meat markets of East Asia, the Middle East and Latin America. Meat demand rises strongly as countries grow wealthier and urbanize[3]. Citizens in developed countries eat four times more meat than those in developing countries, a far greater difference than pertains for grain consumption.

But developing countries are catching up. Current projections suggest that developing countries' demand for meat will increase by 2.9 percent a year between 1993 and 2020 – twice the rate of population growth, with poultry demand growing fastest of all[4].

The growing demand for meat has pushed countries, particularly in densely populated regions of Europe and Asia, to switch from production of beef cattle, which traditionally feed on pasture, towards animals that eat from feedlots all year round, such as pigs (now the world's largest meat source) and poultry, which also now exceeds beef production.

It is often argued that raising animals and growing fodder crops is an inefficient use of land and resources[5]. Around 4 kilos of grain are required to produce 1 kilo of pork, and 8 kilos are needed for a kilo of beef. Certainly, the world's growing desire for meat puts new stresses on agricultural systems, and hence on two fundamental finite resources, land and water.

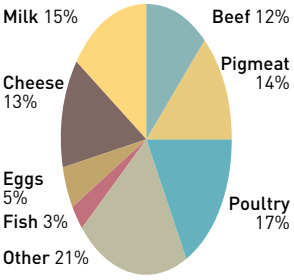
But there are counter-arguments. Animals provide many other resources, from hides and milk to traction power and manure. And there is little evidence that meat production causes actual food shortages, at any rate in the short term. Increasing use of feed grains does not generally appear to have damaged production of cereals for human consumption, as the market often adjusts. In times of food shortages, grain production for human consumption is maintained while production for feed is reduced[6].

In many countries wild animals, or bushmeat, remain a significant source of protein – from rabbits through kangaroos to elephants. This informal, and often illegal, trade is rarely enumerated. But the spread of guns, coupled with the opening up of forest regions along logging roads, is thought to have dramatically increased the market in bushmeat in many countries. In equatorial Africa, where elephant meat can turn up on supermarket shelves and apes are another delicacy, recent estimates put this at more than 1 million tons a year[7].

Not all animal protein comes from the land, however. The oceans have always been a major

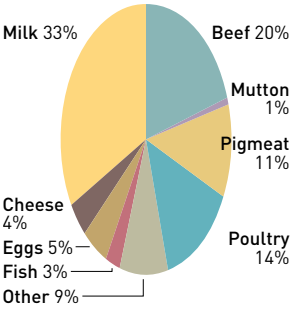
ANIMAL PRODUCTS IN THE HUMAN DIET, 1998
Calories per capita per day

North America



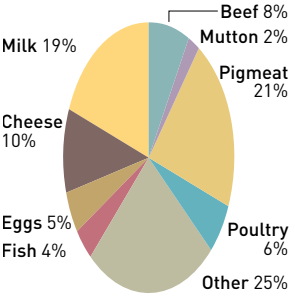
1 018 calories

Latin America and Caribbean



541 calories

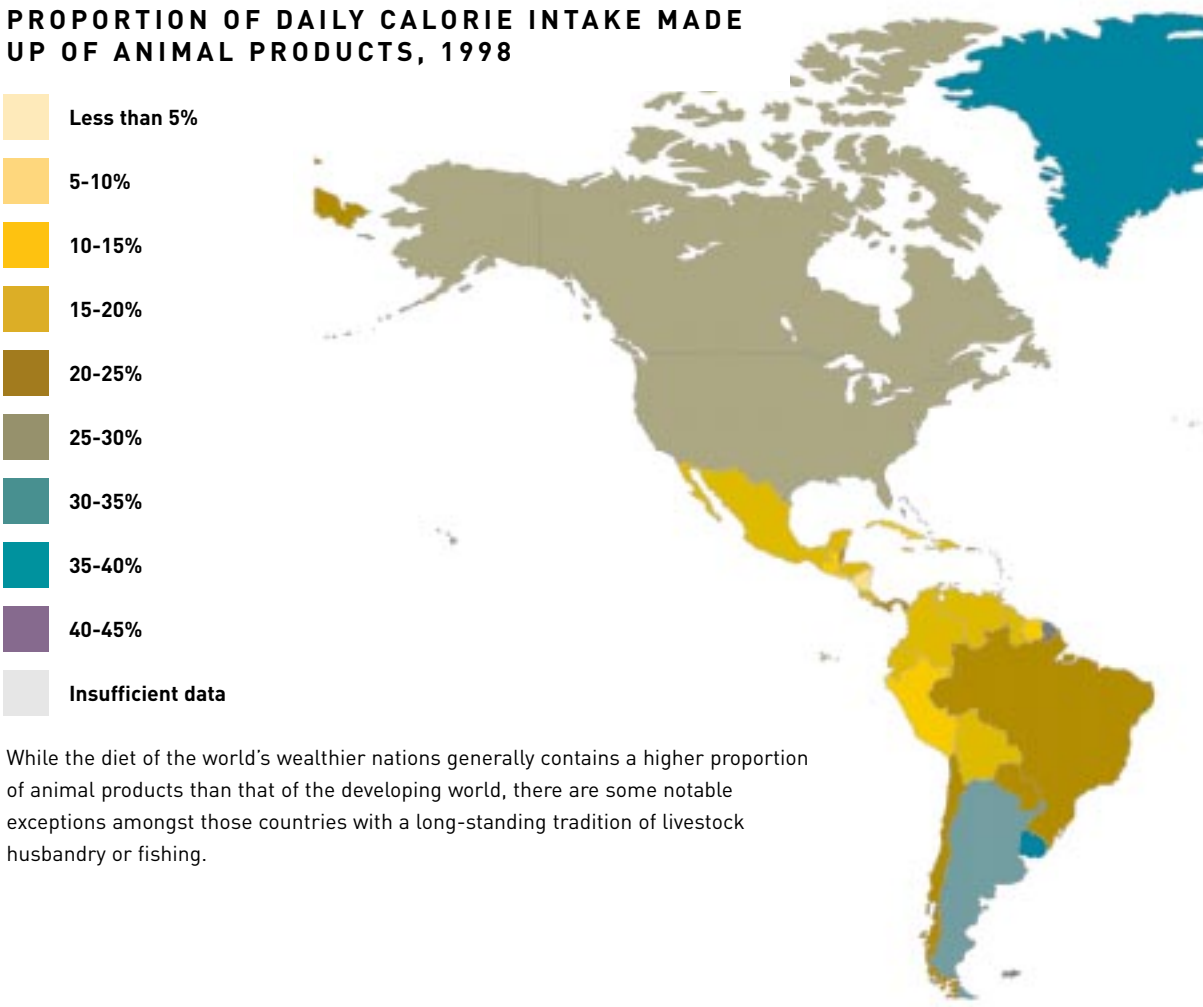
Europe



915 calories

Source: FAO.

PROPORTION OF DAILY CALORIE INTAKE MADE UP OF ANIMAL PRODUCTS, 1998



While the diet of the world's wealthier nations generally contains a higher proportion of animal products than that of the developing world, there are some notable exceptions amongst those countries with a long-standing tradition of livestock husbandry or fishing.

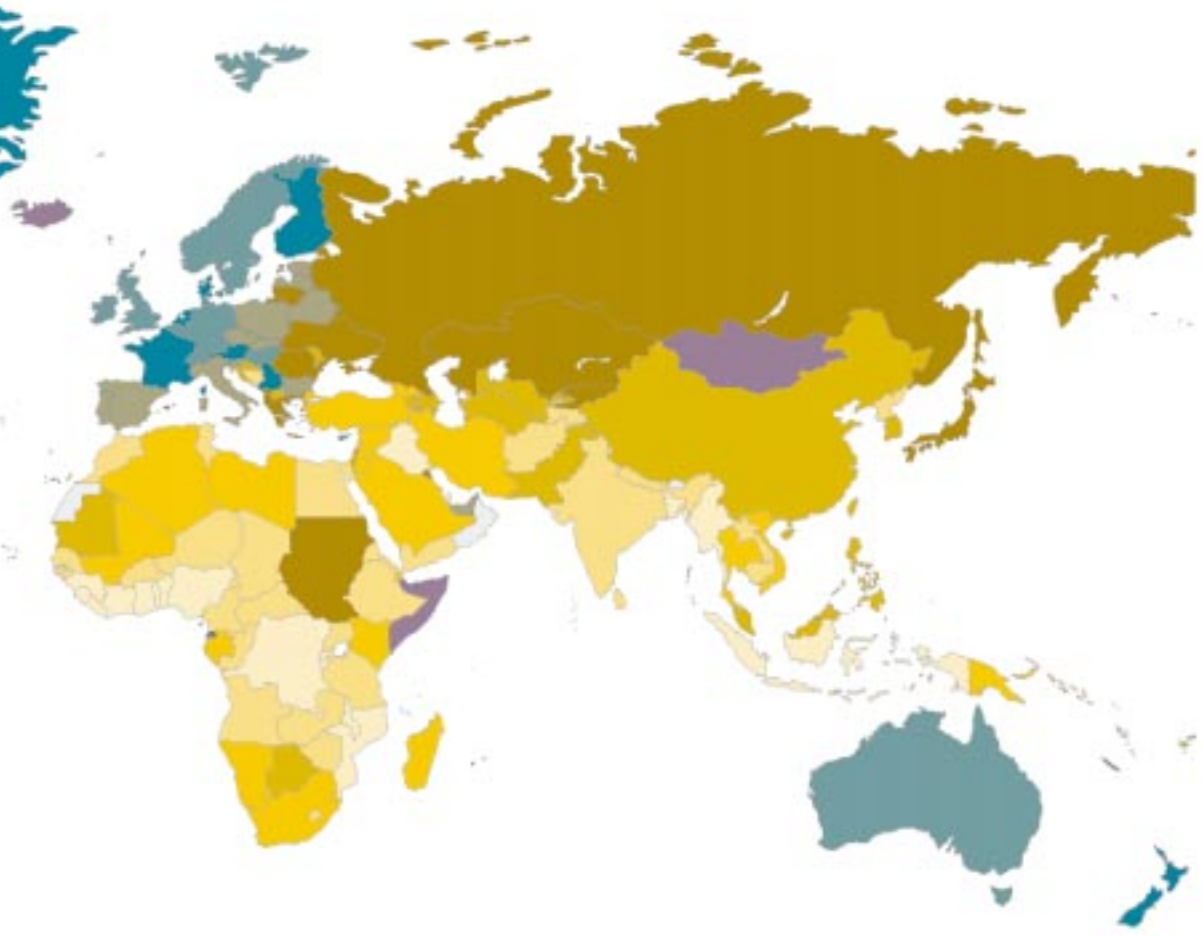
TOP FISH PRODUCERS

	Metric tons of fish	% of world production 1997	% of world population 1997
China	36 333 545	29.75	21.37
Peru	7 877 252	6.45	0.42
Japan	6 690 716	5.48	2.16
Chile	6 083 913	4.98	0.25
USA	5 448 385	4.46	4.67
India	5 378 004	4.40	16.59
Russia	4 715 024	3.86	2.54
Indonesia	4 403 810	3.61	3.49
Thailand	3 488 104	2.86	1.03
Norway	3 222 970	2.64	0.08
Korea, Rep.	2 596 474	2.13	0.79
Iceland	2 209 607	1.81	0.005
Philippines	2 136 249	1.75	1.23
Denmark	1 865 760	1.53	0.09
Vietnam	1 546 000	1.27	1.31
Mexico	1 528 520	1.25	1.62
Argentina	1 352 400	1.11	0.61
Bangladesh	1 342 730	1.10	2.11
Spain	1 341 311	1.10	0.68
Malaysia	1 276 282	1.04	0.36

TOP MEAT PRODUCERS

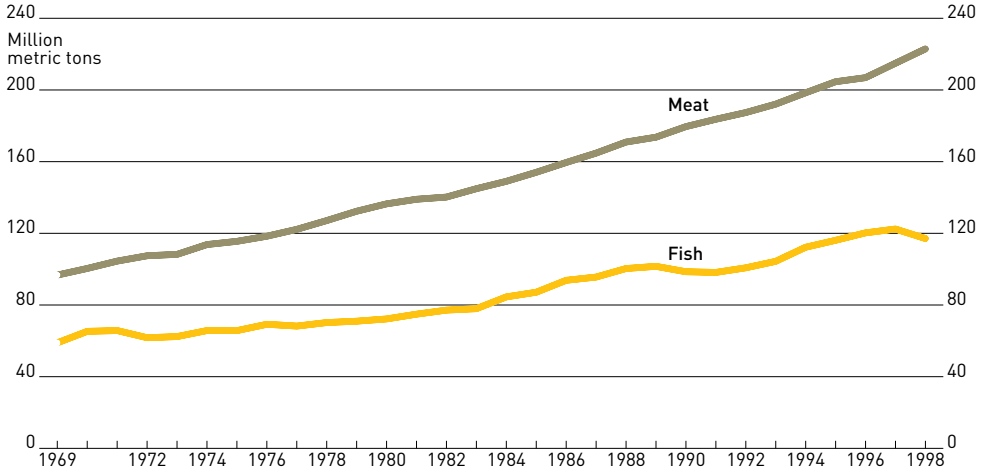
	Metric tons of meat	% of world production 1999	% of world population 1999
China	59 356 512	26.27	21.19
USA	37 179 800	16.46	4.62
Brazil	13 123 030	5.81	2.81
France	6 462 480	2.86	0.98
Germany	6 340 270	2.81	1.37
Spain	4 875 330	2.16	0.66
India	4 677 070	2.07	16.69
Russia	4 344 000	1.92	2.46
Mexico	4 289 282	1.90	1.63
Italy	4 043 075	1.79	0.96
Canada	3 779 300	1.67	0.52
Argentina	3 702 561	1.64	0.61
Australia	3 606 100	1.60	0.31
UK	3 591 848	1.59	0.99
Japan	2 998 288	1.33	2.12
Poland	2 971 500	1.32	0.65
Netherlands	2 935 900	1.30	0.26
Pakistan	2 270 180	1.00	2.55
Denmark	2 006 853	0.89	0.09
Philippines	1 996 683	0.88	1.25

Source: FAO; UNPD.



Source: FAO.

WORLD FISH* AND MEAT PRODUCTION

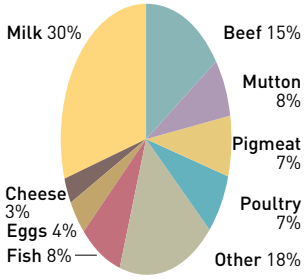


* Includes all marine and freshwater fish

Source: FAO.

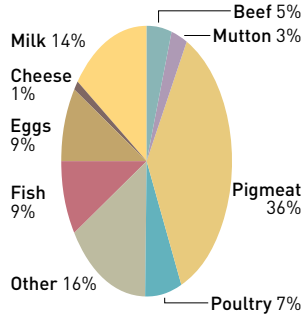
ANIMAL PRODUCTS IN THE HUMAN DIET, 1998
Calories per capita per day

Africa



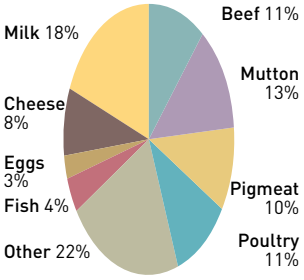
178 calories

Asia



353 calories

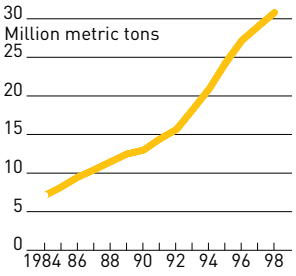
Oceania



896 calories

Source: FAO.

THE GROWTH OF WORLD AQUACULTURE
Freshwater and marine fisheries



Source: FAO.

source of sustenance – and never more so than today. Though for how much longer this "wild" food source will fulfill a dominant role in meeting human dietary needs is far from clear.

Worldwide, humanity gets 16 percent of its animal protein from marine sources. Around half a billion people gain their livelihoods from harvesting the oceans. Over the past 50 years, the world's fishing industry has changed from a largely local and coastal trade – which depleted fish stocks near heavily populated areas but left the rest of the ocean alone – into a global activity with global impacts.

Of some 3 million fishing vessels known to be at sea worldwide, more than a million are large "industrial" vessels that can and do travel the globe. South American ships fish off New Zealand, Japanese trawlers work the South Atlantic and so on.

The world's marine fish catch increased fivefold between 1950 and 1990, reaching around 90 million tons a year. But these global fisheries are now themselves facing a crisis of diminishing returns – a classic global "tragedy of the commons" in which a shared resource is depleted by short-term greed because there is no common policy to maintain it for the long term. Despite increasing investment in ships, nets and tracking equipment, the catch has stagnated since 1990. Current estimates are that it costs between US$90 billion and US$130 billion annually to land a global fish catch worth US$70 billion, the difference being met by government subsidies[8].

According to the Food and Agriculture Organization of the United Nations (FAO), nine of the world's 17 major international fish stocks are at or beyond the point at which yields will decline. One extreme case is the North Atlantic, where cod stocks are at half their former levels. The Grand Banks cod fishery off Newfoundland, tapped for more than 500 years since the Basques first found it, was shut in 1993 after a collapse in stocks, putting thousands out of work. The North Sea's cod fishery could soon go the same way[9]. Asian fleets fished out the North Atlantic squid stocks in the 1980s. Atlantic mackerel, redfish and herring catches are all less than half their size of 30 years ago.

Increasingly, the world is turning to aquaculture to maintain fish supplies. It is the fastest-growing food production system in the world, with global production increasing by 11 percent annually through most of the 1990s until around a quarter of the fish brought to table came from aquaculture. Most of this relates to just a few species: carp in China, easily the world's largest fish farmers; catfish in the United States; and salmon in Europe[10].

But there has been an ecological price to pay. Fish farms are an increasingly important market for feed, including grain and fishmeal. The growing demand for fishmeal means that production from aquaculture is not simply an addition to wild catches, but consumes a significant fraction of that catch.

Aquaculture has become a major threat to coastal ecosystems, particularly mangroves. From Ecuador to the Philippines, mangroves are being converted on a huge scale into brackish shrimp ponds in what has been characterized as the aquatic equivalent of "slash-and-burn" farming[11]. In the past four decades Indonesians have converted 269 000 hectares of mangroves to shrimp ponds to supply the international market. Most are productive for less than a decade before loss of nutrients and a build-up of toxins forces them to be abandoned and replaced[12].