

# NASO maps

## User manual Manuel d'utilisation

National Aquaculture Sector Overview maps

Cartes des Vues générales du secteur aquacole national

version 1.0

The screenshot displays the NASO maps application interface. On the left, a map of China shows several red circular markers indicating farm locations. A popup window provides detailed information for a selected farm:

- Country: China
- Admin 1: Sichuan Sheng
- Environment: freshwater
- Species: *Eriocheir sinensis*
- Systems of culture: Semi-intensive; Paddy cum fish culture
- Technology: Pond; Pond, barrage -; Paddy (field)
- Production (Tons): 226
- Source: National data(2008)

The central part of the interface shows a data table titled "Farming systems distribution and characteristics data submission form INDIVIDUAL FARMS CRUSTACEANS PRODUCTION". The table lists various farms with their names and geographic coordinates (Latitude and Longitude).

ID record	Farm name	Lat. Deg. Min. Sec. N/S	Long. Deg. Min. Sec. E/W	Admin
1	Cooperativa 23 de Diciembre R.L.	12° 50' 14.35" N	87° 29' 37.26" W	Chinanda
2	Carlos Alberto Gallardo Hernández - Gr	12° 49' 17.59" N	87° 8' 53.01" W	Chinanda
3	Central American Fisheries S.A. - San	12° 50' 15.37" N	87° 7' 17.68" W	Chinanda
4	Central American Fisheries S.A. - Rípol	12° 51' 3.26" N	87° 9' 59.16" W	Chinanda
5	Cooperativa La Esperanza R.L.	12° 49' 42.16" N	87° 15' 33.92" W	Chinanda
6	Colectivo Reyes Batraz	12° 50' 7.71" N	87° 4' 58.39" W	Chinanda
7	Cooperativa Francisco Rivera R.L. - Mo	12° 51' 28.22" N	87° 9' 11.59" W	Chinanda
8	Cooperativa La Foyera R.L. - Omar Tu	12° 47' 37.69" N	87° 5' 12.04" W	Chinanda
9	Cooperativa La Foyera R.L. - Luis	12° 52' 2.39" N	87° 10' 10.77" W	Chinanda
10	Cooperativa Francisco Rivera R.L. - Lu	12° 55' 30.69" N	87° 2' 51.87" W	Chinanda
11	Cooperativa de Producción Agropecua	12° 58' 27.87" N	87° 5' 33.53" W	Chinanda
12	Cooperativa El Progreso N° 2 R.L.	12° 48' 47.28" N	87° 6' 13.73" W	Chinanda
13	Cooperativa Oficio Benito Garcia Aguil	12° 50' 44.69" N	87° 12' 15" W	Chinanda
14	Cooperativa Gregorio Santos Vianaga	12° 53' 15.09" N	87° 3' 34" W	Chinanda
15	Cooperativa 30 de Mayo R.L.	12° 51' 49.49" N	87° 5' 11" W	Chinanda
16	Cooperativa Amaynta R.L.	12° 52' 8.74" N	87° 5' 11" W	Chinanda
17	Cooperativa Benjamin Zaldívar R.L.	12° 49' 39.49" N	87° 12' 15" W	Chinanda

On the right, a satellite map view shows the same farm locations marked with red circles. A scale bar indicates 2 miles and 2 kilometers.



## Acknowledgements

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Cover photo: Left: NASO map for the the People's Republic of China at an administrative level (left). Centre: Part of a completed NASO map Excel form. Right: NASO map for the Republic of Nicaragua at an individual farm level (shrimp ponds, *Penaeus vannamei*)

Back-cover: Cages, Italy, Gilthead seabream

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# National Aquaculture Sector Overview (NASO) maps collection

Farming systems distribution and characteristics  
data submission form  
version 1.0

*User manual*

## Abstract

The National Aquaculture Sector Overview (NASO) maps collection geographically illustrates where aquaculture is taking place. Key information features that accompany the geographical locations are either by administrative units or individual farms and they include: cultured species, technology used, culture systems, environments, farm characteristics and respective production quantities, and main issues (credit, diseases, environmental impact, etc.).

A NASO map Microsoft Excel form was prepared to facilitate the creation of the NASO maps. This user manual aims to facilitate the completion of the Excel form. The manual is aimed for all FAO member countries who are reporting aquaculture statistics to FAO and who also wish to inventory and monitor aquaculture in their respective countries. The NASO maps collection is being developed by the Aquaculture Branch in collaboration with the Fisheries and Aquaculture Statistics and Information Branch of the FAO Fisheries and Aquaculture Department.

**Aguilar-Manjarrez, J. & Crespi, V. 2013.**

*National Aquaculture Sector Overview map collection. User manual. / Vues générales du secteur aquacole national (NASO). Manuel de l'utilisateur.* Rome, FAO. 65 pp.

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## **Terminology and glossary**

## **Abbreviations and acronyms**

NASO Excel forms are customized for each country. The appearance of the entry page may differ from what is presented in this manual. Options available in various dropdown boxes in the individual data entry forms may also differ from the illustrations in this manual. The instructions presented in this manual are applicable to all NASO Excel forms.

## Opening the NASO Excel form

The NASO Excel form contains several computing instructions (or macros) and Visual Basic Applications (VBA) functions to assist in data entry and to export data into database (dBASE) tables and/or Google Earth Keyhole Markup Language (KML) files. To use the form correctly, you may need to enable these macros when you open the Excel file.

Depending on the Excel version used, you will need to carry out the following settings described below before you begin to complete the Excel form.

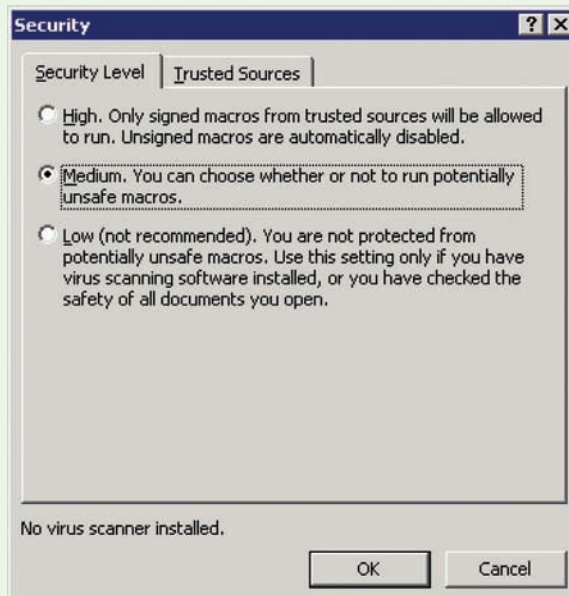
## Excel 2002

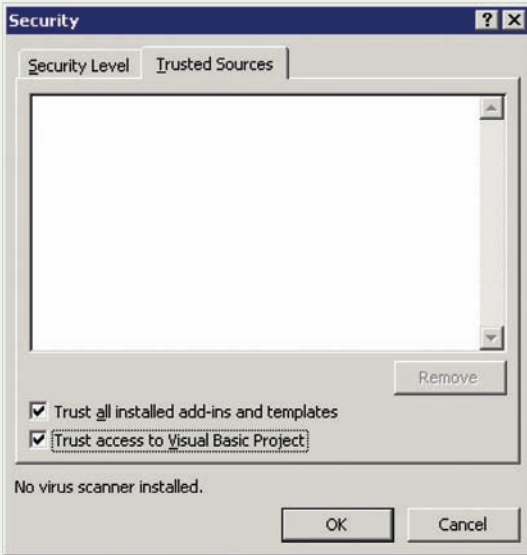
In Excel 2002 (from Microsoft Office XP), you might see the following message when you open the file:

“Macros in this workbook are disabled because the security level is high, and the macros have not been digitally signed or verified as safe. To run the macros, you can either have them signed or change your security level. Click “Help” for more information.”

In this message, do not worry about “signing” the macros. This is complex, and it is far easier to simply change your security level to enable the macros.

To enable the macros, click your “Tools” menu, then “Macros”, then “Security” to open your “Security” window. On the “Security Level” tab, set the security level to “Medium”.



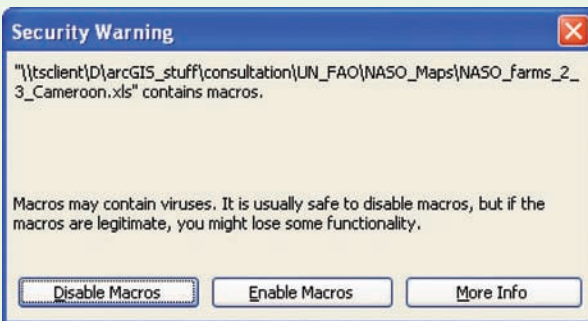


Click the “Trusted Sources” tab, then check “Trust access to Visual Basic Project”:

Click “OK” to close the window. Save the Excel file, close it and then reopen it.

## Excel 2003

In Excel 2003, you might get a message similar to the following when you open the file:



In this case, simply click “Enable Macros” to open the file.

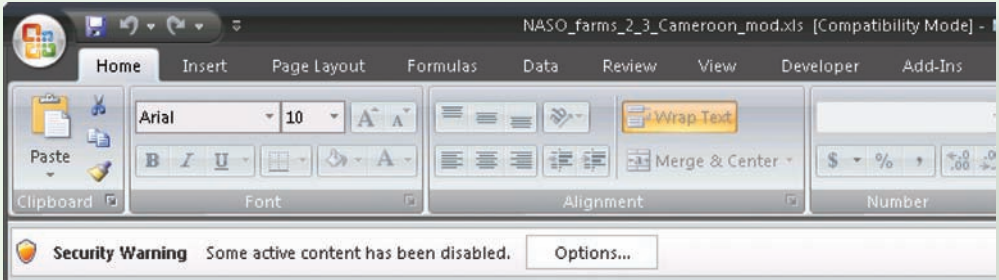
Alternatively, you may see the following message:



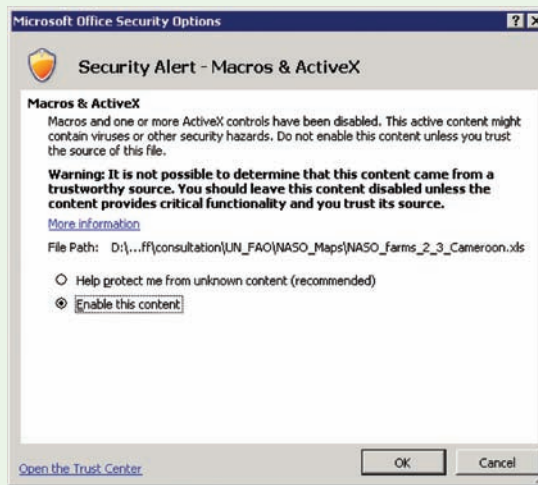
The text in the warning box above explains how to enable macros in Excel 2003.

## Excel 2007

In Excel 2007, you may need to click the “Options” button as soon as you open the file:

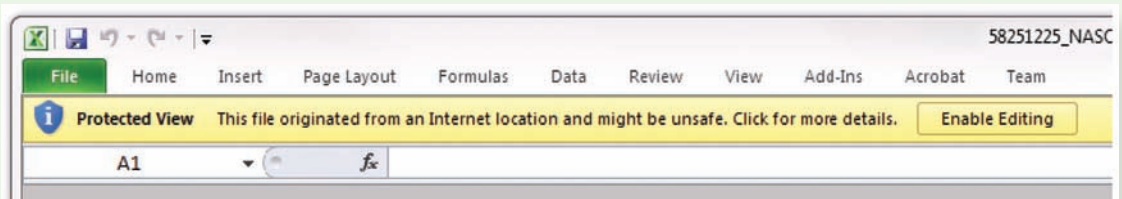


In the “Options” dialog, choose “Enable this content”.

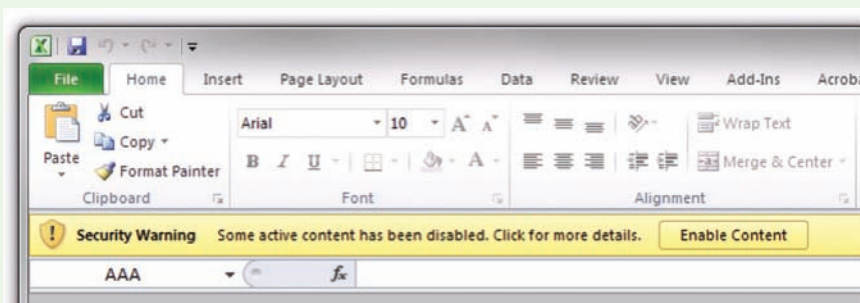


## Excel 2010

In Excel 2010, you may need to initially click “Enable Editing”.

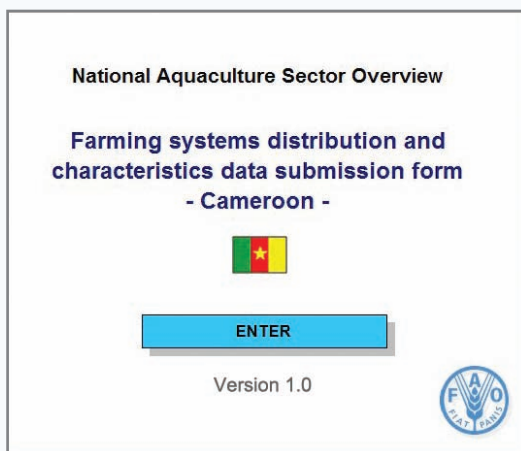


And then “Enable Content”.



## 2. ENTRY PAGE

When opening the Excel file, you may see an entry page (customized for your country) which looks similar to the following:



If so, simply click the "Enter" button to go to the Introduction page.

At this point you should see your navigation links on the left side of the Excel form.

A description of each navigation menu is presented on the next page.

The screenshot shows a complex interface with a navigation menu on the left and introductory text on the right. The navigation menu consists of several sections: "print this page" (with a printer icon), "Entry page", "HELP" (with sub-items: Introduction, Glossary, Recording locations), "CONVERTER" (with sub-items: DD to DMS, DMS to DD), "STEP I" (with sub-items: Disclaimer, Data clearance, Reference data), "STEP II" (with sub-items: Compiler data, Individual Farms, Farms by Administrative Units), "STEP III" (with sub-items: Google and database file generator), and "Contacts". The main content area has a title "Farming systems distribution and characteristics data submission form" and a "Help page" button. Below this is a red-bordered box with the text "PLEASE READ CAREFULLY THIS PAGE BEFORE STARTING DATA ENTRY". The text below explains the purpose of the form and provides instructions for users, including a disclaimer and steps for data entry.

**Farming systems distribution and characteristics data submission form**

Help page

**PLEASE READ CAREFULLY THIS PAGE BEFORE STARTING DATA ENTRY**

This Microsoft Excel data submission form has been created by FAO to collect, update, and/or improve information on: aquaculture locations, cultured species, technology, culture systems, environment, farm characteristics and production quantities, and issues.

An index is provided on the left for navigation by simply clicking on the title fields.

**STEP I. Please read the following information:**

1. Disclaimer. For reference.
2. Data clearance. The compiler must indicate if any of the data submitted is to be treated as confidential.
3. Reference data form, it contains "old data" submitted to FAO in 2004 that can be used as a starting point or reference to complete this form.

**STEP II. Complete the following spreadsheets:**

1. "Compiler data" form, to record contact information on experts who compiled the form.
2. Individual farms form, to record information on a farm-by-farm basis.
3. Farms by administrative units form, to report aggregated information of individual farms by administrative units.

Compiler can complete this form using the "Individual farms" and/or the "Farms by Administrative Units" submission form. This will vary upon the degree of aquaculture development in a given country, the resources available to complete the form and the compiler.

In case information will be provided through the "Farms by Administrative Units" form, the tool supports also a double data input and single farms can be listed in the "Individual Farms" form. This can be useful if the compiler wants to describe a restricted and more specific branch of the whole Aquaculture sector (i.e. the whole aquaculture sector on the "Admin. Unit" form, and a more narrow view of the cage farm aquaculture on the "Individual Farms" form).




## Introduction

The compiler can complete this form using either the “Individual farms” form and/or the “Farms by Administrative Units” form. The form used will depend on the degree of aquaculture development in a given country, the resources available to complete the form and the compiler.

If the information is provided through the “Farms by Administrative Units” form, the tool optionally allows data on single farms to also be entered in the “Individual Farms” form. This can be useful if the compiler wants to describe a restricted and more specific branch of the whole aquaculture sector (i.e. the whole aquaculture sector on the “Administrative Unit” form, and a more narrow view of, for example, cage farm aquaculture on the “Individual Farms” form).

### **Warning:**

Please, do not move, copy, paste or delete any field or spreadsheet in the document. You can copy and paste ONLY cells within the same field (column).

 <b>Caution:</b> Each production data form is a spreadsheet organized by CATEGORIES (columns). Each record must be compiled following the field order from Left to Right: Location → Cultured species → Technologies → Culture systems → Environments → Farm characteristic and production quantities → Main issues			
<table border="1"> <tr> <td style="background-color: yellow;">Title *</td> </tr> <tr> <td>Field</td> </tr> </table>	Title *	Field	Fields with a yellow background are mandatory. If a mandatory field is left unfilled, it will be not possible to fill the next fields of the record. Therefore fields must be filled in the order specified above.
Title *			
Field			

Each record has an ID number. The background color of the ID numbers will change automatically depending on whether the record is complete. An ID number with a green background color indicates that the record is complete, while a red background color indicates the record is missing some mandatory data:

ID Record	
1	Completed record. all the mandatory fields have been filled.
2	NOT completed record. Some mandatory fields have been left empty.
3	Empty records.

### **Caution:**

1. Do not leave empty records (rows) within completed records.
2. Almost all the fields have dropdown menu cells where a value must be selected. In many cases, the options available in the dropdown menu will be customized for each country.
3. Where the dropdown menu is available, fill the cells only with values included in the menu list. Do not paste different values onto these cells.



### **Caution:**

1. If exporting data to either a Google KML or dBASE DBF file, please make sure all data has been entered and all mandatory fields have been completed before exporting the data.

## **Recording aquaculture locations on the individual farms form:**

Entering data for individual farms requires the user to enter the latitude and longitude of the farm location.

The following instructions aim to assist in collecting information on aquaculture locations and their characteristics to upload and display in FAOs National Aquaculture Sector Overview (NASO) ([www.fao.org/fishery/naso/search/en](http://www.fao.org/fishery/naso/search/en)).

Record the latitude and longitude coordinates of each aquaculture site (preferably) and/or locations of clusters of farms (i.e. provide a lat/long location at the approximate centre of the cluster). The lat/long locations can be derived using: (1) a Global Positioning System (GPS) as the preferred choice; or else (2) using Google Earth, Google Maps, Yahoo! Maps or Microsoft Virtual Earth; or (3) GPS cell phones (e.g. iPhone, Blackberry, Motorola), some cameras and GPS mobile navigators; or (4) on a worst case scenario extracting this information from paper maps.

### **OPTION 1. Recording aquaculture locations using a GPS**

1. Travel to desired site location, record the Latitude and Longitude of the site using a GPS and assign a unique ID.
2. The ID or name of the location is extremely important to help identify and manage/update this information in databases. To this end, create an alphanumeric ID number (i.e. a combination of numbers of letters) of no more than eight characters.
3. Use the NASO map CONVERTER tool (see section below) or the Coordinate Converter “calculator” in the GPS Visualizer ([www.gpsvisualizer.com](http://www.gpsvisualizer.com)) Web site to upload and/or export GPS data.
4. Experienced GPS users should use GPS software to upload/export the data recorded in GPS into an Excel file.

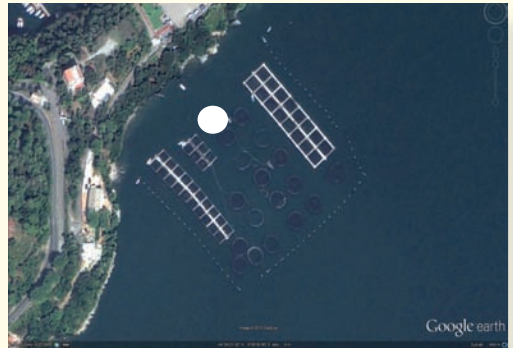
There are a vast range of GPS devices, therefore users are advised to read their GPS user manual carefully. The Latitude and Longitude format varies among GPS units ([www.gpsinformation.org/dale/measure.htm](http://www.gpsinformation.org/dale/measure.htm)), so it is important for users to select the “hddd °mm’ss.s” format in their GPS device to enable Latitude and Longitude recordings in Degrees, Minutes and Seconds.

When recording the Latitude and Longitude location of an individual farm simply record any location that is within any part of the farm or in close proximity to the farm. The white dots in the Google Earth images below show the possible locations for recording the Latitude and Longitude location of individual pond or cages in Nicaragua and Italy.

If there are clusters of individual farms (i.e. ponds) then try to record the coordinates while standing on the northernmost perimeter of the farm. This will allow you to determine that the coordinates refers to the farm that is south of the location that will appear when entering the coordinates on the map (see example below).



**Nicaragua.** Shrimp farming  
 Individual pond  
 Coordinates: 12°57'21.65"N, 87°20'21.29"W  
 Source/Imagery:  
 Image©2013 TerraMetrics  
 Image©2013 DigitalGlobe



**Italy.** Fish cage culture  
 Coordinates: 44° 4'23.08"N, 9°50'27.91"E  
 Source/Imagery:  
 Image©2013 DigitalGlobe



**Nicaragua.** Shrimp farming  
 Pond cluster  
 Coordinates: 12°53'28.03"N, 87°14'29.56"W  
 Source/Imagery:  
 Image©2013 TerraMetrics  
 Image©2013 DigitalGlobe

**OPTION 2. Recording aquaculture locations using Google Earth (similar steps are used for Google Maps, Yahoo! Maps or Microsoft Virtual Earth)**

If you did not record the aquaculture sites locations using a GPS, use Google Earth following these instructions:

1. Download ([http://earth.google.com/intl/en\\_uk](http://earth.google.com/intl/en_uk)) and install Google Earth in your PC.
2. Start Google Earth.
3. Zoom to the desired location.
4. Place the mouse over the desired location and manually record/write the lat/long values provided at the bottom left side of the Google Earth image in the Excel "Individual farms form".

As an alternative, go to [www.maps.google.com](http://www.maps.google.com), find the spot that you need to record, right click on the spot and select "what's here" from the dropdown menu that appears. The coordinates will appear in the search field in the Degrees and Decimal Degrees Format. They can be converted to Degrees, Minutes and Seconds using the conversion tool in the NASO Maps Excel form.

### **OPTION 3. GPS cell phone and cameras**

GPS cell phones are a new aid in the direction of using GPS tracking system. These devices, with the right software and service packs, can indicate your location, provide information regarding nearby areas and give turn-by-turn direction to your destination. These days, almost all new mobile phones sold in the United States of America and some other countries are GPS enabled.

Many recent digital cameras (e.g. Nikon) record geographic coordinates. Also the ATP Photo Finder saves geographic coordinates in photos to be uploaded to Google Earth. GPS mobile navigators (e.g. Garmin) for your car, motorcycle and mobile phone. For those of you who have GPS enabled cell phones, digital cameras, and/or navigators this equipment could be an option to record your lat/long locations. Please consult your user manuals.

### **OPTION 4. Recording aquaculture locations using paper maps**

Select a paper map at the appropriate scale (e.g. 1:50 000) then manually estimate the lat/long location of desired site using data provided on the map (typically the graticules along the edges of the map).

### **The geographic coordinate system**

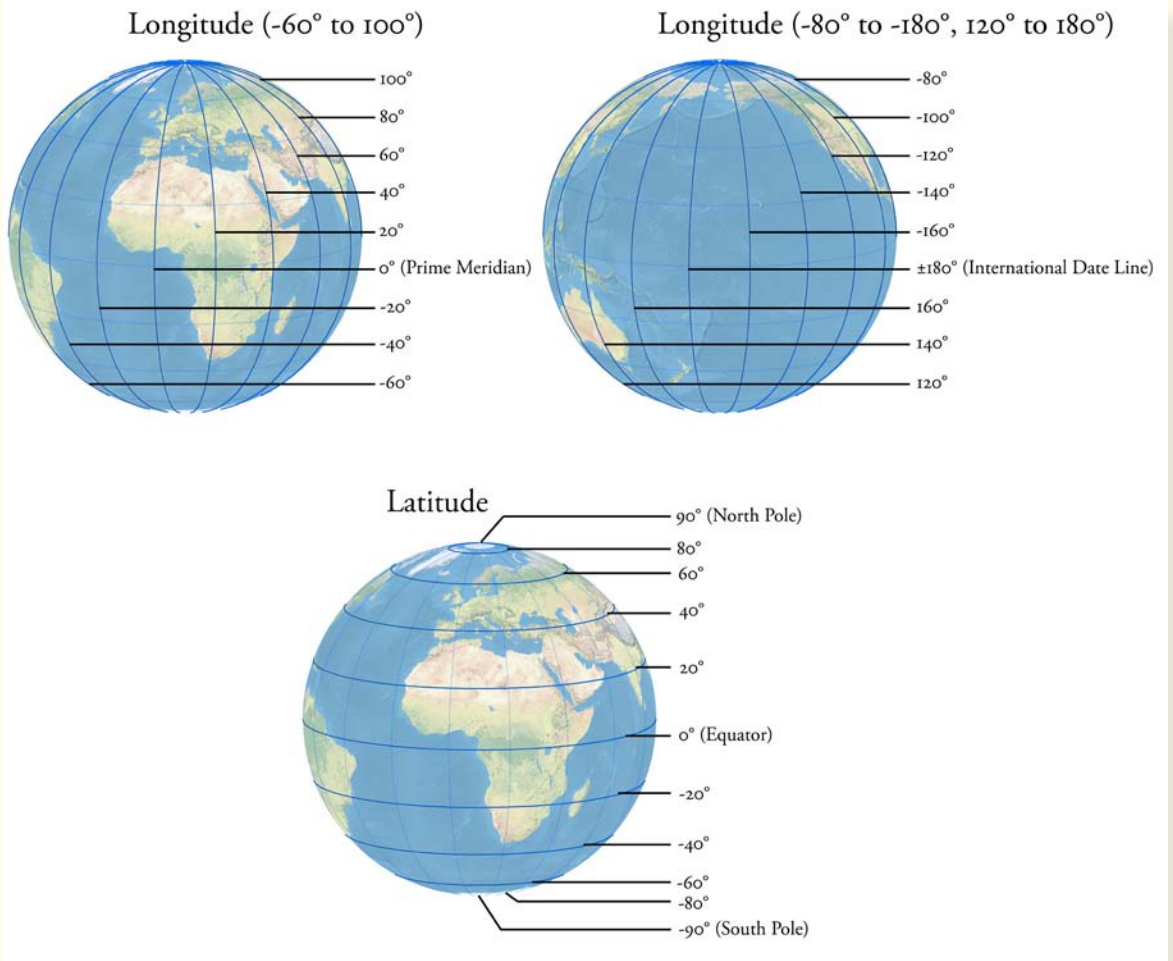
The NASO map Excel form requires geographic coordinates input using Degrees, Minutes and Seconds (DMS).

When looking at a map, latitude lines run horizontally. They are also known as parallels since they are parallel and are equally distant from each other. Each degree of latitude is approximately 111 km apart. Degrees of latitude are numbered from 0° to 90°. Latitude 0° corresponds to the Equator, the imaginary line which divides our planet into the Northern and Southern Hemispheres. Latitudes 90° and -90° refer to the North Pole and the South Pole, respectively.

The vertical longitude lines are also known as meridians. They converge at the poles and are widest at the Equator. Longitude 0° is located at Greenwich, England. The degrees continue 180° (or 180° east) and -180° (or 180° west) where they meet and form the International Date Line in the Pacific Ocean. Greenwich, the site of the British Royal Greenwich Observatory, was established as the site of the Prime Meridian by an international conference in 1884.

There are two methods of expressing fractions of degrees. The first method divides each degree into 60 minutes ( $1^\circ = 60'$ ), then each minute into 60 seconds ( $1' = 60''$ ). This system is called DMS (Degrees, Minutes, Seconds). The symbol for degrees is °, for minutes is ', and for seconds is ". For example Rome, Italy is located at the latitude 41° 53'00", longitude 12° 30'00". The second method states the fraction as a decimal of a degree. This is the DD (decimal degree) system. With this system the position of Rome is: latitude 41.88333°, longitude 12.5°.

DMS coordinates sometimes include a letter to indicate whether they are north or south of the equator ("N" or "S"), and east or west of the prime meridian ("E" or "W"). For example, the city of Lima, Peru (Longitude -76.945583, Latitude -12.049838) may be converted to DMS as either (W76° 56' 44.099, S12° 2' 59.417") or (-76° 56' 44.099, -12° 2' 59.417").



## Converting between DD and DMS

The NASO Excel form require you to enter coordinates formatted as DMS, with a letter indicating North/South and East/West. Unfortunately, you may only have coordinates formatted as DD, and therefore you must convert them to DMS before entering them into the NASO table. The NASO Excel tables include a tool to help with this, but in general the formulas are as follows:

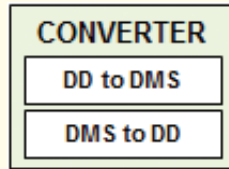
To convert from the DMS system to decimal degrees (DD):

$$\text{Decimal Degrees} = (\text{Degrees}) + (\text{Minutes} / 60) + (\text{Seconds} / 3600)$$

The conversion from DD to DMS is a little more complicated, and will be explained with the following example. Suppose you have the decimal degree reading of  $5.23456^\circ$ . To convert it to the DMS system, you first subtract the whole degree.  $5^\circ$  is the whole degree, so  $5.23456^\circ - 5^\circ = 0.23456^\circ$ . Then you multiply the remaining fraction with 60 minutes ( $0.23456^\circ * 60' = 14.0736'$ ),  $14'$  is the whole minutes. After this you multiply the fraction of the minutes with 60 seconds ( $14.0736' - 14' = 0.0736'$ ,  $0.0736' * 60'' = 4.416''$ ),  $4.416''$  are the remaining seconds. The DMS version of  $5.23456^\circ$  is  $5^\circ 14' 4.416''$

## Using the NASO tool for converting between DD and DMS

Click the “DD to DMS” or “DMS to DD” link in the “Converter” box in the Navigation Bar to go to the appropriate worksheet:



To convert from Decimal Degrees to Degrees Minutes Seconds, click the “DD to DMS” link. Simply enter your Decimal Degrees values in the appropriate columns. The Degrees Minutes Seconds values will appear automatically. The coordinates for Rome, Italy and Lima, Peru are already entered as examples.

Location	Latitude		Longitude				Prefix	Longitude			
	Decimal Degrees	Decimal Degrees	Prefix	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	
Rome, Italy	41.88035	12.522024	N	41	52	49.26	E	12	31	19.2864	
Lima, Peru	-12.049838	-76.945583	S	12	2	59.4168	W	76	56	44.0988	
			S	0	0	0	W	0	0	0	
			S	0	0	0	W	0	0	0	
			S	0	0	0	W	0	0	0	

To convert from Degrees Minutes Seconds to Decimal Degrees, click the “DMS to DD” link. Enter your DMS values in the appropriate columns. The Decimal Degree values will appear automatically. The coordinates for Rome, Italy and Lima, Peru are already entered as examples.

Location	Latitude				Longitude				Latitude		Longitude	
	Prefix	Degrees	Minutes	Seconds	Prefix	Degrees	Minutes	Seconds	Decimal Degrees	Decimal Degrees		
Rome, Italy	N	41	52	49.26	E	12	31	19.2864	41.88035	12.522024		
Lima, Peru	S	12	2	59.4168	W	76	56	44.0988	-12.049838	-76.945583		
									0	0		
									0	0		
									0	0		

For details on converting degrees, minutes and seconds to decimal degrees, see *De Graaf et al.* (2003) (available at: [www.fao.org/DOCREP/006/Y4816E/y4816e0e.htm#bm14](http://www.fao.org/DOCREP/006/Y4816E/y4816e0e.htm#bm14)). For conversion tools, see GPS Visualizer “calculator” ([www.gpsvisualizer.com/calculators](http://www.gpsvisualizer.com/calculators)).

**de Graaf, G., Marttin, F.J.B., Aguilar-Manjarrez, J. & Jenness, J.** 2003. Geographic Information Systems in fisheries management and planning. Technical manual, *FAO Fisheries Technical Paper*. 449. Rome. 162 pp. (also available at [www.fao.org/docrep/006/y4816e/y4816e00.HTM](http://www.fao.org/docrep/006/y4816e/y4816e00.HTM)).

## STEPS TO DATA ENTRY

There are three general steps to data entry. These steps are described briefly below and explained in more detail in “General instructions”.

### Step 1: Required

- Disclaimer: For reference purposes only.
- Data clearance: Whether your data should be treated as confidential or unrestricted.
- Reference data: If available, samples of historical data are provided to be used as a starting point or as a reference to completing this form.

### Step 2: Required

- Compiler data: Contact information for experts who compiled this data.
- Individual farms data: For data recorded on specific farms.
- Farms by administrative units data: For aggregate data on all farms within specific administrative units.

### Step 3: Optional

- Export data to a Google Earth file (KML). Please visit [www.google.com/earth/index.html](http://www.google.com/earth/index.html) to download Google Earth.
- Export data to a dBASE Database file (dbf).

## DATA ENTRY STEP 1

### Data clearance

Click on the “Data clearance” link in Step 1 of the navigation bar to open the Data clearance form.

It would be most grateful if all mandatory fields are completed to help enhance statistics at FAO. However, it is understandable if you wish to restrict or control the distribution of this information outside of FAO. Please select the appropriate boxes below to indicate whether the following fields should be considered as unrestricted, or as strictly confidential and cannot be published.

Data marked as “confidential” will be used only for statistical purposes at FAO.

### Reference Data:

No data entry is needed here. This is simply historical data from past data entry sessions, or sample data from FAO, **if available**, to assist or guide the user with the current data entry session.

We would be most grateful if all mandatory fields are completed to help us enhance statistics at FAO, however, if necessary, it is possible to restrict/control the distribution of this information. To do this, please select which of the following mandatory fields should be considered as strictly confidential and cannot be published.

Data marked as "confidential" will be used only for statistical purposes at FAO.

Mandatory fields	Unrestricted	Confidential	Status
Farm name	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Geographic coordinates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Cultured Species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Technologies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Culture systems	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Environments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Production quantities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED
Year of production	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UNRESTRICTED

## DATA ENTRY STEP 2: Compiler data:

When opening the Compiler data, you will see an entry page (customized for your country) which looks similar to the following:

For each person involved in this data entry session, please enter the following information in the appropriate fields.

ID record	Country	Expert name	Expert Institution Affiliation	Language	Email	Telephone	Address	Last save date
1	Cameroon							
2								
3								

1. Country
2. Expert name
3. Expert institution affiliation
4. Language
5. Email
6. Telephone
7. Address
8. Last save date

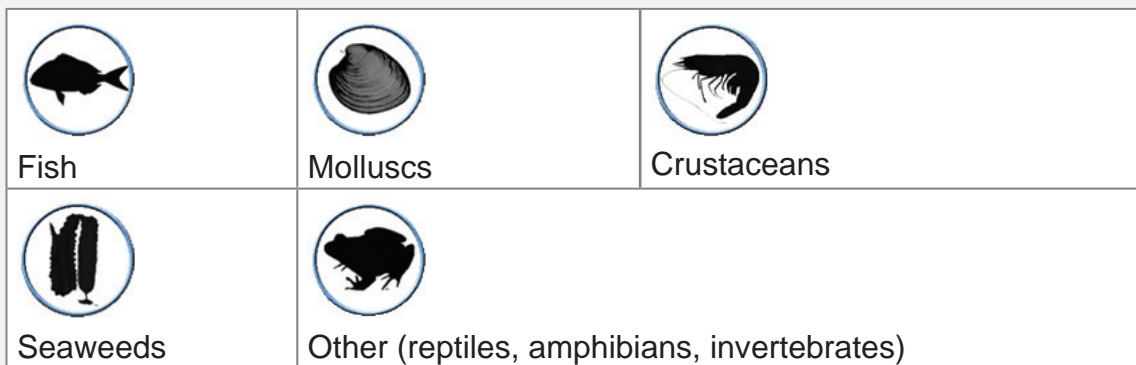


The next important step will be to decide whether the form will be completed by individual farms or administrative units and this will depend upon the degree of aquaculture development and the resources available to complete data collection form and the level of clearance provided by the country experts.

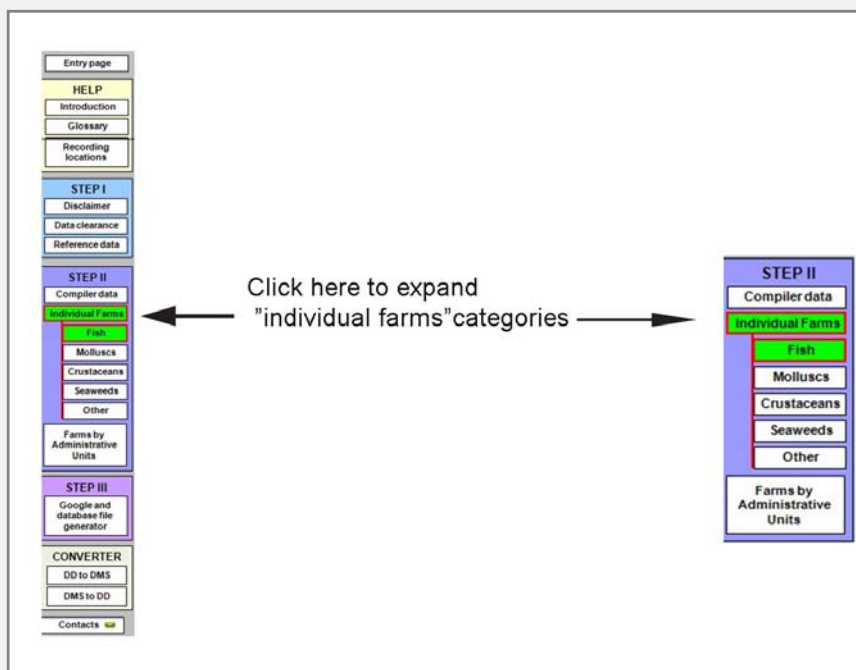
### Individual farms data:

Aquaculture data for individual farms requires the latitude and longitude of the farm location. Please see the section on “Recording aquaculture locations on the individual farms form” above for suggestions on how to obtain the correct latitude and longitude coordinates for farm locations.

There are five separate data entry forms for different categories of aquaculture production:



First click on “Individual Farms” in the navigation bar, then click the category you wish to enter data for. Please complete the relevant categories according to the aquaculture practices in your respective country.



For each individual farm, enter the following data in order: Please refer to the glossary for definitions of individual fields.

There are nine main sections to complete in the Excel form: (1) location (farm name and geographic coordinates); (2) administrative location; (3) culture species; (4) technologies used; (5) culture systems; (6) environments; (7) farm characteristics, production and quantities and value; (8) seed input quantity and characteristics; and (9) main issues.

The completion of the Excel form simply requires the user to select categories in the “drop-down” lists. The categories in the dropdown lists are standardized and correspond to the categories for reporting national aquaculture statistics to FAO.

Note: Many of these dropdown lists will be customized for each country, so the options available to you may differ from the illustrations below.

## Location

### Individual farms

LOCATION (FARM NAME AND GEOGRAPHIC COORDINATES)								
Farm name	latitude				longitude			
	Deg.	Min.	Sec.	N/S	Deg.	Min.	Sec.	E/W
				N				
				S				

1. Farm Name: *Required*
2. Farm Latitude Degrees: *Required*
3. Farm Latitude Minutes: *Required*
4. Farm Latitude Seconds: *Required*
5. Farm Latitude N/S (enter either “N” for North, or “S” for South) : *Required*, select from dropdown list.
6. Farm Longitude Degrees: *Required*
7. Farm Longitude Minutes: *Required*
8. Farm Longitude Seconds: *Required*
9. Farm Longitude E/W (enter either “E” for East, or “W” for West): *Required*, select from dropdown list

## Administrative location

1. Administrative Level 1 (region/state): Required, select from dropdown list.
2. Administrative Level 2 (province/district): Optional, select from dropdown list.

ADMINISTRATIVE LOCATION	
Administrative level 1 (region/state) *	Administrative level 2 (province/district)
▼	
Adamaoua	
Centre	
Est	
Extreme_Nord	
Littoral	
Nord	
Nord_Ouest	
Ouest	
▲	

## Cultured species

- Species 1: Required, select from dropdown list.  
 Species 2: Optional, select from dropdown list.  
 Species 3: Optional, select from dropdown list.  
 Species 4: Optional, select from dropdown list.

CULTURED SPECIES (FISH)			
Species 1 *	Species 2	Species 3	Species 4
▼			
Abramis brama			
Abramis spp			
Acanthopagrus berda			
Acanthopagrus latus			
Acanthopagrus schlegeli			
Acipenser baerii			
Acipenser gueldenstaedtii			
Acipenser naccarii			
▲			

*Note:* It is possible to list up to 4 species. Species should be listed in descending order according to the proportion of each species cultured, with the species with the largest proportion listed first as Species 1.

## Technologies used

- Technology 1: Required, select from dropdown list.  
 Technology 2: Optional, select from dropdown list.  
 Technology 3: Optional, select from dropdown list.

TECHNOLOGIES USED		
Technology 1 *	Technology 2	Technology 3
▼		
Pond		
Pond, barrage -		
Pond, diversion -		
Pond, earthen -		
Pond, lined -		
Raceway		
Raft culture		
Ranching		
▲		

Note: You may list up to 3 technologies. Technologies should be listed in descending order according to the proportion each technology is used, with the technology used the most listed first as Technology 1.

### Culture systems

1. System 1: Required, select from dropdown list.
2. System 2: Optional, select from dropdown list.
3. System 3: Optional, select from dropdown list.

CULTURE SYSTEMS		
System 1 *	System 2	System 3
Extensive		
Modified extensive		
Semi-extensive		
Intensive		
Semi-intensive		
Integrated intensive		
Paddy cum fish culture		
Extensive and semi-intensiv		

Note: It is possible to list up to 3 culture systems. Systems should be listed in descending order according to the proportion of each culture system used, with the most used culture system listed first as System 1.

### Environments

1. Environment 1: Required, select from dropdown list.
2. Environment 2: Optional, select from dropdown list.
3. Environment 3: Optional, select from dropdown list.

ENVIRONMENTS		
Environment 1 *	Environment 2	Environment 3
Freshwater		
Brackishwater		
Marine		

Note: It is possible to list up to 3 environments. Environments should be listed in descending order according to the proportion of each environment used, with the most-used environment listed first as Environment 1.

### Farm characteristics, production quantities and value

1. Employees (i.e. # of permanent employees): *Optional*
2. Surface area (in hectares): *Optional*
3. Number of rearing units (ponds, cages, etc.): *Optional*

4. Production in tonnes, *Either this field or “number of juveniles” below is required to be filled out. Both fields can be filled out if necessary.*
5. Number of juveniles *Either this field or “production in tonnes” above is required to be filled out. Both fields can be filled out if necessary.*
6. Year of production: *Required*
7. Price ex farm (USD x 1kg): *Optional*
8. Source of water: *Optional*
9. Land tenure: *Optional*

FARM CHARACTERISTICS, PRODUCTION QUANTITIES AND VALUE								
Employees	Surface (ha)	number of rearing units (ponds, cages, etc.)	Production (at least one field per record)*		Year of production*	Price ex farm (USD x 1 kg)	Source of water	Land tenure
			Tonnes	Number of juveniles				

**Notes:**

- The data recorded must correspond to one year, please do not enter information from different years.
- The values in this section should be entered in US Dollars in order to allow for comparison with other countries. It can be understood and acknowledged that the US Dollars currency varies in value in relation to other currencies, so the value entered in the NASO tables should reflect roughly the average value over the year.

### Seed input quantity and characteristics

Annual input (Number of fish): *Optional*.

Input Categories: *Optional*, select from dropdown list.

Input Source: *Optional*, select from dropdown list.

SEED INPUT QUANTITY AND CHARACTERISTICS		
Annual input (No of fish)	Input categories	Input source

### Main issues

1. Issue 1: *Optional*
2. Issue 2: *Optional*
3. Issue 3: *Optional*

MAIN ISSUES			
	Issues 1	Issues 2	Issues 3

**Note:**

Issue 1: Most important issue in location;

Issue 2: Moderately important issue in location and

Issue 3: Least important, but it is an issue in location.






## Comments

General comments: Optional, please limit comment to 900 characters or less.

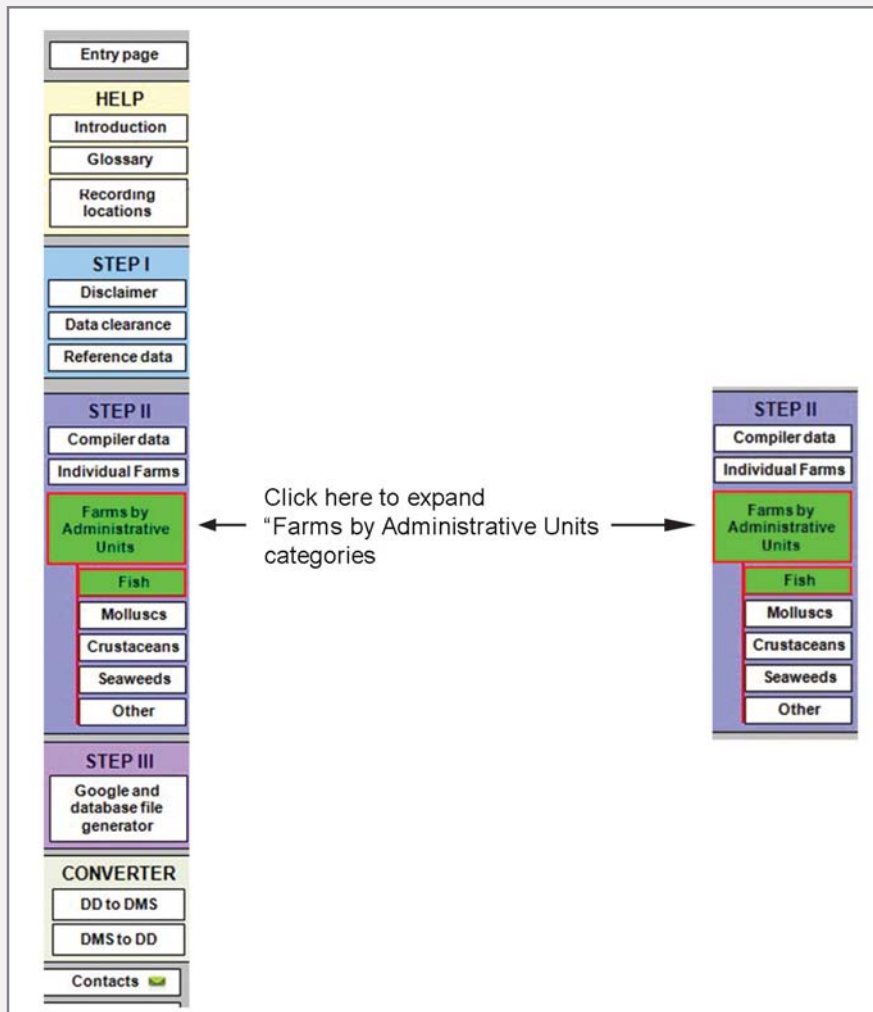
MAIN ISSUES		
Issues 1	Issues 2	Issues 3
<div style="border: 1px solid black; padding: 2px;"> <ul style="list-style-type: none"> <li>Credits</li> <li>Diseases</li> <li>Emergencies</li> <li>Environmental impact</li> <li>Fish consumption</li> <li>Increasing production cost (feed and/or energy)</li> <li>Insufficient supply of feed</li> <li>Insufficient supply of marine fish seeds</li> </ul> </div>		

## Farms by administrative unit data:

This category is intended for aquaculture data that is aggregated to describe an entire region, state, province or district. As with the individual farms form above, there are five separate data entry forms for different categories of aquaculture production:

 Fish	 Molluscs	 Crustaceans
 Seaweeds	 Other (reptiles, amphibians, invertebrates)	

First click on “Farms by Administrative Units” on the left side of the Excel window, then click the category you wish to enter data for. Please complete the relevant categories according to the aquaculture practices in your respective country.



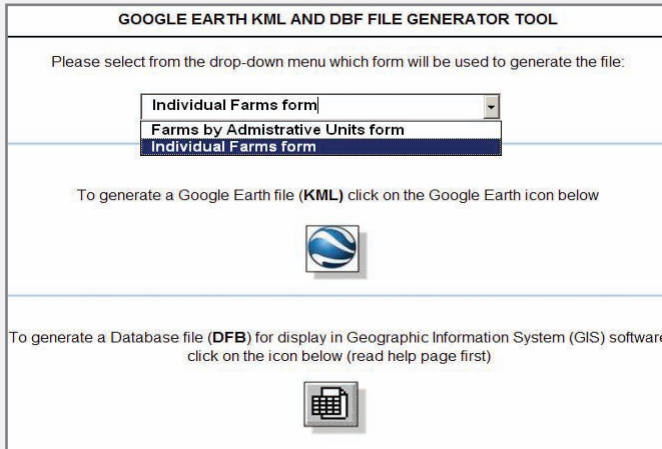
If the country completing this Excel form does not have "Individual farms" level data, if the countries does have the resources to conduct an inventory by individual farms, or if the number of farms are too many to record then the user should complete the "Farms by Administrative Units" section.

The categories for this form are "identical" to those described in the Individual farms section, except that: (1) the location only refers to the administrative units and not single farms; and (2) the information being provided is aggregated/summarized.

### DATA ENTRY STEP 3:

The Excel worksheet includes tools to export your data into a Google Earth (KML) file or a dBASE database (dbf) file. This step is not required, but it may be useful to the user to have a compiled database file for their records, or a map file to visualize the data.

The compiler must have recorded the Excel form by either “Individual Farms” or “Farms by Administrative Unit”, therefore, the relevant file to export will be selected automatically by the Excel form. The Excel form does not allow the user to export both files at the same time.



### Export to Google Earth:

This option will generate a KML (Keyhole Markup Language) file illustrating the spatial distribution of your data.

KML files are a special type of geographic data format created by Google for their Google Earth application. KML files can also be imported into many mainstream GIS (Geographic Information Systems) software for viewing and analysis. Google Earth is available for free download at [www.google.com/earth/index.html](http://www.google.com/earth/index.html)



#### Caution:

To make sure the KML file generator works properly, the Excel decimal separator must be a full stop or dot (.). This is due to the International settings of PCs running Excel. If your Excel display has a different symbol as decimal separator, such as a comma (,), you should change this setting. To do this, open Excel and:

- In the Tools menu, click Options, and then click the International tab.
- Under *Number Handling*, clear the *Use system separators* check box.

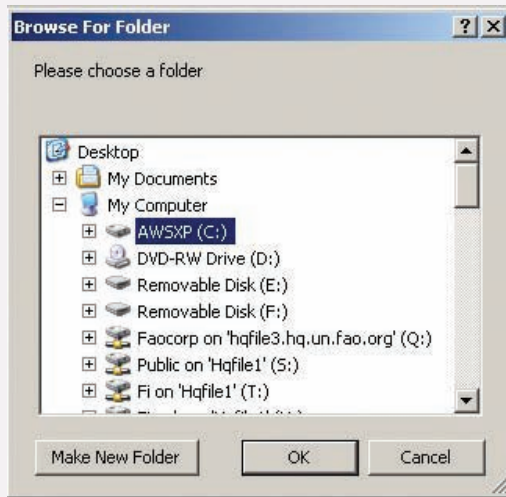
Type “.” (a dot) in the *Decimal separator* and “,” (a comma) in the *Thousands separator* boxes.

To generate the Google Earth file, click on the Google Earth icon:





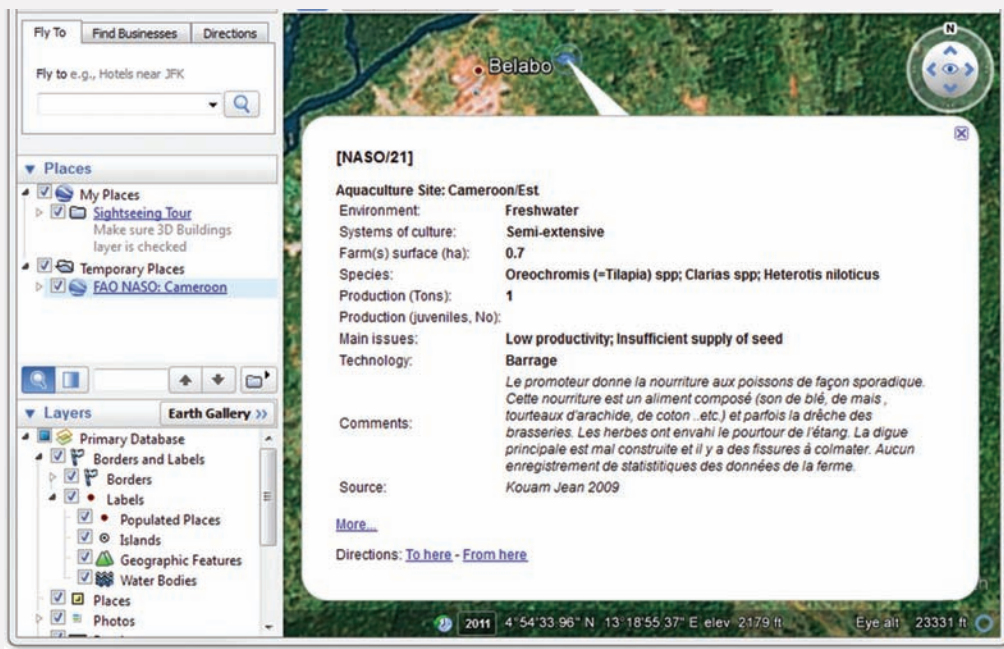
Follow the directions to specify the name and location to save your KML file on your computer.



Upon completion (and assuming you have installed Google Earth), you may open and view the file by double-clicking on it. An example is provided for the Republic of Cameroon.

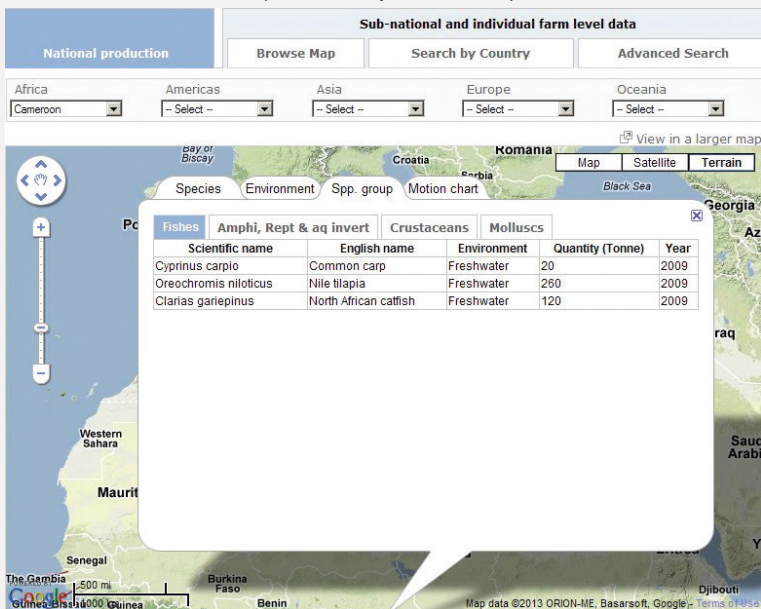
Like most types of GIS data, KML data include both location and attribute information. For example, KML files produced by this NASO Export tool include both the location of the aquaculture sites and a variety of attributes concerning each site.

### Attribute data on individual farm in Cameroon



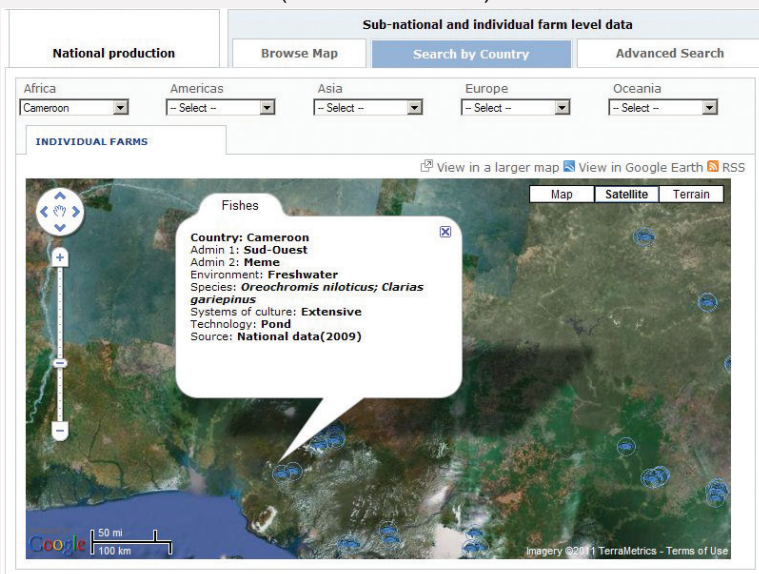
Once the Excel form is completed it should be sent to the FAO Aquaculture Branch (FIRA) for validation. After the validation process is completed and the necessary corrections are made, FIRA staff will then upload the results for display in the NASO map Web site. Countries are also most welcome and encouraged to use the NASO Excel form in their institutes/organizations to help them update this information.

### NASO map for Cameroon (National production)



Source: FAO FishStat Plus

### NASO map for Cameroon (Individual farms)



Source: NASO Excel form

Source: [www.fao.org/fishery/naso-maps/naso-home/en](http://www.fao.org/fishery/naso-maps/naso-home/en)

## Export to CSV

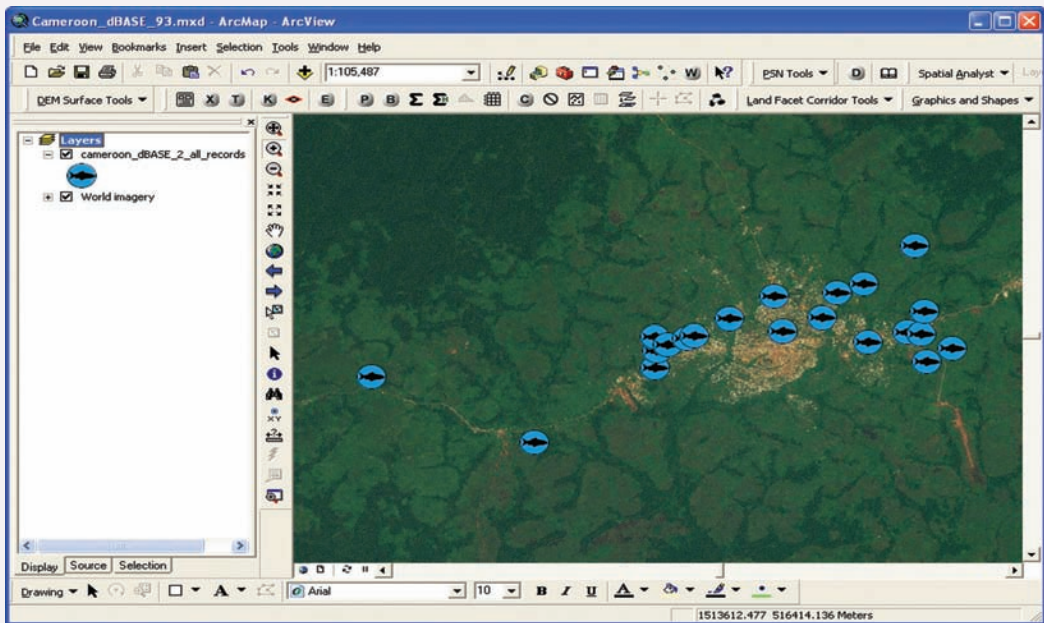
For GIS users this option will generate a CSV database file of your data. Databases in CSV format can easily be imported into most standard GIS packages for analysis and review.

Click on the CSV icon to generate the CSV file:



Follow the directions to specify the name and location to save your CSV file. Once completed, you may import the file into the GIS software of your choice. e.g. the screenshot below shows the output of Excel form using ArcGIS 9.3 software.

### Selected Individual Farms in Cameroon displayed in ArcGIS 9.3 software



## Terminology and glossary

### 1. Terminology

The present list of terms provide additional information to describe the categories listed in the Excel form, the categories for the “Individual Farms” or the “Farms by Administrative Units” are identical except for the location categories and the fact that information recorded in each category in the “Farms by Administrative Units” form is aggregated. The “individual farms” forms records geographic coordinate locations of farms on a farm-by-farm basis, or group of farms basis whereas the “farms by administrative units” records aggregated information of farms by State, provinces or districts as necessary. Likewise, the surface areas or tonnes are recorded individually in the “Individual Farms” form and by administrative units in the “farms administrative units” form.

Fields		Drop down menu	Mandatory fields	Submitted information
Location	Farm name			Name of the farm or the name of the company owning the farm.
	Latitude and longitude			Geographic coordinates of the farm, expressed in Degrees, minutes, seconds.
	Administrative location		At least one field from drop menu is mandatory	Author must indicate the appropriate administrative location of the farm (e.g. state, district or province).
Cultured species			At least one field from drop menu is mandatory	Species reared in the farm. Author can list up to four species.
Technology used			At least one field from drop menu is mandatory	Technologies used in the farm. Author can list up to three technologies.
Culture system			At least one field from drop menu is mandatory	Culture systems of the farm. Author can list up to three systems.
Environments			At least one field from drop menu is mandatory	Environment used by the farm. Author can list up to three environments.

Farm characteristics	Employees				Number of permanent employees working in the farm.
	Surface (ha)				Surface of the farm expressed in hectares (the entire farm, not only the individual rearing units).
	Number of rearing units				Number of rearing units available in the farm. Rearing units could be ponds, cages, tanks, etc.
	Production	Tonnes			Fish production can be expressed in tonnes (if farm does not have, or is not, a hatchery) or number of juveniles produced (in case the farm would have, or is, a hatchery). Both "tonnes" and "number of juveniles" can be recorded in cases where the farm would perform both hatchery and outgrowing activities. At least one production field is mandatory.
		Number of juveniles			
	Year of production				The year to which the record data refers.
	Price ex farm				Price of the fish expressed in US Dollars per Kilogram or US Dollars per fish (in case production would be expressed in "number of juveniles". The price is to be referred to the product value ex farm.
	Source of water				Source of water used by the farm.
	Land tenure				The possession status of the land occupied by the farm.
Seed input	Annual input				Seed input expressed in number of fish used yearly by the farm.
	Input categories				Categories of seed (e.g. eyed eggs, spat, postlarvae, etc.).
	Input source				Seed origin.
Main issues					Aquaculture issues. Author can list up to three issues within a list displayed on a dropdown menu.
Comments					Free text, relevant comments may be added here.

Note: Green color drop-down menu available, yellow color mandatory fields which need to be completed.

## 2. Glossary

Selected terms as defined by FAO's Glossary of aquaculture ([www.fao.org/fi/glossary/aquaculture](http://www.fao.org/fi/glossary/aquaculture)):

### Techniques

**Bag culture.** Off-bottom shellfish culture (e.g. oysters) in which on-growing takes place in mesh bags held on intertidal trestles.

**Barrage.** (a) Artificial bar in any watercourse to raise the level of water. (b) Semi-permanent or seasonal enclosure formed by impervious man-made barriers and appropriate natural features.

**Basin catch.** In totally drainable ponds, a harvesting structure built in the deepest part of the pond, in front of the water outlet; usually drainable so as to harvest the largest fish easily.

**Bottom culture.** Type of extensive culture of mussels, oysters, scallops and clams in which on-growing occurs on the seabed. After an appropriate period of growth period, the shellfish are harvested by dredging. Method also used for the culture of seaweeds.

**Cage.** Rearing facility enclosed on the bottom as well as on the sides by wooden, mesh or net screens. It allows natural water exchange through the lateral sides and in most cases below the cage.

**Cage, fixed.** A cage consisting of a net bag supported by posts driven into the bottom of a lake or river.

**Cage, floating.** Traditional design: floating wood or bamboo cage, occasionally incorporated into a boat to form a sort of well boat; still widely used in Indonesia and Indo-China. Modern design: generally consists of a mesh bag supported by a buoyant collar or, in some cases, frame; some floating types rotate, as a means of controlling fouling.

**Collector (seed).** Underwater device used to collect sticky eggs and settling larval stages such as mussel or oyster spat.

**Dam.** A barrier constructed across a valley for impounding water or creating a reservoir. Dams are characterized by their purposes and construction materials used. 'To dam' means the holding back of water by means of a dam.

**Ditch.** Long and narrow excavation dug out to receive or conduct water.

**Enclosure.** An enclosed natural bay, where the shoreline forms all but one side, which is typically closed off by a solid, net or mesh barrier.

**Farming, integrated.** Occurs when an output from one subsystem in an integrated farming system, which otherwise may have been wasted, becomes an input to another subsystem resulting in a greater efficiency of output of desired products from the land/water area under a farmer's control.

**Hatchery.** Place for artificial breeding, hatching and rearing through the early life stages of animals, finfish and shellfish in particular. Generally, in pisciculture, hatchery and nursery are closely associated. On the contrary, in conchyliculture, specific nurseries are common, where larvae produced in hatcheries are grown until ready for stocking in fattening areas.

**Lagoon.** Water body situated between the shore and a coral reef, through the openings of which tidal water circulates.

**Lake.** A natural relatively large body of standing water with negligible currents and enclosed by land. It can be regarded as a relatively closed system as most of its hydrology is internal, although it may have substantial inflowing and outflowing rivers.

**Longline, culture.** Form of open-water suspended culture in which cultured species are on-grown on ropes or diverse containers (e.g. baskets, stacked trays, lantern nets) suspended from anchored and buoyed surface or subsurface ropes (longlines). Used for the culture of bivalve molluscs, e.g. mussels, oysters, scallops, and marine macroalgae.

**Mixed, culture.** The rearing of fish of different age and size in the same waterbody.

**Off-bottom, culture.** Where the culture equipment are kept off the bottom.

**Paddy (field).** Bunded or diked field in which surface water can be maintained for culture of rice or other crops.

**Pen.** Fenced, netted structure fixed to the bottom substrate and allowing free water exchange; in the intertidal zone, it may be solid-walled; the bottom of the structure, however, is always formed by the natural bottom of the waterbody where it is built; usually coastal e.g. in shallow lagoons, but also inland e.g. in lakes, reservoirs. A pen generally encloses a relatively large volume of water.

**Pond.** Relatively shallow and usually small body of still water or with a low refreshment rate, most frequently artificially formed, but can also apply to a natural pool, tarn, mere or small lake.

**Pond, barrage.** Pond created in the bottom of a valley by building a dam across the lower end of the valley. Water fed directly from a nearby spring, a stream, another barrage pond or a reservoir. Water inflow either uncontrolled or controlled through a diversion canal and a water intake. Drainable through the old river bed. Overflow structure present or not.

**Pond, diversion.** Pond fed indirectly by gravity or by pumping through a diversion canal (which becomes the main feeder canal), from a spring, stream, lake, reservoir or barrage pond. Water inflow controlled through a water intake. Usually drainable through a drainage canal. Individual inlet and outlet for each pond.

**Raceway.** Structure, usually above ground, with a long, linear configuration; high water turn-over rate; highly controlled environment; often terraced with water reuse.

**Raft, culture.** Form of suspended culture in which the ongrowing structures (ropes, etc.) are suspended from a raft. Utilizes moored, floating rafts mostly for coastal shellfish culture; holes are punched in old shells and the shells are placed on strings, which are attached to the raft structure; after settling of spat on the shells, the rafts may be anchored in good growing areas.

**Ranching.** Commercial raising of animals, mainly for human consumption, under extensive production systems, within controlled boundaries and paddocks (e.g. in agriculture), or in open space (oceans, lakes) where they grow using natural food supplies. In fisheries: stocking usually of juvenile finfish, crustaceans or molluscs from culture facilities for growth to market size or to maturity in the natural environment. Species usually used are migratory and return close to the point of release (e.g. salmon) or non-migratory and remain for at least a substantial portion of the life-cycle in restricted areas where they enter the local fishery (e.g. red sea bream, *Penaeus japonicus*, etc.).

**Silo.** In aquaculture: (i) conical or straight sided vessels, which operate on an upwelling or downwelling of water through a bed of eggs. Similar to the Zoug jar method, except that the eggs are not hatched in the vessel. Commonly used as a method of storing excess eggs, or holding eggs whilst parent fish are tested for diseases. (ii) Deep tank with high flow rate and high stocking density. If circular also called “vertical raceway”. Wastes are flushed out.

**Stakes.** Wooden or bamboo posts, mangrove tree branches, nipa palm petioles, etc. embedded in the bottom of shallow (intertidal) sea areas where they are used to collect wild mussel or oyster spat to be cultured on them.

**Tank.** In aquaculture: a fish or water holding structure, usually above ground, typically with a high water turnover rate; highly controlled environment.

## Systems

**Extensive.** Production system characterized by (i) a low degree of control (e.g. of environment, nutrition, predators, competitors, disease agents); (ii) low initial costs, low-level technology, and low production efficiency (yielding no more than 500 kg/ha/yr); (iii) high dependence on local climate and water quality; use of natural waterbodies (e.g. lagoons, bays, embayments) and of natural often unspecified food organisms.

**Semi-extensive.** System of culture characterized by a production of 0.5—5 tonnes/ha/yr, possibly supplementary feeding with low-grade feeds, stocking with wild-caught or hatchery-reared fry, regular use of organic or inorganic fertilisers, rain or tidal water supply and/or some water exchange, simple monitoring of water quality, and normally in traditional or improved ponds; also some cage systems e.g. with zooplankton feeding for fry.

**Intensive.** System of culture characterized by (i) a production of up to 200 tonnes/ha/yr; (ii) a high degree of control; (iii) high initial costs, high-level technology, and high production efficiency; (iv) tendency towards increased independence of local climate and water quality; (v) use of man-made culture systems.

**Integrated aquaculture.** Aquaculture system sharing resources - water, feeds, management, etc. - with other activities; commonly agricultural, agro-industrial, infrastructural (wastewaters, power stations, etc.).

Paddy cum fish culture. An integration technique, which entails raising fish in a rice paddy; fish and rice may be produced either concurrently (rizipisciculture) or in rotation.

**Hyper-intensive.** System of culture characterized by a production averaging more than 200 tonnes/ha/yr, by the use of a complete (processed) fully formulated feed to meet all diet requirements of the species, stocking with hatchery-reared fry, no fertilizers used, full



predator and anti-theft precautions taken, highly co-ordinated and controlled regimes, usually pumped or gravity supplied water or cage-based, full use of water exchange and aeration with increasing levels of control over supply and quality, usually in flowing water ponds, cage systems, or tanks and raceways.

## Environment

**Freshwater.** The cultivation of aquatic organisms where the end product is raised in fresh water; earlier stages of the life cycle of these species may be spent in brackish waters or marine waters.

**Brackish water.** Water with a salinity intermediate between seawater and freshwater, usually showing wide salinity fluctuations.

**Marine.** Coastal and offshore waters in which the salinity is maximal (around 35 ppt) and not subject to significant daily and seasonal variation.

## 3. Abbreviations and acronyms

- CSV comma separated value
- DD decimal degrees
- DMS degrees, minutes, seconds
- FAO Food and Agriculture Organization of the United Nations
- GIS geographic information system
- GPS global positioning systems
- KML keyhole markup language
- NASO National Aquaculture Sector Overview