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TWENTY-EIGHTH FAO REGIONAL CONFERENCE FOR EUROPE

Baku, Azerbaijan, 19-20 April 2012

Agenda Item 8

Importance of Aquaculture and Fisheries for the Region including Summary of Recommendations from the European Inland Fisheries and Aquaculture Commission (EIFAAC) and the Central Asia and Caucasus Regional Fisheries and Aquaculture Commission (CACFish)

Executive summary

The European region is almost as diverse as can be regarding the development stages of both Marine Fisheries and Aquaculture and the management regimes of these. The EU countries are managed through the Common Fisheries Policy and in the Mediterranean and Adriatic Sea, arrangements exist between the EU and non-EU countries, whereas major issues is to be found in the management of the Black Sea and the Caspian Sea. In the former Soviet countries fish consumption has generally fallen to a very low level and the potential for the development of aquaculture is considerable.

Subject to endorsement by the FAO Council and the Director-General of FAO, the Twenty-sixth Session of EIFAAC recommended the commission to continue as a fishery body under Article VI of the FAO Constitution but with an improved structure and modernized Rules of Procedure. These new Rules of Procedure where all Working Parties and Sub-Commissions were abolished, was adopted at a Special Session held in Rome, October 2011.

Following a number of preparatory meetings in Tajikistan, Kyrgyzstan and Turkey, the countries in the Central Asian and Caucasus region requested July 2009 the FAO Director General to support the establishment of a new article XIV body under the FAO Constitution, which was subsequently approved during the Hundred and Thirty Seventh Session of the FAO Council. The Agreement on the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission, CACFish, came into force on 3 December 2010. The Inaugural Session was held in Istanbul, Turkey from 19 to 21 December 2011 where Tajikistan, Kyrgyzstan and Armenia had deposited their instruments of acceptance of the Agreement with the Director-General of FAO. Here the recommended Rules of Procedure and the Five-year Regional Work Programme (2011-2015) of the Commission was adopted.

I. INTRODUCTION

1. Capture fisheries, whether marine or inland, are special in FAO context in the fact that fishers normally share a common resource contrary to the private resources that exist in agriculture and forestry. This makes the resource difficult to manage because fishers do not feel the long term ownership of the resource that is necessary for a sustainable and optimal utilization.

2. The European region is almost as diverse as can be regarding the development stages of both Marine Fisheries and Aquaculture and the management regimes of these.

3. The fisheries management of the marine waters from the Atlantic to the Baltic and the Mediterranean is coordinated among member countries, linked to of the European Union Common Fisheries Policy (CFP) and coordinated with a number of Regional Fisheries Management Organizations, RFMO's, and advisory commissions. Also the Northern and Eastern seas bordering the Russian Federation are well managed through agreements with international RFMOs. However there is a need for better cooperation on research and management of the fisheries resources in the Black Sea and to some extent in the Caspian Sea, where still a considerable amount of IUU fishing (Illegal, Unreported and Unregulated) seriously precludes sustainable exploitation.

4. Inland fisheries do not contribute a lot to the total fish production and the development stage is normally not at the level of the marine fisheries, but pretty uniform throughout the region.

Fisheries provide crucial resources for both food and income. The contribution of fish to global diets has reached a record level of an average 17 kg per person per year, now supplying more than 3 billion people with at least 15 percent of their average protein intake. This raise is mainly due to the ever-increasing production of aquaculture, now growing at almost 7 percent a year globally, and soon to overtake capture fisheries as a source of food fish. Together, fisheries and aquaculture support the livelihoods of an estimated 540 million people, and fish products account for about US$110 billion in annual trade. Yet, about 32 percent of world fish stocks and 75% of the EU stocks are estimated to be overexploited, depleted or recovering. In the countries of Central and Eastern Europe and Central Asia inland fisheries and aquaculture predominate the sector. The FAO Regional Office for Europe and Central Asia offers support ranging from providing guidance on careful and responsible fisheries management to establishing scientific cooperation among the countries of the region that share lakes, rivers and watersheds. FAO also works to ensure that the needs of smallholders are not overlooked, especially by governments prone to making investments in large-scale aquaculture or inland fisheries infrastructure.

5. Aquaculture, which is the fastest growing food producing sector in the world with an average growth of 7% per year, is also very diversely utilized and developed in the region as documented in the next section of this paper. However aquaculture has a huge development potential in most of the region but in particular in the Eastern part and the Balkans where it might also play a considerable role in poverty alleviation in some countries. Carp, sturgeon, trout and catfish species still dominate freshwater aquaculture in this area, whereas sea bream, sea bass, salmon and rainbow trout dominate the saltwater aquaculture in the Mediterranean (Black Sea) and Atlantic regions with turbot culture and tuna fattening now increasing.

6. There is a need to develop processing and value-addition of the old and extended carp production of Central and Eastern Europe to survive the strong competition of new species from Asia.

7. Many countries of Central and Eastern Europe, Caucasus and Central Asia request technical assistance for certification of aquaculture and capture fisheries products.

8. World fish production has constantly been growing during the past decades. In spite of the recession observed in many fields of agriculture, the fish sector continues its increasing trend.

However, this increase is mainly the result of the development and spreading of different aquaculture technologies. Due to the over exploitation of most economically-important marine species, prospects for growth in capture production are limited and efforts should focus on sustainability and responsible fishing at present. On the other hand, global aquaculture production has achieved great growth as is represented in Figure 1. Although aquaculture production has grown in each region, there are big differences in development rates.

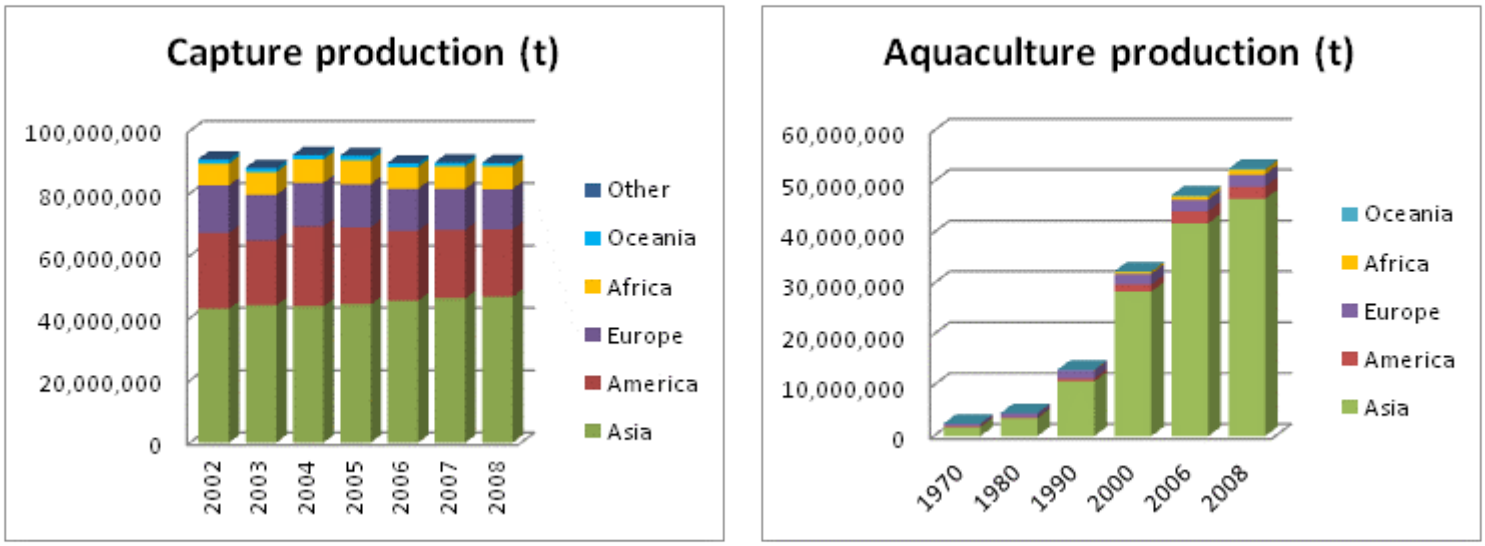

Figure 1: Capture fish and aquaculture production of the world (in tonnes).

9. Europe is a rather heterogeneous region for fisheries and aquaculture. Most of its strengths can also be listed among its weaknesses. In countries belonging to this region, very different environmental, economic, social and cultural conditions can be found which result in great variances in fish production. Capture production seems to have been decreasing slowly but constantly in Europe (Figure 2). However, when examined in detail this tendency becomes less evident. As Western countries of Europe (EU other and other European countries as listed in Table 1) are responsible for more than 60 % of capture fish production of the region, the effect of stagnating or even increasing volumes of all other countries is disguised. Capture production of Eastern European CIS countries, which has been slightly increasing since 2004, is also considerable for the region, it reaches above 30 %. This has only been able to somewhat decrease the rate of the general decline in capture production for the region as a whole.

10. At present the aquaculture sector is not strongly significant in Europe as it only accounts for up to 15 % of the whole fish production of the region. Its share of total aquaculture production of the world is 38 % of total fish production[1]. However, aquaculture still has very promising prospects for the region[2]. In aquaculture production the position of Western European countries is even more dominant than in capture fishery production as they are responsible for more than 80 % of the output of the region. In these countries the latest technologies of fish production are usually available and applied and as such they are able to produce premium quality products with a high level of added value (Figure 3). Aquaculture production of most other countries of the region is rather small, generally due to a lack of capacity and/or proper technology, although most of them have great potential for such activities. In these countries the value of a production unit is also smaller.

[1]Total Fish production: fish for human consumption + fish for reduction - e.g. fish meal and oil, animal feed

[2]In 2015 world aquaculture production will exceed world capture production for human consumption.

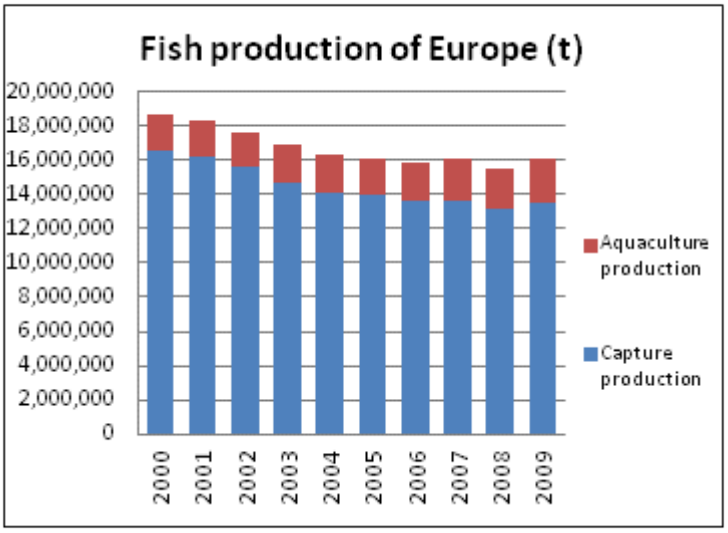

Figure 2: Total fish production in Europe (t)

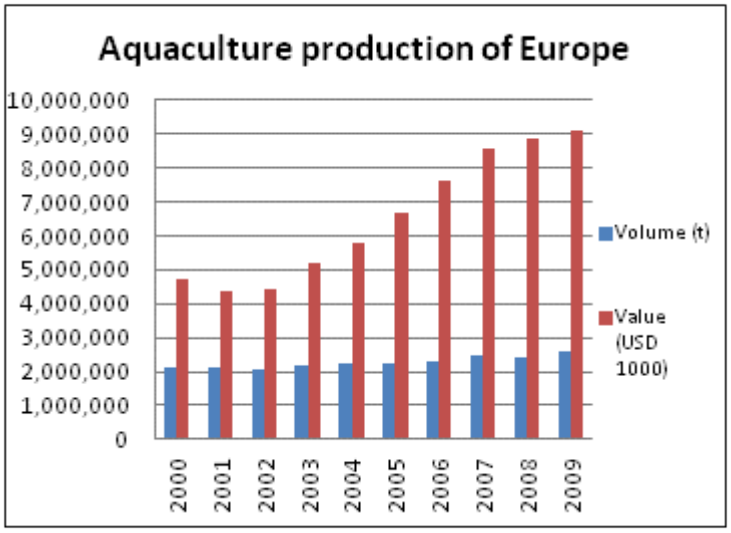

Figure 3: Aquaculture production of Europe in volume (t) and value (USD 1000)

11. In the field of fish production the status of CIS countries is also rather specific. After the dissolution of the Soviet Union both capture and aquaculture production of former member countries suffered a serious decline (Figure 4). Although in the more recent past some of these countries have shown a slight increase in fish production, they are still far behind their former outputs. Most of CIS countries have a great number of production sites suitable for fish production which are not utilized now. Apart from capital investment expertise, proper technology and the development of legal frameworks are also required for the exploitation of such capacities.

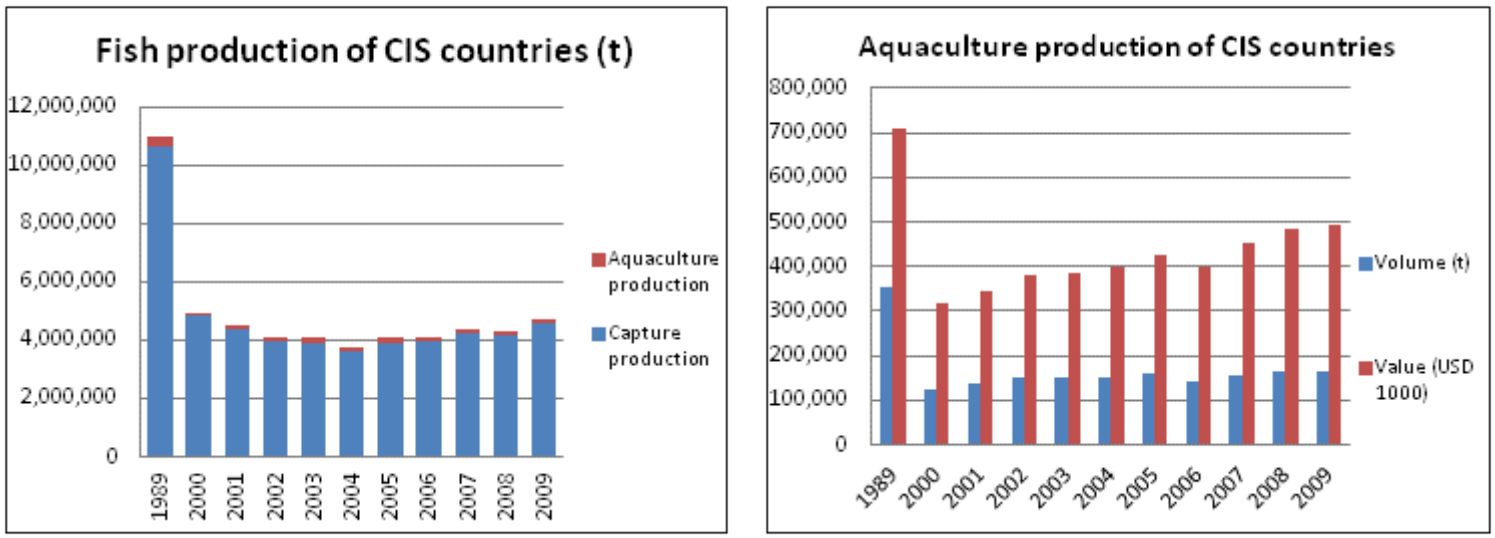

Figure 4: Fish production of CIS countries

12. When fish production of CIS countries is examined in more details it becomes clear that the Russian Federation accounts for nearly 85 % of the total production. Ukraine, Lithuania, Latvia and Belarus are lagging behind with their 14 %. Fish production of other CIS countries is not relevant as they are responsible for about 1 % of total outputs (Figure 5). Aquaculture production contributes with only a minor quantity to total fish production, around 3-4 %. In this field the Russian Federation is the biggest producer as well, followed by Ukraine. Together they are responsible for 85 % of total aquaculture production of CIS countries. In the case of Central Asian CIS countries explanations of poor performance also include the lack of proper water resources and supplies.

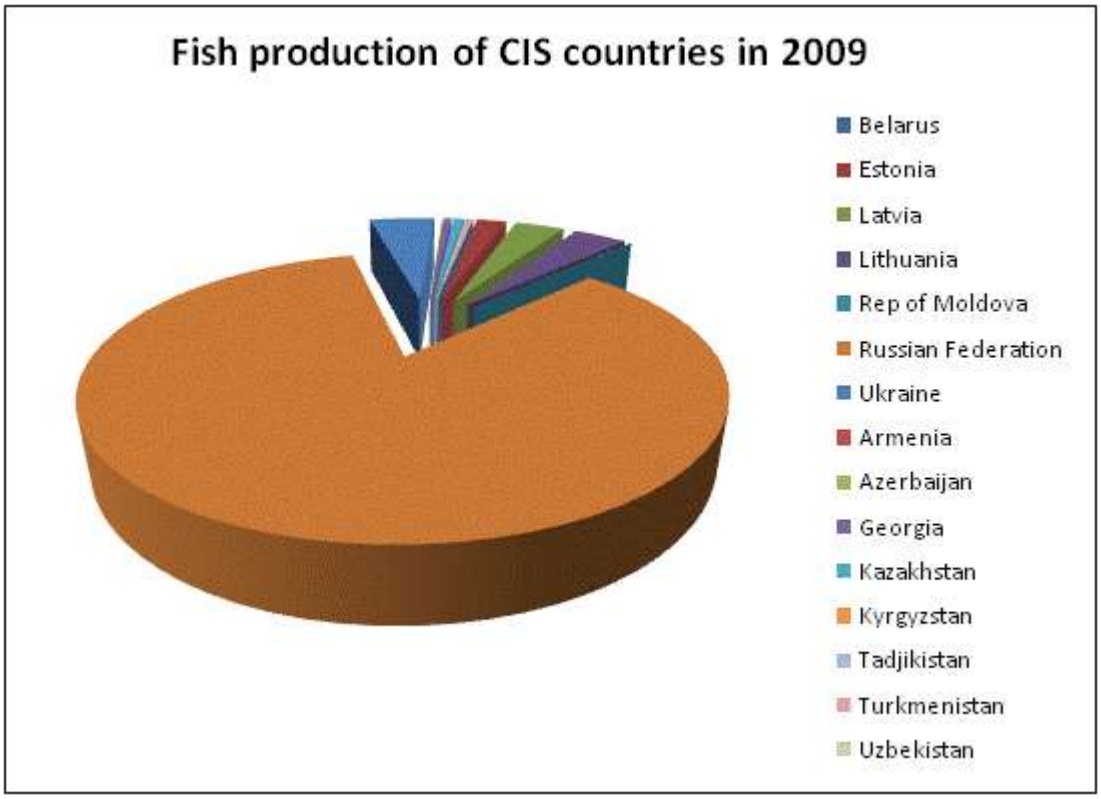

Figure 5: Distribution of fish production among CIS countries in 2009

13. Production volumes are also reflected to a certain extent in the values of consumption per capita (Table 1). Population of countries with high fish production level are more willing to consume and also have better availability to fisheries and aquaculture products.

Central Asia		TransCaucasus &Turkey		East Europe CIS		South Eastern Europe		Central & Eastern EU		EU other		Other European	
Kazakhstan	3.8	Armenia	2	Belarus	15.6	Albania	5	Bulgaria	4.8	Austria	14.2	Iceland	91
Kyrgyzstan	1.8	Azerbaijan	1.8	Republic of Moldova	11.7	Bosnia and Herzegovina	7	Czech Republic	9.9	Belgium	23.4	Norway	51.5
Tajikistan	0.3	Georgia	6.9	Russian Federation	19.9	Croatia	16.8	Estonia	13.7	Cyprus	25.2	Switzerland	15.9
Turkmenistan	3.3	Turkey	6.9	Ukraine	17.3	Montenegro	5.7	Hungary	5.2	Denmark	23.3		
Uzbekistan	0.3					Serbia	5.6	Latvia	14.9	Finland	34		
						TFYR Macedonia	2.9	Lithuania	37.9	France	34.8		
								Poland	10.1	Germany	15.1		
								Romania	5.4	Greece	21.1		
								Slovakia	8.3	Ireland	21.8		
								Slovenia	9.8	Italy	25.2		
										Luxembourg	26.4		
										Malta	31.3		
										Netherlands	19.9		
										Portugal	57.2		
										Spain	44.2		
										Sweden	32.1		
										United Kingdom	21.3		

Table 1: Fish consumption of countries in REU region (kg/capita/year), FAO yearbook. Fishery and Aquaculture Statistics. 2008. World average is 17.1 kg

II. BIG CHANGES IN THE EU COMMON FISHERIES POLICY, CFP.

14. The Common Fisheries Policy of the European Union faces radical changes in the coming years. Despite fisheries management of many of the EU countries having been among the most elaborate in the world and supported by excellent data on stock assessment, the CFP has failed to resolve the problem of overcapacity - fishing capacity is still increasing by about 3 % every year and 75% of the EU fish stocks are overfished.

15. The keywords in the new policy will be **Maximum Sustainable Yield**, MSY, **Transferable Fishing Concessions**, TFCs and **Discard bans**.

16. Despite MSY having been promoted and accepted as target for quite some years, technical and political factors have resulted in exploitations beyond the suggested MSYs. The good news is however that 13 EU stocks are already at MSY level and some others will reach it within one or two years.

17. The simulations in the CFP reform Impact Assessment show that once all MSY levels are achieved, TACs (Total Allowable Catch) will go up; the overall increase being at least 20% by 2020. Such a significant increase has a potential to protect jobs in the catching sector to some extent, as shown by the fact that, according to the simulations, although the number of vessels will decrease, employment per vessel is expected to increase after 2017, and more benefits will follow. The problem for the industry will be the period until the stock have recovered, when the fishery will suffer, but the CFP offers a number of incentives and financial support to the industry to mitigate these problems.

18. Regarding the ban on discarding fish (most discarded fish die), it will enable a better estimation of species mortality and encourage fishers to use more selective fishing gears to minimize discarding. A Discard Ban has been in force for many years in Norway.

19. The Ban would work like this:

- Fish with known high survival rates should be identified and released
- All other fish caught would be landed and counted against the quotas, but only fish over the Minimum Landing Size can be traded for human consumption.

20. TFCs (Transferable Fishing Concessions) and like systems has been used with success in a number of the EU Member States (MS).

21. If designed correctly, TFCs can be an effective tool for vessel owners to plan their fishing activity along market developments, land all catches and plan their investments.

22. It also offers the possibility to leave the industry in exchange for financial compensation. TFC like systems also increase operators responsibility and facilitate discard reduction.

- Aquaculture is the fastest-growing food sector in the world, maintaining a growth rate of almost 7% per year.
- In 2008, world aquaculture production totalled some 53 million tonnes, worth nearly 100 billion dollars. This, in comparison to less than one million tonnes, in 1950.
- 46% of the world's fish production comes from aquaculture.
- During the last three decades the number of fishers and fish farmers has grown faster than the world's population.
- In 2008, Norway produced almost 1 million tons of fish in aquaculture, Italy 200.000 t and Turkey 150.000 t.
- In the same year Georgia produced 180 t, Tajikistan 26 t, Turkmenistan 16 t, Armenia 2000 t, Kyrgyzstan 92 and Azerbaijan 89 t.
- When we include the secondary sector such as handling and processing in world fish production, women make up half of those employed.
- Strengthening the role and performance of regional fishery bodies still remains the major challenge facing international fisheries governance
- There has been a dramatic growth in international trade of fish in value terms which reached a record 102 billion dollars in 2008, nearly doubling in ten years.
- Fish has become among the most highly traded food commodities with nearly 40% of all production now exported
- Traceability is becoming increasingly common in the trade of fish and fish products

III. FAO KEY TECHNICAL ACTIVITIES IN THE REGION

23. **Policy support.** As a result of FAO support to the countries of the region in setting appropriate policy and institutional frameworks to develop modern fisheries sectors and establish sustainable fisheries management plans, there has been a significant increase in the capacities of national fisheries administrations. The FAO Code of Conduct for Responsible Fisheries, adopted by many countries in the region, is supported by guidelines and plans of action for undertaking an ecosystem approach to fisheries and for combating illegal, unreported and unregulated (IUU) fishing in the region. FAO has translated the Code and six of its technical guidelines into Russian and supported their dissemination. In addition, FAO works with governments to help them develop the regulatory and certification procedures needed to participate in trade of fish and fisheries products.

24. **Practical support.** Field activities or as they are called here "practical support" are important to show actual good practices, bring the lessons learned at policy level and often also to attract government attention to FAO recommendations. This is valid for all sectors and justifies FAO field programme whose effectiveness is often questioned.
FAO responds to requests from the countries in the region for tangible help – meaning practical technical support in building or restoring their fisheries and aquaculture sectors. This practical support aims at introducing modern production systems and technologies across the value chain, including aquaculture production and reproduction, fish feed production and pond construction. In addition to capacity-building workshops, FAO produces manuals in response to member requests, such as guidelines on carp and trout propagation. FAO also produced a basic training manual on water re-circulating systems, as opposed to flow-through, aquaculture systems. These systems clean and re-use water and thus do not pollute rivers and streams. This system also reduces the risk of disease, thus reducing the need for antibiotics in the system. By sharing the basic information on the system, FAO supports decision-makers in determining in advance if they have the capacity to develop and operate such a system.

25. **Regional collaboration**. The challenges to achieving sustainability of fisheries and aquaculture are global and need to be addressed by coordinated action. In addition to the dominance of the Black, Caspian, Adriatic and Mediterranean Seas, the countries of Central and Eastern Europe and Central Asia are connected by huge networks of watersheds and rivers that run through many of the countries. FAO's numerous regional- and national-level capacity-building activities have brought countries together to find joint approaches for overcoming their similar problems. This has resulted in increased collaboration and partnerships within the region and between public and private sectors at national level. In the past, with the centralized governance systems, dams, hydroelectric power stations and large irrigation systems were built with no consideration for impact on other countries, with results such as prohibiting fish from accessing spawning grounds. FAO has established and supports regional fisheries bodies to facilitate the ability of these countries to work together, insuring that developments in one country do not have negative impacts on other countries.

- Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFISH), unanimously approved by the FAO governing Council in 2009, came into force in 2010, with a programme to work regionally to promote development, conservation, resource management and aquaculture development in the region.
- European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) assists in the collection of information, facilitates cooperation among governmental organizations, and advises on sustainable development of inland fisheries and aquaculture.
- General Fisheries Commission for the Mediterranean (GFCM) covers the Mediterranean and Black Seas and connecting waters, and promotes the development, conservation and management of marine resources and encourages cooperative training and research projects.

- Network of Aquaculture Centres in Central and Eastern Europe (NACEE) was established with the mission to facilitate the integration of the Central and Eastern European fisheries and aquaculture research and development sector into European research and higher education.

A. Establishment of the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish)

26. In Central Asian and Caucasus Region, agriculture is one of the primary sectors of economic activity and income. National policy goals for fisheries, including aquaculture are generally set within the context of rural and agricultural development policies. Although the contribution of fisheries to national GDPs is practically negligible, it provides food, income, and livelihoods, particularly at local level.

27. Inland fisheries and aquaculture production in the Central Asian countries (i.e. Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) has experienced a dramatic decline since independence of these countries from the former Union of the Soviet Socialist Republics in the early 1990s, a transition period during which national economies and policies changed greatly. Despite the on-going efforts by the Central Asian countries to develop sustainable fisheries, a number of constraints and substantial restrictions still remain particularly infrastructural and financial ones. Against this background, few Governments from the region requested FAO to look the ways for enhancement of regional fisheries cooperation through establishment of a regional fisheries management organizations or other arrangement in the region. In response, FAO Sub regional Office for Central Asia (SEC) technically assisted a first intergovernmental meeting on this subject in Dushanbe hosted by the Government of Tajikistan in November 2008.

28. The Dushanbe Meeting received follow-up from three Regional Intergovernmental Meetings (held in Trabzon, Turkey, June 2009 and November 2010 and in Cholpon Ata, Kyrgyzstan June 2011) and two Steering Committee meetings (held in Ankara, Turkey, March 2009 and Istanbul, Turkey, February 2010). Each meeting was attended by 7 to 12 official delegations representing the following States: Afghanistan, Armenia, Azerbaijan, People's Republic China, Georgia, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkey, Ukraine and Uzbekistan.

29. Having evaluated the various options for regional collaboration available, the countries requested in July 2009 the FAO Director General to support the establishment of a new article XIV body under the FAO Constitution. The eighty-eighth session of the Committee on Constitutional and Legal Matters (CCLM) reviewed in September 2009 the draft Agreement on the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission as endorsed by the Trabzon meeting (June 2009) and forwarded it for approval by the FAO Council at its Hundred and Thirty Seventh Session. The Agreement approved by the FAO Council, on 1st October 2009, was sent by Director General of FAO, In December 2009, to the following countries: Armenia, Azerbaijan, People's Republic China, Georgia, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Afghanistan, Mongolia and Ukraine.

30. In 2010 Governments of Tajikistan, Kyrgyzstan and Armenia have deposited their instruments of acceptance of the Agreement with the Director-General of FAO. The Agreement on the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission came into force on 3 December 2010.

31. The Inaugural Session, which was held in Istanbul, Turkey from 19 to 21 December 2011, encouraged Afghanistan, Azerbaijan, China, Georgia, Islamic Republic of Iran, Kazakhstan,

Mongolia, Russian Federation, Turkmenistan, Ukraine and Uzbekistan to expedite their national processes of acceptance.

32. The following factors played a great part in the notable success of establishment of the CACFish:

- Well-designed and well-managed establishment process
- Active involvement of region's States in that process and the functional and synchronized cooperation between FAO and States during the initiative.
- The strong support provided by the Central Asia Regional Programme for Fisheries and Aquaculture Development" (FishDev-Central Asia), an on-going programme being conducted under FAO-Turkey Partnership Programme
- Backstopping assistance and guidance provided by FAO to governments involved in the establishment process with regard to establishment process of the Commission, drafting of legal basic text, 5-year work programme of the Commission
- Awareness raised, on the importance of regional fisheries management, through the capacity building activities that had done during the preparatory works for the establishment of the Commission

33. Regional fisheries cooperation in the Central Asian and Caucasus region is becoming more visible through the more strengthened cooperation mechanisms. CACFish is expected to be more influential on the development of regional governance frameworks for fisheries and aquaculture in the Central Asian and Caucasus region. In response to the request by the 29th Session of COFI, FAO will organize a scoping workshop on regional cooperation for responsible aquaculture and fisheries development in the central Asian and Caucasian countries in Urumqi of China in June 2012. This is to further strengthen cooperation in aquaculture and fisheries development among Central Asian (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) and Caucasian countries (Azerbaijan, Armenia, Georgia) and to facilitate the bilateral cooperation between China and its neighbouring countries in the central and south Asia, including the countries that are under FAO south-south cooperation programme and also the countries that are the focus countries in the region to roll out their national programme for food security (NPFS) with assistance from FAO.

B. European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC)

34. The Council of FAO in its 140th Session has adopted Resolution 3/140, taking note that the Twenty Fifth Session of EIFAC, held in Antalya, Turkey, from 21 to 28 May 2008 had agreed to change the name of EIFAC, introducing aquaculture in order to recognize the importance of aquaculture to the countries in Europe and to properly reflect the activities of EIFAC, and decided to approve the revised name and Statutes of the Commission, whereby the European Inland Fisheries Advisory Commission (EIFAC) is now called European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC).

35. A Regional Workshop on Recreational Fisheries in Central Asia (Issyk-Kul, Kyrgyzstan, 14-16 September 2009) was organized in response to needs expressed in various national fisheries sector review studies in Central Asia. The workshop was attended by representatives from four of the five Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) and some international recreational fisheries experts.

36. The workshop conclusions, amongst others, were that on average some 10 percent of the population in Central Asia is involved in recreational fisheries (including leisure- and sport fisheries); recreational fisheries harvests provide a significant contribution to food security (qualitative and quantitative) in remote rural areas; recreational fisheries stakeholders continue to have problems being recognized as an equal partner by other resource users; in the preservation of aquatic biodiversity the role of fishing and hunting associations and societies in Central Asia is of great importance; and that

the Code of Practice for Recreational Fisheries, as endorsed by EIFAAC in 2008, is largely applicable also for the situation in Central Asia.

37. The Twenty-sixth Session of EIFAAC was held in Zagreb, Croatia, from 17 to 20 May 2010. The Session reviewed EIFAAC's activities since 2008 in the fields of fishery biology and management, aquaculture, protection of the aquatic environment and social and economic issues. The Session deliberated on the options for the restructuring and improving of the functioning of the Commission and decided that EIFAAC should continue as a fishery body under Article VI of the FAO Constitution but with an improved structure and modernized Rules of Procedure, subject to endorsement of these decisions by the FAO Council and the Director-General of FAO.

38. An EIFAAC Special Session was held in Rome, Italy, 27 October 2011 for Adoption of the new Rules of Procedure where all Working Parties and Sub-Commissions were abolished and where it was decided to adopt a project approach for future work in relevant fields. The Technical and Scientific Committee shall review and evaluate each project proposal. English shall be the working language of the Commission. The Twenty-seventh Session will be held June 11-15, 2012.

C. Network of Aquaculture Centres in Central and Eastern Europe (NACEE)

39. The Network of Aquaculture Centres in Central and Eastern Europe (NACEE) was officially established in 2004 with the mission of facilitating the integration of the Central and Eastern European fisheries and aquaculture R&D sector into the European Research Area and the European Higher Education Area. After operating for some years as a loose association of fisheries-and-aquaculture-related research and educational institutions without a legal personality, and establishing itself as an acknowledged European aquaculture organization, NACEE was transformed into a registered non-governmental organization in December 2010. In the year since the transformation, NACEE's efforts were mainly directed towards the consolidation of its operational framework and financial situation. However, in spite of this transition period, NACEE also continued its professional activities. Together with EAS (European Aquaculture Society), it took an active part in the development of the review of the status of European aquaculture commissioned by FAO in 2009/2010. In 2011, it held a workshop on the role of aquaculture in rural development in Chisinau, Moldova, and a highly successful young researchers' conference in St. Petersburg, Russia. The development of NACEE's research agenda, laying down the bases of future work, is under way. NACEE also works on strengthening its ties with other regional networks, especially NACA. At a recent meeting, it was decided that NACEE and NACA would apply for associate membership in each others' networks.

IV. Emerging problems in the region

40. Aquaculture is one of the constantly developing areas of production in the world. It uses many different types of technologies from the relatively simple and cheap pond fish production to the most advanced production types in water reuse systems. In such closed systems which create an adequate environment for the development of many fish species, there is a possibility to produce these species basically everywhere in the world. As a result, these fish have been introduced and reared in places where they could not be found previously. However, the introduction of alien fish species has raised some concerns that need cooperative action.

41. The introduction of alien species needs special attention not only from farms and enterprises but also from governments to create a legal frame for such activities. Prevention of escapes is a most focused part of the production of such species since escapes can result in serious environmental damage. When the alien species is able to find a favourable environment it can spread quickly and displace native species in the competition over food, habitat, etc. This is especially important when

climate change is also considered as the higher number of unexpected natural phenomena increases the risk of escapes.

42. Regarding escapes, it is not only alien species that are able to generate problems in the environment. As farmed species are reared within relatively even conditions and they don't have the opportunity for uncontrolled reproduction they develop a rather homogeneous genetic stock. As a result when a high number of them escapes they modify and degrade the genetic stock of local wild populations. This is especially dangerous in places – eg. in small streams, river branches or ponds - where unique, endemic sub-species are present or in marine cage cultures where the escapees can cause a rapid degradation.

43. A comprehensive plan of action is required to find an adequate solution for these problems. It is of high importance for both developed and developing countries since most intensive systems are located in developed countries while in developing ones the lack of regulations and their implementation can be the main source of problems. As REU is a rather heterogeneous region regarding the level of fish production it will need a high number of discussions and reconciliations to reach a proper, efficient and compliable agreement that can serve as a base for individual actions.

44. As the European Union is one of the world's biggest importers of fishery and aquaculture products there is a large amount of fish transport in the region. Although the EU has strict rules and regulations regarding food safety and the import of such products there are a number of countries less advanced in legislation and/or implementation regarding transportation. Currently some of the most serious problems faced by the sector are pathogens and diseases spread and introduced through movements of hatchery produced stocks, new species for aquaculture and development and enhancement of the ornamental fish trade. Once a disease agent becomes introduced and established into the natural environment, there is little or no possibility for either treatment or eradication. While infections from wild to cultured populations have predictable consequences due to accessible hosts under cultured conditions, the outcomes of culture-borne transmissions to wild stocks are more difficult to predict. Thus the role of prevention becomes even more significant, strategies of which should include compliance with international codes, development and implementation of regional guidelines and national aquatic animal health strategies; development of diagnostic and therapeutic techniques and information technology; biosecurity measures including risk analysis, epidemiology, surveillance, reporting and planning for emergency response; targeted research; institutional strengthening and manpower development (education, training, extension research and diagnostic services).

45. Aquaculture production technology of tuna is another field in the sector that needs attention. The production is still capture-based which implies some issues related to the management of wild stocks. On the other hand, fisheries will collapse if pressure on wild stocks is maintained. It is required to mitigate the impact of illegal fishing in capture fishery as it is estimated that 30 percent of the total world bluefin tuna catches derive from IUU fishing. These fishing activities must be controlled and eliminated and the industry must comply with the quotas agreed for the conservation of the wild stock. It is also recommended that the catch data from "recreational fishing" is recorded to curb illegal sport fishing of tuna.

46. Feeding of farmed tuna requires a significant consideration. There is very little information available about the food intake of tuna and overfeeding seems to be a common practice among fish farmers. As currently no adequate formulated feed is offered for tuna farmers they still need to use wild fish for feeding. However, the problem is not with the quantity of food but rather the supply and quality of nutrients obtained after its consumption. Feed conversion ratios (FCR) of tuna are generally quite high (around 15–20:1 for large and 10–15:1 for smaller fish) as they have an unusually high body temperature and their constant movement implies a high energy demand so only a small fraction of the total energy input is used for body growth. Formulation and development of artificial diets could be able to support a better feed conversion ratio, ensure a better control over the quality of fish meat, partly eliminate or at least ease farm logistics in terms of sourcing, purchasing, transporting and storing of feed, and could also considerably reduce health risks and spread of fish diseases associated with the use of raw fish. The use of wild feedfish raises a number of other concerns as well, including

the relative impact of harvest on small pelagic resources, and also a risk of environmental deterioration as a result of accumulation of uneaten feed fish on the sediment.