SYMPOSIUM ON
'STATUS OF STATISTICS OF INLAND FISHERIES
AND THEIR DEVELOPMENT IN INDIA':

CHAIRMAN : DR. A.V. NATARAJAN[1]

CONVENERS : SHRI K.K. GHOSH[2]

DR. A.K. SRIVASTAVA[3]

The symposium was held during 33rd Annual Conference of the Indian Society of Agricultural Statistics at Kerala Agricultural University, Trichur on December 21, 1979 under the chairmanship of Dr. A.V. Natarajan, Director, Central Inland Fisheries Research Institute, Barrackpore. Welcoming the delegates to the Symposium, Dr. Natarajan briefly discussed the status of knowledge on statistics of the inland fisheries in the country. He expressed his concern at the gross inadequacy of basic data on inland fisheries for planning and development. He stressed the point that there has been no organised attempt based on sound principles of data collection to build up a meaningful acceptable data-base on Indian inland fisheries. The result is that neither the resources are known in terms of extent of coverage or characteristic features nor levels of utilisation and exploitation and the catch coming from them. Similar picture also is come across in regard to the data on trade practices, engagements and socio-economic condition of the fishermen and other secondary personnel involved in the occupation of inland fisheries. He said that time and again attention has been drawn to the lack of proper data-base of inland fisheries. Little has, however, been done to overcome the problems and create an infrastructure to collect the data. He, therefore, invited the participants to put their knowledge towards building a realistic and pragmatic approach for collection of data on inland fisheries in future, keeping in view the diversity of the problems involved. Development planning in land fisheries at national level has gained importance of late, in view of the major developments in aquaculture technologies for stepping up inland fish production. He,

1. Director, C.I.F.R.I., Barrackpore.
2. Scientist, S-2, C.I.F.R.I., Barrackpore.
3. Scientist, S-2, I.A.S.R.I., New Delhi.

therefore, stressed that while rigidity of data collection may be engaging the minds of statisticians, the field situation and the requirements of data specific to fisheries developments planning and resource management should not be overlooked. The resources data as well as the utilisation and exploitation statistics have to be so classified that the resource aquaculture system identification is possible and data meets the twinneeds of planned development and evaluation of progress. He said that time has come to identify the capture resources as distinct from culture resources and accordingly their input and output should be separately classified.

11 papers were contributed to the symposium out of which only 7 were actually presented whereas the abstracts of the others were made available. Before the participants presented their papers salient features of all the contributed papers were briefly summarised by one of the conveners. Summaries of the contributed papers are given below :

Current Status of Inland Fisheries Statistics

BY

By K. KUMAR[4]

In this paper, role of the Centre and of the State Governments has been discussed in collection of the data on various aspects of fisheries. This also discusses the organisational structure that has been set up during fifth five year plans in pursuance of the recommendations of the working group. Briefly, the studies carried out by the Indian Statistical Institute, the National Sample Survey Organisations and other agencies in State Governments have been summarised together with the main objectives, observations and the recommendations. Paper also points out the gaps in information available regarding fishery resources, nursery areas and fish farms, fish seed production etc.

Estimation of Catch of Fish from Impounded Water Units :
An Appraisal of Data Collection Techniques and Sampling
Procedures Adopted in Different Surveys

BY

A.N. GANGULY[5] AND PAUL JACOB[6]

This paper gives the details of the three surveys carried out by the Indian Statistical Institute, Directorate of National Sample

---

4. Asstt. Commissioner (Fisheries), Department of Agriculture, Govt. of India, Ministry of Agriculture and Irrigation, New Delhi.
5. National Sample Survey Organisation.
6. National Sample Survey Organisation.

Survey and National sample Survey Organisation to evolve suitable sampling techniques for estimation of catch of fish from impounded water units. It critically appraises the 'techniques of data collection' and 'Sampling procedures' adopted in these three surveys with a view to examining the suitable and practical methodology that could be adopted in future large scale surveys of the two methods for collection of data on catch of fish from impounded water units, the method by physical observation of the catch is theoretically more reliable than the other method of obtaining information by interviewing the owners/operators of the impounded water units about the catch made by them in these units. But it is extremely difficult, if not almost impossible, to adopt the former method. On the other hand the latter method of collection of information by interview technique may yield fairly reliable information with the help of trained investigators. The surveys by NSSO leads to specific conclusion that impounded water units should be selected as the ultimate units from which catch data are to be obtained. These units should be physically verified on the spot but catch data from them should be obtained from the owners/operators of the water units by the method of enquiry. For such enquiries, in sampling villages, two village clusters seem to be more appropriate than a sample of single village taking into consideration the cost, workload etc.

Ident ification of Data Requirements on Inland Fisheries and Techniques for Their Collection

By
K.K. GHOSH[7]

The existing stastistics on inland fisheries of India are examined for methods and frequency of collection, classificatory details for utility, reliability and sufficiency in meeting developmental needs. It is shown that there is no organised method or frequency of collection classification is too ambigious and of no fruitful purpose for developmental planning and progress evaluation. The inherent contradictions in data point to the very low quality and reliability. Data on many items of high importance are lacking.

Keeping in view the recently developed high yielding aquaculture systems and technologies of seed production which form the backbone of inland fisheries developmental planning, effort is made to identify the basic minimum of data requirement to meet the demands of priority areas of developmental planning and evaluation of

7. Scientist, S-2, C.I.F.R.I., Barrackpore.

progress of the inland fisheries of India. To remove ambiguity, unequivocal definitions of items of particular interest of fisheries are provided.

The field situations obtaining in India and the experiences of developing sample surveys for estimation of resources and catch are briefly discussed to suggest a possible line of approach for developing a viable inland fisheries statistics system for India.

The paper indicates the role that the available machinery for data collection in the country, such as NSSO, Directorate of Marketing and Economics, State Statistical Bureaus, etc., can play in meeting the needs of collection of required data. The advantage of including aspects of data collection on aquaculture within the schedules of decennial agricultural census and by enlargement of schedules of land utilisation survey are discussed.

Surveys for Estimation of Resources and Catch of Inland Fisheries

By

O.P. KATHURIA[8], PRANESH KUMAR[9] AND S.K. RAHEJA[10]

The paper, besides giving a brief review of the past surveys discusses some salient results revealed by the survey "A pilot sample survey for estimating the resources and catch of fish in 24-parganas of West Bengal" undertaken by the IASRI and the CIFRI.

The broad objective of the survey are (i) to evolve a suitable sampling methodology for estimating resources and catch of inland fish and (ii) to study the prevailing practices of pisci culture.

The impounded water area in 24-parganas district comprises mainly of ponds. About 3.35 per-cent of the area of the sampled villages was observed to be under ponds at the time of visits. The maximum reported area under ponds was 3.65 per cent during the monsoon which was approximately the same as the are a given in revenue records and the minimum was 2.31 per cent during summer months. On an average there are 42 ponds per village. The average area per water unit in the district was worked out as 0.22, 0.27 and 0.17 acres respectively at the time of visit, during monsoon and summer. About 44 per cent ponds recorded catch throughout the year while 55 per cent recorded catch during summer months only. The perennial water units prepondrate (94%) in the district with 3.3

8. Scientist S-3, I.A.S.R.I., New Delhi.
9. Scientist S-1, I.A.S.R.I.. New Delhi.
10. Scientist S-4, I.A.S.R.I., New Delhi.

per cent of them being operated for 9 to 12 months and the remaining for less than 9 months. In a majority of the ponds (98%) ordinary culture technique was followed while composite culturing was done in only 2% of them.

Similarly, 61 per cent ponds were used for stocking 37% for nursery cum stocking and the remaining 2 per cent used as nursery ponds. Type of stocking used was fingerlings in 54% ponds, fry in 40% and spawns in the remaining of 6% ponds.

No catch estimate could be provided in the absence of the data on catch aspect.

It was suggested that the estimates of fish stocking in the ponds or tanks together with the estimated area of ponds or tanks should form a reasonable basis for estimating the catch. The possibility of combining physical observation based on small sample and enquiry method based on larger sample for obtaining estimates of catch from ponds and tanks has been suggested.

Inland Fisheries Statistics—Present Status and Requirements

BY

K. ALAGARAJA[11]

In the annals of sample surveys designing a sampling scheme for the estimation of inland fish catch with required precision in India still remains as one of the most challenging problems.

In capture fisheries estimation of stocks of exploited and commercially important species requires lot more attention than that at present bestowed on it.

In culture fisheries determination of optimum yield and carrying capacity of a water body involves study of a number of factors at different levels. Design of experiments as we conceive in agricultural and other experiments may not be able to help us as ponds differing by a 'bundh' only, do show wide variations in their yields even when all other conditions are scrupulously kept constant. Present studies are capable of touching atmost the fringe of the problem. System analysis and simulation process is required to be taken up.

'Environment polluted'—'Ecosystem affected' are some of the warnings echo from all parts of the globle. Determination of application factor in some of the affected water bodies have already been

11. Scientist S-2, C.M.F.R.I., Cochin

done. Mapping out of the regions of pollution, the level of pollution and the remedies required may be taken up using latest statistical techniques available in Bioassay studies.

Blending culture and capture fisheries has thrown open wide horizon for vast improvement in fish production. For tapping of wild resources for feeding seed starving water areas at cheaper rates, work done so far may be enlarged to extensify the area of studies and intensity in the form of application of statistical techniques so as to obtain sustainable seed yield without affecting fish catches from these areas. Aclimatization of acceptable species in different environments and their level of adoptability using bioassay techniques may be strengthened.

Sustainable yield, available from some of the reservoirs particularly Rehand in U.P., where blending of capture and culture fisheries techniques have been applied, requires statistical studies for extension of the same to other areas also.

Statistical tools existing and being developed for study of fish stocks may be made available to all interested workers through a series of training courses.

Sampling Techniques Tried For Estimation of Inland Fish Production in Maharashtra

By

S. G. NEMAVARKAR[12]

In this paper, the method of estimation of inland fish catches which is presently practicised in Maharashtra State is described. Further, it gives the brief account of the pilot surveys conducted to estimate the fish catches in 1972 and 1977. During 1972, the Directroate of Fisheries adopted observation method for data collection in Kolhapur and Chandrapur districts and observed that the results obtained under this survey showed an improvement over those obtained by using the impirical formula. However, it was suggested that the estimates could be further improved by increasing the sample size. In 1977, the Directorate of Economics and Statistics undertook the survey in all the districts of the State with a view to estimate inland fish production. In this survey, two stage sampling design, where the first stage units were selected by circular systematic sampling with PPS and the second stage units by SRSWOR, was adopted. The selection was done

---

12. Directorate of Fisheries, Maharashtra.

independently in each district. The data are under analysis and the results when available will determine the suitability of the sampling design.

Inland Fisheries Resources of Tamil Nadu

BY

A. S. SREENIVASAN[13]

This paper deals in detail with inland water resources, fish resources, fish seed resources and requirement of fish seed in Tamil Nadu. The cultivable species, criteria for selection of fish for culture and brackishwater aquaculture, in the State are discussed in detail. Further, the economics of fish culture in agricultural farms and the need for conserving the water resources for fish culture have been studied.

Problems of Assessment of Inland Fisheries Resources of Karnataka

BY

M. JAYRAJ[14] AND D. H. RAJANNA[15]

The paper discusses the status of inland fisheries resources and the problems in estimating these resources as well as the total catch from them in Karnataka state. On the basis of past experiences it appears that a large number of framed personnels like supervisors, enumerators etc. will be needed to assess the inland resources and the catches from them. The Directorate of Fisheries of Karnataka State in collaboration with the Bureau of Economics and Statistics has decided to conduct a pilot survey to study the inland fisheries resources and estimation of yield rates in Dharwar and Shimoga districts of Karnataka State.

Assessment of Inland Fisheries Resources
Directorate of Fisheries, Andhra Pradesh, Hyderabad.

This paper points out the lack of appropriate data on inland fishery resources available in the State and emphasises the need for assessment of inland fisheries resources. Stress is being given upon definning clearly the concepts and definitions based upon the technical and non-technical data. Under the present circumstances, data collection on fisheries statistics could be included in the scope of the

---

13. Joint Director of Fisheries, Madras.
14. and15. Directorate of Statistics, Bangalore.

land utilisation survey which is carried out by Directorate of Statistics and then the steps could be taken up for conducting pilot studies in all the States with the cooperation from Central Institutes and the States Fisheries Departments.

Assessment of Inland Fisheries Resources

BY

Y. R. TRIPATHI[16]

This paper exposes some of the problems in estimating the fisheries data like manpower, gear, species composition, total catch etc. from various resources such as rivers, lakes, reservoirs and village tanks. In case of rivenine fisheries the fishing parties move from place to place along the river and bring their catches to certain landing sites where facilities for transport are available. Due to variable nature of fishing parties, their gear and landing sites, it is not possible to get correct data on any of the items of rivenine catch. The data collected by Allahabad Sub-Station of CIFRI at two fixed landing sites near Allahabad and at Bhagalpur have provided certain trends in fish catch for a period of more than two decades.

In reservoirs, the fishing is done mostly under the control of the fisheries department, where all the data on manpower, gear, species composition and total catch are available. The collection of data on fish production from village tanks poses certain problems, Tanks are scattered all over the village sites. They vary in size depth, productivity of soil and production. In many places, the total water, the number of tanks, weather seasonal or perinnial is also not known. The tanks which were perinnial in the past have become seasonal because more water is taken outof them for purposes of irrigation even though fish culture is done in them. This results in less fish production.

The paper presents case study of a scheme which was taken up a Basti district during 1974-75 by the fisheries department.

Economic Aspects of Inland Fisheries of India

BY

P.S. RAO[17]

In this paper on the basis of Secondary data from different Sources, various economic aspects of Inland fisheries have been

16.   Director of Fisheries, Government of Uttar Pradesh, Lucknow.

17. Professor of Fisheries Economics and Head of the Division Central Institute of Fisheries Education. Ministry of Agriculture, Government of India, Bombay,

studied. Comparisons have been made on year-wise inland fish production (1967-76) marine fisheries, Inland fish capture fisheries and inland fish farming ; various inland fishery resources of India etc. Some of the fish production systems developed by CIFRI to raise fish production during the last two decades have been mentioned. On the economic grounds it is shown that the adoption of new technique is beneficial to the farmer.

In the discussion Dr. G.R. Seth raised the question that time and again, starting from coordination Committee on fisheries statistics, recommendations have been made for improving the inland fisheries statistics. However, little appears to have been done so far. He was of the opinion that it is necessary to first realise the malady why it is difficult to implement the recommendations of the earlier symposia/ Conferences seminars and specially appointed committees of the Government. He suggested that a working party of a few experienced inland fisheries statisticans, representing the Union Ministry of Agriculture (Department of Fisheries), selected State Government (Directorates of Fisheries), National Sample Survey Organisation, IASRI and CIFRI may be constituted by Government of India to look into the recommendations made from time to time, assess their feasibility of implementation, work out a minimum feasible national programme for implemetation by all States/Union Territories and estimate the likely resource requirement for implementation. They may also identify specific gaps of knowledge and suggest time bound programmes for filling the same. The Government may take further action in the matter.

Some of the important points which emerged in the discussion were that sufficient data on various aspects of fisheries presently existed in some or other form with the State Fisheries Directorates. It was possible to organise this into a meaningful set through adoption of uniform performance and compilation. Enlargement of the schedules of the various national level data collection systems could help in providing basic, resource data at compartively very low cost. Quoting the NSSO experience, Shri Paul Jacob felt that an enquiry method could only be feasible within permissible costs for collection of data on inland fish catch. The symposium recommended the following :

RECOMMENDATIONS

1. A National Working Party on inland fish catch statistics may be constituted by Government of India comprising experienced inland fisheries statistician representing fisheries division of Ministry of Agriculture, NSSO, IASRI, CIFRI and from amongst the State

Fisheries Directorate/Department. This Committee may be changed to formulate uniform national proformae for collection of inland fisneries statistics for such items on which it is believed that fairly accurate data are presently available. The Working Party may also examine the recommendations of the various Committees, Symposia, Pilot Survey, etc., so as to assess their suitability for adoption and identify a minimum programme alongwith its resource requirement interm of manpower and operational costs. They may take into account the available manpower for collection of data at State/Union territory level.

2. With the development of aquaculture techniques for inland waters, it is essential that there adoption rates, constraints in adoption, input availability, manpower needs, etc, be estimated quantitatively. Therefore, it is recommended that a coordinated research/survey programme be worked out by IASRI and CIFRI for joint implementation with the active participation of different State Fisheries Directorates and other bodies controlling fish culture programme on more or less the same basis as the high yielding varieties programmes is being evaluated by a National Coordinated Programme at IASRI.

3. Adequate Statistical staff may be placed in the State Department of Fisheries without any further delay.

4. Assessment of Capture fisheries resourecs may be taken up in a phased manner by the proposed Resource Assessment Division of the CIFRI. For implementing such surveys, concerned State Governments may be provided necessary facilities of the operation.

5. The expertise available at IASRI on assessment of cost of production of animal products and statistical genetics may be utilised in fisheries research/evaluation programmes on the subjects.

6. Coordinated programme approach for estimating economic statistics of the inland fish production and trade from different types of resources and through different culture systems may be adopted, depending on the expertise on the subject available. Such a coordinated programme could help in building up demand functions for inland fish as well as for inputs required for the production of the same.