

# Future Threats and Opportunities in Finnish Fisheries - A Study to Build up a Regular Follow-up Data Collection

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**Abstract:** The transition from a producer-oriented to a consumer-oriented society has created numerous new demands for food products. New food trends, such as lightness, safety and healthiness, as well as the ecological aspects of products concern fish, too. The outlook of the entire production chain needs to be clarified to enable producers to react to new consumer demands. The general idea in this study was to analyse consumers' and producers' opinions regarding fish products and the production environment simultaneously. Items measured were future threats and opportunities in the fisheries sector and fish consumption habits. A pilot survey was conducted in 1999. Collection of countrywide data was started at February 2000, when the sample size was expanded to include 2000 consumers and 350 enterprises. Data were collected with computer-based phone interviews. The results on enterprises are divided into fishing, aquaculture, processing, wholesale and retail trade. In this study the sample of consumers are approached as a whole. Both fisheries enterprises and consumers outlooks towards Finnish fisheries were rather confident. The outlooks for essential threats and opportunities inside the fisheries sector were quite unanimous. The reliability of the results is discussed.

**Keywords:** survey, consumption, fishery industry, fish markets

survey was targeted at the entire chain of supply and demand in fisheries. Fishing, aquaculture, processing

## 1. INTRODUCTION

In the previous studies in Finland, fish was considered to be a product of high quality and good taste. Although general opinions were quite unanimous, marked differences exist between age groups and socio-economic groups (Honkanen et al. 1998). In the long run, consumption behaviour is determined by attitudes and customs. In the short term, behaviour can be influenced by several factors, i.e. product image, product development, news of the health of the product and price of the product.

and the wholesale and retail trade represented supply; demand was represented by consumers. Consumers and enterprises were asked simultaneously to give their opinions on the outlook for fisheries.

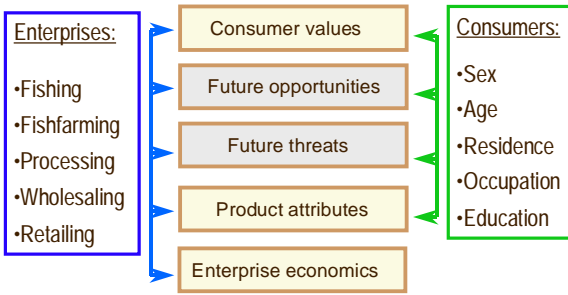
New food trends, such as lightness, safety and healthiness, as well as the ecological aspects of products concern fish, too. Information about the basic requirements and desires of consumers is needed for product development and marketing. Information on consumers' and enterprises' perceptions of their environment are of vital importance for policy makers. It is essential to be aware what are the fundamental differences in the fisheries supply and demand chain.

A barometer survey aims to collect data that are reliable and comparable in the long term. To assess the quality of the survey system in advance the process was divided to three subjects. Firstly the content and intelligibility of questionnaire was tested by think aloud methods with a test group in a cognitive laboratory. Secondly a pilot study was implemented to test the survey in practice within the target population. Finally, the collection of countrywide data was started.

Therefore the outlook of the entire production chain needs to be clarified to enable producers to react to new consumer demands.

This study is a part of wider project to establish a regular follow-up data collection. The subjects of questions varies from economic prospects of enterprises (Ahvonen and Honkanen 2000) to consumption behaviours. In this paper we have focused consumers and enterprises opinions on the opportunities and threats facing Finnish fisheries. The full analysis frame of regular follow-up data collection is presented at Figure 1.

This study examines the views of commercial fishery and consumers on fisheries and fish products. The



**Figure 1.** The analysis frame of regular follow-up data collection. The darken topics are discussed in this paper.

## 2. MATERIAL AND METHODS

### 2.1 A pilot study

The barometer survey was preceded by a pilot study in which the indicators and the data collection system were tested in cooperation with Statistics Finland (Ahvonen and Honkanen 1999). The indicators were planned making use of the survey laboratory, in which a test group assessed the content, intelligibility and interpretability of the form with a cognitive pre-test (cf. Willis 1994, Sudman et al. 1996). A qualitative validity analysis for the question attributes was also implemented (Godenhjelm et al. 2000).

After the indicators had been developed, the whole data collection system was tested by interviewing 53 entrepreneurs and 425 consumers in southern Finland (Ahvonen and Honkanen 1999). Since the consumers were interviewed in the course of the consumer survey conducted by Statistics Finland, the information system developed for that survey over several years could be made use of here, too. The results of pilot study are not directly comparable with those of the barometer survey because the target populations were different in the two cases and because the questions asked in the present interviews were modified in the light of the results of the pilot study. Moreover, due to the small sample of the pilot study, its findings are considerably less reliable than those presented here.

### 2.2 Survey population and sample

The survey population for enterprises consisted of all those fisheries sector enterprises on the business register of Statistics Finland at the beginning of 2000 whose annual turnover exceeded FIM 50 000 (€ 8400). Thus the survey population comprised a total of 1074 firms and entrepreneurs. The sample size was 350. The firms that had ceased operations or that could not be contacted were removed from the sample as overcoverage. The final net sample thus included 299 enterprises, of which 85.6% took part in the interviews. The sample was allocated to fixed quotas to ensure a

sufficient number of observations of all strata (tables 1 and 2).

The survey population consisted of Finns, 15-74 years of age, listed in the Central Population Register at the beginning of 1999. The sample contained 2200 consumers. Those who were deceased or living permanently abroad were removed from the sample as overcoverage (table 2). Comparison of those participating in the interview and the survey population by sex and age group shows that the sample represents the survey population very well (table 3).

**Table 1.** Survey populations, samples, nonresponse and response rates.

	Enterprises		Consumers	
	N	%	N	%
Survey population	1074	100,0	3 885 083	100,0
Sample	350	32,6	2 200	0,06
Overcoverage	51	14,6	8	0,4
Net sample	299	100,0	2 192	100,0
Nonresponse	43	14,4	652	29,7
- no contact	24	8,0	422	19,2
- refusal	8	2,7	197	9,0
- other reason	11	3,7	33	1,5
Response	256	85,6	1 540	70,3

**Table 2.** Sampling fractions of the enterprises (n/N=sample/survey population) and final response percentages by sectors.

Sector	Sampling fractions n/N	Response %
Fishing	79 / 451	85,7
Aquaculture	90 / 249	87,2
Processing	60 / 153	88,7
Wholesale	61 / 82	84,3
Retail trade	60 / 139	81,5
Total	350 / 1074	85,6

**Table 3.** Consumers participating in the study and the survey population, i.e. Finns, 15-74 years of age at the beginning of 1999, by age and sex (%).

Age group	Participating Females	Survey population Females	Participating Males	Survey population Males
15-19	10,5	8,3	8,2	8,7
20-29	15,4	15,8	18,8	16,7
30-39	16,5	18,8	17,9	19,8
40-49	20,6	20,2	20,3	21,1
50-59	17,8	17,5	18,8	17,6
60-69	14,2	13,2	12,6	11,6
70-74	5,0	6,2	3,3	4,4
Total	100,00	100,0	100,0	100,0
N	781	1 953 108	759	1 931 974

### 2.3 Interviews

Consumers and entrepreneurs were interviewed simultaneously by the computer-aided telephone interview system (CATI) of Statistics Finland. Consumers were interviewed in conjunction with the

February consumer survey of Statistics Finland (cf. Statistics Finland 2000) and entrepreneurs separately.

Enterprises and consumers included in the sample were informed beforehand by letter about the interview and its content. The interviews with enterprises were held with a representative of management. The mean interview time for consumers was 11 minutes and for enterprises 14 minutes. The formulation and content of the interview questions followed the general practices of consumer and industry barometer surveys.

### 2.4 Processing and presentation of data

The results for enterprises and consumers were estimated to correspond to the survey population by weighting all the measuring data by the stratum-specific sampling fractions and response probability (nonresponse) at unit level. The weighting coefficients at unit level were calibrated to make the estimated marginal distributions of the age, sex and area of residence of a person correspond to those for the whole survey population, i.e. the population structure. The enterprises were calibrated on the basis of their turnover (e.g. Deville and Särndahl 1992, Deville et al. 1993).

Presentation of survey result needs to be easily accessible, preferably by means of a single measure. The results are presented here as balance figures that basically show the difference between positive and negative percentages.

Balance figures were formed from the weighted percentages of responses. These were obtained by summing the weighted response percentages using the methods generally applied in surveys (e.g. European Commission 1997, Statistics Finland 2000). The values of the balance figures can range between -100 and 100. In the balance calculations the response options were assigned the following weight coefficients:

- Highly probable..... + 1.0
- Fairly probable..... + 0.5
- Don't know..... 0.0
- Fairly improbable..... - 0.5
- Highly improbable..... - 1.0

Following abbreviations are used in figures 2- 21:

- Fish.* = Fishing
- Aqua.* = Aquaculture
- Proc.* = Processing
- Whol.* = Wholesale trade
- Ret.* = Retail trade
- Cons.* = Consumers

## 3. RESULTS

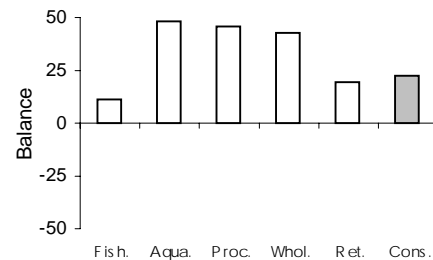
### 3.1 Opportunities for fisheries

Under the heading "Opportunities for fisheries" there is a list of statements believed to describe a favourable trend in fisheries from the point of view of enterprises or consumers in the near future, that is, the next 2-3 years. Not all the statements necessarily apply opportunities to all parties involved.

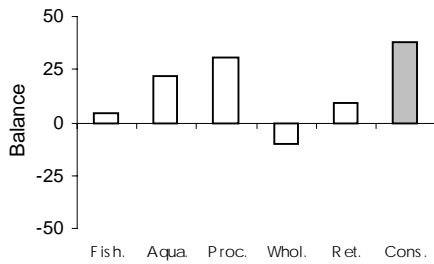
All fishery sectors as well as consumers considered it highly probable that fish consumption would increase in Finland. The belief was strongest among representatives of the wholesale and retail trade. All parties expected the selection of fish products in food stores to increase. As to product groups, enterprises believed most strongly that the supply of new, reared domestic fish species would increase. Consumers considered it more probable than enterprises in general that the supply of organic or eco-labelled fish products would increase. The introduction of new health-enhancing fish products into food stores was generally considered probable (Figures 2, 3, 5, 6 and 8).

Opinions concerning trends in the processing of under-used fish species varied. Fishermen and retailers believed that fish exports would increase in the future (Figures 4 and 7).

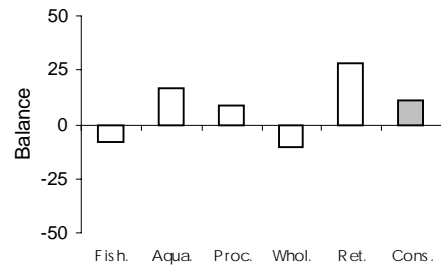
All parties considered it probable that opportunities for recreational fishing would improve in Finland. They all also believed that foreign fishing tourism would increase. As expected, all respondent groups considered it highly improbable that the cost of fishing licences would be reduced (Figures 9-11).



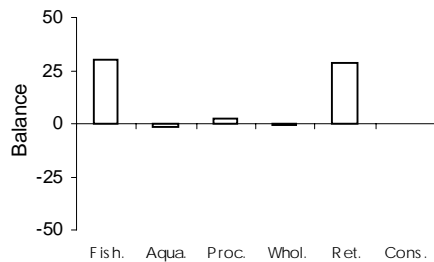
**Figure 2.** "Selection of fish products in our food stores will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



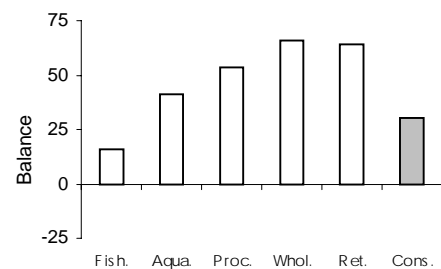
**Figure 3.** "Supply of organic or eco-labelled fish products will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



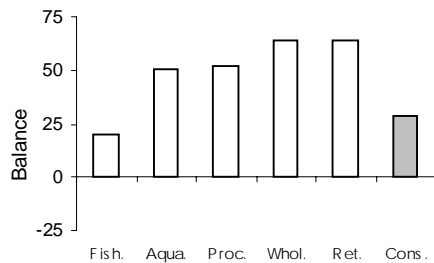
**Figure 7.** "Processing of under-used fish species in Finland will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



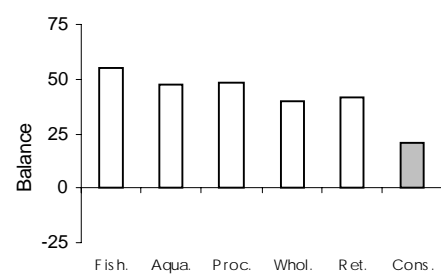
**Figure 4.** "Fish exports from Finland will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



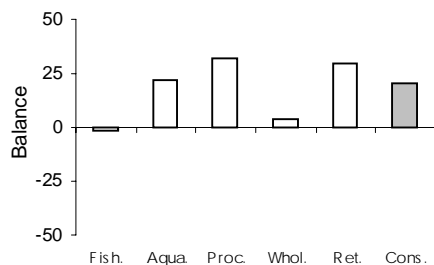
**Figure 8.** "New fish species reared in Finland will become available in our food stores". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



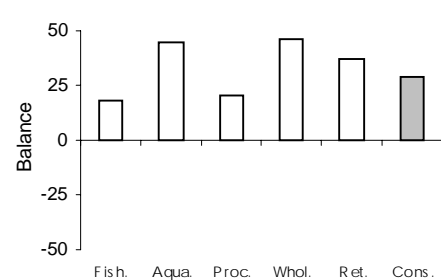
**Figure 5.** "Fish consumption in Finland will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



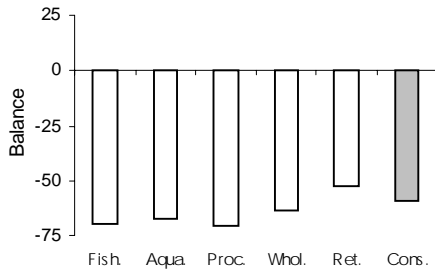
**Figure 9.** "Foreign fishing tourism to Finland will increase". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



**Figure 6.** "New health-enhancing fish products will become available in our food stores". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



**Figure 10.** "Opportunities for recreational fishing will improve in Finland". The estimate of enterprises and consumer on the probability of the statement expressed as balance figures.



**Figure 11.** "Fishing licence fees will be reduced in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.

### 3.2 Threats to fisheries

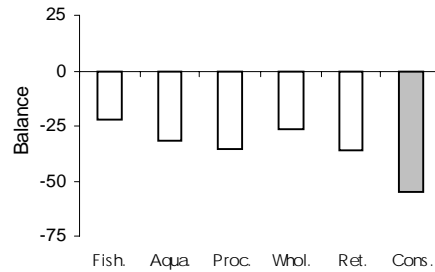
Under the heading "Threats to fisheries" there is a list of statements believed to describe an unfavourable trend in fisheries from the point of view of enterprises and consumers in the near future, that is, the next 2-3 years. As in the previous result chapter not all the statements necessarily imply threats to all parties.

The entire fishery sectors and consumers in particular considered it highly improbable that foreign fish products would replace domestic fish. Both enterprises and consumers were of the opinion that professional fishing was more likely to become unprofitable than aquaculture (Figures 12-14).

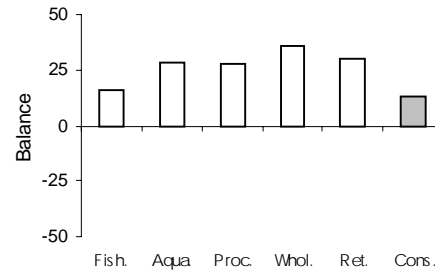
Enterprises, fish farms in particular, did not believe there would be any marked increase in the adverse environmental effects of aquaculture. Also, widespread pollution of waters was considered to be a fairly improbable future threat by enterprises, fishermen excluded. Pollution of waters was regarded as a greater threat by consumers than by enterprises (Figures 15 and 16).

All parties considered the collapse of fish stocks in Finland due to overfishing rather improbable. Also, restrictions on fish consumption due to environmental toxins in fish were not considered very probable, by enterprises in particular. All parties thought it highly improbable that enthusiasm for fishing would diminish (Figures 17-19).

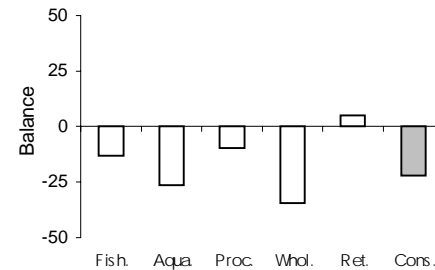
The pressure on fisheries exerted by animal activists was considered clearly more likely to affect aquaculture than fishing. Consumers did not think the threat from extremist groups very probable (Figures 20 and 21).



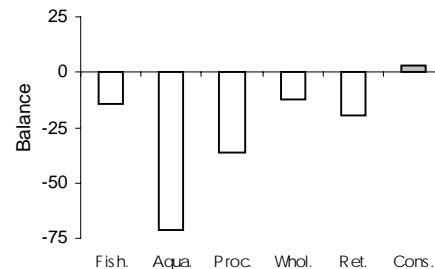
**Figure 12.** "Foreign fish products will replace domestic fish on our markets". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



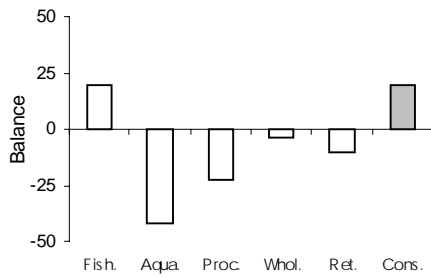
**Figure 13.** "Professional fishery will become unprofitable in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



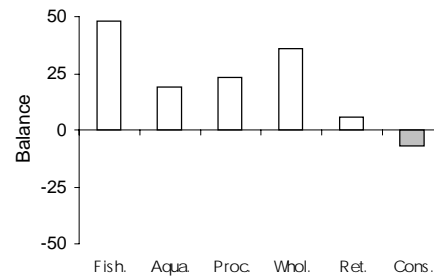
**Figure 14.** "Aquaculture will become unprofitable in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



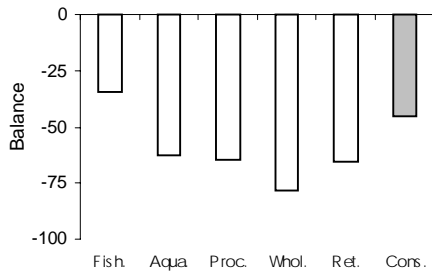
**Figure 15.** "Environmental damage from aquaculture will increase in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



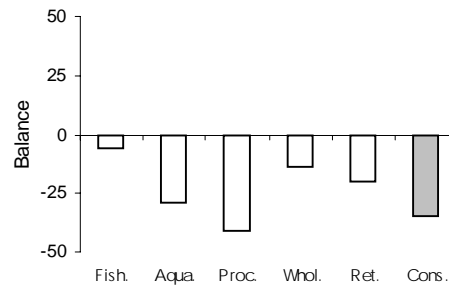
**Figure 16.** "Pollution of waters will increase in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



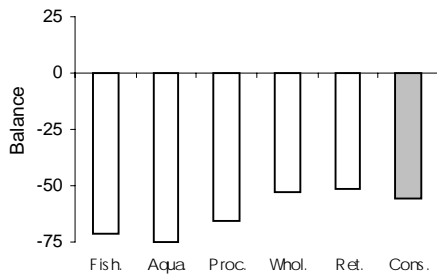
**Figure 20.** "Animal activists will exert pressure on aquaculture in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



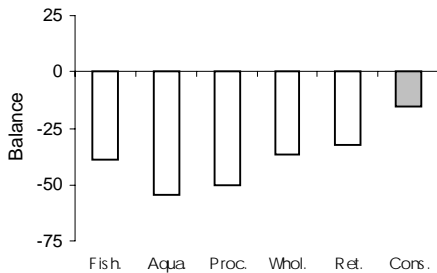
**Figure 17.** "Interest in recreational fishing will diminish in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



**Figure 21.** "Animal activists will exert pressure on fishing in Finland". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



**Figure 18.** "Finland's fish stocks will collapse due to overfishing". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.



**Figure 19.** "Eating of Finnish fish will be restricted by environmental toxins in fish". The estimate of enterprises and consumers on the probability of the statement expressed as balance figures.

#### 4. DISCUSSION

Since the data collection was made for the first time, a special interest was paid to reliability and validity of the measurements. Use was made of the information on the structure of the survey population (e.g. turnover of enterprises, and age, sex and place of residence of consumers) to plan the sampling and fixing of quotas appropriately. Coverage error was reduced by removing the overcoverage from both samples in conjunction with the interviews. It was not possible to estimate the undercoverage for enterprises, but clearly new enterprises at least were not on the register.

Some undercoverage also occurred for consumers, due to the time difference between the interviews and the register updating, which in this case was about one year. The nonresponse rate was low for enterprises and moderately low for consumers compared with interviews in general. The bias caused by nonresponse could be reduced to some extent with the methods applied (stratification and calibration).

The amount of the sampling error was estimated by calculating 95% confidence intervals for the individual questions. The confidence intervals for the whole enterprise data were about  $\pm 5$  percentage points, depending on the question and the proportion of its

response options in the results. The confidence intervals for the consumer responses were  $\pm 2.5$  percentage points at their highest. The indicators were formulated as they usually are in barometer surveys and their response options were simple. Moreover, the indicators had been tested for performance in a pilot study, which reduced the possibility of errors in measurements.

The results are based on the knowledge and expectations of the respondents who can provide reliable information since the questions relate to subjects with which they are familiar. According to the interviewers, the respondents understood the questions well. In the computer-assisted telephone interview the responses were stored into a database direct, thus avoiding processing errors due to separate coding and recording.

Barometer surveys generally measure change. Of importance is not the individual results but the changes occurring between the measuring times. The present results are based on a single measuring time, which sets limits on the interpretation in terms of time. Note, too, that although barometers are widely used to study the expectations of social phenomena, they are not prognoses as such but rather tools that help us estimate trends. The intention is to repeat the survey in 2001.

In this stage of study it is too early to make any detailed conclusions. On the other hand, some general points can be noticed. Both fisheries enterprises and consumers outlooks towards Finnish fisheries were rather confident. The probable threats for fisheries, such as environmental issues, are already under intense discussion. The outlooks for essential threats and opportunities inside the fisheries sector were quite unanimous. Under these circumstances there should be potential to focus resources to substantive issues like facing consumers new demands and maintaining fisheries sector viability.

## 5. REFERENCES

- Ahvonon, A. and Honkanen, A. 1999. Fisheries' product barometer - a pilot study (In Finnish). Finnish Game and Fisheries Research Institute, Helsinki. Fish and game reports (Kala- ja riistaraportteja) nr 172. 33 p. ISBN 951-776-250-X, ISSN 1238-3325.
- Ahvonon, A. and Honkanen, A. 2000. Fishery industry's confidence towards the near future in different levels of production chain in Finland. A paper presented in International Institute of Fisheries Economics and Trade IIFET 2000 Conference. Oregon State University, July 10-14, Corvallis, Oregon, USA.
- Deville, J.-C. and Särndal, C.-E. 1992. Calibration Estimators in Survey Sampling. *Journal of the American Statistical Association*, vol. 87, 376 – 382.
- Deville, J.-C., Särndal, C.-E. and Sautory, O. 1993. Generalized Raking Procedures in Survey Sampling. *Journal of the American Statistical Association*, vol. 88, 1013 – 1020.
- European Commission 1997. The joint harmonised EU programme of business and consumer surveys. Directorate-General for Economic and Financial Affairs. *European Economy. Reports and Studies No 6*. ISSN 0379-0991.
- Godenhjelm, P., Honkanen, A. and Ahvonen, A. 2000. Validly measurement in a "double" split panel test - An experiment in comparing domestic and foreign fish product attributes. A paper presented in The World Association for Public Opinion Research WAPOR Seminar "Quality Criteria in Survey Research". Cadenabbia, Italy, June 29 - July 1, 2000.
- Honkanen, A., Setälä, J. and Eerola, E. 1998. Behavioural patterns related to Finnish fish consumption: An analysis of demographic characteristics. In: Eide & Vassdal (eds.) *Proceedings of the 9th international conference of the International Institute of Fisheries Economics and Trade (IIFET)*. The Norwegian College of Fishery Science, University of Tromsø, Norway. pp. 692-700. ISBN 82-91086-21-4.
- Sudman, S., Bradburn, N.M. and Schwarz, N. 1996. *Thinking about answers. The application of cognitive process to survey methodology*. Jossey-Bass Publishers. San Francisco.
- Statistics Finland 2000. Consumer barometer, February 2000. SVT Official Statistics of Finland - Income and Consumption 2000:7. ISSN 0784-8420.
- Willis, G.B. 1994. *Cognitive interviewing and questionnaire design: a training manual. Cognitive methods saff. Working Papers Series. N:o 7*. Office of Research and Methodology. National Center for Health Statistics. Hyattsville, Maryland.