European Social Science Fisheries Network

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# A Socio-Economic Data Base Framework for Fisheries Dependent Areas: Final Report

Universities of Hull and Trondheim

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The development of a social data base framework for fisheries dependent areas forms a key task within the remit of the European Social Science Fisheries Network, funded under Concerted Action through the FAIR Programme. Responsibility for the task has been vested with Oddmund Otterstad (Task Group Leader, University of Trondheim) who has at his disposal a task group comprising David Symes (Network Coordinator, University of Hull), Jeremy Phillipson (Network Manager, University of Hull), Peter Friis (Roskilde University), and Babis Kasimis (University of Patras).

The Task Group would like to thank all individuals within the statistical services of the states covered within this report, who have offered valuable comments and information during the activities and consultations of the group.

*J. Phillipson*
*Hull, December 1997*

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## 0.0 Executive Summary

### 0.1 *Introduction*

The European Social Science Fisheries Network has undertaken to elaborate the framework for a comparative social science data base for the analysis of fisheries dependent regions and fishing based communities. This would be used to identify and categorise fisheries dependent areas and provide a broadly constructed profile of their socio-economic conditions. It would therefore help to improve the existing understanding of the social and economic situation of fishing regions throughout coastal Europe. The elaboration of a framework for such a data base has comprised four specific objectives: the identification of appropriate comparative indicators or indices for the socio-economic conditions of fisheries communities; the coordination with national and international organisations, scientific institutions and existing databases; the development of the technical specifications of a system for data storage and retrieval; and the formulation of outline research projects which would test the utility of the database.

The work programme has been undertaken in two main phases. The main outcomes of Phase I were presented in the baseline report prepared in late 1996. This included a preliminary analysis of statistical sources in six European states, on which was based the elaboration of the broad features of the data base framework which included: the selection of a modest approach in terms of geographical and data coverage in order to accommodate the great majority of European countries; a focus primarily upon the harvesting sector and sea fisheries; an emphasis on coastal Europe and land based divisions using the international NUTS system of area classification; and a preference for NUTS 4, or municipality level, as the optimum scale for analysis. The attempt in Phase II, as elaborated in this Final Report, has been to build on this broad framework, notably with regard to the selection of indices and variables, and to elaborate the functioning and utility of such a data base. This has included a consultation exercise incorporating the views of key statistical organisations and interested persons with regard to the utility and operation of such a data base. This Final Report fulfils the designated responsibilities of the Data Base Task Group of the European Social Science Fisheries Network.

### 0.2 *Variables and indices*

There are a wide range of potentially useful variables and indices for regional analysis, in terms of the definition and identification of dependent areas and in the exploration of their critical socio-demographic conditions. Indeed, a data base for fisheries dependent areas would not solely consider data relating to the fishing industry *per se*. It would also provide the opportunity for the socio-economic classification of coastal fishing regions and would draw upon a number of economic and socio-demographic indices.

Absolute and relative fishing activity rates (including employment, landings and fleet data) would be utilised for determining the activity level and regional

spread of the fishing industry, as a prerequisite for dependency analysis. Here the greatest challenge emerges in the incorporation of data concerning the fishery chain, where data sets are less well developed, particularly at low spatial scales. The key output from the data base would be the ability to locate and describe fisheries dependence. Three tiers of dependency indices are of particular significance and include: (i) fisheries dependence indices which include the employment ratio (an indication of the contribution of fishing employment to the total employment structure of an area), the absolute fishing activity rate, and the economic significance of the fishing industry within the regional economy; (ii) economic dependence indices including employment, unemployment, activity rate and industrial structure; and (iii) socio-demographic dependence indices.

0.3 *The data base as an analytical tool*

A comparative data base for fisheries dependent areas would offer a number of potential outcomes. Primarily, it would form a basis for identifying fisheries dependent areas in the first instance and highlighting those which are most economically and socially vulnerable. This would involve: the classification of coastal areas and fishing regions and the development of an opportunity/deprivation index; the analysis of the activity level and regional distribution of the fishing industry; and an evaluation of the location, level and nature of fisheries dependence with a view to preparing a dependence typology. All or individual coastal regions could potentially be compared on the basis of individual dependence indices. It is also feasible that national or European average ratios might be calculated, against which one may compare particular regions. However, the different facets of dependency are perhaps best evaluated in matrix form and in the production of an overall dependency ratio which embraces a selection of indices.

The identification and analysis of fisheries dependent areas would provide an essential contribution to the effective targeting and orientation of regional development initiatives for the economic and social development of fisheries dependent areas, together with the appropriate design of socio-economic measures. In addition, the time series monitoring of key indicators would provide the opportunity for enhanced policy impact analysis.

The need for, and the architecture of, a data base was further evaluated by means of a consultation exercise involving a selection of national and international statistical services and other potentially interested organisations and individuals. Most consultees considered such a data base beneficial in terms of the enhanced knowledge base that it would provide for fisheries management and policy development. The choice of indices and variables listed in the consultation document was favourably received with several positive suggestions as to what additional data would be useful. Several comments related to the practical difficulties in obtaining comparative data, notably expected tardiness in the supply of national statistics, the difficulty of obtaining data at low spatial scales, the lack of harmonisation of statistics and

the ambiguities of fishing data. Most consultees favoured a combination of county/region and municipality scales of analysis.

0.4 *Data specifications and outputs*

The data base would need to be able to cope with a wide variety of data forms including published and unpublished sources, annual and decennial time series and data from different spatial scales. The indices and percentage based variables would ideally be computed based upon raw absolute data held in the data base, to allow for maximum statistical transparency. To ensure the comparability and consistency of data, the system would need to incorporate frameworks for the standardisation and estimation of data and variables. A degree of spatial data manipulation will also be necessary as fisheries data are less often collected by the administrative divisions arranged within the NUTS framework. A key task will be found in the allocation of fisheries based data, mostly at port level, to NUTS 4 administrative units.

Data representations would primarily take the form of dependency maps, matrices and tables. Two forms of data output are likely to feature: Regular outputs would include an analysis of fisheries dependent areas every 5 years including: a classification of coastal regions; a fishing region typology and opportunity-deprivation index; a fishing activity analysis; an analysis of the distribution and nature of dependency leading to the development of a dependency typology; an analysis of the changing pattern of dependency; and recommendations for the location and form of regional development. *Ad hoc* outputs could include: the development of a typology of development requirements and forms of regional assistance; an analysis of policy development procedures; and case analyses of dependence indicator communities.

0.5 *Recommendations and development*

It is the recommendation of the Data Base Task Group of the European Social Science Fisheries Network that a socio-economic data base for fisheries dependent areas could provide a valuable contribution to more effective policy intervention and evaluation for European fisheries. Notable benefits could arise in the field of regional development; here the need for such data is likely to intensify as the social effects of restructuring, within the context of the Common Fisheries Policy, become increasingly evident. It is proposed that further consideration be given to the feasibility, operational aspects and utility of such a data base. This recommendation might best be realised through the establishment of a model data base drawing on a limited number of member states at different stages of statistical development.

The development of a comparative approach represents a formidable challenge. Significant benefits would arise through improvements in the state of statistical provision by the greater harmonisation of national statistical programmes. Development is required with regard to the frequency of published data sources, the reliability of data and its temporal and spatial

consistency, and missing data. Significant gains in the sensitivity of policy relevant regional analysis may also be gained through the development of variables and indices, and in particular with regard to data relating to the fisheries chain. It would also be appropriate for such a data base to accommodate qualitative data referring, for example, to behavioural patterns of user groups and institutional arrangements within fishing regions. This may best be developed through the exploration of indicator communities where specific analyses of fishing populations and dependency dynamics might be performed.

## 1.0 Introduction

### 1.1 *Context*

The European Social Science Fisheries Network has undertaken to elaborate the framework for a comparative social science data base for the analysis of fisheries dependent regions and fishing based communities. Such a data base would help to improve the existing understanding of the social and economic situation of fishing regions throughout coastal Europe. Responsibility for preparing this framework has rested with a designated Task Group comprising a Task Group leader and four members spanning four European states.

Policy initiatives and impact analyses currently suffer from a lack of appropriate and sensitive data for the identification and profiling of fishing regions and their levels of fisheries dependence. Existing data bases for European fisheries are primarily steered towards economic and biological modelling. Most summarise the physical or economic outputs from fisheries; there has been little progress in relating such data to the socio-demographic characteristics of coastal regions. Developing a working knowledge of this relationship is essential for determining the level and nature of fisheries dependency. However, bridging this gap within a comparative approach is clearly a formidable challenge given the state of development in fisheries statistics; in particular, data are primarily collected and presented by maritime rather than land based regions; it is mostly spatially coarse and confined to national series. For a data base framework concerned essentially with regional analysis, the need is for a more spatially sensitive approach which is able to identify and analyse particular localities, notably those with a high level of fisheries dependence.

### 1.2 *Aims*

The overall objectives for the data base would be to identify and categorise fisheries dependent areas and provide a broadly constructed profile of their socio-economic conditions. The elaboration of a framework for such a data base has comprised four specific objectives:

(i) the identification of appropriate comparative indicators or indices for the socio-economic conditions of fisheries communities including *inter alia* demographic characteristics, labour structure, skill composition, community structures, education, health etc., and identifying key sources and reliability;

(ii) coordination with national and international organisations, scientific institutions and existing databases to increase collaboration and avoid unnecessary duplication of effort;

(iii) the development of the technical specifications of a system for data storage and retrieval; and

(iv) the formulation of outline research projects which would test the utility of the database.

Hence, the intention is not to compile data sets for European fisheries *per se* but to develop the framework within which such an initiative might be achieved.

## 1.3 *Work programme*

The work programme has been undertaken in two main phases. The main outcomes of *Phase I* were presented in the baseline report prepared in late 1996 (revised early 1997)[1]. This included a preliminary analysis of the diverse statistical sources and national statistical cultures in six European states, on which was based the elaboration of the broad features of the data base framework. A modest approach was selected in terms of geographical and data coverage in order to accommodate the great majority of European countries and it was decided to gear the framework primarily towards the harvesting sector and sea fisheries. For a data base concerned essentially with spatial analysis and prognosis several key geographical parameters were identified. Coastal Europe (those areas bordering saltwater or brackish waters) represented the obvious geographical limits given the emphasis on the regional aspects of marine fisheries. The approach necessarily incorporated land based divisions, and to facilitate international comparison and statistical collection, the international NUTS system of area classification (Nomenclature of Territorial Units for Statistics) was chosen as the basic reference system, as the primary international framework for statistical collection. Despite problems in obtaining standardised units within this framework and the changing extent of statistical boundaries, the approach was seen to offer useful opportunities for the aggregation of data.

Also critical was the choice of an appropriate scale for primary analysis within the NUTS spatial hierarchy. In the analysis of fishing regions and their level of dependence it was necessary to choose a policy relevant scale that was not too coarse (preventing effective targeting of policy initiatives) nor too fine (cumbersome in a policy sense and with added likelihood of data suppression for anonymity reasons). For example, too coarse a spatial mesh may suggest apparently low levels of dependency given a wider catchment area and frame of reference - pockets of acute fishing dependency may be overlooked in all but a few cases. Preference, therefore, was attributed to administrative units approximating to NUTS 4, or municipality level, as the optimum scale for regional analysis and dependency representation. It was acknowledged, however, that the challenge in obtaining appropriate data at such a scale may be considerable for certain states and these may have to resort to NUTS 3.

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[1] Otterstad, O., Phillipson, J. and D. Symes (1997) *A socio economic data base framework for fisheries dependent areas: baseline report*, Report of the European Social Science Fisheries Network Data Base Task Group, FAIR CT95 0070, Universities of Hull and Trondheim

The attempt in *Phase II* has been to build on this broad framework, notably with regard to the selection of indices and variables, and to elaborate the functioning and utility of such a data base. This forms the main body of this final report of the Task Group. More specifically the report considers four main tasks:

(i) it explores the relevance of a number of key variables and indices with regard to fishing region and dependency analysis;

(ii) it considers the issue of data base utility;

(iii) it outlines the technical specifications of a system for data storage and retrieval, and considers the opportunities for coordination with existing fisheries statistical services and data bases; and

(iv) it considers the opportunities for development of the proposed framework and makes some recommendations.

Phase II has evolved through a sequence of discussions within the Task Group and by the circulation of discussion documents. The group was also able to meet in Aarhus in May 1997 to define a strategy for the remainder of the group's activities. In particular, it was decided to undertake a consultation exercise incorporating the views of key statistical organisations and interested persons with regard to the utility and operation of such a data base.

The activities of the Task Group have also been paralleled by a definition study for a fisheries economics data base developed by LEI-DLO (see page 18). This initiative complements the fisheries dependent area data base framework developed by ESSFiN though it is contrasting in its objectives and emphasis. The ESSFiN approach gives less attention to primary economic data dealing with the outputs and inputs of the fishery and attempts to provide a broader framework of relevant information which will place the fishing industry in a regional context; its reference point is the geographical area rather than the fishing industry. Hence, the ESSFiN Task Group is concerned essentially with a data base of coastal areas from within which fisheries dependent areas may be identified and categorised. It is clear, however, that both initiatives are likely to complement each other and that opportunities for coordination, cooperation or integration should be explored.

This final report fulfils the designated responsibilities of the Data Base Task Group of the European Social Science Fisheries Network.

## 2.0 Variables and indices

The aim of this section is to explore the relevance of a number of key variables and indices with regard to regional analysis, in terms of the definition and identification of dependent areas and in the exploration of their critical socio-demographic conditions.

Developing a single, standardised and comparable database for the regions of coastal Europe represents a significant challenge, given diversity in the state and availability of statistics within and between states. There is a number of data challenges and imperfections relating to reliability, definitional complexity and intra-state comparability, which ultimately conditions the final selection of variables for inclusion within the framework. For some variables, standardising techniques will need to be applied in order to introduce greater definitional consistency. Moreover, for some countries, the choice of key indices will represent a significant data challenge and there will be the need for some estimation of key parameters for particular indices and particularly at lower geographical scales. In contrast, for states with well developed statistical cultures the framework may be a modest acknowledgement of their statistical capacities. The attempt has been to steer a course somewhere in between these two positions in order to provide the basis for a more comparative approach; hence the selection of key indices is based on a degree of pragmatism in terms of the apparent availability of particular data sets across member states. This has been gauged by an analysis of the statistical experience of six fishing nations including Denmark, France, Greece, Norway, Spain and the UK.

Data sets and indices will have differing importance depending on the designated outcome. The fisheries dependent area data base would provide a number of key outputs (these are elaborated in more detail in section 3) including:

(i) a typology of coastal areas and fishing regions;

(ii) an awareness of the levels of fishing activity and regional spread of the fishing industry;

(iii) an evaluation of the location, level and nature of fisheries dependence.

Together, these would aim to improve the basis for policy intervention and impact analysis (see 3.2 and 3.3).

### 2.1 *Regional typologies*

A data base for fisheries dependent areas would not solely consider data relating to the fishing industry *per se*. Crucially it would provide the opportunity for the socio-economic classification of coastal fishing regions.

The range of socio-economic and socio-demographic data sets within national statistical services and government departments is considerable. The most

comprehensive and common source is provided by the decennial census of population and this would form a prime data source in the data base; though for certain variables other sources may offer more up to date information to supplement the decennial input. All indices in Tables 1 and 2 are potentially significant in providing profiles of coastal areas. These provide the basis for evaluating fisheries dependency by enabling an analysis of the social characteristics of those areas in which fishing activities are embedded.

*Table 1: Economic indices*

| **DATA CATEGORIES** | **INDICES** |
|---|---|
| ***Employment*** | |
| Numbers economically active (by gender)<br>Numbers economically inactive (by gender) | *Activity ratio*<br>(proportion active to inactive population) |
| Numbers employed/self-employed (by gender) | *Employment rate*<br>(% active population employed/self-employed) |
| Numbers unemployed (by gender) | *Unemployment rate* (including youth unemployment)<br>(% active population who are unemployed) |
| Numbers of working age (15-60/65) (by gender) | *Activity rate*<br>(proportion of working age who are actively employed/self-employed) |
| ***Industry*** | |
| Numbers employed by sector | *Industrial index* (diversification v. specialisation)<br>(proportion of employed population in primary, secondary and tertiary sectors) |
| ***Economy*** | |
| Annual Gross Domestic Product | *Regional production index*<br>(GDP as % national GDP) |
| No. of personal tax payers per tax bands or above certain income level | *Prosperity index*<br>(proportion of incomes in lower or higher tax bands) |

*Table 2: Socio-demographic indices*

| DATA CATEGORIES | INDICES |
|---|---|
| ***Demography*** | |
| Total population | *Population growth*<br>(annual % rate of increase/decrease) |
| Population structure (5 year age groups) | *Dependency ratio*<br>Ratio of young (<14) and old people (60/65) to adult population (15-59/64)<br>*Sex ratio*<br>(Ratio males to females) |
| Number of births and deaths | *Crude birth rate*<br>(no. live births per 1000)<br>*Crude death rate*<br>(no. deaths per 1000)<br>*Net migration rate*<br>(annual % rate of increase/decrease taking into consideration deaths and births) |
| Number of people per square km | *Population density* |
| Numbers single, divorced, separated, widowed | *Marriage and divorcee rates*<br>(no. marriages/divorces per 1000) |
| ***Housing*** | |
| Number and age of households | *Household development index*<br>(numbers of new households) |
| Numbers persons<br>Number of rooms | *Occupancy rate*<br>(Average number of persons per room) |
| Number of cars per household<br>Availability of basic amenities | *Amenity index*<br>(average number of cars per 1000, % of households without basic amenities) |
| Numbers owner occupied, rented etc.. | *Ownership index*<br>(proportion of households owner occupied, rented etc) |
| ***Health*** | |
| Average number of years a new-born baby can be expected to live | *Life expectancy* |
| Numbers of infant deaths | *Infant mortality rate*<br>(Number of infant deaths per 1000 live births) |
| Numbers of hospitals, dentists, opticians, doctors and hospital beds | *Health care indices*<br>(average number of facilities per 10,000) |
| ***Education*** | |
| Numbers with formal qualifications at secondary and tertiary levels of education | *Education level*<br>(Numbers in different education qualification categories per 1000 active population) |

## 2.2 *Activity level*

Determining the activity level and regional spread of the fishing industry is a prerequisite for dependency analysis. Here the *absolute* and *relative fishing activity rates,* elaborated in table 3, are of key significance. They draw upon a modest set of basic fisheries data categories relating to employment, fleet and landings and these provide the minimum requirements for a useful dependency or policy impact analysis.

*Table 3: Fishing activity indices*

| **DATA CATEGORIES** | **INDICES** |
|---|---|
| - numbers of fishermen<br>- volume and value of landings into the area<br>- numbers of vessels based in area<br>- numbers of processing industry workers<br>- value of processing output from area | *Absolute fishing activity rate*<br>(numbers of fishermen)<br>(volume and value of landings into the area)<br>(numbers of vessels based in area)<br>(numbers of processing industry workers)<br>(processing output value) |
| - national fishing employment<br>- volume and value of national landings<br>- numbers of vessels (national)<br>- national processing industry employment<br>- national processing output | *Relative fishing activity rate*<br>(fishermen in area as % of national fishing employment)<br>(value/volume of landings into area as % of national landings)<br>(vessels based in area as % of national total)<br>(processing industry workers in area as % national processing employment)<br>(processing output value as % national processing output) |
| - fishermen based in area as % of total area employment | *Employment ratio*<br>(fishing employment : total employment) |
| - area GDP | *Economic significance*<br>(landings value as % area GDP)<br>(processing output as % area GDP) |

As with the socio-demographic and economic indices, there is a considerable diversity of fisheries data, reflected in numerous fisheries specific data sources. The level of statistical development certainly varies; in part the differences can be attributed to the particular characteristics of production in various states or different institutional forms. Difficulties in making international comparisons also arise from uncertain levels of reliability and definitional inconsistencies. Some data sets are more comprehensive than others, for example, whether or not they distinguish active from inactive vessels or part time and casual labour from full time. Differing units of data aggregation can also be problematic; landings data, for example, may be recorded according to a vessel's port of registration, on other occasions by port of landing/operation or even owner's address - here the actual regional distribution of fishing activity (and any subsequent calculations of

dependence) may be distorted. Some of these data challenges emerge from the particular characteristics of fishing activity; for example, estimating numbers of fishermen maybe problematic given the often part time and infrequent nature of fishing and crew work and the complicating factor of non-national crew members; reliability of landings data is questioned given the challenges of illegal landings and misreporting.

The greatest challenge emerges in relation to the scope of the data base and, more particularly, the incorporation of data concerning the fishery chain, where data sets are less well developed, particularly at low spatial scales. The level of catching activity in an area may be dwarfed by that of the processing activities and these may infer considerable economic and social dependence. Ideally activity rates would go further by incorporating marketing, distribution, ancillary, aquaculture, tourism and retailing activities - elements with varying degrees of prominence for different countries and regions and each involving a series of different policy impacts and circumstances. The indices in Table 3 are primarily geared towards the harvesting sector, referring to marine fisheries (excluding inland waters and freshwater fisheries) and mariculture (i.e. salt/brackish water rather than freshwater aquaculture), given its direct interface with fishing activity and fisheries policy. It is recognised that in some states it is not feasible nor desirable to disaggregate data sets - for example, aquaculture from catching sector employment - though the coastal region emphasis of the data base should help provide a separation between marine and freshwater activity.

Processing employment and output is included in the selection given in Table 3 despite the challenge of obtaining this data. The difficulty of obtaining comparative estimates relating to processing activity is amplified given the problems of defining the boundaries of a sector characterised by much fragmentation, integration and diversification in activities. However, incorporating basic processing data is essential in order to obtain an indication of non-catching sector fisheries dependence and the extent of an area's diversification in fisheries activities. Here it may be particularly necessary to adopt estimation techniques based on multiplier calculations. Alternatively, some basic employment data for sectors like processing or marine aquaculture may be available in employment data categories within population and employment censuses. This might facilitate the identification of employment figures for different regional scales and would provide a useful cross check of fisheries data derived from other sources. In numerous instances, however, this employment data has been aggregated within industrial classifications to a universal figure incorporating freshwater, inland and marine fisheries and aquaculture and in some cases forestry and agriculture.

### 2.3 *Location, level and typology of dependence*

The key output from the data base is the ability to locate and describe fisheries dependence. In reality, this is much more complex than generating simple employment level indices conventionally employed in describing dependency.

Three tiers of dependency indices are of particular significance:

*(i) Fisheries dependence indices*

Based on the fishing activity data, three indices are of prime importance in the data base - in preparing an overall dependency index they would be given a weighting factor of +2. Of uppermost significance is the *employment ratio* which provides an indication of the contribution of fishing employment to the total employment structure of an area. The employment ratio is supplemented by the *absolute fishing activity rate*. If fishing activity were to cease this would highlight the numerical loss. An area, for example, may have a high employment ratio but low levels of fishing activity. These two variables provide the backbone indices to a dependence typology. They are complemented by a third indicator, that of *economic significance*, which refers to the contribution of fishing to the regional economy.

*(ii) Economic dependence indices*

The second tier of indices, with a weighting factor of +1, is economic in nature. Four indices are of particular significance. They include the *employment, unemployment* and *activity rates* together with the *industrial index*. Economic indices possibly have the most direct relevance for fisheries. The first three relate to the employment position which has the greatest significance in the event of fisheries restructuring; these indices need to be considered against the fisheries dependence indices. Also important is the level of diversification in the industrial base as demonstrated through the industrial index.

*(iii) Socio-demographic dependence indices*

Of lesser direct significance to the identification of dependence, and therefore with a weighting factor of only 0.5, though vital in the description of dependent areas once they have been identified, are the socio-demographic indices described in 2.1. All the indices listed in Table 2 are potentially significant in the social analysis of dependent areas.

## 3.0 The data base as an analytical tool

It is important to elaborate further the *utility* of the data base. In part this will involve the consideration of sample indices considered in the previous section within a routine methodology for analysis. Attention is also given to the views of potential data base users and interested parties through a consultation exercise relating to the utility and operation of such a data base. This is complemented by Appendix 1, prepared by Oddmund Otterstad from the Norwegian University of Science and Technology in Trondheim, which demonstrates some key parameters of the data base using illustrative material from Norway.

A comparative data base for the analysis of fisheries dependent areas would offer a number of potential outcomes. It would provide the basis for:

(i) identifying fisheries dependent areas in the first instance and highlighting those which are most economically and socially vulnerable; in particular this would involve the classification of coastal areas and fishing regions, an awareness of the activity level and regional distribution of the fishing industry and an evaluation of location, level and nature of fisheries dependence (dependence typology);

(ii) improved policy intervention through the design of more appropriate socio-economic measures and effective targeting of regional development initiatives; and

(iii) an analysis of the social impacts of policy measures arising from the CFP and other policy areas, upon fishing communities.

The following discussion attempts to further elaborate these elements. Attention is first given to the identification and analysis of dependent regions.

### 3.1 *Regional classification: the location and form of dependence*

The classification of regions would form a central function of the data base. This would not be confined to the level and form of dependency on fishing. As all coastal regions would be included within the data bank such a data base would provide the opportunity to *classify coastal regions* in their own right according to their social and structural characteristics. All indices in Tables 1 and 2 are potentially relevant. Crucially, and drawing upon fishing activity data from elsewhere in the data base, it should be feasible to compare the characteristics of fishing and non-fishing regions and to develop a *typology of fishing regions* based on their employment, economic, industrial and socio-demographic features. Hence, the data would be useful in understanding the nature of fishing regions. Is fishing associated with particular regional geographies in terms of their economic, social or structural characteristics? How does the fishing region differ within and between states and what are the implications for policy?

This analysis would form the basis of an *opportunity/deprivation index* which would determine whether fishing regions are any more deprived in terms of their industrial opportunities and social indicators than non-fishing areas, as is sometimes perceived. Key indices include the availability of employment opportunities for both men and women coupled with the level of diversification within the industrial structure. Demographically, are regions regressing in terms of population numbers and structure? Furthermore, what are the current demographic trends? For example, of the most active age groups (20-39) is there a gender imbalance which might indicate drains of male or female workers from the region? Housing, health and education indicators are also of vital importance in the index as is the prosperity data based on income.

Crucially, in the context of dependency, the data base would indicate regional *levels of fishing activity* (Table 3). Activity level data (both absolute and relative activity rates) would be used for locating the regional spread of the fishing industry, identifying its main characteristics, and thus highlighting those areas actually affected by fishing policy. Activity level also forms the basic input to a dependency classification, though its relevance in the context of dependency is only fully activated when the broader social and economic characteristics of particular regions are considered.

The key function of the data base would be to consider fisheries dependence with a view to preparing a *regional dependence typology*. The aim would not simply be to assess whether a coastal region is dependent on fishing or not, but also to consider the nature or form of dependence which will determine appropriate policy response. The hierarchy of dependence indices identified in 2.3 would provide the basis to the preparation of the typology. This would be based on the differing emphases between 'fisheries dependence indices' (principally employment ratio and the absolute fishing activity rate), which have the most direct relevance to dependence, and relational factors involving 'economic' or 'socio-demographic' dependence indices. Relational factors, which give an indication of the social and economic outlook within a region, can reduce or give added weight to the level of dependence measured by fisheries dependence ratios alone. Hence a region with a high employment ratio and high absolute fishing activity rate may be seen to be less dependent if alternative employment prospects are favourable. Relational elements are important in determining the nature of dependence. For example, is a region's dependence based upon particular economic elements such as high unemployment or an undiversified economy? Both conditions may require different policy responses.

All or individual coastal regions can potentially be compared on the basis of individual dependence indices from the hierarchy. Furthermore, it is feasible to suggest that national or European average ratios might be calculated, against which one may compare particular regions (higher, close to or below the ratio average). For example, Region A (50 fishermen from a total actively employed population of 100,000) has an employment ratio of 1:2000, while the ratio of Region B (500 fishermen, total actively employed population of 200,000) is

1:400. Region B is clearly more dependent based on employment ratio alone. It is below the dependency average of 1:1200. If fishing were simply to cease in both regions there would be differing levels of ramification, the loss of 50 fishermen as opposed to 500. Indeed, two regions may have equal employment ratios but very different levels of fishing activity. At a general level therefore, this example highlights that dependence must also be evaluated against absolute fisheries activity data. The example of Regions A and B also illustrates the need to include overall fisheries dependent employment (processing etc.) where possible; the level of impact would be different if all fish processing activities were located in Region A and not Region B.

The different facets of dependency are perhaps best evaluated in matrix form and in the production of an overall *dependency ratio* which embraces a selection of indices (see Table 4). It has already been suggested that it may be feasible to ascribe differing weight or amplification to different factors depending on their dependency relevance (hence fisheries dependence indices might be given additional weight). Again national and European averages may be calculated for the dependency ratio.

From such a matrix (only four indices included in this example) it is possible to identify dependent areas and explore the precise nature of dependency, as well as to ascertain the predominant forms of fishing dependence. Those regions displaying high employment ratios with high levels of activity and serious relational characteristics are potentially the most vulnerable. Different processes of dependency may be at work in dependent areas characterised by potentially low (e.g. remote fishing communities) or potentially high (urbanised areas and ports) levels of fishing activity. Differing policy responses may be appropriate and this will depend on the broader relational aspects. The policy implications for regions A, B, C and D are likely to be different (see Figure 1).

*Figure 1*

| *Employment ratio* | *Absolute levels of fishing activity* | |
|---|---|---|
| | High | Low |
| High dependence | A | B |
| Low dependence | C | D |

In all cases it will be useful to identify threshold points for indices and indicators. For example, at what point from a European average does an indicator represent a high or a low figure? What is a high level of employment dependent on fishing; when is a regional economy diversified? Lessons can perhaps be learned from existing regional development initiatives such as the

*Table 4: Dependency matrix*

| | *Employment ratio* | | | *Absolute fishing activity rate* | | | *Unemployment rate* | | | *Health care index* | | | *Dependency ratio* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | High | Medium | Low | High | Medium | Low | High | Medium | Low | High | Medium | Low | |
| | +2 | 0 | -2 | +2 | 0 | -2 | +1 | 0 | -1 | -0.5 | 0 | +0.5 | |
| Region A | | +2 | | | 0 | | | 0 | | | 0 | | +2 |
| Region B | | -2 | | | -2 | | | -1 | | | 0 | | -5 |
| Region C | | +2 | | | +2 | | | +1 | | | +0.5 | | +5.5 |

European Regional Development Fund. The Objective regions (1, 2, 3, 4, 5a, 5b, 6) are primarily designated as development areas based on their deviation from an average. The designation of Objective 1 areas, for example, concerning the development and structural adjustment of regions whose development is lagging behind, is based on a per capita GDP of less than 75% the Community average over the last 3 years. Similar notional thresholds could be established for the fisheries dependent area data base.

The real utility of a socio-economic data base for fisheries dependent areas does not, however, end with the means of classification. This provides the material for two further aspects of policy relevant analysis in terms of (i) the targeting and appropriate configuration of regional support initiatives and socio-economic measures, and (ii) the assessment of policy impacts. Both elements are considered below.

### 3.2 *Regional development and policy response*

The dependence typology would provide a basis for the targeting of regional initiatives and development programmes. In particular, the identification and analysis of fisheries dependent areas would provide an essential contribution to:

* the effective targeting of regional development initiatives for the economic and social development of fisheries dependent areas; working at the level of NUTS 4 allows a policy relevant scale of analysis;

* the effective orientation of regional development initiatives - given the particular form of dependency, what are the appropriate development requirements and forms of regional assistance? It is feasible that a menu of initiative categories or development emphases might be developed according to the dependence typology;

* the appropriate design of socio-economic measures; given the distribution and form of dependency can policy measures be made more regionally and socially sensitive? (e.g. can MAGP targets be graduated regionally as well as sectorally?).

The data base would offer only partial information in relation to the effective targeting of regional support. Preferably it would be supported by case material for individual regions and by further site analysis following the initial identification of priority areas.

### 3.3 *Policy impact analysis*

The opportunity for enhanced policy impact analysis, either periodically or on an *ad hoc* basis, would form another important output from the data base. This would essentially take place through the time series monitoring of key

indicators within the data base (e.g. levels of fishing activity, unemployment etc..).

While in many respects it is difficult to attribute particular social trends to particular policy measures, some general patterns may be identified. It is important to consider which social indicators are particularly influenced or activated by fisheries policy as some will be more clearly influenced than others. Levels of fishing activity, for example, may reflect particular policy measures in the fishing field - here the link between policy and impact is perhaps most clear. Other changes in the health of a regional economy may also be attributable to particular policies (e.g. a rise in unemployment) and these trends may be more evident in areas particularly dependent on fishing.

For other indicators, such as education level or health of population, the linkages to fishing policies are less direct. This social data is, however, useful in its own right in allowing the comparison of 'quality of life' and standards of living in fisheries dependent areas, coastal areas in general and at a national level. Such data would help to substantiate or deny the assumptions regarding the social deprivation of fisheries dependent areas.

### 3.4 *Consultation exercise*

So far in this report, attention has been given to the utility and key indices within a data base framework for fisheries dependent areas. The need for, and the architecture of, such a data base was further evaluated by means of a consultation exercise involving a selection of national and international statistical services and other potentially interested organisations and individuals. The intention was to address a number of specific issues including the need for a dependent area data base in the first instance, the choice of appropriate indices and the appropriate scale of analysis.

#### *Methodology*

The consultation took the form of a 2 page discussion paper which summarised the contents and recommendations from the baseline report produced during Phase I, together with a brief one page questionnaire (see Appendix 2) and cover letter. This was circulated early in October 1997 to some 63 organisations and individuals with a potential interest, with a request for a response by early November. A reminder was issued with the passing of the deadline. In all 19 responses were received, or 30% of the total sample. In effect, several questionnaires were often sent to the same organisation and, if one considers responses from consultees of separate organisational affiliation, the return represented 51% of the sample. A list of consultees is attached at Appendix 3. Those who responded accounted for a spectrum of interests including government departments, universities, dedicated statistical services at national and international level, and fishermen's organisations.

*Utility*

The sizeable non-response to the consultation may appear to signal a lack of enthusiasm for the concept of a fisheries dependent area data base or at least the kind of data framework that is presently under consideration. It is, however, difficult to assess the real extent of perceived need. The level of response may simply reflect a normal return rate from such a consultation or the effectiveness of the consultation documents themselves in putting across the key issues and elements of the framework. Of the 19 responses only 2 thought there was no need for the kind of data base described; unfortunately no reasons were given. For the remaining consultees the real benefit of such a data base was seen in terms of the enhanced knowledge base that it would provide for fisheries management and policy development. In particular, it would offer improved opportunities for monitoring of policy outcomes and the systematic analysis of regional trends and distributional effects. Finally, several consultees suggested that it would provide an effective means for the evaluation and targeting of regional and structural support. Other responses noted more specific benefits with regard to regional management, quota management decisions and the opportunities provided for scientific research.

*Indices*

The choice of indices and variables listed in the consultation document was generally favourably received - in fact, some respondents decided all indices were relevant. As one might have foreseen, given that the set of data categories included in the selection was based on a degree of pragmatism relating to the availability of data, there were several positive suggestions as to what additional fisheries activity data would be useful and necessary. The most frequent related to data concerning the processing sector which was omitted from the consultation document. This need has been reflected in the choice of key variables in Table 3. The same can be said of the need for an indication of the contribution of fishing to the regional economy or GDP. Others called for a breakdown of landings according to vessels from the local area, the nation and foreign vessels, as well as a fleet and species breakdown. An area's dependence on particular quotas was seen as an important element by 2 respondents. Others noted the potential utility of assessing the seasonality of fisheries (including pluriactivity), the fleet ownership structure as well as other employment sectors such as aquaculture. One consultee considered it important to explore the social characteristics of the fishing population itself (age and gender structure, income and expenditure, marital status, occupational health, education etc.), rather than those of the regions in which they are based. Ideally, both data sets should be included.

There was less certainty over the real utility of some of the variables proposed to provide a socio-demographic profile of the regions. In particular this referred to the health, births/deaths and household data. This supports the hierarchical classification of dependence indices (and associated weighting techniques) elaborated in section 2.3. It reflects the point that the socio-demographic indices, whilst of key relevance in assessing levels of

deprivation, are less directly associated with the question of dependence. Two responses considered it useful for a further break down of the industrial classification data categories (primary, secondary, tertiary) to identify processing and related sector employment. Another thought it useful to develop the business profile of areas by incorporating data relating to other areas of economic activity.

Many of the comments received in relation to the indices concerned the practical difficulties in obtaining comparative data. Some expected tardiness in the supply of national statistics for international data bases and difficulty of obtaining data at low spatial scales. The problem with some fisheries data may be their commercially sensitive nature. The lack of harmonisation of data and data classifications was seen to be particularly problematic, as were differences in the periodicity of data categories. The ambiguities of fishing data referring to landings (which may include landings by local vessels, national vessels, foreign vessels and landings abroad) and employment (whether based upon place of residence or port of vessel registry and whether including self-employed categories of which fishermen are often a component) were highlighted. One consultee noted the need for the allocation of port based data to administrative boundaries, which closely follows the approach taken in the proposed framework.

*Scale of analysis*

Four broad scales for the analysis of dependent areas were identified (country, groups of counties, county/region, municipality). Of these most consultees favoured a combination of county/region and municipality scales. This would confirm the choice made in the proposed framework for a NUTS 4 analysis. It would not discount the relevance of macro-regional or national representations, though clearly the most useful scale is seen to be more regionally specific. Some preferred the county/region perspective as opposed to the municipality - in part this may be an acknowledgement of the greater challenge in obtaining data at more locally specific scales.

3.5 *Coordination with existing statistical services*

It is preferable for a fisheries dependent area data base to utilise existing published data sets from national (including both government departments and private organisations) and international (eg Eurostat, FAO) statistical services. However, where published data are unavailable, unreliable or out of date, it will be necessary to consider unpublished data, possibly through purchase, or the development of new or estimated data sets. In general, the main challenge will be in manipulating, estimating and standardising data so that the system is more comparative and appropriate in temporal, spatial and definitional terms.

One potentially valuable source of fishing activity data could arise from the data base proposed by LEI-DLO (*Analytical fisheries economics data base -*

*AFED*)[2]; here possibilities for integration or coordination should be explored. The AFED would provide for the EU wide analysis of economic aspects within the fisheries sector. This refers to information concerning fleet (composition, size, activity), landings (species), prices, employment, cost and earnings, production cost, investments and finance. In order to assess the socio-economic consequences of the CFP and the restructuring measures for fisheries dependent economies, some categories of data (notably employment and fleet information) will also be specified at regional level within the AFED proposal and it is these data which could primarily contribute to the fisheries dependent area data base. By regional data the AFED is essentially referring to ICES regions and port data.

Hence, at the regional data level there is some overlap between the AFED proposal and the fisheries dependent area data base considered in this report, though the latter is not solely related to the economic activity of fisheries and is more specifically dedicated to the analysis and interpretation of regional dependence.

3.6 *Who should manage a dependent area data base?*

There are a range of user groups who may potentially utilise the data base framework, though primarily they are likely to include policy makers and administrators (local, national or at European level) together with research institutions. The choice of an appropriate institution to actually manage such a data base was a matter of some uncertainty for the consultees with only a handful responding to the question; choices included government departments, quangos, the EU (Commission or Eurostat) and local authorities. The preference, however, appears to favour a well constituted University or research institution.

The managing institution, possibly under contract from an international organisation like the European Commission, would have to be well placed internationally and with a long term interest in European fisheries policy. Given the need for an international comparative approach - it might consider utilising a national framework of data support to supply and help evaluate data.

3.7 *Overview*

As a whole, the utility of a socio-economic data base for fisheries dependent areas would not be confined only to the simple description, nor indeed to the delineation of what are or are not fisheries dependent areas. Utility would also rest on the following elements:

* the ability to derive a meaningful typology of coastal and fisheries dependent areas on the basis of a combination of economic, demographic and social data;

[2] W. Dol, N.F. Einhaus, W.H.G.J. Hennen, P. Salz and D. Verwaart *Analytical fisheries economics data base: definition study, Final Report*, January 1996, LEI-DLO

* the ability to analyse the socio-economic characteristics of fisheries dependent areas in order to answer questions relating to levels of deprivation suffered by fisheries dependent areas (employment; education; social provision, depopulation etc..);

* the ability to pinpoint critical areas for policy intervention either through modifications/exceptions from 'common' policies or for targeted regional policies;

* the ability to monitor policy impacts.

It is clear, however, from the responses to the consultation that maximum data base utility would arise with development of data sets and the incorporation of a wider range of indices within the analysis. In part, this relates to the social and economic characteristics of regions. It would be useful, for example, to elaborate the levels of social problems facing the different regions including crime, drug abuse and suicide rates, or the uptake of social help budget in an area. In terms of industrial and educational development, an indication of the levels of research activities or technological support would be beneficial. It is acknowledged that these data sets may be better suited to local surveys than to a data base describing conditions throughout all regions of the EU. Finally, it would be useful to assess the remoteness of areas (e.g. nearest town of population 50,000 or settlement size) as well as levels of infrastructural provision (such as rail, air and road links), as potential indicators of peripherality.

It would certainly be preferable if the basic fishing activity data were expanded, allowing further opportunities for analysis. It would be useful, for example, using vessel landing records, to assess the nature of fishing activity in terms of days spent at sea, location of fishing, gear methods, species interests, quota dependence and vessel specifications (length, capacity, age). This would allow more sensitive policy impact predictions and analyses as the implications of particular policies on various fisheries and regions could be explored. It would be feasible to assess an area's dependence on particular fishing locations or sectors. Are regions diversified or more specialised in their target fisheries and to what extent are they dependent on particular fishing grounds (inshore, offshore or distant water)? The development of market data for fisheries regions would also form a very useful data category for dependency analysis. Are areas dependent on exports or imports of fish and where are their main sources or target markets? Assessing the seasonality of fisheries is also potentially important, as is gauging an awareness of levels of pluriactivity where fishermen may partially engage in other sectors of employment such as agriculture or tourism; here there are implications for the interpretation of a reduction in fishing activity - in those regions characterised by high levels of pluriactivity, a reduction of fishing activity poses a destabilising influence on the economic organisation of the industry rather than necessarily a direct reduction in jobs. Some of these data sets are already available at municipality level in some states, such as Norway, with well developed fisheries data systems. Here, for example, landing data can be

presented on a basis of vessel owner address and postal districts which offers a useful means of mapping fisheries dependency.

## 4.0 Data specifications and outputs

It is important to outline some of the broad parameters for the storage, retrieval and presentation of data within the data base framework and to indicate some of the main data outputs. Aspects of technical detail and detailed methodology are not considered, as these would be the remit of the technical and computer experts responsible for the support and development of such a data base, in close cooperation with the end user.

### 4.1 *Data storage*

The data base would need to be able to cope with a wide variety of data forms including published and unpublished sources, annual and decennial time series and data from different spatial aggregations (port, enumeration district, municipality etc..). Ideally, for a particular variable, if different sources of data are available, these should be held in the data bank to complement the analysis of data consistency. Different sources of social and economic data may often provide a more up to date or reliable data set for a specific variable. In many cases, for example, there are annual demographic or employment related data. This would greatly compensate for the time delay in publication, or infrequent nature of data sets such as the population census. National socio-economic data sets should be complemented by regional sources (NUTS 3) within existing European data bases, such as those provided by Eurostat. Most fisheries activity data should be available on an annual basis.

The indices and percentage based variables would ideally be computed based upon raw absolute data held in the data base. This would allow for maximum statistical transparency. Furthermore, where possible, the basic unit of data collection should be utilised, allowing for maximum possibilities for aggregation. General socio-economic data would arise primarily from decennial population census sources and therefore the basic unit in these instances is the enumeration district; if this is not possible, then the next available level of data will suffice (NUTS 4). In most cases, port level should represent the basic collection unit for fisheries activity data. Coupled to this would be the need to develop a supporting file on each coastal region incorporating the findings of *ad hoc* socio-economic surveys or information on existing regional development initiatives.

### 4.2 *Data processing, retrieval and analysis*

To ensure the comparability and consistency of data, the system will need to incorporate frameworks for the standardisation and estimation of data and variables. Estimation procedures may be relevant given the time delay in the availability of social data through census sources in order to provide the opportunity for more uptodate analysis. All information concerning the data including definitions, sources, reliability, estimation or standardisation procedures, etc should be available within the system to allow for maximum transparency and effective data interpretation. These explanatory notes should

describe any definitional and temporal data inconsistencies between and within states.

A degree of spatial data manipulation will also be necessary. For example, unlike census of population statistics, fisheries data are less often collected by the administrative divisions arranged within the NUTS framework. A key task will be found in the allocation of fisheries based data, mostly at port level, to NUTS 4 administrative units; geographical information systems would be potentially useful in allocating data from differing spatial units to common scales and divisions. In those instances where fisheries employment data is available from alternative socio-economic sources like the census of population, the information will be more readily available according to the NUTS divisions.

The AFED report has outlined the comprehensive architecture for the functioning of a data base in terms of data management and planning, information production and data base support services. Consideration is given to the details of the user interface, access, ownership, privacy and legal aspects, and the incorporation of expert knowledge within the system. Many of these detailed elements would be relevant to a data base for fisheries dependent areas.

Expert knowledge of social scientists should be incorporated within the analysis system. It is recommended that this would take place though working groups dealing with particular nations or policy areas (eg. regional development or policy impact analysis) and which could provide the opportunity for policy relevant analysis and response.

Finally, the data retrieval system itself would allow for the selection from a menu of different critical indices at varying geographical scales. Indices could be selected individually or in combination. Furthermore, it should be possible to select different 'cut-off' levels for dependency thresholds.

4.3 *Data base presentation and outputs*

Data representations would primarily take the form of dependency maps, matrices and tables. Maps would prove the potentially most useful medium in providing a spatial representation of patterns of dependency or other socio-economic regional characteristics. They can also be constructed to highlight trends in dependency and other social indicators.

Two forms of data output are likely to feature:

*(i) Regular outputs*

* each 5 years an analysis of fisheries dependent areas including:

- classification of coastal regions (social and structural characteristics);

- fishing region typology and opportunity-deprivation index;

- fishing activity analysis;

- analysis of distribution and nature of dependency (representations based on key indices of dependence and according to various fishing activity variables) leading to development of a dependency typology;

- analysis of changing pattern of dependency (time series analyses of key variables);

- recommendations for the location and form of regional development aid through the identification of priority development areas and consideration of the opportunities for policy response given the nature of dependency.

*(ii) Ad hoc outputs*

* development of typology of development requirements and forms of regional assistance (policy response menu);

* analysis of policy development; given the distribution and form of dependency, can policy measures be made more regionally and socially sensitive?

* case analyses of dependence indicator communities; different processes of dependency may be at work in different dependent areas (e.g. remote fishing committees v. urbanised areas and ports) - what are the appropriate policy responses and how do they differ?

* policy impact analysis and analysis of time series data; involving the assessment of causal relations between variables and the consideration of 'impact probability' based on the socio-economic profiles of regions;

* policy relevant regional analysis based on *ad hoc* requests.

## 5.0 Recommendations and development

5.1 It is the recommendation of the Data Base Task Group of the European Social Science Fisheries Network that *a socio-economic data base for fisheries dependent areas could provide a valuable contribution to more effective policy intervention and evaluation for European fisheries*. Notable benefits could arise in the field of regional development; here the need for such data is likely to intensify as the social effects of restructuring, within the context of the Common Fisheries Policy, become increasingly evident.

5.2 *It is proposed that further consideration be given to the feasibility, operational aspects and utility of such a data base*. This should include the refinement of indices and the development of a policy relevant systematic methodology for the analysis of fisheries regions and their dependency. This recommendation might best be realised through the establishment of a model data base drawing on a limited number of member states at different stages of statistical development. Opportunities for coordination with the AFED data base should be further explored.

5.3 It is acknowledged that the development of a comparative approach represents a formidable challenge. Significant benefits would arise through improvements in the state of statistical provision by the greater harmonisation of national statistical programmes. Development is required with regard to:

* the frequency of published data sources; while most fisheries data are available on an annual basis there may be a considerable time delay before its publication; the decennial availability of census data poses a significant drawback for effective policy response and analysis and effort should be directed to the search for alternative sources of social data; this primarily refers to basic demography (numbers, age structure etc.) and housing data as most other social variables are revised annually;

* the reliability of data; this may reflect data collection procedures, or in the case of fisheries data, misreporting of landings and blackfish;

* the temporal and spatial consistency of data given divergent reference points, data units and definitions;

* missing data; key data sets are sometimes unavailable in some states and particularly at low spatial scales; notably, considerable improvement is required as to data referring to the processing and other value adding sectors; it is also feasible that some missing socio-demographic data categories might be incorporated as special data needs within population census.

5.4 Although this report fulfils the obligations of the data base Task Group it is appropriate to signal some potential areas in which the proposed data base framework might be developed or extended in future.

Significant gains in the sensitivity of policy relevant regional analysis may be gained through the development of variables and indices. In relation to fisheries activity data this might include:

* data relating to the fisheries chain including numbers employed in processing and supporting industries and their contribution to the regional economy (GDP); this is essential for an understanding of the level of diversification within the fishing economy;

* an extension of vessel data to incorporate gear, fleet structure (vessel size, capacity, age etc..), fishing effort and structure of catches (fishing grounds, species and seasons);

* additional economic indicators referring to revenues, exports and import data, etc...

* a natural extension of the data base would be to include sociographic data for fishing related populations (e.g. age, health, education etc..).

It would also be appropriate for such a data base to accommodate qualitative data referring, for example, to behavioural patterns of user groups and institutional arrangements within fishing regions. This may best be developed through the exploration of indicator communities where specific analyses of fishing populations and dependency dynamics might be performed.

# Appendix 1: Illustrative Material for Data Base Framework



*by Oddmund Otterstad, Allforsk, Norwegian University of Science and Technology (NTNU), Trondheim, Norway*

The following appendix attempts to illustrate, through sample material, some of the characteristics of the data base framework outlined by the task group in its baseline report. It is oriented to the first stage in the data analysis process, data description, as opposed to the procedures for analysis or data interpretation.

The illustrations are based predominantly on Norwegian statistical data which are among the most comprehensive data sets on fisheries in Europe; it follows that some illustrations represent ideal case examples in terms of data availability. Most of this material was developed as part of research projects carried out in Norway and Spain, funded by the Norwegian Research Board under the Coastal and Rural Development Programme.



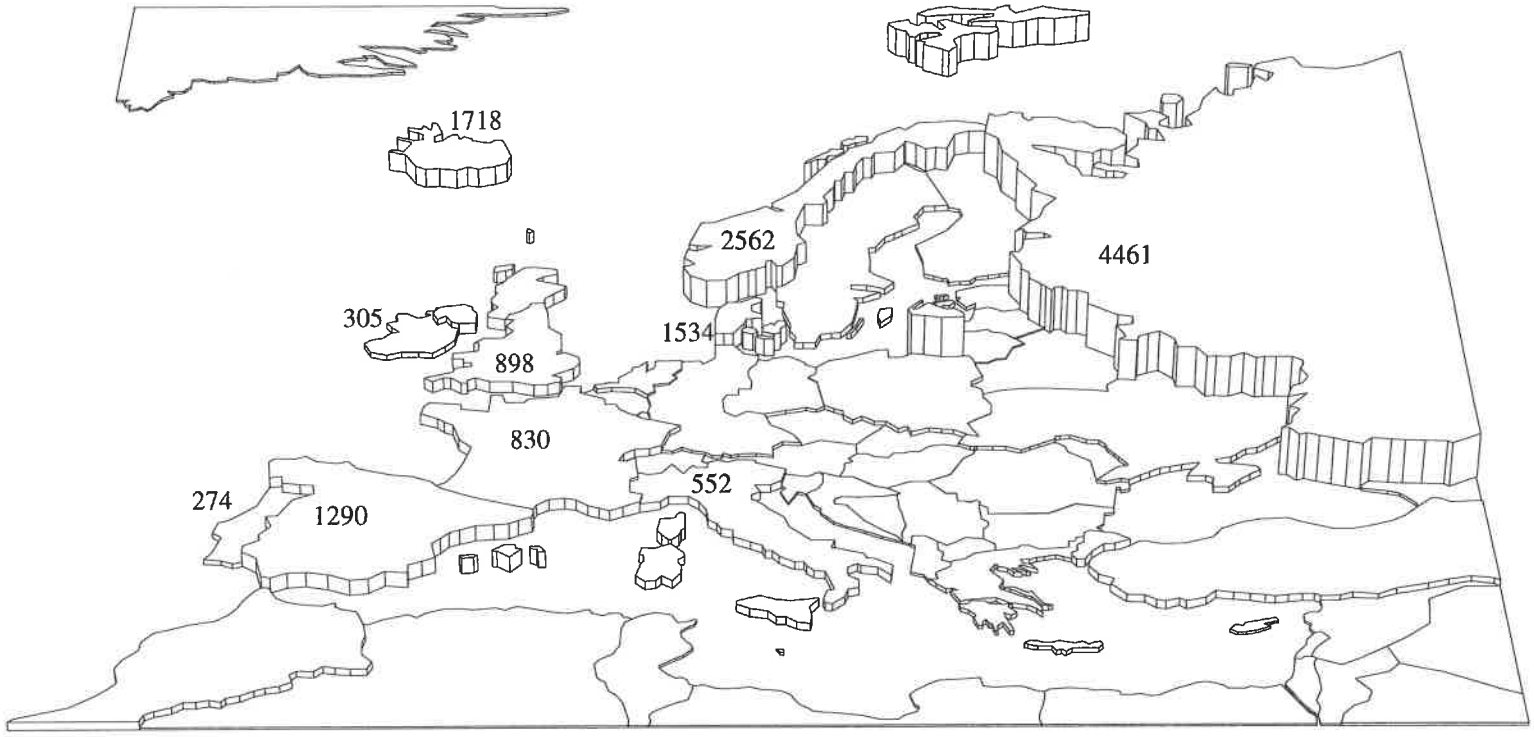
The illustrative material is divided into a number of plates which utilise a range of graphic styles for the presentation of statistical data. The first group portrays the different scales of analysis. Plate 2 sets Norway in the European context according to volume of landings. The spatial presentation of data is then elaborated in Plates 3 to 5 which consider the different NUTS levels, including 3 (county level) and 4 (municipality level). Plate 5 takes the description a step further, based on detailed postal district data in Norway.

The second series of plates begins to illustrate the range of variables within the data base framework. In terms of fisheries activity data, Plate 6 is set at Norwegian NUTS 3 level and displays catches by fishing ground. Plate 7 extends the selection of variables through a shorthand analysis of two contrasting fishing municipalities. Municipal level fisheries data is again utilised in Plate 8 for both Norway and Spain. Finally, a selection sociographic variables is presented in Plate 9.

Plates 10-12 each display time series data, highlighting the evolution of Norwegian fisheries at national level, while, by contrast, Plate 13 provides a synoptic profile of a former Norwegian fishing community.

# 1. Scales of analysis

## The national level




**Comment to the figure:**

Starting at the national level, this figure shows a prism map with only one variable, landings of fish for all countries in Europe in 1993. The scores are indicated by the height of the prism for the individual countries. The numbers are 1000 tons live weight. Russia and Norway have the highest scores.

Statistical source: FAO

*«For a data base concerned essentially with spatial analysis and prognosis it is necessary to highlight the broad geographical parameters. Coastal Europe (those areas bordering saltwater or brackish waters) represents the obvious geographical limits of the data base framework given the emphasis on the regional aspects of marine fisheries.»*

# Different systems of area classification:

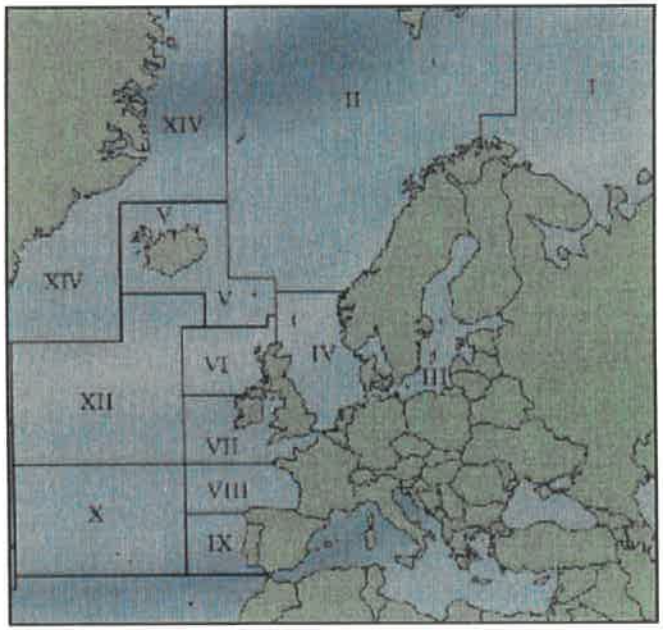
**The decision of the task group:**

*«The approach necessarily incorporates land based divisions, and to facilitate international comparison and statistical collection, the international NUTS system of area classification (Nomenclature of Territorial Units for Statistics) provides the basic reference system.»*

1. NUTS (Nomenclature of Territorial Units for Statistics)

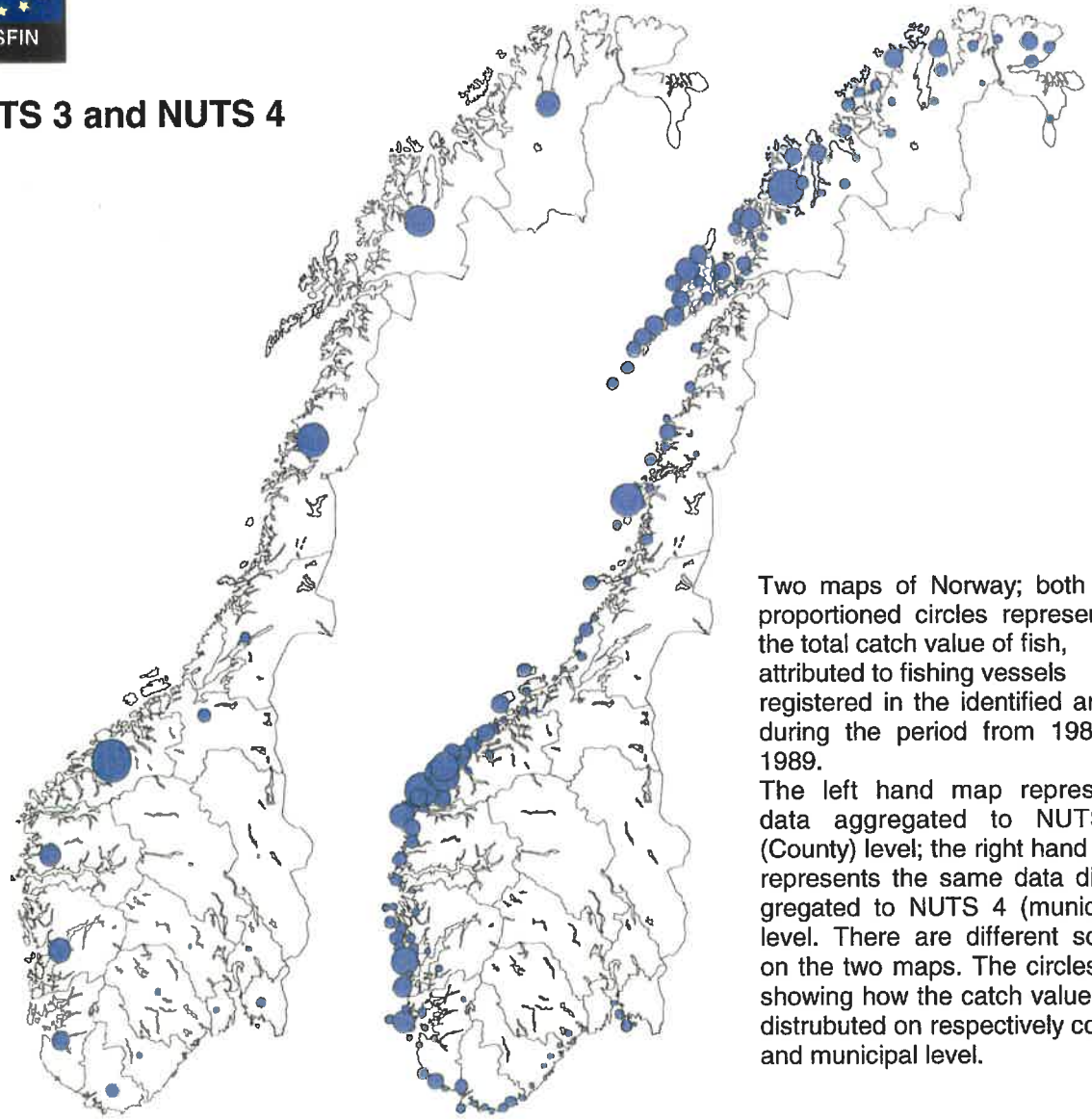
Land territory in Europe by NUTS 3 division (county level)

2. The ICES classification of the European sea territory



ESSFIN

# NUTS 3 and NUTS 4



Two maps of Norway; both with proportioned circles representing the total catch value of fish, attributed to fishing vessels registered in the identified areas, during the period from 1980 to 1989.
The left hand map represents data aggregated to NUTS 3 (County) level; the right hand map represents the same data disaggregated to NUTS 4 (municipal) level. There are different scales on the two maps. The circles are showing how the catch value was distrubuted on respectively county and municipal level.

*«Critical, however, is the choice of an appropriate scale for primary analysis within the NUTS spatial hierarchy.*

*In the analysis of fishing regions and their level of dependence it is necessary to choose a policy relevant scale that is not too coarse (preventing effective targeting of policy initiatives) nor too fine (cumbersome in a policy sense and with added likelihood of data suppression for anonymity reasons).*

*For example, too coarse a spatial mesh may suggest apparently low levels of dependency given a wider catchment area and frame of reference - pockets of acute fishing dependency may be overlooked in all but a few cases.*

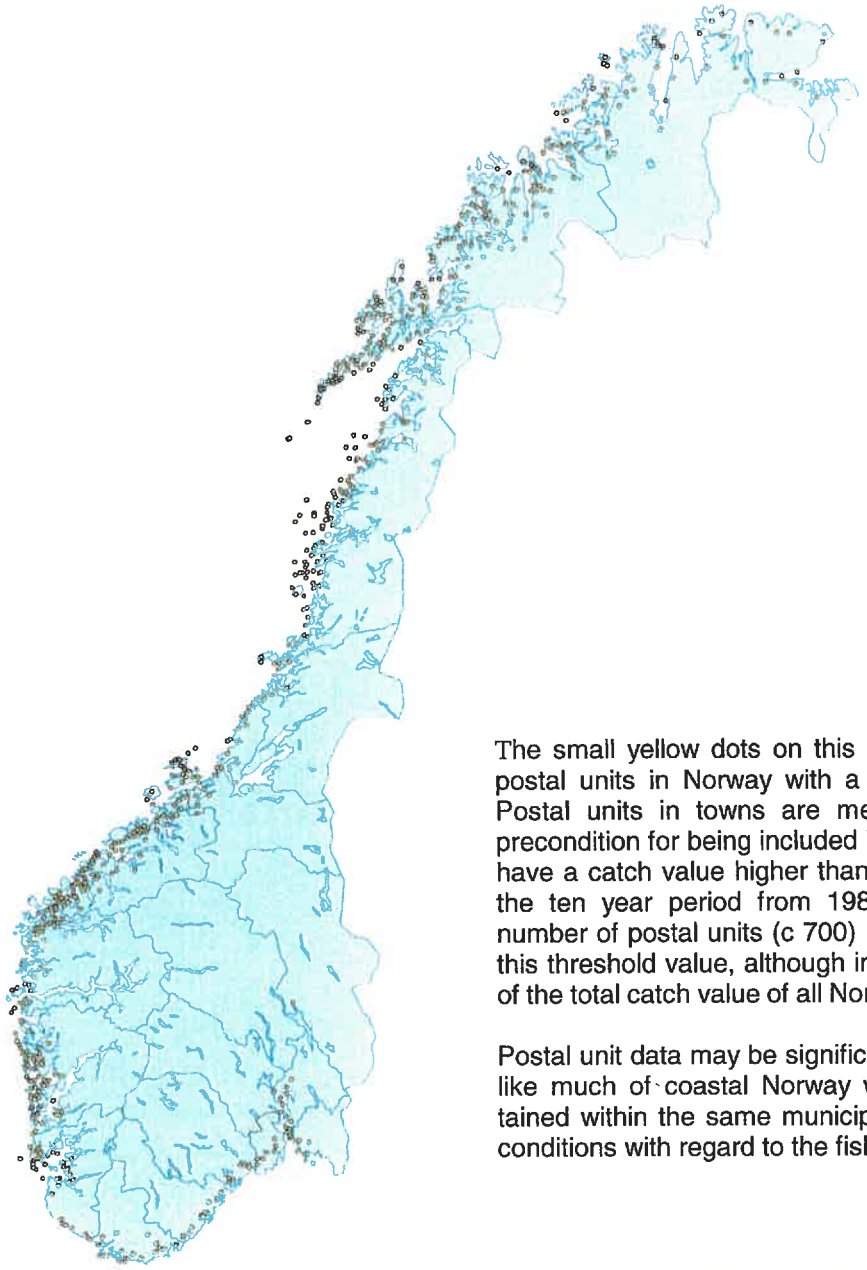
*Preference, therefore, is attributed to administrative units approximating to NUTS 4, or municipality level, as the optimum scale for regional analysis and dependency representation.*

*It is acknowledged, however, that the challenge in obtaining appropriate data at such a scale may be considerable for certain states and these may have to resort to NUTS 3.»*

ESSFIN

# Postal units

## Local fishing communities



*«Some of these data sets are already available at municipality level in some states, such as Norway, with well developed fisheries data systems. Here, for example, landing data can be presented on a basis of vessel owner address and postal districts which offers useful means of mapping fisheries dependency.»*

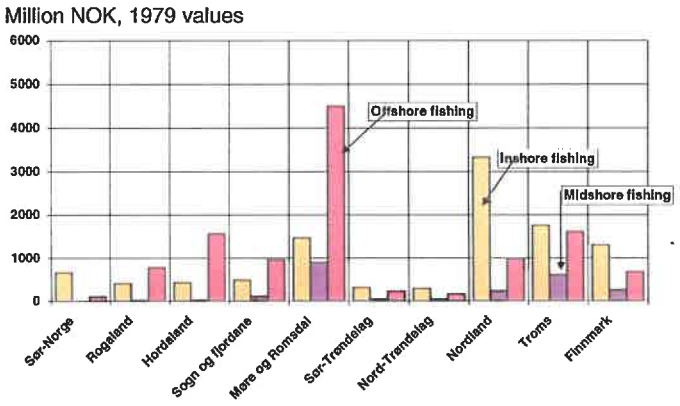
The small yellow dots on this map gives the location of 650 postal units in Norway with a registered active fishing fleet. Postal units in towns are merged into one dot. The only precondition for being included is that the local vessels need to have a catch value higher than 1 million NOK (1979 value) in the ten year period from 1980 to 1989. Almost the same number of postal units (c 700) recorded smaller amounts than this threshold value, although in total they account for only 1% of the total catch value of all Norwegian fishermen in the 1980s.

Postal unit data may be significant in sparcely populated areas like much of coastal Norway where local communities, contained within the same municipality, may reflect very different conditions with regard to the fishing industry.

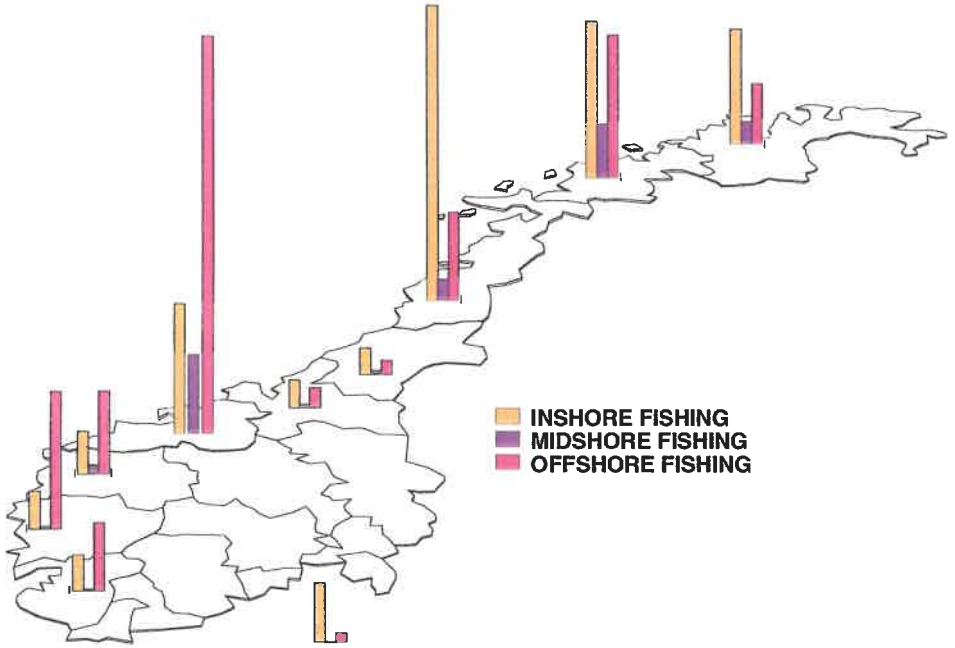
# 2. Variables

## Fisheries data

**Total catch value 1980 to 1989 by county and fishing ground**




**Catch value 1980-89**
**by county and fishing ground**




*«It would certainly be preferable if the basic fishing activity data were expanded allowing further opportunities for analysis. It would be useful, for example, using vessel landing records, to assess the nature of fishing activity in terms of days spent at sea, location of fishing, gear methods, species interests, quota dependence and vessel specifications (length, capacity, age).»*

*«This would allow more sensitive policy impact predictions and analyses as the implications of particular policies on various fisheries and regions could be explored. It would be feasible to assess an area's dependence on particular fishing locations or sectors. Are regions diversified or more specialised in their target fisheries and to what extent are they dependent on particular fishing grounds (inshore, offshore or distant water)?»*

## An extensive array of fisheries data

**Catch value information is available at national, county, municipal and (to some extent) postal unit level, broken down by four important variables: size of fishing vessel, fishing ground, fishing gear and fish species. It is also possible to get the number of days at sea, the average income per man-day etc.**

### Two outlying fishing municipalities in Norway: a winner and a loser

**HERØY**

MØRE OG ROMSDAL FYLKE

* increasing catches
* vessels bigger than 41 metres
* variety of fish species
* increasing catches of crustaceans
* deep sea fishing (the North Sea and distant waters)
* seine and trawl

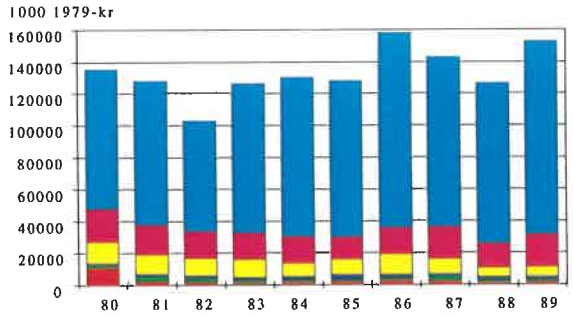
**FLAKSTAD**

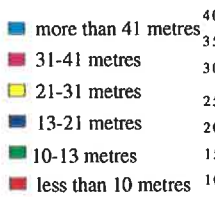
NORDLAND FYLKE

* negative catch development
* dominated by vessels 13-21 metres
* almost exclusively cod
* coastal fishing in Northern Norway
* gill nets and long line
* reduction in the traditional fishing

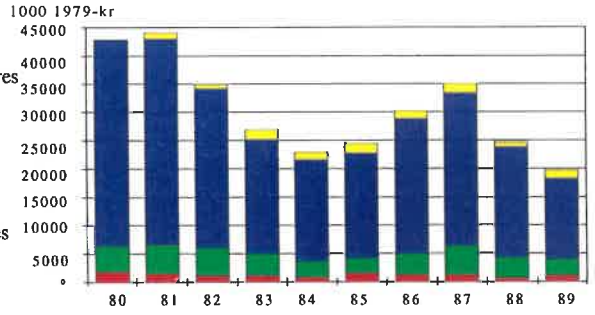
**CATCH VALUE DEVELOPMENT, 1980-89, BY VESSEL SIZE**

HERØY



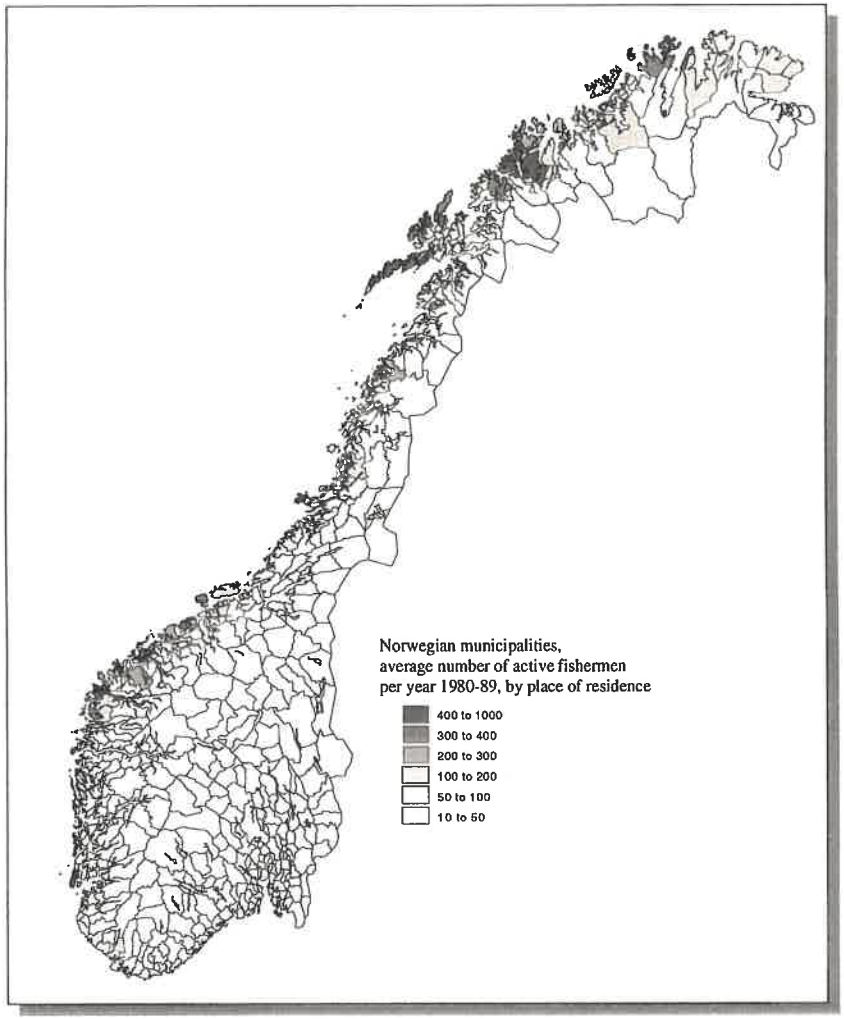




FLAKSTAD

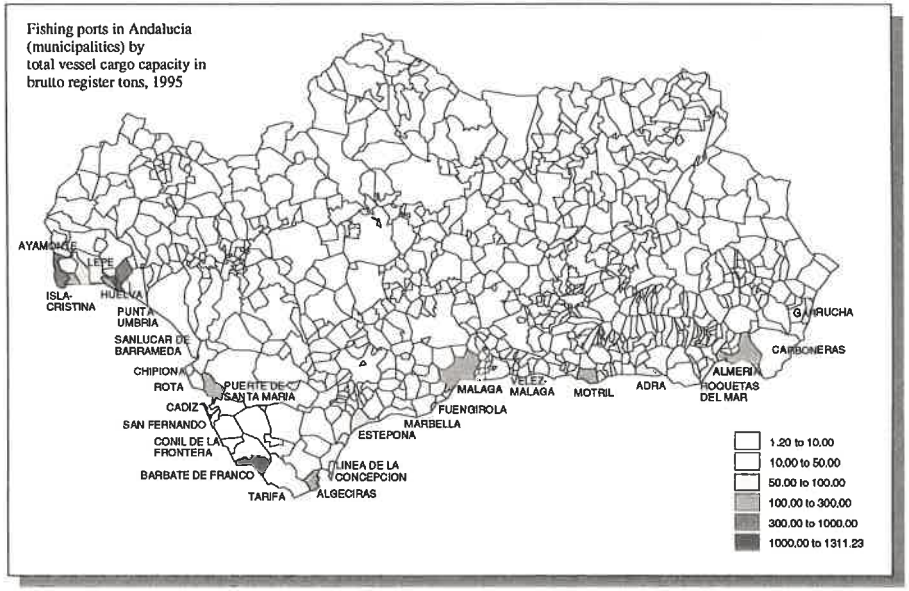



*«The development of market data for fisheries regions would also form a very useful data category for dependency analysis. Are areas dependent on exports or imports of fish and where are their main sources or target markets? Assessing the seasonality of fisheries is also potentially important as is gauging an awareness of levels of pluriactivity where fishermen may partially engage in other sectors of employment such as agriculture or tourism.»*

# Fisheries dependent areas




In some countries the fisheries statistics are usually presented by reference to ports, in others it is more usual to use the home address of fishermen or the place of the fishing vessel registration.



# Socio-economic data

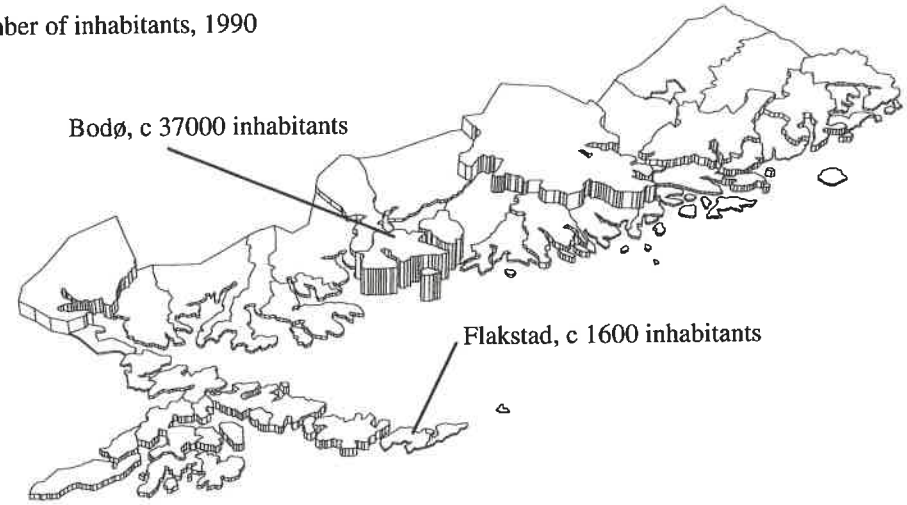
These three figures show some important socio-economic data for the county of Nordland, the most important county in Norway in terms of the number of fishermen. The group of islands 'stretching out into' the sea, are the Lofoten islands, the focus of the important winter cod fisheries. Comparing the county centre (Bodø) and for instance Flakstad, representing the fisheries municipalities in Lofoten, we discover important socio-economic differences within the county.

The three maps show the following variables for the municipalities in the county of Nordland:

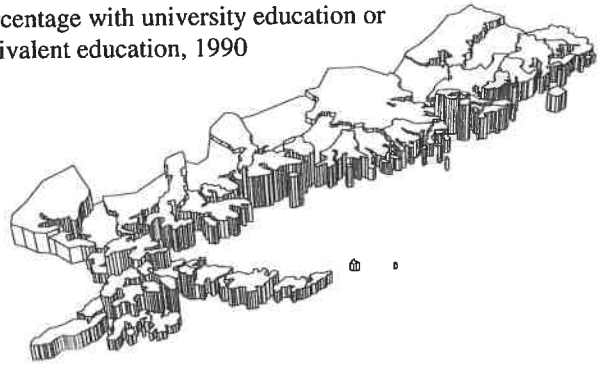
1. number of inhabitants, 1990
2. percentage with university education or equivalent education, 1990
3. percentage females in work force, 1990

Flakstad has approximately the double number of fishermen, 1/20 of the population, and, contrary to Bodø, it ranks as one of the lowest in terms of scores for the variables 'percentage of university education' and 'percentage of females in the work force'.

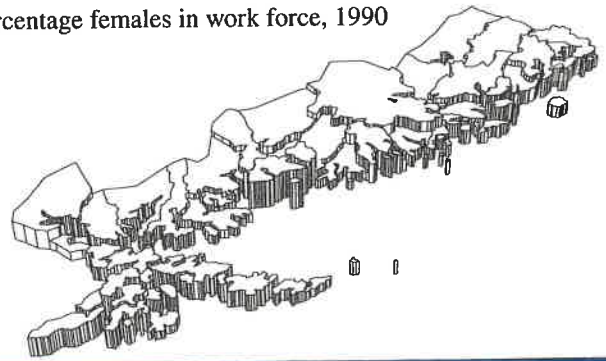
1. number of inhabitants, 1990




2. percentage with university education or equivalent education, 1990



3. percentage females in work force, 1990



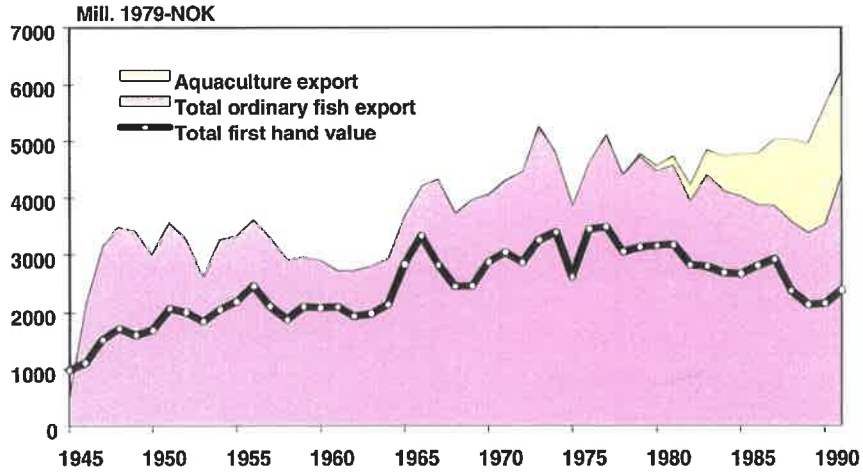
*«It would be useful, for example, to elaborate the levels of social problems facing the different regions including crime, drug abuse and suicide rates, or the uptake of social help budget in an area.*
*In terms of industrial and educational development an indication of the levels of research activities or technological support would be beneficial. It is acknowledged that these data sets may be better suited to local surveys than to a data base describing conditions throughout all regions of the EU.*
*Finally, it would be useful to assess the remoteness of areas (e.g. nearest town of population 50,000 or settlement size) as well as levels of infrastructural provision (such as rail, air and road links), as potential indicators of peripherality.»*

# 3. Time series data

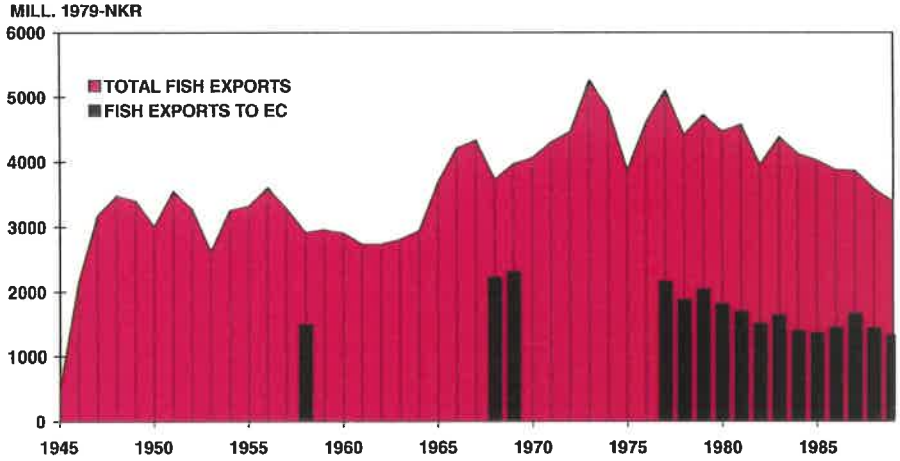
## Total production of fish products

**Development of the total fish production value in Norway 1945 to 1991 (both marine fishing and aquaculture)**

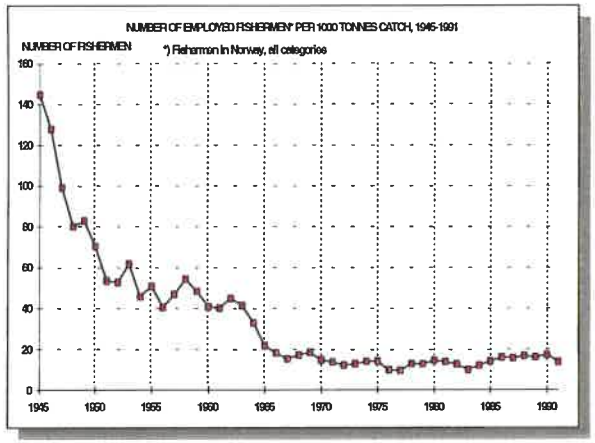
'First hand value' is the amount of money paid to the fishermen on landings; all figures are indexed to 1979 values




**Total fish export value from the traditional fishing industry (excluding aquaculture) in Norway, 1945 to 1991, and the share exported to the EU countries (both marine fishing and aquaculture)**

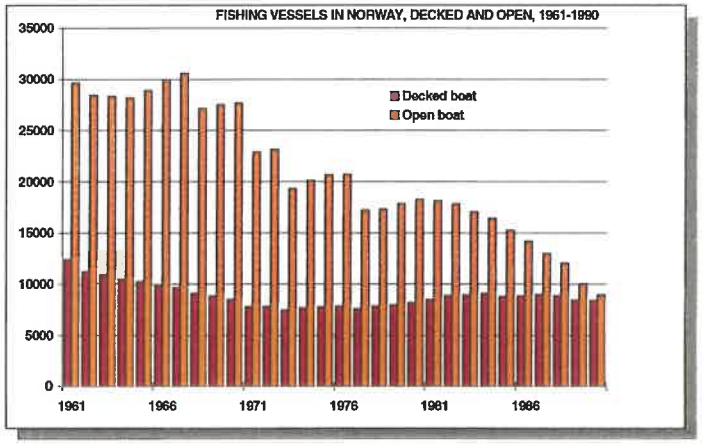


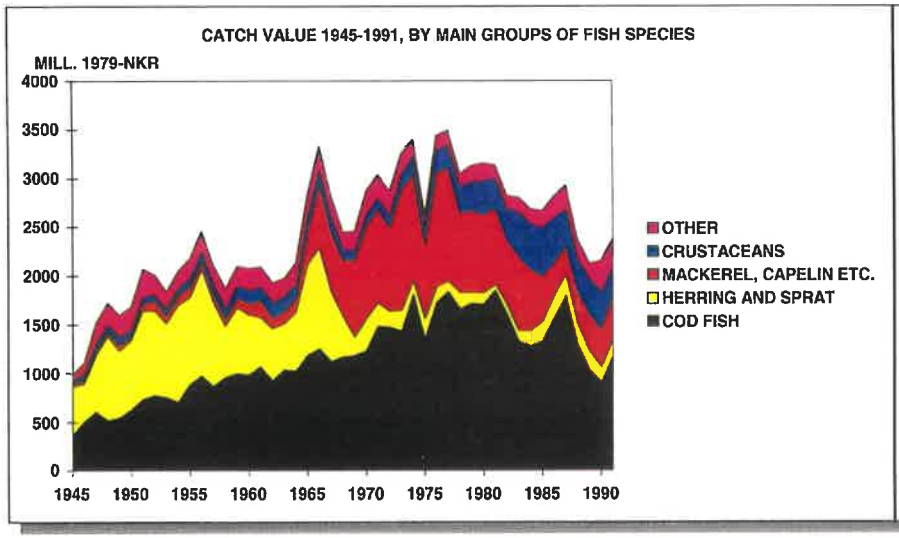
# Fishing employment, fleet, value and quantity of fish

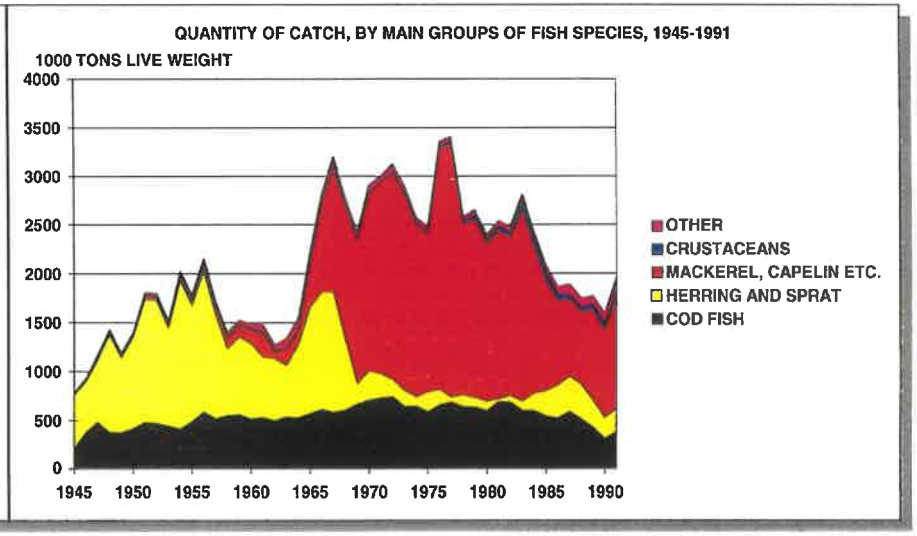



These four graphs show important trends concerning the economic development of the Norwegian fisheries in the post-war period:

the employment capacity (left upper), the fishing vessels (right upper), catch value (left lower) and catch quantity (right lower), by main groups of fish species.



ESSFIN

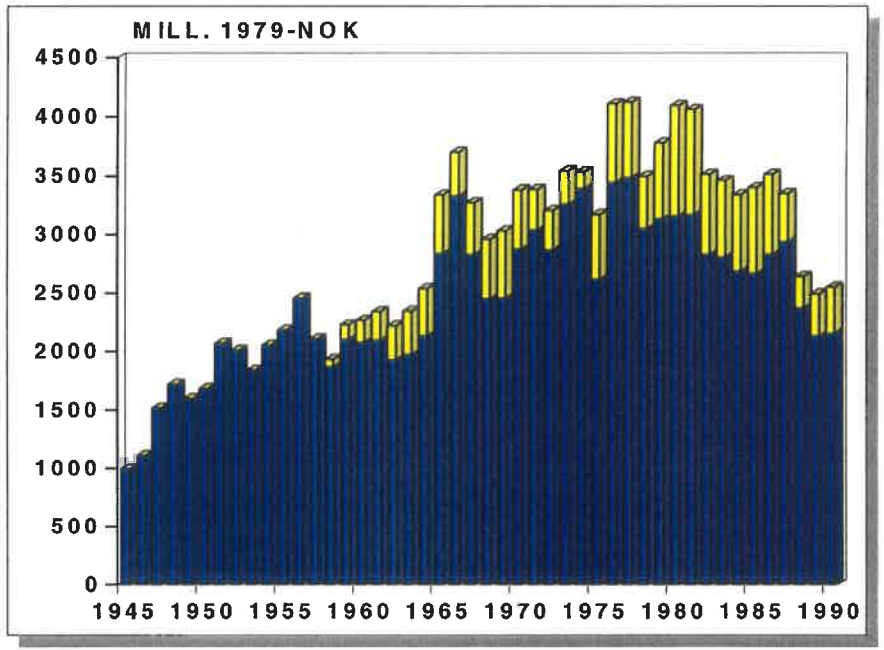
# Other economic data

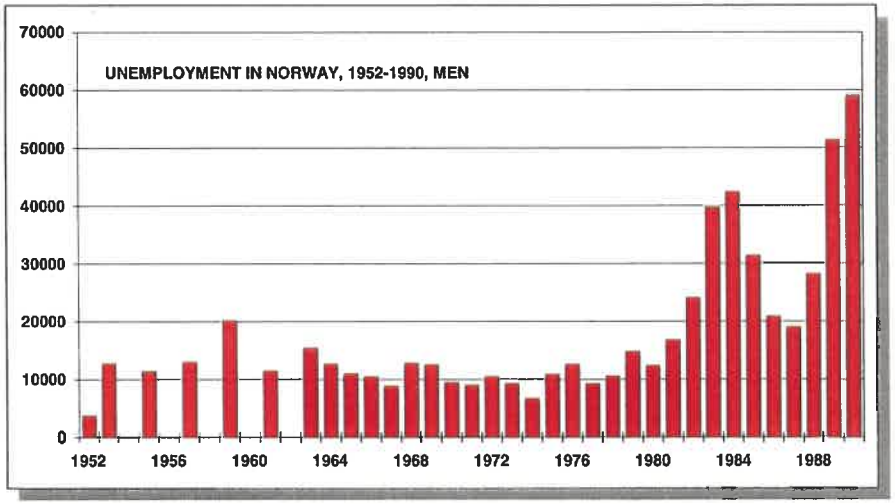
To the right:

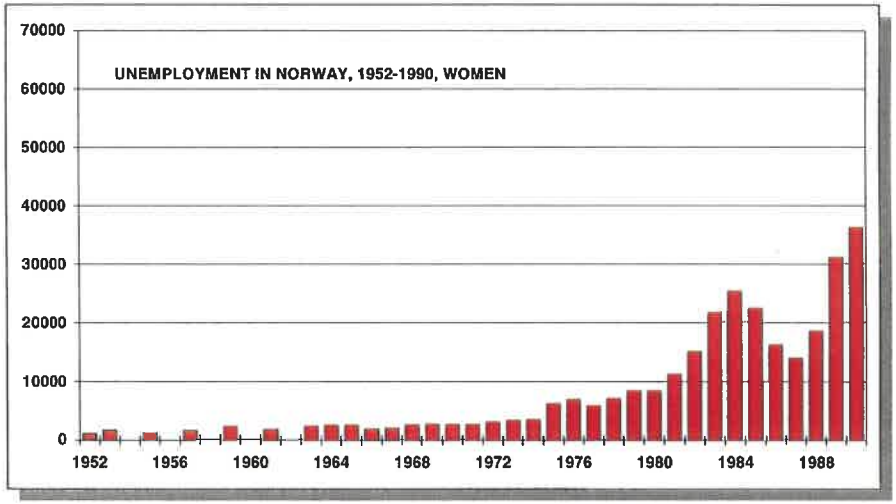
Total catch value of the Norwegian fishing industry (excluded aquaculture) 1945 to 1991, by the 'pure market' value (in blue) and state subsidies (in yellow)

Below:

Time series for male and female unemployment figures for Norway (also available at county and municipal levels)



# Finally, one example..

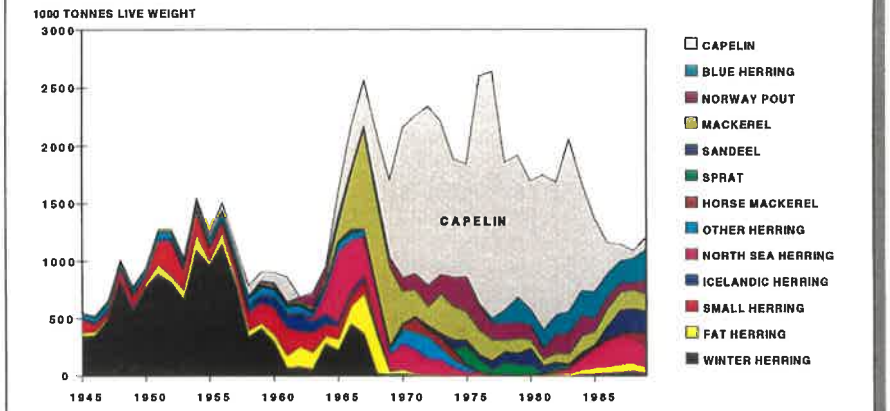
A Norwegian fishing community, «wiped out» of the business in the late 1950s

**Name: «Råkvåg»**

- a traditional fishing community (since 1500)
- dependent on the herring fisheries
- specialised in the winter herring fishery
- lost out in competition in the late 1950s
- outmigration (from 800 to 400 inhabitants)
- most of the local public services closed down
- revival in the 1980s due to tourist activities
- today a popular place in the summer time
- a quiet place during winter
- not much fishing any more
- no industrial production
- dominated by retired people and leisure activities

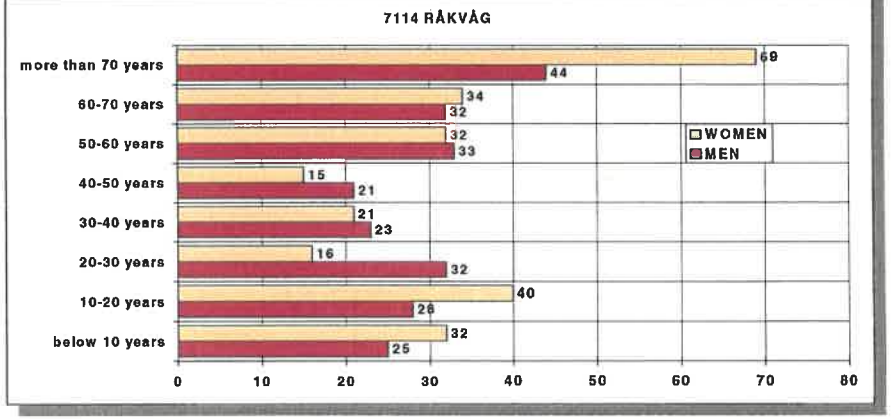
**Statistical evidence:** The figures show the dramatic development of the herring fisheries in Norway and the long term impact on an extremely dependent 'herring-fishing' community

A. The Norwegian herring fisheries 1945-1990, by fish species




B. The age distribution in Råkvåg (the postal unit), by the 1990 census

(few young people, few persons in active age groups, many old women)



**Appendix 2: Consultation Document**

## A socio-economic data base framework for fisheries dependent areas

### Aims

The European Social Science Fisheries Network, as part of the European Commission's FAIR programme, has undertaken to define the framework for a comparative data base that would seek to make good the deficiencies in existing data sources for the socio-economic analysis of fisheries dependent regions and fishing based communities. Such a data base would help to:

(i) identify fisheries dependent areas in the first instance and highlight those which are most economically and socially vulnerable;

(ii) assist in the design of more appropriate socio-economic measures and effective targeting of regional development initiatives;

(iii) complement an analysis of the social impacts of policy measures arising from the CFP and other policy areas, upon fishing communities.

The need for such data is likely to intensify as the social effects of restructuring, within the context of the Common Fisheries Policy, become increasingly evident.

Existing data base related developments within European fisheries are predominantly steered towards biological perspectives. A separate initiative aims to establish a data base for the economic analysis of the fisheries sector (Analytical Fisheries Economics Data Base: Definition Study, Final Report 1996, LEI-DLO). Otherwise, some data is provided by Eurostat and other international organisations but this is spatially coarse; fisheries data is also presently oriented to maritime regions and describes the physical rather than socio-economic characteristics of fisheries. In an attempt to find appropriate spatial data for an analysis of fisheries dependent areas, it is necessary to turn to statistical sources within individual states.

### Dependency data

The data base would be geared initially towards the harvesting sector as the dependence indicator; emphasis would be placed upon levels of dependency as a product of sea fisheries (marine fisheries and mariculture).

Two kinds of data would be included:

1. Dependent areas should be identified and described on a basis of absolute levels of *fisheries activity* (landings, numbers of fishermen etc). Fisheries data should be available on an annual basis.

A minimum list of dependency indices might include:

(i) Number of fishermen based in area (home port or main port of operation)
(ii) Fishermen based in area as % of total area employment
(iii) Fishermen based in area as % of national fishing employment
(iv) Total value and volume of landings into area
(v) Total value and volume of landings into area as % of total national landings

2. Dependency should also be considered in relation to the *general socio-economic characteristics* of the areas in which fishing activities are embedded. A range of socio-economic data sets is located within national statistical services and government departments; the most comprehensive and common source is provided by the decennial census of population. The production of a dependency analysis every 10 years, based upon census intervals, would form a key data base output. Where available in alternative forms, general decennial socio-economic data would be supplemented by annual inputs.

Variables to provide socio-economic profiles of areas:

* *total population* for ten year intervals (and latest annual estimate); providing an indication of population development.
* *age, gender composition and marital status* of population for 10 year intervals; has there been a masculinisation of the community which might signify remoteness or underdevelopment?
* *economically active and inactive population by gender*; percentage of total population which are employed and economically active, percentage of males and females in 20-39 year age group, dependency ratio.
* *unemployed males/females*; indicating alternative employment opportunities.
* numbers of *births and deaths* together with a potential indicator of outmigration.
* *numbers employed in primary, secondary and tertiary sectors*; is there a diversified economy?
* *household data*; number of households, persons per room, tenure, basic amenities, numbers of cars per household.

Additional data is required concerning health, income and education levels although substantial challenges of data consistency are expected here. In most cases, data variable headings will need to be general allowing for flexibility in criteria between states.

Where possible, the basic unit of data collection should be utilised, allowing maximum possibilities for aggregation. General socio-economic data would arise primarily from decennial population census sources and, ideally, the basic unit here is the enumeration district. The most common unit for fishery data is the port.

**Scale of analysis**

A coastal data base approach is preferred as offering greatest relevance in terms of fisheries dependence. Data would be collected for *all* coastal areas; this would allow opportunities for development in terms of dependency criteria as well as flexibility to account for changing dependency patterns.

The framework would utilise existing administrative and statistical divisions within the international NUTS system of area classification; preference is given to administrative units approximating to NUTS 4, as the optimal policy relevant scale for dependency representation. Unlike census of population statistics, fisheries data are less often collected by the administrative divisions arranged within the NUTS framework and a key task would be found in the allocation of fisheries port data to levels approximating to NUTS 4.

**QUESTIONNAIRE: socio-economic data base framework for fisheries dependent areas**

Name .....

1. is there a need for a socio-economic data base for fisheries dependent areas?

   Yes ☐ No ☐

   if yes, in what ways would you expect the data base to be of use?

2. is the following selection of key variables appropriate for such a data base?

| *Dependency indices*: | yes | no |
|---|---|---|
| number of fishermen based in area | ☐ | ☐ |
| fishermen based in area as % of total area employment | ☐ | ☐ |
| fishermen based in area as % of national fishing employment | ☐ | ☐ |
| total value and volume of landings into area | ☐ | ☐ |
| total value and volume of landings into area as % of national landings | ☐ | ☐ |

| *Variables to provide socio-economic profiles of areas*: | yes | no |
|---|---|---|
| total population | ☐ | ☐ |
| age, gender composition and marital status of population | ☐ | ☐ |
| economically active and inactive population by gender | ☐ | ☐ |
| unemployed males/females | ☐ | ☐ |
| numbers of births and deaths | ☐ | ☐ |
| numbers employed in primary, secondary and tertiary sectors | ☐ | ☐ |
| household data | ☐ | ☐ |
| health data | ☐ | ☐ |
| education data | ☐ | ☐ |
| income data | ☐ | ☐ |

   Are any key variables missing from this list (if yes, please specify)?

3. at what scale should dependent areas be identified and described?

   country ☐ groups of counties ☐ county/region ☐ municipality ☐

4. how might such a data base be coordinated with existing statistical services?

5. who would be best placed to manage a socio-economic data base for fisheries dependent areas?

**Please send to J. Phillipson, Dept. of Geography, University of Hull, Hull, UK, HU6 7RX (Fax: 44-1482 465007)**

## Appendix 3: List of Consultees

| Country/Organisation | Contact and affiliation | Response |
|---|---|---|
| **Committee of the Regions** | 1. Elisabeth Rousset, Brussels | no |
| **Europeche** | 2. Guy Vernaeve, Brussels | no |
| **European Commission** | 3. John Farnell, DG XIV - A, Brussels | no* |
| | 4. Guillermo Robledo Fraga, DG XIV - A, Brussels | no* |
| | 5. Bernard Lange, DG XVI - A4, Brussels | no* |
| | 6. Manuel Arnal Monreal, DG XIV - D, Brussels | no* |
| | 7. Rudolf Niessler, DG XVI - A3, Brussels | no* |
| | 8. Jean-Paul Repussard, DG XIV - D/1, Brussels | no* |
| | 9. Stephanos Samaras, DG XIV - D/1, Brussels | no* |
| | 10. Costantinos Vamvakas, DG XIV - A/3, Brussels | no* |
| **European Parliament (Fisheries Committee)** | 11. J. Gordon Adam, Brussels | no |
| | 12. Miguel Arias Cañete, Brussels | no |
| | 13. María del Carmen Fraga Estévez, Brussels | no |
| | 14. Brigitte Langenhagen,, Brussels | no |
| | 15. Allan MaCartney, Brussels | yes[a] |
| **FAO** | 16. David Ardill, Fisheries Department, Rome | no |
| | 17. Alain Bonzon, Fisheries Department, Rome | no |
| | 18. Christophe Breuil, Fisheries Department, Rome | no |
| | 19. Adele Crispoldi, Fisheries Department, Rome | yes |
| | 20. Tony Jarrett, Fisheries Department, Rome | no |
| **OECD** | 21. OECD/OCDE-Fisheries Division, Paris | yes |
| **Denmark** | 22. Flemming Hansen, Fiskeridirektoratet | yes |
| | 23. Pia Hansen, Fiskeridirektoratet | no |
| | 24. Anette Jerlak, Danmarks Statistik, KSDB | yes |
| **France** | 25. Marc Andro, Observatoire Economique des Pêches, Info Bretagne Service, Quimper | yes |
| | 26. Mrs Cavalier, Direction des Pêches et des Cultures Marines, Bureau des statistiques, Paris | no |
| | 27. Sophie Girard, Fond d'intervention et d'organisation des marchés des produits de la pêche et des cultures marines, Paris | no |
| | 28. Remy Gourgeolet, Direction des Pêches et des Cultures Marines, Bureau des statistiques, Paris | no |
| | 29. Claude Merrien, Ifremer, Lorient, France | no |
| **Greece** | 30. Helen Bountouris, Ministry of Agriculture, General Directorate of Fisheries, Department of Sea Fisheries, Acharnon | no |
| | 31. Stavroula Douphexi, National Statistical Service of Greece (ESYE), Directorate of Primary Sector, Department of Annual Statistics for Agriculture - Stockbreeding and of Statistics of Fisheries, Athens | yes |
| | 32. Michael Gribas, Ministry of Agriculture, General Directorate of Fisheries, Department of Aquaculture | no |
| | 33. Stephanos Ioakimidis, Agricultural Bank of Greece, Directorate of Animal Production, Department of Fisheries, Athens | no |
| | 34. Michael Kotsolios, Ministry of Agriculture, General Directorate of Fisheries | no |
| | 35. Ministry of Agriculture, General Directorate of Fisheries, Department of Fisheries Applications, Acharnon | no |
| | 36. Anastasios Panopoulos, Agricultural Bank of Greece, Directorate of Animal Production, Department of Fisheries, Athens | no |

| | | |
|---|---|---|
| **Norway** | 37. Trond Bjørndal, Centre for Fisheries Economics, Norwegian School of Economics and Business Administration, Bergen-Sandviken | yes |
| | 38. Odd Jarl Borch, Nordland Research Institute, Bodo College, Bodo | no |
| | 39. Jan Davidsen, NORUT Samfunnsforskning as, Tromsø | no |
| | 40. Fiskeridepartementet, Oslo | no |
| | 41. Havforskningsinstituttet, Fiskeridirektoratet, Bergen | no |
| | 42. Bjørn Henriksen, Norsk samfunnsvitenskapelig | yes |
| | 43. Datatjeneste NSD, Bergen | no |
| | 44. Bjørn Hersoug, Norwegian College of Fishery Science, University of Tromsø, Tromsø | yes |
| | 45. Arne Kalland, Centre for Development and the Environment, Oslo | no |
| | 46. Knut Bjørn Lindkvist, Department of Geography, University of Bergen, Bergen-Sandviken | no |
| | 47. Lomelde, Fiskeridirektoratet, Bergen | no |
| | 48. Åge Mariussen, Nordlandsforskning, Bodø | no |
| | 49. O. Svein Olsen, Norwegian Inst. of Fisheries & Aquaculture, Universitetsomrad, Tromso | no |
| | 50. Statistisk sentralbyrå, Oslo | no[b] |
| **Spain** | 51. Sr.D. Fernando Alvarez Blázquez, Subdirector de Acción Social Maritima, Instituto Social de la Marina, Madrid | yes |
| | 52. Sr.D. Juan M. García Bartolomé, Director de la Revista Agricultura y Sociedad, Ministerio de Agricultura, Pesca y Alimentación, Madrid | yes |
| | 53. Dª María Luisa Boned Correa, Servicio de Información Estadística, Instituto Nacional de Estadística, Madrid | yes |
| | 54. Ministerio de Agricultura Pesca y Alimentación, Secretaría General de Pesca Marítima, Madrid | no |
| **United Kingdom** | 55. R. Allan, Scottish Fishermen's Federation, Aberdeen | no |
| | 56. Russel Bradley, Association of Sea Fisheries Committees, Malton | yes |
| | 57. David Brew, Scottish Office Agriculture, Environment and Fisheries Department, Fisheries Statistics, Edinburgh | no[c] |
| | 58. Barrie Deas, National Federation of Fishermen's Organisations, Grimsby | yes |
| | 59. A.G. Kuyk, Ministry of Agriculture, Fisheries and Food, Fisheries Division 1, London | no |
| | 60. Peter McGill, Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh | yes[c] |
| | 61. B. Neil McKellar, Feru Seafish, Edinburgh | yes |
| | 62. W. Hall, Ministry of Agriculture, Fisheries and Food, Fisheries Statistics, London | yes |
| | 63. The Secretary, Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh | no[c] |

Notes: * - As the funding body, the Commission chose not to offer comments as a matter of policy
a - response received via two Parliamentary constituents, the Scottish Fish Merchants Federation (R. H. Milne) and the Aberdeenshire Council (Jamie Bell)
b- letter forwarded to Directorate of Fisheries, Bergen
c - The response from P. McGill represents the replies from all Scottish Office consultees