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منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Organización de las Naciones Unidas para la Agricultura y la Alimentación

EXPERT CONSULTATION ON LAND AND WATER USE IN AQUACULTURE -

Towards an improved information basis

Rome, Italy, 7-10 October 2002

Prospectus

Background and context

Aquaculture is one of the world's fastest growing food production sectors, bringing with it great potential for food supply, poverty alleviation and enhanced trade and economic benefits. However, aquaculture is dependent on appropriate water supplies and other services of aquatic ecosystems, uses land in many cases and further relies on a range of other natural resource inputs. Aquaculture, if misdirected, has the potential to damage this resource base, diminishing environmental quality and societal benefits.

All food producing sectors, including fisheries and aquaculture, are facing problems of environmental degradation and increasing land and water scarcity. The agricultural sector as a whole is facing increasing competition for land and water resources from industrialization and urbanization, from growing requirements for safe drinking water supplies and from demands for nature conservation. These issues are particularly critical in many developing countries, given their high dependence on agriculture for food and income generation.

Aquaculture, like other sectors, must compete for and justify its claims on land and water resources. In many areas where aquaculture has expanded in the past, there is increasing pressure on the use of existing sites and there are now fewer new sites available, in the coastal zone, but also inland in some countries. For example, for many land-based sites, there is increasing demand for agriculture, settlement and conservation; for many water-based sites, the coastal and shore margins have an increasingly high value for settlement, recreation and conservation.

Given these demands at the strategic level, as well as that of the individual enterprise, it is clear that efforts to improve resource-use efficiency, and to conserve critical inputs, will become increasingly important. The increasing concern about environmental impact, and general sustainability has wider resource implications which stimulate growing interest in assessments to measure the resource demands and environmental cost of aquaculture, and to compare these with

the potential benefits it may generate. Assessments of resource use and capacity are essential for successful and sustainable aquaculture, in (a) identifying and quantifying physical, social and other factors necessary for efficient and cost-effective production, defining constraints and determining the costs/benefits of overcoming these; (b) identifying and resolving resource-allocation problems, helping to define priorities, contributing to planning processes and decisions, and providing rationales and criteria for developing resources; and (c) defining environmental limitations and providing the basis for sound and effective environmental management (Muir, 1995[1]).

This current FAO effort is based on requests by member countries to assist them in their efforts of implementing the FAO Code of Conduct for Responsible Fisheries (CCRF[2]). The CCRF, in particular in its Articles 9.2.4. and 9.1.3 requests States to enhance their capabilities of data collection and dissemination and in the use of such data for rational use of resources and aquaculture development planning:

> ***CCRF Article 9.2.4.*** *States should establish appropriate mechanisms, such as databases and information networks to collect, share and disseminate data related to their aquaculture activities to facilitate co-operation on planning for aquaculture development at the national, subregional, regional and global level.*
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> ***CCRF Article 9.1.3.*** *States should produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities.*

Recently, the need for better reporting on the status and trends of aquaculture development[3] was discussed at the Sub-Committee on Aquaculture of FAO's Committee of Fisheries[4]. During the discussions, it was reiterated that there is a continued need for identifying most appropriate methodologies for data collection for each production system in view of the great variety and diversity of aquaculture practices. The Sub-Committee recommended that priority was to be given to establishment of unified standards and guidelines for data collection and clearer definitions of the terminologies used in the sector.

Scope and Purpose

FAO's Inland Water Resources and Aquaculture Service (FIRI), in collaboration with the Fisheries Information, Data and Statistics Unit (FIDI) and other interested FAO units, are

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[1] Muir, J.F. 1995. Aquaculture development trends: perspectives for food security. Contribution to the International Conference on Sustainable Contribution of Fisheries to Food Security, Kyoto, Japan, 4-9 December 1995, organized by the Government of Japan, in collaboration with the Food and Agriculture Organization of the United Nations (FAO). KC/FI/95/TECH/4. 133p.

[2] FAO, 1995. Code of Conduct for Responsible Fisheries. Rome, FAO. 48 p.
http://www.fao.org/FI/agreem/codecond/codecon.asp
FAO Fisheries Department, 1997. Aquaculture development. *FAO Technical Guidelines for Responsible Fisheries* No.5. FAO, Rome. 40p ftp://ftp.fao.org/fi/document/techguid/fishaqu5.pdf

[3] FAO, 2002. Needs for better reporting on the status and trends of aquaculture development. COFI: AQ/1/2002/5. Committee of Fisheries. Sub-Committee on Aquaculture. First Session, Beijing, China, 18-22 April 2002.
http://www.fao.org/docrep/meeting/004/y3247E.htm

[4] Committee of Fisheries. Sub-Committee on Aquaculture. First Session, Beijing, China, 18-22 April 2002.
http://www.fao.org/fi/meetings/cofi/cofi_aq/cofi_aq1/default.asp

preparing this expert meeting, with a view to generate primary baseline information and expert advice on trends, patterns, opportunities and challenges of land and water use in the various forms of aquaculture farming systems and practices.

It is evident that there is a wide range of issues involved, and that a major first step of analysis would involve the compilation and review of available data and information on land and water use in aquaculture. Preparatory work[5] on FAO's aquaculture database so far has shown that there is very significant scope for enhancing, updating and organising knowledge on required and available statistical data and bibliographic reference materials on land and water use in aquaculture. The focus in this first step of analysis is primarily on data and statistics as available, and on their collection, recording, use and interpretation. The medium- and long-term perspective here is on using and interpreting such data sets with a view to enhancing resource use efficiency and environmental performance and improving sectoral management and governance efforts.

The main objectives of the consultation are therefore:

i) to compile and review available data and information on land and water use in aquaculture;
ii) to provide advice on experiences and approaches for the collection, use and interpretation of aquacultural land and water use data and information;
iii) to discuss the use and interpretation of such data and information for the purposes of analysing and comparing resource use efficiencies of aquaculture practices

It is expected that the Expert Consultation will help generate required basic information and data sets on land and water use in aquaculture. Participating experts are invited to focus their preparatory work on available datasets, literature and recent assessment efforts as related to land and water use in aquaculture. The approach will be to invite selected contributions on land and water use patterns as they relate to:

1. national statistical efforts on collection, monitoring, dissemination, use and interpretation of aquacultural land and water use data
2. regional (multi-country) assessments of land and water resource use in aquaculture
3. selected aquaculture species / commodities
4. culture environments (inland and coastal waters)
5. different aquaculture production / farming systems
6. experiences, approaches and advances in other sectors dealing with land and water use, for example, in land use evaluation and planning, and in agricultural statistics

Whenever possible data and information on aquaculture production and duration of production will be included with reference to related use of land and water resources. It is hoped that information will be collated on patterns on land and water uses by non-aquacultural users prior to their use for aquacultural purposes.

At this stage this initiative is meant primarily to address biophysical aspects of land and water resource uses, essentially to serve as a platform on which the wider issues can be developed.

[5] The said preparatory work on FAO's aquaculture database included a basic review of available structural data of some **22** countries as reported to FAO since 1984, their input into electronic worksheets and an initial bibliographic research on non-FAO data and statistical literature related to land and water use in aquaculture (Mariani,, 2002)

However, contributions on relevant social and economic data and information - if readily available or easily accessible – may be collated and presented as these could prove very useful. For example, information on market prices of land and water resources would be a good measure of the opportunity costs of the respective resources. Comparisons of opportunity costs of the resource use in aquaculture with other uses will allow us to infer on the competitiveness of aquaculture relative to other uses.

Documentation for the Consultation

The discussions at the Consultation will be based on advance contributions and presentations by participating experts. Participants will be provided with additional resource materials including a Review of selected aquaculture statistical data and related bibliographic background and reference material[6] and other relevant background documentation[7].

Participants are encouraged to compile and share relevant documentation, articles, publications, data sets, internet sites & links and other possible sources of information, possibly before the dates of the Consultation.

Expected Outputs

It is hoped that this stock-taking exercise will provide FAO, its member countries and interested partners with basic strategic advice on possible ways to improve the collection, organization, dissemination and general use of data and information on land and water use in aquaculture. Due consideration will be given to (a) current conditions and circumstances of available data collection systems and methods, and (b) associated issues of practicability and feasibility of desirable assessments and surveys focussing on land and water resource use in aquaculture. The discussions and contributions should generate an **overview of measures for comparative analysis of efficiencies of land and water resource use in aquaculture**. Based on such methodological considerations, the consultation should facilitate the formulation of recommendations for additional and specific follow-up activities on the collation, use and interpretation of aquacultural land and water use information.

It is intended to publish a report of the Expert Consultation in addition to consultation proceedings which would contain written contributions by participating experts.

Participation

The Consultation will be attended by technical experts from various disciplines and representing a broad spectrum of experience and interests in aquaculture development. In addition to selected

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[6] Mariani, 2002. Review of selected aquaculture statistical data and related bibliographic background and reference material. Support paper for Expert Consultation on Land and Water Use in Aquaculture. 287 p.

[7] FAO, 2002. Needs for better reporting on the status and trends of aquaculture development. COFI: AQ/1/2002/5. Committee of Fisheries. Sub-Committee on Aquaculture. First Session, Beijing, China, 18-22 April 2002. http://www.fao.org/docrep/meeting/004/y3247E.htm

technical experts, FAO will invite selected resource persons from global and regional organisations, and of international non-governmental organisations, representing environmental, social and private sector interests. All participants will be invited to attend the Consultation in their individual capacity as technical experts in their field of competence.

Language of the Expert Consultation

The consultation will be held in English. All materials prepared for and during the meeting, as well as all discussions will be in English.

Programme, Dates and Venue

The suggested tentative programme for the Consultation is included in this Prospectus. The Consultation will be held during 07-10 October 2002 in Rome, Italy, at FAO Headquarters.

Technical Secretariat

The Consultation is being organised by the FAO Fisheries Department. For additional information, please note the contact details of the Technical Secretaries of this Consultation:

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Tentative Programme & Themes

N. B.: Please note that this tentative schedule is an outline of the envisaged programme. The schedule may be adjusted to allow for presentations of selected individual contributions and other additional presentations, discussions and working group sessions, as required.

Monday , 7 October

Opening
Introduction: welcoming remarks

1. Purpose and scope of Consultation

2. Brief overview of land and water uses in aquaculture

including: Current related efforts by FAO such as:.

i. Work on FAO's aquaculture data base
ii. Application of GIS and Remote Sensing methods to aquaculture
iii. Development of aquaculture components for FAO's FIGIS (Fisheries Global Information System)

Tuesday , 8 October

3. Statistical efforts on aquacultural land and water use in selected countries

A number of selected contributions and presentations will be invited from the below main producing countries. Electronic data sets for 22 countries as available in FAO will be provided to

experts willing to prepare contributions/presentations on aquacultural land and water use in selected countries. Electronic data sets are available for the following countries (see columns 2 and 3 in following table):

(1) Region	(2) FAO datasets available	(3) Other datasets available	(4) Additional contributions expected or to be confirmed
Africa	Egypt		
Americas	Cuba, Ecuador, Mexico		Canada, Chile, USA
Asia-Pacific	Bangladesh, India, Indonesia, Korea Rep., Malaysia, Myanmar, Philippines, Taiwan (Province of China), Thailand	ADB/NACA Farm Performance Study (1994-1995) Bangladesh, Cambodia, China, India, Indonesia, Korea (R.o.), Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan (P.o.C), Thailand, Vietnam China (1994-1998)	Australia, Japan, VietNam
Europe	France, Germany, Greece, Italy, Poland, Norway, Russian Federation, Ukraine		Hungary, Israel, United Kingdom

An important aspect for detailed discussion will be the methods used in different countries for data collection and analysis. Contributions and presentations should make explicit reference to these methods and approaches, and related experiences.

4. Experiences with regional (or multi-country) assessments of land and water resource use in aquaculture

Asia: ADB/NACA Farm Performance Study 1994-1995 (Regional Study and Workshop on Aquaculture Sustainability and the Environment)

also:

- **AIT Outreach Programme**
- **SEAFDEC Aquaculture Department**
- **ICLARM**

Africa: ICLARM

Europe: EIFAC Working Party on Aquatic Resources Management in Aquaculture (1995- to date)

also:

Central and Eastern Europe: Experiences and recent efforts by the Fish Culture Research Institute (HAKI), in Szarvas, Hungary.

Others, as available and/or interested, for example:
DFID Aquaculture Research Programme (uncertain)
European Commission DG Fish (?)
Federation of European Aquaculture Producers
Pond Dynamics/Aquaculture Collaborative Research Support Program (PD/A CRSP) (to be confirmed)

Wednesday, 9 October

5. Land and water use in different aquaculture production / farming systems and in different culture environments (inland and coastal / marine waters)

including:

i. Land-based systems (rain-fed ponds, ponds, tanks, raceways, irrigated or other flow-through systems);
ii. Water-based systems (cages, pens, inshore/offshore, rafts, racks, etc);
iii. Integrated or mixed systems (polyculture, agriculture-aquaculture systems, e.g. rice-fish, livestock-fish, etc);
iv. Levels of intensity/intensification
v. Use of fresh, brackish and marine waters (water supplies/sources and areas - lakes, reservoirs, rivers, coastal waters)

6. Land and water use for aquaculture of different species groups, species and commodities

i. finfish (carps, salmonids, catfish, tilapia, seabass, seabream, etc.)
ii. crustaceans (shrimps, prawns, crabs, etc)
iii. molluscs (oysters, mussels, clams, etc.)
iv. seaweeds

Thursday, 10 October

7. Experiences, approaches and advances in other sectors dealing with land and water use assessments

i. Calculating water use efficiencies comparing aquaculture and other agricultural sectors
ii. Agricultural water use data
iii. Agricultural statistics
iv. Land use evaluation and planning for agriculture

8. Conclusions and recommendations for follow-up activities by FAO