

DECISION SUPPORT BY A KNOWLEDGE-BASED ANALYTICAL FISHERIES ECONOMICS DATA BASE

W. Dol, N.F. Einhaus, W.H.G.J. Hennen, P. Salz, D. Verwaart

*LEI-DLO, P.O. Box 29703, 2502 LS The Hague, The Netherlands,
e-mail: d.verwaart@lei.dlo.nl*

Abstract: Statistical data about fisheries in the European Union are heterogeneous with respect to definitions, level of detail, quality and completeness. Consistent data are required for decisions regarding the Common Fisheries Policy. Information Management is the classical solution from informatics to this problem and the European Commission is actually working towards harmonized statistics. However, it may take a decade at least before complete data are available. Models were developed for providing reliable, consistent and well-documented data to the short-term policymaking process.

Keywords: fisheries statistics / European Union / policymaking / expert systems / data inconsistency

1. INTRODUCTION

Comprehensive analysis of the economic performance of the fishing fleets in the European Union today faces a number of serious statistical quantitative as well as qualitative problems. Statistical data originate from many national and regional institutions. There is no co-ordination with respect to definitions, and quality of data collection and processing systems is heterogeneous. As a result, many data for policy decisions are not available or inconsistent with other data.

The present objective is: to elaborate a Definition Study of the feasibility of the development of a prototype of an Analytical Fisheries Economics Database (AFED). The AFED will provide consistent and complete information for policymaking and evaluation. This information is the result of standardization of existing data to common definitions, estimation of lacking data and identifying and resolving inconsistencies. Knowledge from experts will be applied and recorded in the system for future use (e.g. estimation rules, decision tables).

2. RESULTS

The present study reviews the availability of data in four countries (Belgium, Germany, Denmark and the Netherlands), the data which should be included in the AFED to start with and the technical implementation of the prototype. Significant amounts of statistical information have been identified and described. Definitions of these data are analysed in terms of their dimensions and/or aggregation level. The dimensions are specified as space (EU, country, region and fishing area), time (month, year), fleet segment (size of vessels and type/gear combinations) and fish species. A method for making an inventory and comparison of available data was developed and applied.

The data which are required to set up a relevant economic data base for policy decisions by the European Commission are described and categorized according to four priority levels. Priority is given to information regarding the economic performance of fleet segments. In general, monetary information is required on costs and earnings of fleet segments and prices. Physical information is necessary regarding volumes of catches per

species. Size and activity of fleet need to be described in GRTs, kW, age composition and as far as possible in seatime.

AFED should meet the requirements of the users by translating original national data and original definitions from the statistics of the EU Member States into a EU-wide set based on standard definitions and by estimating data which is lacking. This concept is represented in figure 1. Furthermore special attention is given to the reliability of thus obtained statistics and their proper interpretation. This expert input is to be produced by working groups specialized in a specific issue. The development of a prototype data base would allow for an empirical testing of the proposed approach on a pilot scale.

The report discusses the link between the user needs and the system requirements. Detailed functional decomposition is specified. Three main functions (control, production of information and support of users and system) are elaborated into a total of thirty sub-functions. The interaction between the human expert and computer hardware and software is outlined from the moment of data acquisition to the presentation of scientific analysis.

The elaboration of cases in interaction with fisheries economics experts demonstrated that a classical expert system was not feasible in this situation because of the diversity of problems to be resolved and because of alternative solution methods. Therefore a system architecture was designed that supports inclusion of results from expert working groups like estimation methods, decision tables and thumb rules. It also supports inclusion and active use of documentation on data, methods and expert preferences. In this manner, the system architecture supports evolution from a system using mainly human intelligence in the direction of an expert system. It is represented in figure 2.

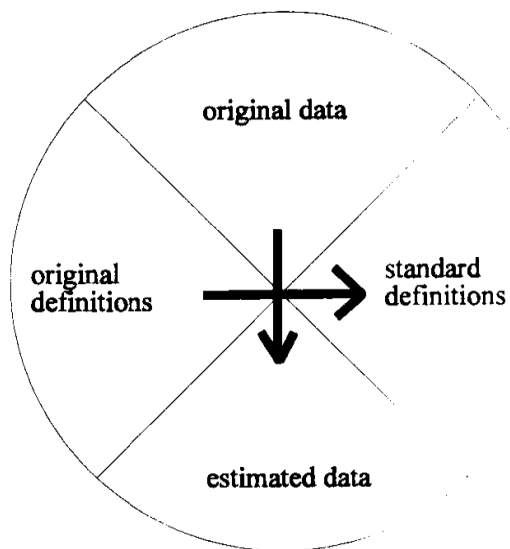


Fig. 2. The AFED concept

3. CONCLUSION

Development of the prototype of the AFED system is considered feasible. The required data, knowledge and software are available. During the prototype phase the feasibility of the development of an EU-wide data base will be assessed. The prototype will in any case provide a tool regarding the economic analysis of the North Sea fisheries.

The interesting aspect of this project from an informatics point of view is that consistent and homogeneous information can be provided without the application of Information

Management, the ex ante standardization of data definitions. This concept will be of importance with the rapidly growing electronic availability of many data from heterogeneous sources.

4. ACKNOWLEDGEMENT

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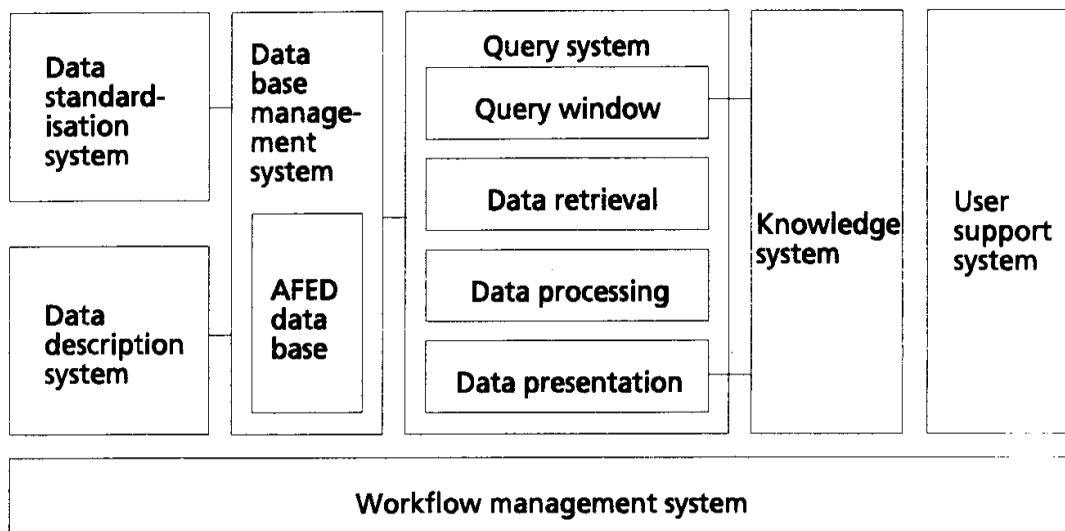


Fig. 3. AFED system architecture