

Recent developments in the ASFIS programme

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Introduction.

It will soon be seven years since SEAFDEC hosted the seminar: "Fisheries Information Science in Southeast Asia" (Bangkok, August 1982). As far as I have been able to ascertain, it remains the only seminar dedicated to the broad spectrum of fishery information problems at regional level ever held anywhere in the world. Those of us who participated in that seminar are very much indebted to SEAFDEC for the important initiative.

Although it was my first visit to this region, I had long been in correspondence with several of the other participants, and had held discussions with a few of them on their infrequent visits to and through Rome, almost invariably in some other connection. Uppermost in my mind as I returned to Rome was how much time we had lost, prior to the seminar, due to the lack of even the modest resource needed to "get something moving". Perhaps because fishery industries offer a much smaller potential contribution to overall economic development, fisheries development has been, historically, very much the poor cousin when compared with, for example, agriculture and forestry. And in most sectors information programmes have long been seated on the bottom rung on the scale of budgetary allocations.

But as the expression "fisheries exploitation" is being increasingly replaced by "fisheries management" in official statements, so even fisheries information activities should assume more respectability and thus deserving of higher levels of support. For "management" in its manifold aspects is, by its very nature, the assembly, processing and analysis of assorted kinds of information.

Much has happened in Southeast Asia since that 1982 meeting. This is manifest not only in the steadily growing number of outputs that you have kindly sent to Rome, and what I have read in your various newsletters and in exchanges of correspondence, but also what this reflects - namely, a growing confidence that your efforts are bearing fruit. I look forward to discussing with you details of your

achievements, your problems and your plans during the course of this week. Meanwhile, in this paper I shall outline recent developments in FAO fisheries information programmes, with particular reference to the core activity of special interest to participants in this seminar, namely ASFIS - the Aquatic Sciences and Fisheries Information System.

#### Trends in the Fisheries Department of FAO

Visitors to FAO during the last 7-8 years will have noticed a growing preponderance of people sitting in front of microcomputer keyboards and monitors at the expense of people working with pencil, paper, calculators - the traditional office environment. This, of course, does not reflect a change in the FAO Regular Programme which, in accordance with the Organization's mandate, retains its major functions as a clearing house for agricultural information. Rather it reflects a change in the manner in which the programme is implemented, through ever increasing application of modern information technology.

The change-over is not uniform throughout the Fisheries Department. It is most evident in the Fishery Resources and Environment Division where microcomputers are used, inter alia, in software development, the analysis of stock-assessment data, modelling, converting remotely-sensed data into a geographically referenced database and the creation of a machine readable species catalogue. It is least evident in the Policy and Planning Division for the obvious reason that there are fewer potential applications. Between these two we find the Fishery Industries Division where the major applications are the marketing information database "Globefish", which is undergoing transformation to microcomputer environment, and the development of computerized registers of equipment and suppliers under the auspices of a UNDP project entitled "Clearinghouse for Fishery Advisory Services".

I note these developments here simply to inform you that FAO is establishing a basis from which it will provide a growing volume of information - data sets and software - in machine readable format, to those institutions with the requisite hardware and know-how. The clearing-house functions of the Organization should thus be significantly enhanced, though matters of policy and copyright, and problems such as abuse of proprietary packages and eventual interpretation of machine readable data in such large scale dissemination are yet to be clarified.

The core information activities of the Fisheries Department remain the responsibility of the Fishery Information Data and Statistics Service - FIDI - where microcomputers are increasingly supplementing FIDI's traditional use of the Organization's mainframe computer, for, inter alia, the maintenance of FISHDAB - the Fisheries

Statistical Database, and its access to external databases via telecommunications networks. Thus, a microcomputer system is being used for the development of a Fishery Investment Project Information System (FIPIS), and a micro-CDS-ISIS based system is being evaluated for the exchange of machine-readable bibliographic information. Publications in the ASFIS Reference Series are now being prepared on microcomputer to facilitate updating and their enhancement through the use of word-processing/desk-top publishing software. These positive developments in the work of FIDI are, however, accompanied by developments in the information industry which are forcing us to re-examine the direction in which the ASFIS programme has been moving.

#### ASFIS update

You must surely all know that ASFIS is the name we have given to a modular information system for the collection and dissemination of information on all aspects of the science and technology of marine and freshwater environments, including socio-economic and legal aspects. Details on the evolution of the system were presented at the 1982 seminar, and have been the subject of many other papers prior to and since that seminar.

In terms of resource involved, the most significant module of ASFIS is the bibliographic database, the monthly updates to which are published in print-format as ASFA - Aquatic Sciences and Fisheries Abstracts. Since the 1982 seminar, access to the database has been broadened through its leasing by two more database vendors, the European Space Agency located at Frascati, Italy, and BRS Information Technologies located at Latham, New York. Thus the database can now be interrogated world-wide via telecommunications through six suppliers located in five countries - Canada, France, Germany F.R., Italy and the United States. In Mexico, the database is accessible in a national on-line system supplied by Servicio de Consulta a Bancos de Informacion - SECOBI. It is also the basis of national SDI services in Canada and Spain. Before too long, it is expected that Japan and the Soviet Union will be added to this number, which then must surely be approaching an information-industry record.

Perhaps more significantly for participants in this 1989 seminar is the fact that the portion of the database published from 1982 onwards is now available on CD-ROM (Compact Disk, Read-only Memory) together with search software. This medium, which can be searched on microcomputer, eliminates the need for access to and the expense of telecommunications facilities. Although subscription to the CD-ROM version costs only little more than the print-product, it is a hard currency cost, at present beyond the means of many potential users in developing countries. However, the technology is quite new; further advances and broader acceptance should reduce costs substantially, as indeed has already happened in the compact disk music industry.

The network of centres contributing input to the database continues to expand. After a short absence, Japan has now rejoined the partnership, as was anticipated in 1982. Norway is now participating individually, but strong interest in Denmark holds out the promise of a Scandinavian network. The People's Republic of China has been contributing at a growing level during the past three years, and is in process of organizing a national network of fisheries and marine science institutions to further enhance coverage of Chinese sources. IMSTI, the Chinese "Institute for Marine Scientific and Technical Information", is using the CD-ROM as a basis for some of its information services. Agreement has recently been reached with Cuba, and by twinning the Cuban "Department of Fishery Industries" with the long-experienced ASFIS centre in Mexico, the eventual provision of input should be facilitated and enhanced.

Institutions in many other countries have expressed an interest in associating themselves with the ASFIS programme, some of them multinational/regional bodies such as the Baltic Sea Commission, the prestigious International Council for the Exploration of the Seas (ICES), and the recently established Pacific Islands Marine Resources Information System (PIMRIS), a cooperative venture of the University of the South Pacific, the South Pacific Commission and the Forum Fisheries Agency. We are deeply gratified by this growing recognition of the system. But problems of an unexpected nature have recently surfaced, and these are causing us to re-examine the concepts under which ASFIS has evolved to its pre-eminent position.

There is no question that, heretofore, the economic viability of ASFIS has been positively influenced by two factors which are unique to the system. First is the fact that in a single database can be found good coverage of the literature dealing with all aspects of the science and technology of the aquatic environment; this is certainly what the major users of the database have deemed beneficial. But, of course, we recognize that most of the major users are in industrialized countries, where research programmes are much more extensive than in the Third World. The second factor has been the involvement of a commercial publisher who, on the promise of a fair return on his investment, has borne the major responsibility for marketing the ASFIS products, and keeping the system abreast of advances in information technology, such as CD-ROM.

Unfortunately, however, as the information industry has developed and diversified in recent years, ASFIS has reached the point of diminishing returns. The growing problem was described in a recent article in "NACA - the ICLARM Quarterly" (Freeman, R.R., Bibliographic coverage of the growing fisheries literature in ASFA. NACA, January 1988, p.5). In summary, the existing partnership generates some 32000 records per year, but it appears to be impossible to sustain publica-

tion of more than about 25000 records per year on the income derived from subscriptions. The cost of subscription to the products has reached the limit that the specialized market can bear. Increasing this cost is counterproductive since it leads to cancellation of subscriptions. Narrowing the scope would detract from a feature which has led to the broad acceptance of the database among its present users. Certainly increased use of the database "on-line" to large-scale vendors, and on compact disk, has jeopardized subscriptions to the print-product, but we can hardly protect the conventional medium at the expense of taking advantage of new technology.

Consequently, FAO has had to recompense the publisher for the diminishing return by accepting a fairly substantial increase in the contractual cost of producing a comprehensive database, and this situation has emerged at a time of unprecedented financial crisis in FAO. While there are signs of recovery from this crisis, we do not envision any substantial increase in the ASFIS budget in the next few years. Conversely, a significant increase in the growth-rate of the database is in the offing. The potential levels of input from new centres and the proliferating marine science literature in regions already covered suggest growth leading up to a total of perhaps 40000 records per year about five years from now. Clearly, unless greater economies of scale can be realized, and at present this cannot reasonably be envisioned, then the original expectation of running an economically viable information system covering all aspects of aquatic resources and environment, and with equity for all participants, can no longer be realized.

#### A Fishery Development Information System?

In seeking a palliative for this difficult situation it appears that the most viable of the available alternatives will be to develop a subprogramme, or sister-programme, focussed on information products to meet the needs of developing countries for the development of their fisheries. A combination of circumstances lead to this conclusion:

- (1) The broad subject scope which has led to such wide acceptance of the database in developed countries, is less relevant to the needs of the majority of potential users in developing countries. There, the major interest lies in fisheries development.
- (2) In recent years, citations relevant to fisheries development per se have been diluted by the more rapidly growing volume of citations in other areas such as the biology of aquatic organisms, pure marine science and non-living resource aspects. Thus the increasing cost of subscrip-

tion has not been matched by a proportionate increase in access to literature relevant for fisheries development. This puts the major interests of developing countries at a disadvantage; ironically, it also handicaps FAO's major programmes of action resulting from resolutions of the FAO World Conference on Fisheries Management and Development, and the deliberations of FAO's governing bodies.

- (3) Growth in the volume of fisheries-development relevant material entering the database will inevitably result from the growing participation of developing countries in the system. But institutions in developing countries certainly need cheaper, less diluted, access to these sources than appears feasible through the constraints under which the system is now developing. This suggests South-South information transfer on topics of special interest to the South to keep the need for North-South transfer to a minimum.
- (4) Finally, to implement the action programmes mentioned above in a reasonable time-frame, we must accelerate the participation of developing countries. But experience is teaching us that the stringent requirements which have lead to the broad acceptance of the SAFIS bibliographic database are not so quickly met in most developing countries - for instance, the requirement for an English language abstract when a large part of the developing country literature carries no abstract whatsoever, and the quite sophisticated indexing needed to facilitate retrieval from a comprehensive database when simpler indexing would suffice for a more sharply focussed database.

Thus accelerated participation of developing countries will have to be founded on a simpler approach which can be progressively amplified to higher levels of sophistication as infrastructure develops and experience accrues. What should be the scope of "fisheries development" in the developing country context? There are a number of ways of looking at this problem. The FAO action programmes emphasize small-scale fisheries development, reduction in post-harvest losses, fisheries planning and management, and the socio-economic aspects of fishing communities. Bearing in mind that most developing countries lie within the tropics, a broader view would include all aspects of tropical fisheries. An alternative definition might well be all aspects of fisheries development and management - that is, the information needed to develop and sustain a viable fishing industry. Your advice on the question of scope and the priority areas for a phased implementation, would be most welcome.

The basis of a fisheries development database is already embedded in the existing ASFIS bibliographic database. On average one thousand records per year dealing with various aspects of artisanal/small scale fisheries could be filtered from the existing flow of input. The collective total of citations dealing with other areas of interest surely adds several hundreds more. Through simplifying the input requirements your accrued experience here in Southeast Asia could add several hundred more records per year in short order, and PIMRIS may very well be able to deliver basic bibliographic information within a relatively short time frame. Evolving systems in Africa and Latin America will have inputs.

Whereas a mainframe computer is needed for the creation of the existing ASFIS bibliographic database, a microcomputer system would be sufficient to develop the envisaged subsystem. Micro-CDS-ISIS software is appropriate and already widely used. Print-products could be processed through desk-top publishing software and distributed at a relatively low cost. Periodic updates to the machine readable version could be distributed on diskettes. It is perhaps not a forlorn hope that much of the work could be carried out in a developing country institution to take advantage of lower costs as well as develop indigent expertise with modern information technology. In other words, the operation would develop rather as a field project than an FAO Regular Programme activity. As such, it should be possible to obtain "seed" support from donor agencies. One of the most serious constraints under which the ASFIS programme has evolved has been the almost total lack of extrabudgetary support, for it is not within the mandate of most donor agencies to directly support a core and continuing Regular Programme activity such as ASFIS.

In summary, we believe that a global database and corresponding print-product relevant to the needs of fisheries development will be an important adjunct to the existing ASFIS database to the user community in developed countries, and to the evolving regional systems such as SEAFIS and PIMRIS in developing countries. On scientific/technical grounds, it is difficult to justify a separate database; indeed cynics might view this proposal as a manifestation of the widening gap between North and South. But we live in a world where economic realities have to be faced - in this case the fact that ASFIS can no longer develop as a comprehensive system without rapidly escalating costs that put its products and services further beyond the reach of the vast majority of institutions in developing countries.

The ideas presented in this paper offer a potentially viable alternative. But at present they are only ideas. I should be grateful for your frank opinion and your suggestions so that this time around, as I return to Rome, I shall hopefully not feel that we are again losing valuable time.