

System Appreciation Document

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Table of Contents



Abbreviations

Α	Accuracy in %
Artfish	Approaches, Rules and Techniques for Fisheries Monitoring
CE or C/E	Catch/Effort
CPUE	Catch Per Unit Effort
CV	Coefficient of variation in %
DB	Database
DGC	Data Group Code
EAD	Environment Agency Abu Dhabi
EU	European Union
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIS	Fisheries Information System
FS	Frame Survey
IT	Information Technology
NFIS	National Fisheries Information System
PBA	Probability Boat Active
SF	Standardization factor
SUI	Sampling Uniformity Index
UAE-NFIS	EAD Fisheries Information System



1 Purpose

Fisheries provide a source of income, employment and recreation to inhabitants while contributing to the cultural heritage of the Emirate of Abu Dhabi. Fishing is primarily conducted from open fibreglass dories and wooden dhows. Dome shaped traps are the most commonly used gear type although a variety of other methods exist. Catches are typically diverse and characteristic of multispecies tropical fisheries, target species primarily being composed of representatives of the families: Carangidae, Lethrinidae, Haemulidae, Epinephelidae and Scombridae.

Catch and effort data form the foundation of fisheries management. The outputs of effective fisheries information systems enable resource status to be monitored and evaluation of fisheries performance to be made, crucial aspects for informed management planning and decision making. In this context, the Terrestrial and Marine Biodiversity Sector of the Environment Agency – Abu Dhabi (EAD) is implementing the 'Fish Landings and Population Dynamics Project' the principal objectives of which include the collection of catch, effort and economic data and the production of fisheries statistics for the Emirate of Abu Dhabi. The project responds directly to the EAD's goal of developing a management regime for the fisheries of Abu Dhabi.

Since the inception of the Fish Landings and Population Dynamics Project in 2001, a stratified catch and effort data recording system for the Emirate of Abu Dhabi was set in place. Starting in 2005 a fishery data collection system was launched for the recording of species landed and of gear types used. A tailor-made fisheries database application was developed capable of storing the primary data, performing catch/effort estimates and producing fisheries statistical reports.

Experience gained during the aforementioned system implementation period had revealed that although it was well conceived there were nevertheless several application areas that needed improvement, notably:

- Estimation of fishing effort by boat-gear category: Until now effort has been extrapolated on the basis of boat movements registered by the coast guard. This method cannot provide effort estimates by boat-gear since the latter is not reflected in the recordings.
- Estimation of fishing effort is not synchronized with the monthly collection of landings since it involves laborious screening of coast guard records in order to calculate total boat days for active boats. Such being the case the current system cannot provide instantaneous catch/effort estimates that are essential for regular and effective fisheries statistical monitoring.
- The data collection procedures are well conceived and the enumerators have no difficulty in implementing the data collection protocols in use. The latter however are not based on strict statistical criteria; this means that the reliability of the resulting estimates is generally not known and not indicated in the reports (a prerequisite set-up by international and regional fisheries bodies).
- At present the utility of the statistical outputs is limited to the production of annual reports. The database can indeed be interrogated at any moment but in the absence of readymade statistical procedures users have to formulate themselves database queries; such a practice requires a certain extent of database query knowledge that is generally not mastered by the average user.



• Certain standard analytical procedures have yet to be integrated into the current database such as standardization of fishing effort and CPUE, multi-variate analysis of catch/effort variables, etc.

In view of the above methodological and operational needs the Environment Agency of Abu Dhabi is upgrading its current system in order to respond better to current and future needs. Such an upgrade is carried out by means of the following twofold action:

(a) Revision of the data collection procedures (specifically those concerning fishing effort) and introduction of statistically sound data collection protocols for sampling landings and fishing effort.

(b) Adaptation and customization of the internet system ArtFishWeb Beta version (introduced by FAO in 2017) in a manner permitting its eventual expansion to the entire UAE.



2 Scope

The general objective of UAE-NFIS is to provide the means for effectively implementing a statistically consistent and comprehensive National Fisheries Information Systems (UAE-NFIS). Specifically:

(a) The UAE-NFIS database will constitute a sustainable statistical work frame for field and office operations for the effective statistical monitoring of fisheries in the Emirate of Abu Dhabi (UAE);

(b) It will be used for the fulfillment of statistical commitments to national user groups as well as to regional and international fisheries bodies.



3 Intended Audience

UAE-NFIS functions are intended for four user groups: System Administrators, Data Operators, Privileged Users and Public Users.

The first group of operations is performed with the purpose of setting-up, maintaining and diffusing system standards, primary data and catch/effort estimates using basic internet services.

Routine inputting of catch/effort samples collected in the field is done by Data Operators on a decentralized basis. Data Operators use the functions of UAE-NFIS to input samples and formulate monthly catch/effort estimates of local scope. Such data is instantly reflected on the database using internet connections and services.

Privileged users (EAD managers and researchers, authorized institutions and regional/international bodies) have read-only access to system standards, primary data (samples) and to all statistical reports, including electronic publications. It should be noted here that administrators and data operators are automatically privileged users.

Public users have limited read-only access to monthly reports and only for periods authorized by EAD management. This is the only user group that can access UAE-NFIS without login credentials.



4 System / Application Overview

Effective storage, processing and diffusion of data on catch, fishing effort, first-sale prices and average fish weight are key factors for providing appropriate services to users involved in fisheries statistical studies. This means that a statistical programme that operates on a regular basis must be based on robust statistical methods and self-sustaining computer operations.

The author has established a set of best practices for installing UAE-NFIS and for training EAD staff on its use. It is expected that UAE-NFIS users will rapidly become productive with the database and use its services in a wide variety of applications sectors.

The UAE-NFIS data model uses commonly adopted statistical and IT standards. From the statistical viewpoint, the UAE-NFIS database uses the FAO standards relating to data collection schemes for catch and fishing effort and for estimating total production by means of a generic approach.

With regards to IT standards the database has been conceived along the FAO and EU guidelines which favor open-source applications. The operational platform of UAE-NFIS is PhP-MySQL.

4.1 Functional Description of the System / Application Areas

The figure below provides a schematic description of UAE-NFIS functions. What is not shown is the capability of the system to handle automatically English and Arabic in all of its user interfaces, as well as its capacity to integrate numerical data with information media, such as documents, pictures, videos, etc.







4.2 The URLs associated with the application

https://uae-nfis.ead.ae/uae/uae-nfis.php

Doc. ID: EAD-xxxxx Issue Date: xx/xx/xxxx Rev. Date: xx/xx/xxxx Rev. No.: 00

Page No.: 9 of 15



5 **Project Technology Overview**

5.1 **Production Environment**

The following table provides the Server hostnames. This includes other systems to which access is required for providing support to this application.

	Aeadvsa135-ead	
Server Brand	VMware, Inc.	
Server Model	VMware Virtual Platform	
Server Name	Aeadvsa135-ead	
Processor	Intel(R) Xeon(R) CPU X5690 @ 3.47GHz	
Memory	8 GB	
Hard disk	150 GB	
O/S	Microsoft Windows Server 2016 Enterprise	
Service Pack	1	
Application Server IP address	10.10.25.185	
Domain	Erwda.int	
Software Installed (prerequisite software)	Apache/2.4.29 (Win32) PHP/5.6.30	
Other System Software		
Database Software	MySQL 5.7	
Anti-Virus	McAfee	
Backup server	aeadsvb002-ead.erwda.int	
Associated Database Server IP address	10.10.25.185 (Aeadvsa135-ead)	

5.2 Test Environment



	Aeadvsa150-test	
Server Brand	VMware, Inc.	
Server Model	VMware Virtual Platform	
Server Name	Aeadvsa150-test	
Processor	Intel(R) Xeon(R) CPU X5690 @ 3.47GHz	
Memory	8 GB	
Hard disk	100 GB	
O/S	Microsoft Windows Server 2016 Enterprise	
Service Pack	1	
Application Server IP address	10.10.25.199	
Domain	Erwda.int	
Software Installed (prerequisite software)	MySQL Workbench 6.3	
Other System Software		5.3
Database Software	MySQL 5.7	
Anti-Virus	McAfee	
Backup server		
Associated Database Server IP address	10.10.25.199 (Aeadvsa150-test)	

System Performance

Because of its architecture that uses segments (periods) UAE-NFIS will have the same performance throughout its life. WAMP platforms tend to be slower than VPS ones; however the response times currently experienced are very good and are expected to remain as such.

5.4 Assumptions

The system is fully operational and free of errors. Interventions on the source programs should not be needed. All system parameters and messages are handled externally in a very simple fashion. However:

- Regular total backup operations ought to be performed on a weekly basis in order to ensure extra data security on top of the server backup. These functions are easy to perform (just a click by the administrator) and only last seconds.
- Practical training on system operations should be conducted internally every year, with the twofold purpose of: (i) train new staff and, (ii) discussing points that need improvement such as editing of messages and descriptors, adding infomedia links, etc.



6 Application / System Inventory

6.1 Code

Most of the UAE-NFIS programs are PhP scripts with few exceptions that concern programmed Excel modules.

At present there are over 300 PhP scripts, each with an average size of 300 lines, thus totaling 90 000 lines of coding.

All PhP modules reside on the EAD server right under the WAMP 5.6/WWW main directory.

There are also the following sub-folders:

- BACKUP_RESTORE containing .csv backup copies of the admin database and all database segments (periods) that have been archived.
- EXCEL containing all system messages as well as programmed workbooks for data analysis and graphics.
- HELP containing all online tutorials.
- PICTURES containing all information links and media associate with the system standards.
- STARTUP_RESET containing the seed MySQL databases and PhP scripts for initializing the system.
- PUBLICATIONS containing codes of documents and media for download.

6.2 Database

UAE-NFIS operates by means of two physically different sets of tables. The first set consitutes an administrative database that controls the contents of the system and its accessibility. The second set consists of "periods" each of which contains autonomous data and information for each reference month. With this architecture the system has online access only to periods requested; in this manner its performance is not affected by progressive data volume increases.

Figure 2 illustrates this set-up.





Figure 2. Architecture of UAE-NFIS.

6.3 Design Document

Please refer to UAE-NFIS Database design document given in the appendix.

6.4 Test Plan / Cases

The system has been fully tested during initial training by means of workshops. There have been a few cases of message misspellings; also some improvements were requested concerning species groupings.

The IT group of EAD also suggested that the operational PHP-MySQL platform to be WAMP 5.6 in order to avoid future needs for upgrades.

6.5 User Manual

Please see section below.

6.6 **Training Documents**

Training is a principal component of UAE-NFIS. It is essentially divided into two components: (i) statistical training and, (ii) computer operations.

Three documents have been prepared for statistical training and can be accessed in the appendix. These are:

• A PPT presentation on the role of fisheries statistics in fisheries management.



- Basic statistical training with emphasis on applications.
- Advanced statistical training describing the statistical theory upon which statistical procedures are based.

With regards to computer training the system contains online HELP screens that provide a full illustrative description of UAE-NFIS functions.

For reference purposes three computer manuals have been prepared that can be accessed in the appendix:

- Operations guide for the UAE-NFIS administrator.
- Operations guide for UAE-NFIS data operators.
- Operations guide for UAE-NFIS privileged users.



7 Appendix

Serial No.	Document Name	Embedded Document
	UAE-NFIS Operations guide for administrators	UAE-NFIS-ADMINISTRATOR.docx
	UAE-NFIS Operations guide for data operators	UAE-NFIS-DOPERATOR.docx
	UAE-NFIS Operations guide for privileged users	UAE-NFIS-PRIVILEGED.docx
	UAE-NFIS Database design document	UAE-NFIS- DatabaseDesignDocument.docx
	UAE-NFIS Fisheries statistics in fisheries management	FISHERIES_MANAGEMENT.ppt
	UAE-NFIS Basic statistical training	BASIC STATISTICS.docx
	UAE-NFIS Advanced statistical training	ADVANCED STATISTICS.docx