



COMMITTEE ON FISHERIES

SUB-COMMITTEE ON FISH TRADE

Seventeenth Session

Vigo, Spain, 25–29 November 2019

OVERVIEW OF THE FISHERY AND AQUACULTURE SECTORS

Executive Summary

This document provides a brief outline of recent and expected trends in the world fishery and aquaculture sectors, with a special focus on major facts and developments affecting international trade in fish and fishery products that have taken place since the last Session of the Sub-Committee on Fish Trade.

Suggested action by the Sub-Committee

- Note the recent changes that have occurred in the fisheries and aquaculture sectors;
- Share information and relevant national experiences on recent and expected developments affecting the fisheries and aquaculture sectors and in particular those related to trade in fish and fishery products;
- Provide guidance for future FAO work in the area of international trade in fish and fishery products, particularly with regard to enabling developing countries and small-scale operators to participate more effectively in the fish trade.



INTRODUCTION

1. The fisheries and aquaculture sectors contribute in a significant way to food security and the livelihoods of millions of people, as a creator of employment, supplier of nutritious food, generator of income and facilitating economic growth through harvesting, processing and marketing. Several countries, including many less advanced economies and many small islands developing states (SIDS), depend on these sectors. In addition, although fisheries and aquaculture may contribute in a limited way to the overall national economy, and the consumption of their products can be small compared to other food at the national level, they can be crucial for the population of numerous coastal, riverine, insular and inland regions for the reasons stated above.
2. Trade plays a major role in the fisheries and aquaculture sectors, which operate in an increasingly globalized environment. Fish can be produced in one country, processed in a second and consumed in a third. This results in fish and fishery products as being among the most traded food commodities worldwide.
3. During the last two years, the fishery and aquaculture sectors have continued to expand, with growth in overall production, trade and consumption.

OVERVIEW OF FISHERY AND AQUACULTURE SECTOR

Employment

4. In 2017, an estimated 59.7 million people were employed in the primary sector of capture fisheries and aquaculture. Of this total, 40.4 million people were engaged in fisheries and 19.3 million in aquaculture. Most of the people directly employed, on a full-time, part-time or occasional basis, as fishers and fish farmers are artisanal and small-scale producers, with the bulk of them living in Asia (about 85 percent) and developing countries. Globally, about 200 million people are directly and indirectly employed along the fisheries and aquaculture value chain, from harvesting to distribution. These activities support the livelihoods of many more millions of people, with fishing and aquaculture dependent people often located in places that are at particularly high risk of extreme events. Women play an important role in the fisheries and aquaculture workforce and represent about 13 percent of the people employed in the primary sector and 50 percent if the primary and secondary sector are considered¹.

Production

5. Total world fishery and aquaculture production² showed new growth in the 2016–2017 period (Table 1)³, reaching an all-time record of 173 million tonnes in 2017, with an overall expansion of 8 million tonnes compared to 2015 and of 32 million tonnes as compared to one decade ago (2007). Preliminary data for 2018 point to further growth of about 3 percent, while in 2019, the overall production should only slightly increase due to an expected decrease of capture fisheries.

¹ <http://www.fao.org/3/abc014e.pdf>.

² Statistics on fisheries and aquaculture production, trade and consumption quoted in this document exclude whales, seals, crocodiles, caimans, other aquatic mammals and aquatic plants. Data reported are the ones available at the time of the preparation of the document (September 2019). 2017 is the latest year available for FAO official fishery and aquaculture statistics and the source of 2028 data is the OECD-FAO Agricultural Outlook 2019-2028 (https://doi.org/10.1787/agr_outlook-2019-en).

³ It is important to mention that these figures reflect the changes being implemented by China in its fisheries and aquaculture statistics for 2009–2016, which implied the downward adjustment of 2016 global statistics by about 2 percent for capture production and 5 percent for aquaculture production, compared to previously released data.

Table 1. World trends in a glance

	2014	2015	2016	2017	2018	Change: 2017 over 2016	Change: 2028 over 2017
PRODUCTION AND UTILIZATION (million tonnes, live-weight)							
Production	160.7	164.3	165.8	172.6	196.3	4.1	13.7
Capture fisheries	90.2	91.5	89.4	92.5	94.2	3.5	1.8
Aquaculture	70.5	72.8	76.4	80.1	102.2	4.9	27.5
Trade volume	61.8	59.2	59.5	64.9	63.0	9.0	-2.9*
Total utilization	160.7	164.3	165.8	172.6	196.3	4.1	13.7
Food	142.6	145.3	147.5	153.2	177.8	3.8	16.1
Non-food	18.1	19.0	18.3	19.5	18.5	6.4	-4.8
Per capita apparent food fish consumption (kg/year)							
Total food fish	19.5	19.7	19.8	20.3	21.3	2.7	4.8
From capture	9.9	9.8	9.5	9.7	9.0	1.6	-6.5
From aquaculture	9.7	9.9	10.2	10.6	12.2	3.7	15.1

*This potential reduction is mainly due to an expected higher share of Chinese fish production being destined to domestic consumption rather than to exports.

6. Since the last three decades, aquaculture has been the main driver of the increase in fish production, with an average growth of 4.8 percent per year in the period 2007–2017, reaching 80 million tonnes in 2017. Preliminary data for 2018 and projections for 2019 point to a further rise of aquaculture production of about 4 percent per year. This will imply a growth of the share of aquaculture in total fish production from 46 percent in 2017 to about 47–48 percent in 2019. If aquatic plants are included, aquaculture has already overtaken capture fisheries as the main source of fish production since 2013.

7. Despite the increasing role of aquaculture in total fish supply, the capture sector remains dominant for a number of species and vital for domestic and international food security. Since the mid-1990s, overall capture fisheries production was around 89–93 million tonnes, with major variations mainly determined by fluctuations of anchoveta catches in South America. In addition, thanks to improved management of selected resources, some stocks have shown a recovery, with an increase in their catches. According to preliminary data, 2018 was a very positive year for the capture fisheries industry, with a growth of about 3 percent compared with an already rather positive 2017. However, in 2019, a contraction of catches of some species (in particular small pelagics) and only partially compensated by a growth of catches of other species (such as some groundfish), is expected to reduce overall production by about 3–4 percent.

8. Yet, despite significant improvements in some stocks and overall catch stability, there is an overall decreasing trend in the proportion of marine fish stocks caught within biologically sustainable levels, especially in the least developed regions, from 90 percent in 1974 to 66.9 percent in 2015. In contrast, the percentage of stocks fished at biologically unsustainable levels increased from 10 percent in 1974 to 33.1 percent in 2015, with the largest increases in the late 1970s and the 1980s⁴. At the same time, inland fisheries are severely affected by the growing demand for freshwater fish.

⁴ FAO. 2018. *The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals*. Rome. Licence: CC BY-NC-SA 3.0 IGO.

9. Developing countries, mainly in Asia, are by far the predominant producers, with 83 percent of total fish production and 94 percent of total aquaculture (Table 2). China is the leader producer, with a share of 36 percent of total world production and of 58 percent of world aquaculture production in 2017. In the same year, other major producers were Indonesia, India, Viet Nam, United States of America, Russian Federation and Peru.

Table 2. Relative shares in the fishery and aquaculture sector by geographical and economic regions in 2017 (percentage)

	Total production	Aquaculture	Capture fisheries	Fish Exports	Fish Imports
	Share in total quantity (%)			Share in total value (%)	
World	100.0	100.0	100.0	100.0	100.0
Asia	69.8	88.9	53.1	37.8	33.3
Africa	6.8	2.6	10.5	4.6	3.4
Central America	1.6	0.5	2.5	1.8	1.3
South America	6.6	3.1	9.6	10.5	2.0
North America	3.9	0.8	6.7	8.0	16.8
Europe	10.3	3.8	16.0	35.1	41.8
Oceania	1.0	0.3	1.6	2.1	1.4
Developing countries:					
LDC*	7.9	5.0	10.5	2.3	0.8
Other developing countries	75.1	89.4	62.6	51.8	28.6
Developed countries	17.0	5.6	26.8	45.9	70.6
LIFDCs**	13.8	11.8	15.6	12.2	2.6

*Least Developed Countries; **Low-Income Food Deficit Countries

10. According to the results of the FAO fish model released in July 2019, the next decade is expected to be a positive one for the fisheries and aquaculture sectors⁵. Major growth will come from aquaculture, which is expected to overtake total capture fisheries production by 2022 and to reach over 102 million tonnes by 2028 (Table 1). With the exceptions of the years affected by El Niño, global capture fisheries are expected to slightly increase during the next decade, thanks to progress in rebuilding certain fishery stocks, the implementation of more robust management regimes by some countries and optimized utilization of fishery production through reduced discards and losses, which will counterbalance the pressure on resources that are not effectively managed.

Consumption

11. A growing share of fish production is directed to human consumption. Of the 173 million tonnes produced in 2017, 89 percent (or 153 million tonnes) were used for direct human consumption, with the rest destined for non-food uses, including reduction into fishmeal and fish oil. About 45 percent of the fish destined for human consumption was in live and fresh form. Preliminary data for 2018 and estimates for 2019 indicate a continuation of this trend, with about 157–158 million tonnes used for human consumption in 2019.

⁵ According to the results of the FAO fish model, included in the OECD-FAO Agricultural Outlook 2019–2028 publication (available at www.agri-outlook.org/).

12. Fish and fishery products play a crucial role in nutrition and global food security as they represent an important source of macronutrients and micronutrients such as vitamins, minerals (zinc, iron, iodine and selenium) and omega-3 fatty acids. Even small quantities of fish can have a significant positive nutritional impact on plant-based diets, as also helping an improved uptake of various nutrients from plants when consumed with fish, and this is the case in many low-income food-deficit countries (LIFDCs) and least-developed countries (LDCs). Of the 40 countries where fish contribute 30 percent or more of the total animal protein supply, 39 are developing countries and 23 are LIFDCs. Micro-and macronutrients provided by fish are essential in the diet of some densely populated countries, where total protein intake level is low and nutritional issues are faced, and are very important in the diets of many other countries, in particular SIDS. At the global level, fish accounts for about 17 percent of the world population's intake of animal proteins and provides about 3.3 billion people with almost 20 percent of their average per capita intake of animal proteins and 5.4 billion people with 10 percent of such proteins.

13. World apparent per capita fish food consumption has significantly grown during the last few decades, reaching an estimated 20.3 kg in 2017⁶. Preliminary data for 2018 and estimates for 2019 point to a further growth, up to about 20.5 kg in 2019. This expansion in demand has been driven by a combination of population growth, rising incomes and urbanization, and is facilitated by the strong expansion of fish production and more efficient distribution channels. International trade has also played an important role in broadening fish consumption by providing wider choices to consumers. A sizeable and growing share of fish consumed in North America, Europe and Africa consists of imports, owing to steady demand for non-locally produced species and a static or declining domestic fish production. Over the next decade, this dependency on fish imports to satisfy domestic demand is expected to grow further.

14. Despite the overall increase in fish availability to most consumers, marked differences exist between and within countries and regions in terms of the quantity and variety consumed at the per capita level impacting the subsequent contribution to nutritional intake. Asia consumes more than two-thirds of the total food fish supply, while Oceania and Africa have the lowest share. In per capita terms, the highest fish consumption, over 50 kg, is found in several SIDS, particularly in Oceania, while the lowest levels, just above 2 kg, are in Central Asia and some landlocked countries. Although annual per capita food fish consumption has grown steadily in developing regions and in LIFDCs, it is still lower than in more developed regions. Availability and disposable income are not the only factors boosting fish consumption. It is evident that socio-economic and cultural factors also strongly influence the level of fish consumption among countries and within countries.

15. In the next decade, per capita consumption is expected to reach 21.3 kg in 2028, with a major expansion in demand expected to occur in developing countries. A growing share of fish available for human consumption is expected to originate from aquaculture production. Since 2015, aquaculture became the main source of fish for human consumption and reached a share of 52 percent in 2017. This share should increase up to 54 percent in 2019, is projected to reach 57 percent of the total food fish available for human consumption in 2028 and is anticipated to further grow in the next few decades. Consumption is expected to increase in all continents, except Africa, with Latin America and Europe showing the fastest growth rates. The static per capita fish consumption for Africa as a whole and the decreasing trend in Sub-Saharan Africa is due to the population growing faster than supply. This is a concern for food security, due to the crucial role that fish plays in providing proteins and micronutrients in many African countries. Compared with the world average, Africa currently has a lower per capita fish consumption (about 10 kg), but its share of fish to total animal protein intake is higher. Fish represents about 20 percent of total animal protein intake in Africa and this can be higher than 50 percent in selected African countries, in particular in West Africa.

⁶ Per capita fish consumption have also been affected by the previously mentioned revision of Chinese production data.

Trade

16. A significant share of total fish production (about 38 percent live-weight equivalent in 2017) is exported, reflecting the sector's degree of openness and integration into international trade. World trade of fish and fishery products has significantly increased during the last few years, fully recovering the 10 percent decline experienced in 2015 compared with 2014. That decline was due to several reasons, including the weakening of many key emerging markets, lower prices for a number of important species, together with the strong gain of the US dollar versus multiple currencies.

17. In 2017 exports reached a new record at USD 156 billion and preliminary figures for 2018 indicate a further growth of 5 percent compared with 2017, up to USD 163 billion. The trend for the first months of 2019 points to trade in fish products remaining stable compared to 2018. Projections up to 2028 indicate that fish trade will continue to be highly traded, even if expanding at a slower rate than in the previous decade. However, this current and potential slowdown in the growth of fish trade is not an isolated phenomenon, as it also occurs for other agriculture products and global merchandise trade. These general trends are caused by a series of factors including an increase of trade tensions (with consequences on higher tariffs being introduced by some major trading partners), weaker economic growth and policy uncertainty in some countries leading to weak demand growth.

18. For many developing countries, fish trade represents a significant source of foreign currency earnings in addition to the sector's important role in income generation, employment, food security and nutrition. In 2017, exports of developing countries were valued at USD 85 billion and their fishery net-export revenues (exports minus imports) reached USD 41 billion, higher than all other agricultural commodities combined. In addition, in recent years, developing countries have increased fishery imports to supply their processing sectors for re-export and to meet rising domestic consumption. Preliminary estimates for 2018 indicate a growth of developing country exports to USD 88 billion and imports to USD 49 billion. Both figures should only slightly increase in 2019.

19. During the last two years, in addition to still being the main producer, China has confirmed its key role as the main exporter of fish and fishery products (USD 20.5 billion in 2017) and the third largest importer (USD 10.7 billion in 2017). China's imports have increased in the last years, partly as a result of the outsourcing of processing from other countries, but also reflecting China's growing domestic consumption of species not produced locally. In 2018, its trade of fish and fishery products further increased (reaching USD 21.7 billion for exports and USD 14.3 billion for imports), while data for the first eight months of 2019 indicate a decline in fish exports (-6 percent), but a significant increase in fish imports (25 percent) compared with the same period in 2018.

20. Norway has remained the second largest exporter (USD 12.0 in 2018), followed by Viet Nam, which has been the third largest exporter since 2013. In 2017 and 2018, other major exporters were India, the United States of America and Thailand. Thailand has experienced a significant decline in exports since 2012, mainly as a result of its reduced shrimp production due to disease problems. Data for the first months of 2019 indicate a slight decline for the top fish exporters compared to 2018 trends.

21. A share of the trade of fish and fishery products also consists of fish raw material being exported to be then processed in other countries where comparatively low wages and production costs provide a competitive advantage, with the resulting processed products being subsequently exported. The outsourcing of processing industries is particularly relevant in some Central and East European countries as well in some Asian countries, with the processing industry contributing significantly to those economies through job creation and trade.

22. Developed countries still dominate fishery imports (Table 2), although with a declining share in recent years (71 percent share of world imports in 2017 versus 79 percent in 2007, 83 percent in 1997 and 88 percent in 1987). Preliminary estimates for 2018 point to a further reduction of this share to below 70 percent. Their imports originate from both developed and developing countries giving many producers an incentive to produce, process and export.

23. The European Union, the United States of America and Japan are highly dependent on fishery imports to satisfy their domestic consumption. In 2017, their combined imports represented 63 percent by value of world imports of fish and fishery products. This share slightly declined in 2018 and 2019. The European Union is, by far, the largest single market for fish imports, valued at USD 55.8 billion in 2017 (USD 29.0 billion if intra-European Union trade is excluded), up 18 percent from 2015. Preliminary data for 2018 show a 6 percent increase, while data for the first six months of 2019 indicate a slight decline in imports. The United States of America is the top importing single country of fish and fishery products. Its imports reached USD 21.6 billion in 2017 and further increased by 4 percent in 2018 to peak at USD 22.6 billion. Preliminary estimates for 2019 indicate a slight decline (1 percent). Japan, traditionally the largest single importer of fish, was overtaken by the United States of America in 2011 and again since 2013. Japanese fishery imports have shown a declining trend in the 2012–2015 period but increased again in 2016–2018, reaching USD 15.4 billion in 2018. Data for the first eight months of 2019 indicate a slight decline (1 percent).

24. Due to their dependence on imports, tariffs on fish in developed countries are rather low, albeit with a few exceptions (i.e. for some value-added products or selected species). This has allowed developing countries to supply fish and fishery products to markets in developed countries without facing prohibitive customs duties thus expanding their exports, despite market access issues related to non-tariff measures. This trend follows the entry into force of a number of bilateral and multilateral trade agreements and the rising disposable incomes in emerging economies.

25. In contrast, rather high tariffs for fish and fishery products are still applied by many developing countries that can reflect fiscal policies or protective measures. Over time, thanks to regional and bilateral trade agreements, the applied tariffs should decline further, also in developing countries, with some exceptions given to least-developed countries (LDCs). Many new plurilateral trade agreements incorporated new trade areas for fish and fishery products, dealing with sustainability, fisheries subsidies and other non-tariff issues.

26. The issue of tariff escalation continues to be a serious problem for many fish products, including accessing developed country markets and expanding regional trade. Several additional factors have an impact on the performance of exporting countries to access regional and international markets. These issues include problems linked to the internal structures of some countries. Despite technical advances and innovations, many countries, especially those with less-developed economies, still lack adequate infrastructure and services, which can affect the quality of fishery products, contributing to their physical loss or a challenge in marketing.

27. Non-tariff measures to trade may also affect trade through the application of required product standards, control of sanitary and phytosanitary measures, procedures for import licensing and rules of origin, conformity assessment and others. Trade can also be influenced by the specific ways in which customs classifications, valuations and clearance procedures are handled, including lengthy or duplicate certification procedures.

28. Other impacts on trade might be linked to technical barriers to trade (TBTs), which refer to technical regulations and standards that set out specific characteristics of a product. The World Trade Organization (WTO) Agreement on TBTs contains rules expressly aimed at preventing these measures from becoming unnecessary barriers, but they still exist and create difficulties for traders. These measures also include the technical procedures that confirm the compliance of products with the requirements stipulated in regulations and with standards that apply to both domestically produced products and imports.

29. The trade of fish and fishery products is becoming more sophisticated in terms of the information required for the products – traceability and sustainability certification are becoming a market requirement not associated anymore with price premiums, but simply with the ability to reach a specific market or not. The ability to adhere to import requirements that are constantly in evolution can be a challenge for most exporting countries. Many developing countries and small-scale fishers are

facing multiple problems in complying with these market requirements leading to challenges in keeping existing markets or expanding into new ones. In addition, concerns about the social responsibility in fisheries and aquaculture value chains continue to rise.

30. Import requirements include areas such as quality and safety but are also increasingly related to technical standards and labelling and, more recently, to voluntary certification. Capacity building, training and transfer of experience and know-how are needed to support countries in meeting these requirements. Some capacity-building is being provided by international organizations and agencies, including FAO, and also by the importing countries themselves, but more support is needed, for instance, through initiatives such as Aid for Trade by WTO.

31. Investments are often needed in infrastructure, in particular, to improve the cold chain from the landing or harvesting site and onwards through the entire supply chain. Much of the focus so far has been on the export-oriented production, but there are also large unmet needs to improve domestic infrastructure for the distribution of fish and fishery products in many countries in the world. The full implementation of the WTO Trade Facilitation Agreement (TFA), which entered into force in 2017, is expected to expedite the movement, release and clearance of goods across borders, reducing these negative influences on trade. High customs fees may also negatively affect trade.

32. In the last two years, international trade has been facing many uncertainties, with more trade-restrictive measures being implemented by countries than in previous years. Although this pattern is applicable to the trade of merchandise in general, it is also true for fish and fishery products. The importance of global value chains continues to grow to produce goods in general. For fish and fishery products in particular, they became an important element in connection with the outsourcing of production.

33. The entry into force of the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) created the possibility of countries imposing trade restrictions at the port to avoid the entrance of products originated from illegal, unreported and unregulated (IUU) fishing.

Main species and prices

34. Trade in fish and fishery products is becoming more dynamic and is characterized by a greater diversification amongst species and product forms. This reflects the differences in consumers' tastes and preferences, with markets ranging from live aquatic animals to a wide range of processed products. Salmonids (salmons and trouts) have been the most important commodity traded in value terms since 2013 and accounted for about 18 percent of the total value of internationally traded fish products in 2017. In the same year, the other main groups of exported species were shrimps and prawns with around 17 percent of the total, followed by groundfish (i.e. hake, cod, haddock, Alaska pollock, etc.) at 9 percent and tuna (9 percent). In 2017, fishmeal represented around 3 percent of the value of exports and fish oil 1 percent. A number of high-volume but relatively low-value species are also traded in large quantities, not only nationally but also at regional and international levels.

35. With the dramatic increase in aquaculture production, a growing share of international fish trade consists of farmed products, in addition to providing a significant share of nutritious fish for domestic consumption. Unfortunately, international trade statistics do not distinguish between wild and farmed products. Hence, the exact breakdown between products from capture fisheries and those originating from aquaculture in international trade is open to interpretation. Estimates indicate that aquaculture products represent between 21–26 percent of total volumes and between 34–36 percent of total value. If fish products for direct human consumption only are considered, the share increases to 27–29 percent of traded volumes and 36–38 percent of value. The higher shares in value terms indicate that an important segment of the aquaculture industry processes relatively high-value products destined for international markets.

36. According to the most recent FAO Fish Price Index (FPI), the average international fish prices were 3 percent lower in January-July 2019 compared to the same period in the previous year. This is a consequence of lower prices being experienced for some of the major species (including shrimps and tunas) starting from March/April 2019. Other species presented different trends, in particular for some small pelagics (i.e. anchovies, sardines, mackerel, etc.), groundfish (mainly cod) and cephalopods (squid, cuttlefish and octopus) in some markets, due to demand being higher than supply.

37. The latest FPI also reflects the ongoing divergence of prices for species originating from capture fisheries and aquaculture. While the capture fisheries FPI sub-index remained at high levels, the aquaculture one has decreased to the levels last seen in early 2016. This contrast points to the differences in supply availability, but also the relative lack of integration between markets for the most important farmed and wild species. Although there is a limited degree of substitutability between farmed and some wild species in the groundfish/whitefish segment, high-status species like cod are generally very well protected from price competition from farmed alternatives. For other key wild species, such as cephalopods, aquaculture offers no competition whatsoever despite some experiments being carried out to develop a farming technology.

Outlook

38. Many factors will influence the evolution and dynamics of the world's fishery and aquaculture sectors. For production, these include environmental degradation and habitat destruction, overfishing, IUU fishing, climate change, transboundary issues concerning natural resource utilization, poor governance, invasion of non-native species, diseases and escapes, accessibility and availability of sites and water resources, as well as to the availability of technology and finance. From the perspective of market access, issues include those related to food safety and traceability, the need to demonstrate that products are not derived from illegal and prohibited fishing operations, the growth of protective and non-tariff measures, and uncertainties around the international trade environment in the short to medium term.

39. The future evolution of the fisheries and aquaculture sectors is also very much linked to challenges posed to food systems by socioeconomic trends. The world population is expected to reach nearly 10 billion people in 2050, a trend that, on its own, raises concerns about how to feed the world in the future. At the same time, income growth in low- and middle-income countries may well imply dietary changes towards higher consumption of animal protein and thus of fish and fishery products. Moreover, structural changes in the economy, together with urbanization and migration, challenge food systems further because they imply modifications in consumption patterns, in the way food chains are organized (i.e. higher demand for processed food) and in distribution channels.

40. For fisheries and aquaculture, these changes mean maximizing the sector's contribution to food and nutrition security, ensuring that all people at all times have access to good-quality, nutritious food while simultaneously supporting the livelihood of hundreds of millions of people around the world. Maximizing the benefits of the fisheries and aquaculture sectors can only be achieved by carefully balancing environmental, social and economic sustainability principles in the management of our natural aquatic resources.⁷

⁷ Chapter 3 at <http://www.fao.org/3/i9705en/i9705en.pdf>