

**EUROPEAN INLAND FISHERIES ADVISORY COMMISSION**

**Report of the**

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**SYMPOSIUM ON INTERACTIONS BETWEEN SOCIAL, ECONOMIC  
AND ECOLOGICAL OBJECTIVES OF INLAND COMMERCIAL AND  
RECREATIONAL FISHERIES AND AQUACULTURE**

**Antalya, Turkey, 21–24 May 2008**

**held in connection with the**

**EUROPEAN INLAND FISHERIES ADVISORY COMMISSION  
Twenty-fifth session**

**Antalya, Turkey, 21–28 May 2008**



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## PREPARATION OF THIS DOCUMENT

The Symposium on Interactions between Social, Economic and Ecological Objectives of Inland Commercial and Recreational Fisheries and Aquaculture was organized in conjunction with the twenty-fifth session of the European Inland Fisheries Advisory Commission (EIFAC) in Antalya, Turkey, from 21 to 24 May 2008.

This report contains a summary of the presentations and subsequent discussions held at the symposium and the conclusions and recommendations of the symposium to the subsequent EIFAC session.

The report was prepared by Mr Ian Cowx (Hull University, United Kingdom) and Mr Raymon van Anrooy of the FAO Subregional Office for Central Asia (SEC). The authors of the report would like to thank Mr Ramazan Celebi and Mr Erkan Gözğözoğlu (Ministry of Agriculture and Rural Affairs [MARA], Turkey) and their staff; Mr Yilmaz Emre (Mediterranean Fisheries Research, Production and Training Institute [AKSAM], Turkey) and his staff; Mr Ibrahim Okumuş (Rize University, Turkey); Mr Robert Arlinghaus (Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Germany); Mr Phil Hickley and Mr Miran Aprahamian (Environment Agency, United Kingdom); Mr Eric Hudson (Centre for Environment Fisheries and Aquaculture Science, United Kingdom); Mr Laszlo Varadi (Research Institute for Fisheries, Aquaculture and Irrigation [HAKI], Hungary); Mr Arjo Rothuis (Ministry of Agriculture, Nature and Food Quality, The Netherlands); Mr Sedat Yerli (Hacateppe University, Turkey); Mr Andy Thorpe (University of Portsmouth, United Kingdom); Mr Atilla Ozdemir (Central Fisheries Research Institute, Turkey); Ms Anna Rita Colagrossi, Ms Dila Altin, Ms Deniz Ozkan, Ms Aysegul Omur, Mr Gerd Marmulla and Mr Thomas Moth-Poulsen (FAO); and many other assistants provided by the local hosts, for their collaboration in the preparation and organization of the symposium and in making it the success it became. General thanks for their important contributions to the presentations and discussions are due to all who attended the symposium.

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### ABSTRACT

The Symposium on Interactions between Social, Economic and Ecological Objectives of Inland Commercial and Recreational Fisheries and Aquaculture, was organized in conjunction with the twenty-fifth session of the European Inland Fisheries Advisory Commission (EIFAC) in Antalya, Turkey, from 21 to 24 May 2008. The symposium was chaired by Mr Ibrahim Okumuş (Turkey) and convened by Mr Ian Cowx (United Kingdom) and was attended by 255 participants from 26 countries. The symposium programme comprised 57 oral presentations and 24 posters.

The symposium was opened by Mr Mehmet Mehdi Eker, Minister for Agriculture and Rural Affairs of Turkey (MARA), Mr Phil Hickley (EIFAC Chairperson), Mr Gerd Marmulla (Secretary of EIFAC) and Mr Raymon van Anrooy (FAO Secretary to the symposium).

The symposium objectives were:

- 1) To review the wide range of socio-economic and ecological interactions between fisheries and aquaculture and the roles of various stakeholders with respect to these interactions.
- 2) To identify where future research should focus and propose measures to decrease interactions that compromise sustainable development and management, and promote interactions that contribute to sustainability.
- 3) To provide information to policy- and decision-makers to contribute to the general awareness of trends in socio-economic and ecological interactions within and between the sector and other rural sectors.
- 4) To facilitate dialogue between scientists, researchers, fisherfolk, aquaculturists and policy- and decision-makers on the motives, interactions and interests of stakeholders.
- 5) To advise EIFAC on appropriate management and development measures and tools for inland fisheries and aquaculture in Europe.

The symposium made considerable progress towards understanding the interactions between ecological/environmental and socio-economic/governance objectives for fisheries and aquaculture. There was a broad recognition that inland fisheries and aquaculture need to shift from a sectoral view where they are treated in isolation to an integrated, multidisciplinary systems view.

The symposium provided a number of clear and comprehensive conclusions and recommendations to the twenty-fifth session of EIFAC for follow-up by the appropriate responsible bodies.

Some key papers of the symposium will be published in a special issue of the Wiley Journal, Fisheries Management and Ecology and other papers and abstracts will be published in 2009 in an EIFAC Occasional Paper.

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# **SYMPOSIUM REPORT**

## **BACKGROUND AND OBJECTIVES**

Sustainability is at the core of efforts to develop and manage inland fisheries (i.e. commercial and recreational) and aquaculture in Europe. Sustainability in this context includes social, economic and ecological (or more broadly environmental) aspects, which are shaped by functioning governance structures and management institutions. Previous EIFAC symposia have shown that in many cases sustainability is not viewed from all these three aspects in an integrated manner.

The FAO Code of Conduct for Responsible Fisheries and the European Union (EU) strategy for sustainable development of European aquaculture recognize that the sector should take an approach where farming and fisheries technologies, social and economic issues, natural resource use, biodiversity conservation and governance are integrated to enhance sustainable management.

Interactions between social, economic and ecological objectives of inland fisheries and aquaculture are numerous, and include amongst others:

- Improvement in ecological status of rivers, lakes and other water bodies
- (Re-)stocking for commercial and recreational fisheries
- Recovery and conservation of depleted/threatened stocks
- Collection of fish from the wild for aquaculture
- Harvesting by commercial and recreational fisheries for human consumption
- Catch-and-release recreational fishing
- Employment and income generation by capture fisheries and aquaculture
- Pollution of inland water bodies by aquaculture
- Escapes of fish from farms and introduction of alien species
- Increase of eutrophication through water discharge from farms or other sources
- Harvesting of protected species
- Conflicts between resource users, non-users and interest groups, and competitiveness of the sector compared to other sectors
- The role of fisheries within society and in cultural and religious traditions, and
- Enactment of new and enforcement of current policies, and decisions on water use.

Interactions between social, economic and ecological objectives are particularly relevant considering the ongoing shift from a dominance of commercial towards recreational fisheries. This raises issues of economic rent, angling tourism, ethics of exploitation and competing objectives between biodiversity conservation and expansion of recreational fishing opportunities. A Seminar organized by the European Association of Agricultural Economists (EAAE) on the “Economics of aquaculture with respect to fisheries”<sup>1</sup> (Civitavecchia, December 2005) identified a great need to explore these interactions further to identify appropriate solutions that balance private and public use of goods now and in the future.

Similarly, the General Fisheries Commission for the Mediterranean/Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea (ADRIAMED) organized an Expert Consultation in Rome (November 2003) on “Interactions between aquaculture and capture fisheries”<sup>2</sup>. This consultation highlighted the importance of interactions between capture fisheries and aquaculture in terms of impact on biodiversity, restocking of depleted stocks, space and water competition, marketing and the livelihoods in fishing communities with particular emphasis on the Mediterranean area. Unfortunately, discussions on this subject have mainly focused on the marine environment and inland fisheries have received little attention. The EIFAC symposium aimed to address this gap.

This issue is particularly relevant in inland waters in Europe because of obligations under the EU Water Framework, Bird and Habitats Directives. Conflicts could potentially arise within the fisheries and aquaculture sectors because of needs to protect biodiversity and improve the ecological status of waters. Resolution of such conflicts was discussed at the symposium.

The principal aim of the symposium was to provide a forum for those working on specific socio-economic and ecological aspects of inland fisheries and aquaculture in Europe (including researchers, natural and social scientists, environmental scientists, fisherfolk, aquaculturists, economists, planners, government officials, non-governmental organization [NGO] representatives, and other stakeholders), to review the interactions between socio-economic and ecological objectives in fisheries and aquaculture, exchange experiences and discuss solutions to imbalances in sustainable development and management of the sector.

The *specific objectives* of the symposium were the following:

- To review the wide range of socio-economic and ecological interactions between fisheries and aquaculture and the roles of various stakeholders with respect to these interactions.
- To identify where future research should focus and propose measures to decrease interactions that compromise sustainable development and management, and promote interactions that contribute to sustainability.

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<sup>1</sup> “Economics of aquaculture with respect to fisheries”. Proceedings of the 95th EAAE Seminar, Civitavecchia (Rome), Italy, 9–11 December 2005. K.J. Thomson and L. Venzi (eds), November 2006.

<sup>2</sup> “Interactions between aquaculture and capture fisheries: a methodological perspective”. *Studies and Reviews. General Fisheries Commission for the Mediterranean*. No. 78. Rome, FAO. 2005. 229p. Cataudella, S.; Massa, F.; Crosetti, D. (eds.) <http://www.fao.org/docrep/009/a0141e/A0141E00.htm#TOC>

- To provide information to policy- and decision-makers to contribute to the general awareness of trends in socio-economic and ecological interactions within and between the sector and other rural sectors.
- To facilitate dialogue between scientists, researchers, fisherfolk, aquaculturists and policy- and decision-makers on the motives, interactions and interests of stakeholders.
- To advise EIFAC on appropriate management and development measures and tools for inland fisheries and aquaculture in Europe.

The symposium examined interactions, in accordance with the following four thematic areas:

- 1) *Ecological interactions* (including among others, rehabilitation of aquatic systems, pollution, global warming overexploitation, species introductions, restocking of inland water bodies for fisheries and extensive culture, use of natural stocks for aquaculture production, organic and inorganic waste, organic aquaculture, use of fish to feed fish, aquatic animal health issues, utilization of chemicals, therapeutants and hormones). Competition for resources between commercial fisheries, recreational fisheries and aquaculture and with other resource users was one of the key issues under this theme.
- 2) *Economic interactions* (issues might include, among others, markets and market opportunities, equity issues, income issues, recreational fisheries evaluation, opportunity costs of resource use, value of natural common property resources).
- 3) *Social interactions* (employment and gender issues, alternative uses of resources, cultural aspects of resource harvesting and consumption, stakeholder participation in integrated planning).
- 4) *Governance interactions* (including latest developments with regards to the EU Water Framework and Habitats Directives, forthcoming policy regulations, directives and management plans, codes of practices and guidelines, competition between stakeholders for allocation of public and common-property-goods, legislation and zoning, conservation areas).

#### **ATTENDANCE OF THE SYMPOSIUM**

The Symposium on Interactions between Social, Economic and Ecological Objectives of Inland Commercial and Recreational Fisheries and Aquaculture was organized in conjunction with the twenty-fifth session of the European Inland Fisheries Advisory Commission (EIFAC) in Antalya, Turkey, from 21 to 24 May 2008. The symposium was chaired by Mr Ibrahim Okumuş (Turkey) and convened by Mr Ian Cowx (United Kingdom) and was attended by 255 participants from 26 countries. The symposium programme comprised 57 oral presentations and 24 posters. The symposium programme and a list of participants are attached as Appendixes A and B to this report.

#### **OPENING OF THE SYMPOSIUM**

The participants in the symposium were welcomed by H.E. Mr Mehmet Mehdi Eker, Minister for Agriculture and Rural Affairs of Turkey (MARA), Mr Phil Hickley (EIFAC Chairperson), Mr Gerd Marmulla (Secretary of EIFAC) and Mr Raymon van Anrooy (FAO Secretary to the symposium). The welcome speech of Minister Eker is attached as Appendix C to this report.

Following the welcome remarks, Mr Ian Cowx, Convener of the symposium, on behalf of the Scientific Steering Committee, presented an overview of the symposium objectives, the background information and the symposium programme.

## **SUMMARY OF PRESENTATIONS AND DISCUSSIONS**

The oral presentations followed the structure of the symposium, which comprised four main sessions, supported by a number of sub-sessions and a workshop-style discussion at the end of the first three sessions.

The symposium sessions were divided as follows:

Session 1: Ecological interactions

Session 2: Socio-economic interactions

Session 3: Governance

Session 4: Conclusions and recommendations to the EIFAC twenty-fifth session

Poster sessions on ecology and aquaculture (first day) and on management and development of fisheries (second day) were also held.

A summary of the paper presentations and subsequent discussions held at the symposium is presented below by session:

### **Session 1: Ecological interactions**

The main contents of the presentations and the discussions can be summarized as follows:

1. Fish communities in lakes are negatively as well as positively affected by anthropogenic nutrient inputs, which cause shifts in diversity, abundance and biomass. Whereas one might conclude that meeting the objectives of the European Water Framework Directive (WFD) could be beneficial for fish habitat, fish and inland fisheries in principle, these relationships might be highly complex. Improving the ecological state of inland waters in line with the WFD by reducing nutrient inputs might result in reduced fisheries productivity. Fisheries exploitation and fisheries management actions, such as stocking, must be better integrated in assessments of the ecological state of lakes. Harmonization of ecological assessment methods at the international level would be helpful.
2. A myriad of lethal and sub-lethal impacts from catch-and-release recreational angling practices exist. Catch-and-release can constitute a viable way of matching angler demands with conservation goals. Catch-and-release mortality might negatively affect fish stocks as can sub-lethal impacts (e.g. fitness consequences). The need for research into catch-and-release related mortality for some European fish species, including cyprinids, zander, pike and eel was identified. It was noted, however, that catch-and-release practices offer useful components of any strategy designed to move towards sustainable exploitation in recreational fisheries.
3. The risks associated with introducing invasive alien species should be taken into account when promoting and enhancing aquaculture. Protocols for assessment of risk associated with introductions of fish species for aquaculture purpose are required at the European level. Guidelines are currently being developed to facilitate environmentally sound introductions of species for aquaculture purposes. Threats to the sustainability of the sector associated with

“accidental” or illegal stocking practices of non-native fish into open water bodies, should be monitored and controlled better by international and national administrations.

4. Stocking of fish to enhance fish harvests of natural water bodies is often used (and sometimes misused) in fisheries management. Practical experiences (i.e. from some experiments with brown trout in Germany) have shown that fish harvests do not necessarily decline when stocking practices are ceased, i.e. there is not necessarily a positive relationship between stocking and fish harvests. Stocking experiments, including the cessation of stocking to test for the actual benefits of stocking on yields and catches by anglers and fishers, should be encouraged.

5. Polish experiences in traditional carp pond farming practices have shown that these often lead to balanced habitats (in terms of fauna and flora diversity), and have positive effects on the environment through the accumulated water bodies and provide economic benefits to rural populations. Side benefits of carp farming practices are great in terms of environmental, social and economic aspects.

6. Discussion of different waste-water treatment methods for effluents from land-based trout farms (e.g. sedimentation in constructed wetlands) showed that the application of micro-screens had positive effects on water quality.

7. Management strategies and measures (including protection by legal regimes, reproduction, restocking, and aquaculture) for endangered sturgeon species in Bulgaria, Serbia and Hungary were discussed and compared.

8. The Finnish Fish Index of Biological Integrity Index was proposed as a suitable tool for monitoring the ecological status of rivers, following the guidance of the Water Framework Directive (WFD). The index tested included number of fish species, proportion of sensitive species, proportion of tolerant species, proportion of cyprinid individuals and density of age 0+ salmonids. The index might be useful for other EIFAC countries.

9. Experiences from the Czech Republic showed that recreational anglers are capable (if organized) of keeping angling records, even for large water bodies. These records contain high quality information and are suitable for management decision-making purposes.

10. In Finland, populations of migrating brown-trout have diminished over the last decade because of dams that stopped migration in the rivers and overfishing by gillnets. Regulation of gillnet fishing and restoration of stream channels have not led to full recovery of the stocks. By catch from intensive gillnetting is believed to be the main threat in their recovery process.

11. Sturgeon stocks in Turkish waters have declined because of overfishing, destruction of critical habitats and illegal fishing. It was argued that a new management strategy should be developed to rehabilitate the stocks; the establishment of a coastal protected area was also considered.

12. The possible negative effects of global warming on aquaculture development in Turkey were discussed. Preventive measures that could be taken were suggested and include the development of an integrated water management plan, construction of dams and ponds to store water, increased use of recirculation systems, development of polyculture, and integration of aquaculture with other agriculture activities. Further studies and regional collaboration on the effects of global warming on fisheries and aquaculture are urgently required.

13. Introduction of signal crayfish in Finnish waters in the late 1960s can be considered successful. It grows in co-existence with the native noble crayfish and its growth in production provides good opportunities for the fisheries sector. Ecological consequences of the rapid growth and distribution of the introduced species should be monitored closely.

14. Introduction of goldfish in ponds with native crucian carp in the United Kingdom has caused some negative ecological consequences, particularly competition with other cyprinid species and the distribution of some aquatic plant species.

15. Damage by cormorant populations to fish farm economic viability can be large (as a case from Serbia showed). Mortality, infection rates and other fish health parameters were negatively affected by cormorant colonies nearby fish ponds.

16. A case from Turkey showed that fishing activities in some lagoon areas were negatively affected by tourism, transport, agricultural run-off, and untreated urban waste. Fish populations suffer in these circumstances from bad water quality (high heavy metal pollution), wave damage to reed beds and stressful environments.

17. Eutrophication of various inland waters (lakes and damlakes) in Turkey is a problem that affects fish populations. Anthropogenic activities are adding to the changes in trophic status of these water bodies. Various methods can be applied to measure water quality of these lakes that are suitable for recreational fisheries.

## **Session 2: Socio-economic interactions**

The main contents of the presentations and the discussions can be summarized as follows:

1. A major problem affecting commercial fisheries (in Serbia and Croatia) is the unclear social status (social security, insurance, etc.) of the fisherfolk in these countries, which is associated with their low level of organization. Recreational fisheries (anglers) are more important in terms of persons involved and socio-economic aspects and it is generally better organized. In Serbia, recreational fisheries is mainly for home consumption of the fish harvested, while in Croatia the recreational/leisure aspects are more important than the consumption aspects. Common issues are the generally poor status of the fish stocks, and the lack of fishery regulatory and enforcement frameworks. Restocking is considered a management tool to improve the status of the stocks.

2. Extensive aquaculture practices in Hungary offer opportunities for diversification of rural farm incomes through the provision of angling facilities. Investment in angling facilities is considered most viable when combined with other services such as a restaurant facilities and wild-life or bird watching. The risk of escape of fish from farms to the natural water bodies (biosecurity threats) is not considered a problem at present.

3. Awareness raising and education by NGOs on illegal fishery practices in Turkey (on pearl mullet in the spawning season) was effective as illegal fishing was reduced significantly with little loss of economic benefits.

4. Inland fishery production in Central Asia has declined sharply in the period following the former Union of the Soviet Socialist Republics. Causes for this decline include overfishing,

environmental degradation, fish migration barriers, poor governance (lack of policy and regulatory frameworks and limited management support to the sector), illegal, unreported and unregulated (IUU) fishing, and introduction of exotic species that had negative effects on native species stocks. Signs of renewed interest in the sector are visible as policy and regulatory frameworks are being updated, development cooperation is increasing and regional cooperation is starting to take-off. The inland fisheries sector in Eastern Europe and Central Asia can learn from the research, development and management experiences in the Western and Central parts of Europe; therefore translation of key EIFAC documents into the Russian language is required. Network of Aquaculture Centres in Central and Eastern Europe (NACEE) experiences may also provide useful experiences for Central Asia, particularly in aquaculture research and production aspects.

5. Reduction in commercial salmon fishing activities in the United Kingdom resulted in improved fishery performance, but participation and days fished decreased. Lessons need to be learnt from coarse fisheries, as here numbers of participants have increased, following a major programme on increasing participation and marketing. People are encouraged to fish through urban fishing development programmes (e.g. “fishing for the future” of the Environment Agency) and promotions like “get hooked on fishing” and the “National fishing week”. It was concluded that fisheries management has to differentiate between capture fisheries (effort based management), and catch and release fisheries (people based management).

6. Following the EU Eel Recovery Action Plan, preferences of anglers in Germany for a range of management measures and tools were studied. Limited restrictions (limit number of rods, limit number of caught eels) were acceptable to anglers, provided that efforts were also made to reduce other mortality factors (including commercial fishery, cormorants and mortality caused by hydropower stations).

7. In a number of countries, the drive for revenue generation through tourist development is leading to increased water abstraction from rivers and other water bodies (the case of Rhodes was cited). This, combined with periodic droughts, higher summer temperatures and historic abstraction for domestic and agricultural use, are having detrimental impacts upon local fish populations in some areas. There is a need to ensure that tourist developments (current and future) factor in likely water abstraction requirements to ensure water bodies (and the organisms therein) are safeguarded – and that the area to be developed will not exceed its “carrying capacity” in terms of water demands.

8. Rules are difficult to enforce when there has been little stakeholder consultation and, indeed, may actually be counterproductive – as evident from in the Azov Sea sturgeon fishery. Here, the prohibition of sturgeon catches since 2000 has merely triggered a proliferation of poaching, especially as the regulation caused severe economic distress for the Russian fishing cooperatives which had targeted sturgeon. Restrictive actions in fisheries are only likely to function effectively when stakeholders are fully involved [and feel they are true partners] in the decision-making process.

9. There is growing evidence of consumers willing to pay a price premium for certified organic products – including trout in the Italian market – which may be linked to either higher quality (food safety) standards and/or the environmental desirability [in the eyes of the consumer] for organic products. There is a need to disentangle these two concepts – if this can be done at all – and ask whether consumers are signalling their desire for the [food] safety or environmental attributes of the product. Also there might be a case for a meta-analysis of all such willingness

to pay studies on organic/sustainably produced products to determine the range of price premia encountered.

10. In certain countries, Turkey being one, women play a minor role within the fisheries sector, whether capture or aquaculture. It was stressed that the role of women in the sector throughout large parts of South East Asia is much more important than in Europe; reference was made to marketing and processing of fish, which is mainly carried out by women in that part of Asia. There is perhaps a need to better understand the role of women within fisheries across the EIFAC region– and how this role may vary on a country-by-country basis – as a first step to understand sectoral livelihood strategies.

11. Aquaculture development in Turkey is growing rapidly. The main aquaculture and capture fisheries development related problems include overabstraction of water and fry, pollution, eutrophication and the introduction of non-native species. This has resulted in some cases to an imbalance of the ecosystem. To address these issues catchment management plans are needed which will deal with the status of stocks, fishing mortality and enforcement of the regulations. Moreover, a policy for aquaculture should be developed, with the participation of all key stakeholders, addressing sectoral management and development, the species being cultured and broodstock management issues.

12. The recreational fishing sector is currently small in Turkey, but has the potential to expand. Legislative amendments are needed to support the development of recreational fisheries. It is argued also that river management authorities need to consider the potential importance of recreational fishing, in view of the socio-economic benefits the subsector can provide to rural economies.

13. Economic modelling can be valuable in identification of the relative importance of input costs, such as labour, fuel, capital depreciation and feed to the overall productivity of a fishery or aquaculture enterprise. Economic models can be used to show how to optimize the fishery operations and maximize profitability of the operations.

### **Session 3: Governance**

The main contents of the presentations and the discussions can be summarized as follows:

1. Interactions between seabass, seabream and trout were shown in terms of market demand, marketability of the supply and market prices in Turkey. It was argued that aquaculture has certain advantages over capture fisheries in terms of marketing the products, particularly regarding aspects like control over harvest, size of products, growth rates, location of harvest and species harvested.

2. Lagoons in Turkey are argued to have considerable potential for fishery development. Effective management of these lagoons is, however, suffering from limited participation of certain stakeholder groups (including fishers) in planning and decision-making processes.

3. Governance aspects that would allow recovery, maintenance and long term sustainability of fisheries were discussed. It was stressed that research is essential to establish a knowledge base to establish a feasible policy framework and that there is a great need to involve all stakeholder

groups such as anglers, water managers, fishery owners and local populations in the decision making process to ensure support for the resultant management programmes.

4. Restocking as a traditional management tool should be practised in a balanced way focusing on the specific aims of the restocking. Moreover, efforts towards recovery of endangered freshwater fish stocks should be increased to ensure a healthy ecosystem and the creation of broader angling opportunities.

5. The need for, the preparation process of, and the contents of the proposed EIFAC Code of Practice (CoP) for Recreational Fisheries were outlined. The proposed EIFAC CoP was well-received and it was recommended that it be endorsed by the EIFAC twenty-fifth session and European Governments, and receive follow-up at international level.

6. Stocking programmes in a sub-arctic lake in Finland were reviewed, stressing the need for adaptation of restocking policies following fish stock collapse; adaptive management was considered more suitable than following strict guidelines and regulations. Responsible management should take into account regional research.

7. The new EU Directive 2006/88 on fish health, to be implemented from August 2008, was argued to have potential positive impacts on data and information availability on aquaculture and fish trade. These data and information could provide an essential component of the knowledge base on which to base an ecosystem management policy.

8. The issue of transboundary movement of migrating salmon stocks was discussed in terms of governance (using a case from Finland). It was stressed that any policy can only be successfully implemented when mutually agreed by the relevant stakeholders involved in the fishery of the aquatic bio-resource.

9. The WFD targets might be supported by river habitat restoration measures that meet both scenic and fish stock recovery aims. Particularly heavily degraded waters provide opportunities to improve fish diversity and fisheries very efficiently by artificially improving habitat structures with relatively low efforts.

10. The Technical Advisory Body on Fisheries Management in the Mekong Basin (TAB), established in 2000 is responsible as Regional Fisheries Management Mechanism for regional management capacity building in fisheries, creation of knowledge on how to address constraints to fisheries management and development of strategies and promotion of implementation of these strategies. As there are similar experiences and many lessons to learn from each other, it was stressed that contacts and collaboration between EIFAC and TAB should be strengthened.

11. Interests of commercial and recreational fishers often differ. A case from France showed that even when well-defined regulatory frameworks are in place, conflicts between the two groups might arise. Increased stakeholder participation from both groups in the amendment, implementation and monitoring of regulations might provide solutions to address these conflicts.

12. The management system in most inland waters of the Russian Federation makes use of total allowable catch (TAC) as the main management tool. It is argued that this tool is not sufficient

if the aim is optimizing catches from inland water bodies, particularly in view of the changes from commercial fisheries exploitation towards recreational and conservation purposes. The use of additional management tools (e.g. protected areas for recovery of species) should be experimented with to address these ongoing changes.

13. Fishery management in Turkey is based on the fishery law, fisheries and aquaculture regulations, fishing port regulations, regulations of wholesale markets and retail markets for fish, and on notifications from the Ministry of Agriculture and Rural Affairs (MARA). These notifications consist of time and size restrictions, fishing gear restrictions and area closures in some cases. Research on ecology, stock assessment, TACs, levels of fishing effort, types and sizes of fishing gears needs to be undertaken to improve fisheries management in the country.

14. In contrast to expectations, a case from Ireland revealed that brown trout and roach do not compete in the food chain in clean inland waters. This finding has important consequences for salmonid conservation and sustainable management of coarse and salmonid recreational fisheries.

15. Rehabilitation of depleted stocks in inland water bodies should be carried out in a well-planned manner, supported by research and training programmes, as results from a case in Bosnia and Herzegovina show. Nationwide implementation of findings is constrained by limitations in state funding and proper policy and regulatory frameworks for the sector.

## **CONCLUSIONS AND RECOMMENDATIONS**

The symposium made considerable progress towards understanding and resolving the interactions between ecological/environmental and socio-economic/governance objectives for fisheries and aquaculture. There was a broad recognition that inland fisheries and aquaculture need to shift from a sectoral view where they are treated in isolation to an integrated, multi-disciplinary systems view.

The conclusions of the symposium can be summarized as follows:

- The symposium recognized the considerable number and range of inter- and intrasectoral users. It also recognized the management conflicts and synergies that exist between recreational and commercial fisheries and aquaculture and other aquatic resource users. These arise, for example, from stocking and introductions to meet angler demand versus protection of biodiversity or development of hydropower production versus fisheries interests. As a consequence, there is a need to balance promotion of aquaculture and inland fisheries with biodiversity protection.
- One of the inherent problems recognized throughout the inland fisheries and aquaculture sectors in Europe was the lack of basic socio-economic data, and an understanding of socio-economic concepts on which to support promotion of the sectors. Economic research tends to be too narrowly focused on the economic aspects and is poorly linked to social interactions and environmental issues.
- This problem is exacerbated by weak political, and often institutional, support (i.e. operational resources and finance) to help resolve conflicting ecological/environmental and socio-economic objectives arising from user interactions.

- The EU Water Framework Directive is a major driver of the inland fisheries sector management and development. As a consequence, the intrinsic “value” of water and water bodies, is likely to increase, which will exacerbate competition over the resource and its environs.
- Aquaculture – like farming – is not immune to the growing trend towards intensification of resource use (e.g. water use limitation through recirculation, automatic systems, increasing productivity). This driver could help ameliorate conflicts over resources, but could also have adverse ecological consequences.
- There is a worrying increase in tensions arising from sectors of society that consider exploitation of fisheries to be unacceptable.
- For a variety of reasons, the preference of policy-makers seems to be moving from supporting commercial fisheries towards promotion of recreational fisheries. This has not necessarily been reflected in the co-opting of recreational fishers (or recreational fishers associations) into formal management structures.
- While there is a recognized growing demand for fish for consumption, it was also acknowledged that this trend might develop with respect to aquaculture for restocking purposes; this is in view of the common need to restore fish populations and improve the quality of aquatic ecosystems in many EIFAC member countries (under the EU WFD).
- River governance, particularly in terms of transboundary management of water resources that are used for fisheries purposes, is inadequate in large parts of the EIFAC region. In this respect, the construction of dams – and water retention and abstraction policies – may have severe consequences downstream, potentially causing conflicts and socio-economic and ecological hardships to the sector.
- The wider society has generally only limited understanding of inland fisheries issues, and particularly of how the inland fisheries sector is contributing to ecological and socio-economic objectives of society; this calls for an increase in efforts to raise awareness and education on inland fisheries.
- Management of inland fisheries continues to have problems being recognized as an equal partner by other users who fail to take full account of multiple user needs and objectives. Many of these problems arise from poor communication and dialogue between user groups and fisheries interests, lack of empathy of the needs and aspirations of each other, lack of finance and knowledge on integrated management of inland fisheries and aquaculture that melds economics, social issues and biology.

The Symposium recommends to the twenty-fifth session of EIFAC that the appropriate responsible bodies take the following actions:

- Develop toolboxes, quantitative models and indicators for high quality socio-economic assessment of inland fisheries and aquaculture in data-poor situations. This should include best practice examples and case studies that are sufficiently robust to account for regional variability in ecological, social and economic conditions.

- Promote development of interdisciplinary fisheries research and management methods, approaches and decision-making that link economic, sociological and psychological expertise (coined socio-economics) with the traditional fisheries biological approach.
- Improve communication, information transfer and public outreach of inland fisheries and aquaculture issues to non-fishery stakeholders and to those charged with taking decisions on the development and management of the aquatic environment.
- Develop and promote a more structured approach to recreational fisheries management to take due account of the importance of the activity to local and regional economies.
- Develop and promote alternative employment opportunities for those currently engaged in commercial fisheries to maintain and enhance livelihoods and revenue opportunities. Also, due consideration should be given to gender equity.
- Carry out forward-looking research to examine the ecological and socio-economic implications for inland fisheries/aquaculture of attaining the 2015 targets from the EU WFD – at the national and local level – so as to support managerial decision-making in an ex-ante manner.
- Assess the future direction of European inland aquaculture – to ameliorate any likely ecological costs whilst maximizing the various (alternative) opportunities that aquatic ecosystems might generate.
- Generate and communicate research on the economic value of recreational fishing as a lever to promote the evolution of managerial decision-making in a manner that equates to stakeholder prevalence in the sector.
- Ascertain the nature of the interaction between commercial and recreational fishing in terms of participation in governance, management of the fisheries resource, and IUU fishing.
- Assess the demand on aquaculture for fish for stocking and adjust the range of products, species and sizes to address the needs of conservation, rehabilitation and (recreational) fisheries that apply stocking.
- Establish a European-wide mechanism for examining, preventing and mitigating of transboundary water resource access and availability issues and problems, which pays proper attention to fisheries sector needs and requirements.
- Address emerging issues via a project management type approach so as to better facilitate the availability of financial and other critical resources.
- Develop (technical) guidelines on recreational fisheries and inland capture fisheries related sectors, to contribute to responsible development and management of these subsectors.
- Translate key EIFAC documents into the Russian language in support of the inland fisheries sectors in Eastern Europe, the Caucasus and Central Asia, which can learn from the research, development and management experiences in the Western and Central parts of Europe.

- Strengthen contacts and collaboration between EIFAC and the Technical Advisory Body on Fisheries Management in the Mekong Basin (TAB) and other regional fishery bodies (RFBs) in view of their similar experiences and the many lessons to learn from each other.

The above conclusions and recommendations of the symposium were presented to the twenty-fifth session of EIFAC, held between 26 and 28 May 2008 as document EIFAC/XXV/2008/2. The Commission adopted the report of the symposium including its conclusions and recommendations.

Papers presented at the symposium will be published in Blackwell Science Journal, Fisheries Management and Ecology (where appropriate) and in an EIFAC Occasional Paper. Abstracts of the posters will also be published in the latter.

### **CLOSURE OF THE SYMPOSIUM**

Mr Erkan Gözğözoğlu (MARA) and Mr Phil Hickley, Chairman of EIFAC, officially closed the symposium by thanking the Convener, Chairman, Secretariat, Chairs of the various session, rapporteurs and other support staff of FAO and MARA, scientific and programme committees of the symposium and, last but not least, the participants in the symposium whom, through their contributions presentations, posters and inputs in the workshop discussions, made the symposium the success it was.



## APPENDIX A

### Symposium programme

#### Wednesday 21 May

|                                  |  |   |
|----------------------------------|--|---|
| 08.00–09.00                      | Registration   |   |
| 09.00–09.30                      | Symposium opening and welcome addresses  |   |
| 09.30–09.45                      | Overview of symposium aims and objectives<br><i>I. Cowx and I. Okumus</i>  |   |
| <b>Session 1a</b>                | <b>Plenary session on ecological interactions</b>  |   |
|                                  | Chair: R. Arlinghaus   |   |
| 09.45–10.10                      | Fish-based assessment of ecological status of Finnish lakes loaded by diffuse nutrient pollution from agriculture<br><i>M. Rask, M. Olin and J. Ruuhijarvi</i>               |   |
| 10.10–10.35                      | A meta-analysis of lethal and sub-lethal impacts of catch-and-release recreational angling on European fish species<br><i>R. Arlinghaus and D. Huhn</i>                      |   |
| 10.35–11.00                      | Coffee/tea break   |   |
| 11.00–11.25                      | Impact of invasive alien species in aquaculture<br><i>I. Cowx</i>  |   |
| 11.25–11.50                      | The possible effects of global warming on fisheries and aquaculture in Turkey<br><i>R. Celebi, E. Gözğözoğlu, A. Benli and A. Velioglu</i>                                   |   |
| 11.50–12.15                      | Effect of supplementary stockings of juvenile brown trout, <i>Salmo trutta</i> L., on yield in a Norwegian mountain reservoir<br><i>T. Hesthagen, I. Johnsen and O. Gran</i> |   |
| 12.15–14.00                      | <b>Lunch</b>   |   |
| <b>Session 1b and Session 2a</b> | <b>Parallel session on ecological interactions (1b)</b>  | <b>Parallel session on socio-economic interactions (2a)</b>   |
|                                  | Chair: S. Yerli  | Chair: A. Rothuis   |
| 14.00–14.20                      | Traditional carp pond farming in Poland as an example of sustainable aquaculture<br><i>M. Ciesla, J. Sliwinski and R. Wojda</i>  | Socio-economic character and importance of fisheries on Danube between Serbia and Croatia<br><i>M. Smederevac-Lalic, M. Lenhardt, A. Hegedis, G. Cvijanovic, I. Jaric, Z. Gacic and S. Cvejic</i> |

|                                  |   |   |
|----------------------------------|---|---|
| 14.20–14.40                      | Effluent treatment concepts for trout aquaculture in dependence on production intensity<br><i>P.-D. Sindilariu, R. Reiter and H. Wedekind</i>   | The economic value of recreational fishing through the example of a Hungarian multifunctional pond fish farm<br><i>G. Gyalog, E. Bekefi and L. Varadi</i>   |
| 14.40–15.00                      | Sustainable use of sterlet and development of sterlet aquaculture in Serbia and Hungary<br><i>M. Lenhardt, K. Györe, A. Hegediš, B. Mićković, Z. Gačić, M. Smederevac-Lalić and G. Cvijanović</i> | Sociological analysis in fishing villages for sustainable fishery management of the endemic pearl mullet in Lake Van, Turkey<br><i>H. Nalcaoglu and M. Sari</i>   |
| 15.00–15.20                      | Management strategies in protection and restoration of sturgeon biodiversity in Bulgaria<br><i>T. Hubenova, E. Uzunova and A. Zaikov</i>  | A research on determination of current status on freshwater aquaculture in the Mediterranean region of Turkey by mainly socio-economic indicators<br><i>Y. Emre, C. Sayin, M. Goncu, Y. Tascioglu and N. Mencet</i> |
| 15.20–15.45                      | Coffee/tea break  |   |
| <b>Session 1c and Session 3a</b> | <b>Parallel session on ecological interactions (1c)</b><br>Chair: S. Yerli  | <b>Parallel session on governance (3a)</b><br>Chair: E. Gözğözoğlu  |
| 15.45–16.05                      | The response of a brown trout population and the perception of the situation by anglers after ceasing trout stocking<br><i>J. Baer and A. Brinker</i>   | Inland fisheries and aquaculture in Turkey: trends in supply, consumption and prices<br><i>F. Rad</i>   |
| 16.05–16.25                      | A new fish-based index for monitoring the ecological status in rivers – A contribution to Water Framework Directive<br><i>T. Vehanen, T. Sutela and H. Korhonen</i>                               | Fisheries management of lagoons in Turkey<br><i>H. Deniz, E. Gözğözoğlu and R. Celebi</i>   |
| 16.25–16.45                      | Lessons available from anglers records: case study of the Brno reservoir (Czech Republic)<br><i>Z. Adamek and P. Jurajda</i>  | Fishery management in the large lake systems located in the special protected areas of the European north of Russia<br><i>I. Studenov</i>   |
| 16.45–17.05                      | Ecological status of inland waters of Muğla<br><i>M. Barlas, F. Yilmaz, B. Yorulmaz, and H. Kalyoncu</i>  |   |
| <b>17.10–18.30</b>               | <b>Poster session on ecology and aquaculture</b>  |   |

## Thursday 22 May

|                                  |  |  |
|----------------------------------|--|--|
| <b>Session 2b</b>                | <b>Plenary session on socio-economic interactions</b>  |  |
|                                  | Chair: A. Rothuis  |  |
| 09.00–09.25                      | The inland fisheries of Central Asia: why production and consumption declined – and suggested strategies for rehabilitating the sector.<br><i>A. Thorpe and R. Van Anrooy</i>                      |  |
| 09:25–09.50                      | Examining changes in participation in recreational fisheries in England and Wales.<br><i>M. Aprahamian, P. Hickley, B. Shields and G. Mawle</i>  |  |
| 09.50–10.10                      | Reconciling ecological and social objectives in managing European eel ( <i>Anguilla anguilla</i> ) stocks – the angler’s perspective<br><i>M. Dorow, B. Beardmore, W. Haider and R. Arlinghaus</i> |  |
| 10.10–10.30                      | Fish farming industry’s socio-economic analysis and marketing patterns in Trabzon, Turkey<br><i>M. Dagtekin and O. Ak</i>  |  |
| 10.30–11.00                      | Coffee/tea break   |  |
| <b>Session 2c and Session 1d</b> | <b>Parallel session on socio-economic interactions (2c)</b>  | <b>Parallel session on ecological interactions (1d)</b>  |
|                                  | Chair: A. Thorpe   | Chair: A. Ozdemir  |
| 11.00–11.20                      | Reconciling the conservation objectives for an endangered endemic freshwater fish with those for tourist development on the island of Rhodes (Greece)<br><i>M. Stoumboudi and I. Cowx</i>          | Responses of fluvial fish assemblages to agriculture in boreal zone<br><i>T. Sutela and T. Vehanen</i>   |
| 11.20–11.40                      | Interactions between conservation, economic and social objectives of sturgeon culture in Russia: problems and possibilities of optimization<br><i>M. Chebanov and E. Galich</i>                    | Wild stocks of lake-migrating brown trout near extinction in Finnish Lake District: rapid recovery actions needed<br><i>J. Syrjanen and P. Valkeajarvi</i>   |
| 11.40–12.00                      | Consumers’ willingness to pay for organic trout<br><i>M. Disegna, C. Mauracher and I. Procidano</i>  | A study on the adaptation of mirror and common carp introduced to reservoirs: a contribution to the solution of the choice problem<br><i>Ş.Kirankaya and F. Ekemci</i>   |
| 12.00–12.20                      | The role of women in fisheries and aquaculture in Turkey<br><i>A. Benli, A. Velioglu and R. Celebi</i>   | A primary study on the status of sturgeon populations ( <i>Acipenser</i> sp.) in the South Eastern Black Sea Coast (Kızılırmak-Yeşilirmak Basin) in early 2000s<br><i>M. Zengin, S. Tiril, M. Dagtekin, M. Gul and H. Eryildirim</i> |
| 12.20–14.00                      | <b>Lunch</b>   |  |

|                                  |  |   |
|----------------------------------|--|---|
| <b>Session 3b</b>                | <b>Plenary session on governance</b>   |   |
|                                  | Chair: E. Hudson   |   |
| 14.00–14.25                      | Trout stocking revisited: an interdisciplinary approach to stakeholder participation and co-management<br><i>S. Haertel-Borer, H. Mosle, E. von Lindern, A. Satake, E. Staub, O. Seehausen and A. Peter.</i> |   |
| 14.25–14.50                      | Recovery programs for endangered freshwater fish in Flanders, Belgium<br><i>K. Vlietinck and A. Dillen</i>   |   |
| 14.50–15.15                      | Providing context to the global code of practice for recreational fisheries<br><i>R. Arlinghaus, S. Cooke and I. Cowx</i>  |   |
| 15.15–15.40                      | Coffee/tea break   |   |
| <b>Session 3c and Session 1e</b> | <b>Parallel session on governance</b>  | <b>Parallel session on ecological interactions (1e)</b>   |
|                                  | Chair: E. Hudson   | Chair: S. Yerli   |
| 15.40–16.00                      | From strict guidelines to adaptive stocking in sub-arctic Lake Inari<br><i>P. Heinimaa</i>   | Introduced crayfish <i>Pacifastacus leniusculus</i> (Dana) utilization and effects on inland fishery<br><i>M. Pursiainen and T. Ruokonen</i>  |
| 16.00–16.20                      | The impact of the new EU fish health regime arising from Directive 2006/88 on ecological interactions of aquatic animals in Europe<br><i>E. Hudson</i>   | Effects of three <i>Carassius</i> (Cyprinidae) species [ <i>C. auratus</i> (Linnaeus, 1758), <i>C. carassius</i> (Linnaeus, 1758) and <i>C. gibelio</i> (Bloch, 1782)] in the inland waters of Turkey.<br><i>D. Innal and F. Erk'akan</i> |
| 16.20–16.40                      | Fishing tourism, biodiversity protection and regional politics – case of the River Tornionjoki, Finland<br><i>J. Salmi and P. Salmi</i>  | <i>Ameiurus melas</i> (Rafinesque, 1820) – pest or possibility<br><i>G. Cvijanovic, M. Lenhardt, A. Hegedez, Z. Gacic and I. Jaric</i>  |
| 16.40–17.00                      | Functional vs scenic restoration – challenges to improve fish and fisheries in urban waters<br><i>C. Wolter</i>  | Does coexistence affect the growth and condition of native crucian carp <i>Carassius carassius</i> and introduced goldfish <i>C. auratus</i> in small ponds?<br><i>A. Serhan Tarkan and G. Copp</i>                                       |
| <b>17.00–18.30</b>               | <b>Poster session on management and development of fisheries</b>   |   |

**Friday 23 May**

| <b>Session 3d and Session 1f</b> | <b>Parallel session on governance (3d)</b>   | <b>Parallel session on ecological interactions (1f)</b>  |
|----------------------------------|--|--|
|                                  | Chair: E. Gözgözoğlu   | Chair: A. Ozdemir  |
| 09.00–09.20                      | Implementing “regional fisheries management” in the Mekong basin<br><i>N. Viet Manh</i>  | Diet of great cormorant ( <i>Phalacrocorax carbo</i> L.) at Special Reserve of Nation “Stari Begej – Carska bara” in northern Serbia<br><i>S. Skorić, Ž. Višnjić-Jeftić, A. Hegediš, Z. Gačić, V. Djikanović, V. Poleksić, B. Rašković and M. Lenhardt</i> |
| 09.20–09.40                      | Commercial and recreational cohabitation: the case of Annecy Lake<br><i>C. Sebi</i>  | Fishing activities and pollution risk on Köyceğiz-Dalyan Lagoon system<br><i>B. Yorulmaz, M. Barlas, F. Yilmaz, and N. Özdemir</i>   |
| 09.40–10.00                      | Optimization of freshwater fisheries in Russia<br><i>S. Brazhnik and Y. Sechin</i>   | Determination of trophic situation of Sarimsakli dam lake (Kayseri-Turkey)<br><i>D. Aydin and S. Ahiska</i>  |
| 10.00–10.20                      | Inland fisheries of Turkey<br><i>H. Kilic , V. Kurum and T. Turkyilmaz</i>   | Changes along a trophic gradient in Lake Mogan (Turkey): a shallow eutrophic lake<br><i>F. Mangit and S. Yerli</i>   |
| 10.20–11.00                      | Coffee/tea break   |  |
| <b>Session 3e and Session 2d</b> | <b>Parallel session on governance (3e)</b>   | <b>Parallel session on socio-economic interactions (2d)</b>  |
|                                  | Chair: E. Gözgözoğlu   |  |
| 11.00–11.20                      | Conservation and sustainable fishery management of brown trout in Irish lakes: is roach a real threat?<br><i>A. Massa-Galucci, B. Hayden, J. Caffrey, M. O’Gready and M. Kelly-Quinn</i> | The review on Turkey inlands in terms of interaction between social, economic and ecological objectives of fisheries and aquaculture<br><i>S. Yerli and İ. Okumuş</i>  |
| 11.20–11.40                      | Turkish fisheries management towards sustainable exploitation of resources<br><i>V. Kurum and H. Fersoy</i>  | The potential Turkey inherits in fishing native trout<br><i>T. Ersal, B. Kalac and T Sanalan</i>   |

|                                  |   |  |
|----------------------------------|---|--|
| 11.40–12.00                      | Economical, social and ecological value of whitefishes on the European North of Russia<br><i>A. Novoselov</i>   | Profitability and productivity analysis of fishery enterprises in Lake Durusu (Terkos)<br><i>M. Soylu and S. Uzmanoglu</i> |
| 12.00–12.20                      | Salmonids of the Neretva river basin – present state and suggested sustainable selection programme to protect and strengthen the populations<br><i>S. Muhamedagic, H. Gjoen and M. Vegara</i> |  |
| 12.20–14.00                      | <b>Lunch</b>  |  |
| <b>Session 1g and Session 2e</b> | <b>Workshop session on ecological interactions (1g)</b><br>Chair: R. Arlinghaus   | <b>Workshop session on socio-economic interactions and governance (2e)</b><br>Chair: L. Varadi                             |
| 14.00–16.00                      | Workshop discussions  | Workshop discussions   |

### Saturday 24 May

|                  |  |
|------------------|--|
| <b>Session 4</b> | <b>Plenary session on conclusions and recommendations of the symposium to the twenty-fifth session of EIFAC</b><br>Chairs: I. Cowx and I. Okumuş |
| 09.00–10.30      | <b>Presentation of the symposium report</b>  |
| 10.30–11.00      | <b>Closing of the symposium</b>  |

## APPENDIX B

### List of participants

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## APPENDIX C

### Opening speech by

**H.E. Mr Mehmet Mehdi Eker, Minister for Agriculture and Rural Affairs of Turkey**

Esteemed representatives of FAO, scientists, distinguished producers, distinguished members of press, ladies and gentlemen,

This year, our country hosts, for the first time, the international symposium of the European Inland Fisheries Advisory Commission (EIFAC) on “Interactions between social, economic and ecological objectives of inland commercial and recreational fisheries and aquaculture”. Welcome!

It is a pleasure to host the international symposium and the twenty-fifth session of EIFAC. I would like to firstly thank FAO, the officials of the FAO sub-regional office for Central Asia, and those who made great efforts in the organization of this symposium.

I would like begin my speech by expressing my appreciation on behalf of my Ministry and my country, to have you in Antalya, which is a very important city in terms of inland fishing and aquaculture, agricultural production in greenhouses and tourism.

Distinguished participants,

One of the continuing problems in the world of today is insufficient and unbalanced nutrition of society. Therefore, the scientists and authorities are trying to develop the food production sector.

According to data of FAO, there are approximately 850 million people world-wide who have to survive with a daily income of one USD or less. This gives an indication of the importance of the food sector.

Fisheries in the world are affected by decreased water availability and decreased fish stocks due to overfishing, pollution, climate changes etc. Drought periods, which more frequently occurred in recent times, add to the complexity of the situation.

That is why, the steps to be taken by EIFAC and other international organizations to increase sustainability of the inland water resources are of utmost importance for our future. Good planning and supporting policies are required. Turkey does appreciate these regional and international attempts and puts effort in supporting them in every platform.

Besides Europe and the Mediterranean, Turkey is also attaching importance to development of relations in the field of fisheries in Central Asian, Balkan and African countries.

After the opening of the FAO Subregional office for Central Asia in our country, the already existing cooperation between the Turkish Ministry and FAO is further increasing. There are several collaborative projects conducted on a diverse range of fisheries subjects. I am convinced that the contribution of our country to FAO sub-office for Central Asia shall support the Organization to efficiently carry out its activities.

Development of sustainable policies requires close cooperation between decision makers and scientists. Therefore, these types of platforms are suitable grounds for cooperation and collaboration.

Considering the themes of the symposium, I am glad that these include issues of environmental- and socio-economic management. I wholeheartedly believe that the outcomes of the symposium shall considerably contribute to our planning efforts towards sustainable development of the sector.

Distinguished participants,

Our country is rich in inland water resources, including 200 lakes, 206 dam lakes, 953 ponds and 33 rivers. The production of inland fisheries in our country was in 2006 some 100 000 tonnes, 44 000 tonnes from fishing and 56 000 tonnes from aquaculture. It has a share of 16 percent in the total fisheries production.

There are 21 672 active registered vessels in our country. And 3 330 of them are fishing in the inland waters. In parallel with this, 16 500 of the total number of 110 230 fishermen in our country are active in inland waters.

Mostly carp, catfish, African catfish, tench, pike perch, and freshwater crayfish are fished. Freshwater crayfish, pike perch, tench and trout have export potential. The most rapidly developing food production sector of the world, aquaculture, is also rapidly developing in our country.

To provide an indication of the developments in the sector in last five years, respectively 110 percent and 141 percent increases were realized in aquaculture production and export of fisheries products. Turkey's fisheries production is expected to reach 600 000 tonnes by 2023, half of which is expected to come from inland waters.

In light of the current developments, Turkey ranks third in the world in terms of rapid increase in aquaculture production and Turkey provides 25 percent of the EU market for gilthead bream and sea bass.

In 2007, 1 180 inland fish farms which mostly produce trout, realized a production of approximately 60 000 tonnes.

With the purpose of sustaining the environmental, economic and social sustainability of the fisheries sector, the Ministry has prepared a "nation-wide strategic plan for fisheries". The future activities are realized within the scope of this plan.

I would like to emphasize the importance of EIFAC, which has put, since its establishment, an extraordinary effort in the sustainable development of inland fisheries in Europe.

I would like to draw your attention to two issues discussed in an EIFAC Executive Committee meeting in Rome in May last year.

I am of the opinion that it would be useful to expand the activities of the European Inland Fisheries Advisory Commission in such a way that the rapidly growing aquaculture sector will

be given higher priority and make organizational changes to EIFAC accordingly, and thus to change its name into “European Inland Fisheries and Aquaculture Advisory Commission”

.. and to establish a working group to prepare and publish sectoral reports of the member countries for the purpose of providing a platform for sharing information amongst them.

I hope that this symposium on the “Interactions between social, economic and ecological objectives of inland commercial and recreational fisheries and aquaculture” and twenty-fifth session of EIFAC shall be successful and I hope you will enjoy yourself in our country.



**The Symposium on Interactions between Social, Economic and Ecological Objectives of Inland Commercial and Recreational Fisheries and Aquaculture, was organized in conjunction with the twenty-fifth session of the European Inland Fisheries Advisory Commission (EIFAC) in Antalya, Turkey, from 21 to 24 May 2008. The symposium was attended by 255 participants from 26 countries.**

**The symposium programme comprised 57 oral presentations and 24 posters.**

**The symposium made considerable progress towards understanding the interactions between ecological/environmental and socio-economic/governance objectives for fisheries and aquaculture. There was a broad recognition that inland fisheries and aquaculture need to shift from a sectoral view where they are treated in isolation to an integrated, multidisciplinary systems view. The symposium provided a number of clear and comprehensive conclusions and recommendations to the twenty-fifth session of EIFAC for follow-up by the appropriate responsible bodies.**

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