

FISH MARKETING AND CONSUMPTION SURVEY IN THE KYRGYZ REPUBLIC



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Cover photograph: (1) *A pond fish farm in Issyk-Kul*, (2) *Issyk-Kul Lake*, (3) *trout cage farm in Issyk-Kul Lake*, (4) *roadside processed fish stall in Issyk-Kul*, (5) *fish specialty shop in Bishkek*, (6) *fish stall in the market in Bishkek* (courtesy of FAO/Sunil Siriwardena).

FISH MARKETING AND CONSUMPTION SURVEY IN THE KYRGYZ REPUBLIC

by

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PREPARATION OF THIS DOCUMENT

This document has been prepared by the FAO Project “Support to Fishery and Aquaculture Management in the Kyrgyz Republic” (GCP/KYR/003/FIN). It is based on the data and information collected from a countrywide survey on fish marketing and fish consumption in the Kyrgyz Republic carried out by the project to contribute towards Project Output 1.1: “People have daily access to safe and high quality fish and learn the health benefits through larger fish consumption”, under Outcome 1: “Improved fish processing and marketing in the Kyrgyz Republic”. Under this outcome, the project also launched a fish consumption promotion campaign and created small-scale primary fish processing units. This report presents the key outcomes of the above survey.

The countrywide survey was conducted, and the first draft of the report prepared, by the El-Pikir Centre for Public Opinion and Forecasting of the Kyrgyz Republic, based on a contract awarded by FAO via a competitive bidding process. The data and information presented are intended to assist with consideration of issues related to improving and implementing further activities to develop fish markets and the marketing and consumption of fish in the Kyrgyz Republic.

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ABSTRACT

A countrywide survey was carried out to assess the status, trends and issues related to fish production, marketing and consumption in the Kyrgyz Republic. The methodology adopted was a combination of structured questionnaires and one-to-one interviews that collected data from 1 167 respondents, who included fish farmers, key informants, and vendors/sellers and consumers of fish and fish products. The trends and issues that emerged from the survey results are presented and interpreted under the headings of fish production, trade and consumption. Since the country's independence, fish production in the Kyrgyz Republic has not realized its full potential owing to knowledge gaps in innovative technology and in good management practices in aquaculture and fisheries. The main constraints have been an inconsistent supply of quality fish seed, a lack of access to fish feeds and credit, and the absence of state support services. Farmers see opportunities to develop recreational fisheries in their aquaculture ponds. The main constraints to a developed marketing of fish are related to infrastructure and institutional management. Most markets are poor in terms of basic infrastructure and services for food handling. Other constraints in fish marketing are: a knowledge deficit in terms of modern sanitation techniques and quality control; management of hygiene among fish handlers; and markets being distant from fishers. A vigorous attempt to improve the system should begin by a thorough evaluation of the problems in the market and marketing system. The quality of unprocessed fish during transit from harvest to the consumer cannot be assured as the present system of inspection and quality control is restricted mainly to processed fish products. The price of fish is influenced by the price at which the intermediaries/wholesalers buy their fish and the amount of profit they intend to gain, and it is fixed through supply and demand interaction. The marketing inefficiencies also contribute to unregulated price margins. In relation to other commodities, fish prices have recently increased, and this is discouraging increased per capita fish consumption. The share of fish in the food basket offered by catering entities averages 19 percent, while the share of fish and fish products in the total food basket of a household amounts to less than 9.7 percent. The indications are that, to increase this share, fish prices must go down. The fish selling business is dominated by females, mainly in the post-harvest sector owing to their involvement in household-based small-scale fish processing. Exporters perceive low-interest credit and improved legislation to streamline export procedures, the elimination of corruption, and greater access to information (particularly on pricing policies, quality standards, and forecasted fish consumption and demand) as key to improving the export industry. The document includes a set of recommendations to address the issues that emerged from the survey related to fish production, marketing and consumption.

CONTENTS

	PAGE
PREPARATION OF THIS DOCUMENT	iii
ABSTRACT	iv
ACKNOWLEDGEMENTS	ix
EXECUTIVE SUMMARY	xi
1. INTRODUCTION	1
2. METHODOLOGY	3
3. FISH PRODUCTION	5
3.1 Establishment of fish farms	5
3.2 Number of employees and remuneration	5
3.3 Species of fish grown by fish farms	6
3.4 Reasons for growing specific fish species	8
3.5 Fish farmers associations	9
3.6 Some practices of fish farmers	10
3.6.1 <i>Use of fish feed</i>	11
3.6.2 <i>Use of veterinary services</i>	12
3.6.3 <i>Processing fish</i>	12
3.7 Storing fish products	13
3.8 Selling fish	14
3.9 Price of fish	16
3.10 Recreational fishing	17
3.11 Farmers' perception of their business environment	17
3.11.1 <i>Development prospects</i>	18
3.11.2 <i>Perceived competition in the sector</i>	18
3.12 Problems with fish farming	18
3.13 Help that farmers need	20
4. TRADE	23
4.1 Exportation of fish and inter-oblast trade	23
4.1.1 <i>General profile</i>	23
4.1.2 <i>Means of communication</i>	23
4.1.3 <i>Sale of fish and fish products</i>	24
4.1.4 <i>Competition in the business</i>	24
4.1.5 <i>Problems and needs of exporters</i>	24
4.2 Importation of fish	25
4.2.1 <i>General profile</i>	25
4.2.2 <i>Competition in the business</i>	26
4.2.3 <i>Problems and needs of importers</i>	27
4.3 Sellers of fish and fish products	27
4.3.1 <i>Profile of sellers of fish and fish products</i>	27
4.3.2 <i>Key parameters of fish market</i>	30
4.3.2.1 <i>Main segments of fish and fish products in the market</i>	30
4.3.2.2 <i>Points of sale</i>	33
4.3.2.3 <i>Suppliers of fish and fish products to the markets</i>	33
4.4 Buyers of fish and fish products	34
4.5 Price of fish and fish products	34
4.6 Marketing environment	38
4.6.1 <i>Equipment availability</i>	38
4.6.2 <i>Business environment</i>	38
4.6.3 <i>Means of communication</i>	39

4.6.4	<i>Competition</i>	40
4.6.5	<i>Trade stimulation</i>	41
4.6.6	<i>Taxation</i>	43
4.6.7	<i>Quality standards</i>	44
4.6.8	<i>Business expansion plans</i>	44
5.	FISH CONSUMPTION	45
5.1	Household consumption	45
5.1.1	<i>Profile of study participants</i>	45
5.1.2	<i>Consumption of fish and fish products</i>	46
5.1.3	<i>Eating out</i>	48
5.1.4	<i>Taste preferences of household members</i>	48
5.1.5	<i>Place of purchase and satisfaction with quality of fish and fish products</i>	49
5.1.6	<i>Frequency and volume of purchases of fish and fish products</i>	50
5.1.7	<i>Opinions and attitudes</i>	54
5.2	Institutional consumers	54
5.2.1	<i>Profile of large consumers of fish and fish products</i>	54
5.2.2	<i>Types of fish and fish products purchased</i>	54
5.2.3	<i>Menu</i>	55
5.2.4	<i>Consumption and prices</i>	56
5.2.5	<i>Consumption of other food products</i>	57
5.2.6	<i>Opinions and attitudes</i>	57
5.2.7	<i>Problems</i>	57
6.	ISSUES AND TRENDS	59
6.1	Issues and trends emerging from the survey	59
6.1.1	<i>Farm and farming practices</i>	59
6.1.2	<i>Markets and marketing</i>	59
6.1.3	<i>Price and pricing</i>	60
6.1.4	<i>Fish traders</i>	61
6.1.5	<i>Buyers and consumers</i>	62
7.	RECOMMENDATIONS	63
	REFERENCES	65

LIST OF TABLES

1. Number of surveyed respondents by respondent category	3
2. Number of fish ponds and fish farms by oblast	4
3. Number of surveyed fish farms against registered number of fish farmers	4
4. Average number of full-time and temporary workers	5
5. Average remuneration of fish farm workers per month by gender (KGS)	6
6. Average remuneration of fish farm workers per month by oblast (KGS)	6
7. Main species of fish grown or found in fish farms (key informant estimates)	7
8. Species of fish farmed or found in ponds (farmers' estimates)	8
9. Criteria given by respondents for selection of fish species for commercial production	9
10. Reasons for fish farming rather than some other business, by oblast	9
11. Percentage of fish farmers that are members of associations or cooperatives, by oblast	10
12. Average production of live fish by oblast	11
13. Percentage of fish farmers engaged in processing fish by oblast	12
14. Main types of fish processing by fish farmers	13
15. Main types of fish processing by fish farmers by oblast	13
16. Availability of equipment to store fish and fish products (% respondents)	14
17. Use of produced fish by oblast	14
18. Mode of selling fish by oblast	15
19. Points of sale of fish by farmers (% responses)	15
20. Price variations for fish sold by fish farms	16
21. Trend in prices of fresh fish sold by farmers over the past three years by region (% respondents)	17
22. Farmers allowing recreational fishing in fish farms by region	17
23. Fish farming business environment in 2011 compared with 2010, by region	18
24. Trend in fish production on farms in the past three years, by region	18
25. Current issues/problems facing fish farmers	19
26. Assistance needed by farmers	20
27. Training needs of fish farmers	21
28. Number of fish types in an assortment in the markets by oblast	31
29. Monthly volume of fish sales in markets	33
30. Types of fish suppliers to fish sellers in the market by type of fish product	34
31. Percentage change in prices against baseline price for certain types of fish	36
32. Average monthly consumption and average prices of meat, poultry, fish and fish products per household	52
33. Average per capita consumption of fish products per month, by oblast	52
34. Changes in consumption of fish and fish products compared with previous year (% household respondents)	53
35. Consumption of fish and fish products by institutional consumers and average price	56
36. Consumption of meat products by institutional consumers and average prices	57

LIST OF FIGURES

1. Percentage of fish farmers as members of an association or cooperative, by name	10
2. Types of feed used by fish farms	11
3. Use of veterinary services by fish farmers (% respondents)	12
4. Use of fish produced by fish farms (% respondents)	14
5. Mode of selling fish (% respondents)	15
6. Average number of potential buyers of fish at one farm	15
7. Trend in prices of fresh fish sold by farmers in the past three years (5% respondents)	16
8. Business environment in 2011 compared with 2010	17
9. Trend in fish production on respondents' farms in the past three years	18
10. Distribution of sellers by oblast (% respondents)	28

11. Types of sellers (% respondents)	28
12. Location of seller's point of sale (% respondents)	28
13. Organizational form of sellers (% respondents)	28
14. Specialization of fish sellers (% respondents)	28
15. Share of fish and fish products in total revenue of sellers (% respondents)	28
16. Number of full-time staff at large suppliers (% respondents)	29
17. Average monthly salary of full-time staff of large suppliers in different oblasts (KGS)	29
18. Demand for types of fish products in the market (% responses)	30
19. Average number of procurements of fish and fish products per week	31
20. Most popular types of fish and fish products sold in the markets	32
21. Percentage of fish species sold in the markets	32
22. Points of sale of fish and fish products	33
23. Decision-making on the price of fish and fish products (% respondents)	35
24. Change in average prices, 2007–2011	35
25. Percentage change of price against baseline price for 2011 for selected fish species	37
26. Equipment used to store fish and fish products (% respondents)	38
27. Assessment of business environment in 2011 compared with 2010 (% respondents)	39
28. Marketing information fish sellers would like to receive (% responses)	39
29. Means of communication with partners (% respondents)	40
30. Expenditures on advertising in 2010 (% respondents)	40
31. Methods of advertising business by fish suppliers (% respondents)	40
32. Number of competitors in the market	41
33. Criteria used to select fish suppliers (% responses)	41
34. Types of incentives or business stimulations used by suppliers (% responses)	42
35. Factors that could contribute to greater profits (% respondents)	43
36. Main problems faced by survey respondents in the past year	43
37. Suggestions to increase profitability of the business	44
38. Areas and direction of business expansion (% respondents)	44
39. Age of respondent households (% age groups)	45
40. Educational level of respondent households (% households)	45
41. Main sources of income (% household respondents)	45
42. Reasons for consumption of fish and fish products (% household respondents)	46
43. Reasons to consume fish and fish products, by gender (% respondent households)	46
44. Most popular dishes made with fish or fish products (% household respondents)	47
45. Most frequently bought fish species (% household respondents)	48
46. Types of fish products preferred by members of households (% household respondents)	49
47. Places where households buy fish and fish products (% household respondents)	50
48. Average amount of money spent on fish and fish products per purchase (KGS)	51
49. Readiness to increase consumption of fish and fish products by region, if prices reduce (% household respondents)	54
50. Number of persons served per day by large consumers	55
51. Criteria used by large consumers to select the fish and fish products supplier (% respondents)	55
52. Fish dishes and fish products offered on the menu (% respondents)	56
53. Share of fish in total volume of food offered on the menu by various large consumers	56

LIST OF PLATES

1. Fish pond near Lake Issyk-Kul	5
2. Cage culture in Lake Issyk-Kul	5
3. Small-scale farmer- processor with dried and smoked fish	13

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EXECUTIVE SUMMARY

A countrywide survey was carried out to assess the status, trends and issues related to fish production, marketing and consumption in the Kyrgyz Republic. It employed structured questionnaires and interviewed 1 167 respondents who included fish farmers, fish and fishery product exporters and importers, fish and fishery product sellers, household and institutional consumers, and key informants. The survey outcome provides guidance to improve the marketing of fish both locally and for exportation, as well as to promote fish consumption in the Kyrgyz Republic. The survey also generated a database based on the information collected.

PRODUCTION OF FISH AND FISH PRODUCTS

The active phase of fish farm development in the Kyrgyz Republic occurred in 1996–2002 and 2005–2011 in Chui and Issyk-Kul Oblasts (provinces), respectively, but with little development elsewhere. Fish farms are operated by: (i) small-scale fish farmers who own or rent ponds and who sometimes also engage in small-scale processing of fish for sale, mainly in the local market; (ii) large-scale fish farmers that own ponds and process fish for export; and (iii) fish farmers with non-operational ponds who engage in the processing of fish that they buy elsewhere.

Between 80 and 90 percent of fish farm employees in the country are males, and the average number of workers is 6–7 on small-scale farms and 10 on large-scale farms. An average of 6 and 10 additional temporary workers are hired seasonally by small- and large-scale farms, respectively. The wages of fish farm workers vary by region, being highest in Chui Oblast and lowest in Talas and Naryn Oblasts. The wage of a permanent worker does not exceed KGS4 198,¹ and for a temporary worker it is KGS3 528.

The total number of fish species cultured on all fish farms is 13, and on any one farm it could vary from 1 to 4. Common carp and silver carp are the most commonly grown species in extensive practice, followed by grass carp, rainbow trout, whitefish and peled. According to the respondents, the criteria for selection of fish species for farming varies from fast-growing species (31 percent) to species able to withstand local environmental conditions (13 percent). Only 5 percent farmers are guided by profit in the selection of fish species. The annual production capacity of pond farms is 1–11 tonnes of fresh fish per year, while cage farms produce about 70 tonnes. Some 41 percent of fish farmers are affiliated with associations or cooperatives, this trend being highest in Issyk-Kul Oblast. Except for cage-fish culture farmers, most farmers do not use fish feeds manufactured based on a nutritionally balanced formula, and the feed used is largely dependent on the available feed ingredients, such as agricultural by-products.

Overall, 18 percent of farmers also engage in fish-processing activities, such as curing and drying (50 percent of such farmers), smoking (20 percent) and salting and marinating (10 percent). However, 42 percent of farmers do not have the basic equipment required for processing activities, such as tubs to store fish or freezers.

Of the fish produced, 82 percent goes out for sale, 8.6 percent is consumed by the fish farm household, and the rest is used to make payments in kind. The fish sales mainly take place at the farmgate to wholesale buyers (61 percent), and 27 percent of fish farmers sell fish in public places or to fish stores or wholesale points. The average selling price of fish by farmers is KGS90–266 per kilogram, with trout fetching the highest price, and European perch fetching the lowest. In the last three years, the price of fish has increased four to five times from farmgate to the final consumer. Some 91 percent of fish farmers believe they could increase their production provided that basic inputs are locally available.

Farmers believe that the government should provide support and specialized services to improve their production capacity and business sustainability. They also identify the need for a consistent supply of quality fish seed, nutritionally balanced fish feeds and access to soft loans.

¹ The Kyrgyz som (KGS) is the national currency of the Kyrgyz Republic. During the study year, the average conversion ratio was KGS47 to USD1.

TRADE

Export of fish and fishery products and inter-oblast trade

Export of fish and fishery products is in the hands of a few large fish farms and fish processors, which buy fish from wholesale traders. Fish is primarily exported to Kazakhstan. Most of the exported fish are in chilled or frozen form, while distribution within the country mostly involves frozen, salted, chilled, marinated or canned product.

On average, exporters employ 10–20 workers, two-thirds of whom are males. In addition, temporary staff can vary from 10 to 40 workers. The wages of permanent workers make up to about 50 percent of the cost of production, and the wages of temporary staff can be up to KGS5 000 per month per person. Exporters are generally equipped with refrigerated rooms, refrigerated showcases, freezers, storing tubs and special trucks for transportation of fish.

Some exporters also distribute fish within and outside their oblasts in the Kyrgyz Republic. Exporting and distribution within the country of fish and fishery products takes place 2–7 times per week, with quantities ranging from 0.2 to 15 tonnes of chilled fish and/or 25 tonnes of frozen fish. Supply of fish and fishery products within the country is mainly to specialized stores, large wholesale buyers, government entities, large trade centres, major grocery stores, retail outlets and markets. Major constraints faced by exporters include high taxes, lack of credit availability with affordable interest rates, and corrupt practices. Exporters perceive that low-interest credit and improved legislation to streamline export procedures, the elimination of corruption and increased access to information, particularly on pricing policies, quality standards, and forecasted fish consumption and demand, are key to improving the export industry.

Import of fish and fishery products

The few importers that exist in the country import fish mainly from the Russia Federation, with smaller volumes from Kazakhstan and China. Imports are mainly in frozen form (80 percent), with smaller volumes in salted, smoked and canned forms. Imports could reach 10 tonnes per month. Most of the fish imported into the country are Atlantic herring and walleye pollock. Almost all importers engage in fish processing, mostly salting, smoking or marinating. Importers employ 3–10 full-time workers, 60–80 percent of whom are males, while temporary workers range from 1 to 10 (all males or up to 50 percent females). Wages for workers are not related to gender or full-time or temporary status and reach up to KGS5 000 per month. Selection of fish suppliers by large importers is based on reputation, quality certification and ecologically friendly produce. Nevertheless, the small importers go by low prices and reputation, as well as by the quality of the fish as determined by colour and smell, and the availability of the option to return unsold fish. The price of imported fish fluctuates seasonally, being highest in July and lowest in November.

Large importers distribute products to all available outlets, including large and small buyers, as well as to wholesale buyers and households. Small importers mainly sell their products to specialized stores, shops and markets. Large importers have not observed any change in the business environment in the past year, while small importers have felt a deterioration in the business environment. All importers claim to abide by local product quality standards and are not aware of required international standards. As reported in the case of exporters, the main constraints for importers are the high rate of taxation and the unavailability of credit at low interest rates to invest in improvement of facilities and enhancement of the business.

Sellers of fish and fish products

One-third of sellers operate as small vendor stands or kiosks in markets, and 58 percent of them are in Bishkek and Issyk-Kul Oblasts. Some 93 percent of sellers are small enterprises with fewer than 10 workers, with 60 percent of the permanent workers being women. Women are paid 6 percent more

than men. They also sell other food items in addition to fish. The sellers² sell various types of fish products, these being dominated by frozen (70 percent of sellers), salted (61 percent) and chilled fish (47 percent). Cured (36 percent), smoked (34 percent) and live/fresh fish (27 percent) are less often sold.

By percentage of sellers, the share of fresh and live fish in the fish assortment is 73.2 percent, followed by frozen fish (31.4 percent), and smoked, cured and chilled fish (21–16.3 percent). The share of fillet, minced meat, marinated fish and caviar does not exceed 9 percent. An assortment is typically limited to six species of fish; however, a greater number of species in an assortment is found in the city of Bishkek and in Chui Oblast, which have main large markets and fish shops. The most popular species of fish marketed are Atlantic herring (17 percent), common carp (14 percent), bream (9 percent), walleye pollock (8 percent), and pike-perch and rainbow trout (7 percent each). Other kinds of fish (more than 20 types) account for 38 percent of the market. In the past five years, the prices of all kinds of fish have increased annually, with catfish topping the list with an average price increase of 280.8 percent. The average price per kilogram of bream has increased in the past five years by 180.2 percent, while those fish species risen by from 137.4 to 156.1 percent. Sellers use refrigerated showcases (37 percent), freezers (23 percent) and walk-in refrigerators (20 percent) to store their products.

Fish sellers do not monitor or evaluate their business environment and, hence, do not notice any differences in the business environment compared with previous years. As a result, they are unaware of the competition that exists around them. Sellers use business stimulation methods such as discounts to frequent buyers, wholesale discounts and seasonal discounts. Other forms of incentive include selling products with the right to return unsold products, and provision of packaging and delivery services.

Up to 80 percent of sellers do not receive any marketing information and are not aware of any standards that must be maintained. They expressed their desire to receive information on competitors' pricing policies, market prices, crediting, taxation, and place and time of fish sale, as well as forecasted fish consumption and government policy on fish trade.

Buyers (institutional consumers)

All institutional buyers of fish and fish products are catering institutions (cafes, canteens and restaurants, kindergartens and boarding schools). The main fish product types bought by them are frozen (27 percent), live (14 percent), canned (13 percent) and chilled (10 percent), and the most popular fish are rainbow trout (16 percent), common carp (13 percent), and walleye pollock (11 percent). The share of fish in the food offered by these catering entities averages 19 percent.

As in the case of sellers, buyers do not monitor market prices of fish and fish products. Some 46 percent of institutional buyers expressed a willingness to increase procurement of fish and fish products if prices go down. Institutional buyers often face problems³ with high wholesale prices (50 percent), poor quality of fish (35 percent), limited assortment (23 percent) and poor sanitation in sales outlets (8 percent).

Household buyers

The average number of members per household is 5.1, and the main sources of income in the households surveyed are agriculture (19 percent), civil service (17 percent), trade (13 percent) and pensions (10 percent).

Overall, 16 percent of households do not use refrigerators, and the average frequency of purchase of fish or fish products is once every 24 days. The average monthly income in the surveyed households is

² Most sellers sell more than one type of fish product, and hence the total percentage of fish products adds up to more than 100 percent.

³ Respondent buyers may face more than one problem and, hence, the total percentage adds up to more than 100 percent.

KGS10 833.6, and they spend on average KGS288 for each purchase of fish. The share of fish and fish products in the total food basket amounts to less than 9.7 percent. The level of fish consumption is as low as the consumption of pork (most people in the country do not consume pork for cultural and religious reasons). Household buyers prefer canned, live, chilled, frozen and salted fish. Most often, households buy common carp, herring and trout. Some 46 percent of households buy fish and fish products at a local market; 21 percent buy fish at a specialized outlet, 12 percent at a supermarket, and 10 percent at a specialized fish store.

Household buyers perceive fresh and live fish as a commodity that is inconvenient to prepare, and that chilled and frozen fish have a poor taste and high price.

FISH CONSUMPTION

Respondents agree that fish and fish products are good for their health (93 percent) and easy to digest (36 percent). Some recognize that fish is quick to prepare (30 percent) and has nutritional value (24 percent). Women, more often than men, perceive fish as a healthy and nutritious food. However, men perceive it as a commodity that can be prepared easily. There is an age-dependent preference for fish type. Common carp is preferred by all age groups, while silver carp, herring and trout are preferred by younger and middle age groups. Fish consumers tend to eat fish outside their homes in restaurants, cafes and canteens. Fried fish is preferred to fish salads, appetizers, and steamed and baked fish. There is a gender preference as to product type, with women preferring cooked fresh and live fish (39 percent) and men preferring canned (19 percent), salted (16 percent) or smoked fish (13 percent). According to respondents (41 percent), children prefer canned fish. The main reasons given for the low preference for dried, cured and salted fish are “hard texture”, “no nutritious value” and “not healthy”, and for frozen fish, “poor quality”, “poor taste” and “additional time to defrost”.

Consumers of fresh/live fish buy 2.4 kg per month, while chilled and frozen fish amount to 2.2–2.3 kg. According to the survey, the average per capita consumption by type of product varies from 0.47 kg for fresh and live fish to 0.04 kg for canned, fillet, minced and caviar. As women prefer fresh and live fish, this difference in consumption implies that women may consume more fish than men.

The number of respondents who noted increased consumption of fish and fish products was very small. However, 68 percent expressed a willingness to increase consumption of fish and fish products if the price is reduced. It also emerged that insufficient consumption of fish and fish products is primarily related to a lack of awareness of the benefits of consuming fish. Thus, there is a need for an awareness campaign to promote fish consumption.

RECOMMENDATIONS

The Department of Fisheries and Institute of Biology of the National Academy of Science should take the lead in closing the knowledge gaps in innovative technology and good management practices in aquaculture and fisheries to boost fish production to ease the prices of fish and encourage fish consumption.

The State should encourage potential entrepreneurs with an incentive package across the whole supply chain, including tax relief, duty-free import of equipment and inputs, and soft loans to enter into public-private partnerships to address the constraints in market structure, as this will improve the marketing efficiency and help regulate prices.

However, a thorough evaluation of the problems in the market and marketing system should be undertaken before any attempt to improve the system.

Strengthening fisheries associations and community organizations with market information (including price trends and pricing policies), and building their confidence in marketing management should be adopted as a long-term solution for price issues.

The present inspection and quality control system should be improved to international standards and should not be restricted to processed fish products but extended to transit from harvest to the consumer in order to ensure the quality of fish.

Considering the health benefits of fish consumption, the Health Promotion Centre of the Ministry of Health should launch a countrywide campaign to promote fish consumption and healthy ways of preparing fish for consumption. The Ministry of Education should include the health benefits of fish consumption in school curricula as a means of targeting parents to promote household fish consumption. In this regard, the government should also seek donor support to launch a suitable fish consumption promotion campaign.

To provide a conducive legal environment that will assist and protect stakeholders in the fish supply and marketing chain, the Department of Fisheries should assess the gaps in the relevant legislation and take action to remedy them.

1. INTRODUCTION

The project “Support to Fishery and Aquaculture Management in the Kyrgyz Republic” (GCP/KYR/003/FIN) was launched with the financial assistance of the Government of Finland at the request of the Government of the Kyrgyz Republic and with support from FAO in the form of technical assistance. The project is based upon the justification that the drastic fall in fish production and consumption in the Kyrgyz Republic following the break-up of the Union of Soviet Socialist Republics has had a negative impact on poverty alleviation and food and nutritional security, and thus deserves special attention for priority development interventions, including appropriate policy and legal and institutional frameworks to revive and develop the sector and a demand-driven aquaculture production and marketing system, while ensuring the sustainable management of fisheries resources. The project aims, *inter alia*, to promote improvements in the market supply chain and processing of fishery products and to ensure the safety and quality of these products. Another project output related to the above goal is that: “People have daily access to safe and high quality fish and learn the health benefits through larger fish consumption”. The present study was conducted to collect information, identify trends and issues, and provide recommendations and insights to improve the fish marketing system, the fish processing industry and national fish consumption in the Kyrgyz Republic.

2. METHODOLOGY

The present study was carried out in the seven oblasts (provinces) of the Kyrgyz Republic. The methodology was based on a combination of structured questionnaires and one-to-one interviews to collect qualitative and quantitative data. The following four major groups of respondents were included in a survey for this study:

- fish farmers including farmer–producers and farmer–exporters/importers;
- vendors/sellers of fish and fish products;
- consumers of fish and fish products; and
- key informants.

Vendors/sellers of fish and fish products included:

- wholesale sales outlets;
- specialized fish shops;
- supermarkets, small shops and kiosks; and
- retail sellers of fish and fish products (located primarily in markets).

Consumers of fish and fish products were grouped into the following two respondent categories:

- institutional consumers (i.e. hospitals, state security units, schools, kindergartens, higher education institutions, and cafes, restaurants and canteens); and
- households as physical entities.

Key informants included representatives of government agencies (national, oblast, and/or rayon (district) level) who deal with the fish industry as part of their official duties and/or are aware of issues faced by various groups of respondents.

In total, 1 168 respondents belonging to all respondent categories were surveyed (Table 1).

TABLE 1
Number of surveyed respondents by respondent category

Respondent category	No. of respondents
Farmers – fish producers	33
Farmers – exporters and importers	5
Sellers of fish and fish products	70
Consumers of fish and fish products – households	1 000
Consumers of fish and fish products – institutions	50
Key informants	10
Total	1 168

According to the Department of Fisheries under the Ministry of Agriculture and Melioration, only 43 fish farms were registered in the Kyrgyz Republic as of 17 August 2011 (Table 2). Thirty-three of these were included in the survey (Table 3). The study team obtained the contact details and addresses of fish farms from the Department of Fisheries registry before commencing the fieldwork. In the course of the study, several of the contacts turned out to be invalid, and some refused to take part in the survey. This resulted in a lower number of fish farms being surveyed than the registered number. However, the survey included 77 percent of the fish farms registered with the Department of Fisheries, which can be considered a high percentage for this type of survey.

The following specialized respondent-specific questionnaires and guides were developed and employed in the survey:

- questionnaire for farmers/fish producers;
- questionnaire for exporters of fish and fish products;
- questionnaire for importers of fish and fish products;
- questionnaire for sellers of fish and fish products;
- questionnaire for legal entities / institutional consumers of fish and fish products;

- questionnaire for households (consumers of fish products); and
- guide for key-informant interviews.

TABLE 2

Number of fish ponds and fish farms by oblast

Oblast	No. fish ponds ¹	Extent (ha)	Fish farms	
			(no.)	(%)
Chuit	73	4 331	16	37
Issyk-Kul	79	8 360	20	47
Talas	7	3 298	5	12
Naryn	6	2 567	1	2
Osh	6	7 796	–	0.0
Jalal-Abad	14	2 946	1	2
Batken	1	267		0.0
Total	186	29 565	43	100

¹ Fish ponds include small natural waterbodies stocked by individuals.

Source: Department of Fisheries, Ministry of Agriculture and Melioration of the Kyrgyz Republic, as at 17 August 2011.

TABLE 3

Number of surveyed fish farms against registered number of fish farmers

Oblast	Actual		Sample	
	Number of fish farms	% of total registered	Number of fish farms	% of total registered
Chui	16	37	12	28.0
Issyk-Kul	20	47	15	35.0
Talas	5	12	3	7.0
Naryn	1	2	1	3.0
Osh	–	–	–	2
Jalal-Abad	1	2	1	2
Batken	–	–	–	–
Country, total	43	100	32	77

Source: Department of Fisheries, Ministry of Agriculture and Melioration of the Kyrgyz Republic, as at 17 August 2011.

All survey questionnaires and the guides were produced two languages in (Kyrgyz and Russian), and respondents had the opportunity to be interviewed in their preferred language. All the questionnaire categories were pilot tested among 20 respondents in all of the 7 oblasts and adjusted according to the results of the pilot survey. The answers and findings from the questionnaires and interviews formed the basis for the analysis of the current situation of fish marketing and consumption in the Kyrgyz Republic and allowed the authors to recognize emerging issues and trends and make recommendations for improvements. Segregating the data by oblast reveals some regional differences in fish marketing and consumption patterns.

The methodology for this study was designed based on the assumption that fish farmers and fishers produce fish and that exporters export fish and fish products. Therefore, two separate questionnaires were designed to target these two groups. However, in reality, some of the fish exporters are also engaged in fish farming. In this survey, those exporters engaged in fish farming were treated as exporters and not as fish farmers. Therefore, it should be noted that average data provided for fish farms do not take into account the fish farmers who are described in the section in this document on exporters. As a result, the average volume of fresh fish production, fish processing, and number of workers employed by fish farms is higher than indicated by the data presented in this section. Nevertheless, the information presented in this section is representative of 77 percent of the registered fish farms in the Kyrgyz Republic.

3. FISH PRODUCTION

3.1 Establishment of fish farms

The study has revealed that a significant proportion (50 percent) of the surveyed fish farms started their activities in the period 1995–2002, and that since this period the development of fish farms has slowed. Since independence, the majority of fish farms were started from 1996 onwards. Most fish farms in Chui Oblast were established between 1998 and 2002, while 80 percent of Issyk-Kul fish farms were started between 2005 and 2011. Almost 10 percent of the fish farms surveyed have been established in the past ten years and most are located in Issyk-Kul Oblast. Most are pond fish farms (Plate 1), and there are only four operational rainbow trout cage farms in Lake Issyk-Kul (Plate 2). No notable activity in terms of establishment of new farms has been noted in Talas, Naryn and Jalal-Abad Oblasts.

PLATE 1

Fish pond near Lake Issyk-Kul



Courtesy of: FAO/Sunil Siriwardena.

PLATE 2

Cage culture in Lake Issyk-Kul



Courtesy of: FAO/Sunil Siriwardena.

3.2 Number of employees and remuneration

A fish farm employs an average of 6–7 persons. Depending on the season, farms attract six additional temporary workers. Most farm workers are male; of six full-time workers, five are usually male and one is female. The same ratio is reported for temporary staff (Table 4).

TABLE 4

Average number of full-time and temporary workers

	Total (n=32)¹	Male	Female
Average number of full-time staff	6.5	5.1	1.4
Average number of temporary staff	6.1	5.5	0.6

¹ n = number of farmers surveyed.

Farms in Talas Oblast tend to have the highest number of employees (up to 21 full-time workers and up to 11 temporary workers during peak season). Fish farms in Naryn Oblast have the lowest number of employees: 1 permanent and 8 temporary. Fish farms in Jalal-Abad do not usually employ temporary workers and have no more than three permanent staff. The number of workers per farm depends on several factors, such as extent of the farm, intensity of the farming practice and the availability of family labour.

The average monthly remuneration of fish farm workers ranges from KGS2 400 KGS⁴ to more than KGS4 500 (Table 5). The remuneration of fish farm workers varies between oblasts, between full-time

⁴ The Kyrgyz som (KGS) is the national currency of the Kyrgyz Republic. During the study year, the average conversion ratio was KGS47 to USD1.

and temporary workers, and between genders. The remuneration of full-time permanent workers is higher than that of temporary workers, on average by KGS700 for male and KGS1 100 for female employees. Farm employees in Talas and Naryn oblasts tend to have remuneration that is lower than the national average, being KGS1 150 KGS and KGS860 per month lower for permanent and temporary employees, respectively.

TABLE 5

Average remuneration of fish farm workers per month by gender (KGS)

	Total (n=32)¹	Male	Female
Full-time workers	4 205	4 500	3 533
Temporary workers	3 802	3 839	2 438

¹ n = number of farmers surveyed.

The monthly remuneration of full-time permanent workers ranges from KGS1 000 to KGS8 000, while that of temporary workers ranges from KGS500 to KGS7 000. Staff working on fish farms in Chui Oblast are the highest paid compared with those in other oblasts (Table 6). The average monthly remuneration of full-time permanent workers of fish farms in Chui Oblast is KGS1 954.15 KGS higher than that of similar workers in Talas Oblast and 1 666.65 KGS higher than those in Naryn Oblast.

The average variation of remuneration between permanent and temporary male workers (about KGS160) is less than that (about KGS1 100) of a female worker per month (Table 6). The remuneration of women, both permanent and temporary workers, is notably lower than that of men.

TABLE 6

Average remuneration of fish farm workers per month by oblast (KGS)

Oblast:	Chui (n=12)¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
Full-time workers	5 000	3 771	3 800	4 000	4 000	4 205
Male	4 917	4 367	4 000	4 000	4 000	4 500
Female	5 250	2 778	3 500	–	–	3 533
Temporary workers	4 333	3 500	1 625	2 000	–	3 802
Male	4 333	4 000	1 833	2 000	–	3 839
Female	–	2 643	1 000	–	–	2 438

¹ n = number of farmers surveyed.

3.3 Species of fish grown by fish farms

“Rainbow trout is produced in cage farms in Lake Issyk-Kul. Some farms have up to 8 cages and produce up to 70 tonnes of trout per year.” – Key informant.

“In 2010, the Institute of Biology of the National Academy of the Kyrgyz Republic recalled all biological justifications for cage culture in Lake Issyk-Kul for commercial production of rainbow trout. After this recall, the State Agency for Environmental Protection and Forestry and the Department of Fisheries under the Ministry of Agriculture were supposed to issue an order on liquidation of the cages, but it has not been done. According to the Law on Fauna and the Law on Fish Industry, operation of cages is illegal if there is no biological justification.” – Key informant.

“Farmers often release a lot of larvae into their ponds. However, commercial return is minimal. This situation is typical for the extensive method of fish production. For instance, releasing whitefish in the form of larvae gives a commercial return of 0.02 percent. If farmers would grow fish larvae up to an older fry or fingerling stage and release them into ponds rather than stocking their ponds with fish larvae, the commercial return could be increased to at least 30 percent. Just imagine how much greater the farmers’ profits and production could be, and what kind of benefit this approach would produce at the country level!” – Key informant.

It has been reported that there are 71 freshwater fish species in the Kyrgyz Republic, and of these, 50 are indigenous and 21 are introduced (Turdakov, 1963). According to a recent publication on the introductions of fish species in the Kyrgyz Republic (Alpiev *et al.* 2013), a total of 73 fish species belonging to 15 families are present in Kyrgyz waters and of these, 49 species are indigenous and 24 species have been introduced, either deliberately or accidentally. Out of the 49 indigenous fish species, 6 species are endemic to the water systems of Lake Issyk-Kul.

The mainstay species of pond aquaculture production are common carp (*Cyprinus carpio carpio*) and Chinese major carps (silver carp [*Hypophthalmichthys molitrix*] and grass carp [*Ctenopharyngodon idella*]), and, for cage culture, rainbow trout (*Oncorhynchus mykiss*) (Sarieva, Niazov and Siriwardena, 2012). According to key-informant estimates and farmer surveys, one fish farm can grow up to four or five species of fish. However, ponds can also contain other non-targeted species of fish that are not commercially produced. These non-targeted species may enter the ponds when incoming water is not properly screened to prevent the entering of unwanted species. The non-targeted species reported during the study were pike-perch (*Sander lucioperca*), Balkhash marinka (*Schizothorax argentatus*), snakehead (*Channa argus*), crucian carp (*Carassius carassius*) and tench (*Tinca tinca*). Respondents named 13 targeted species of fish that are grown commercially or are simply found in farmed fish ponds (Table 7). The widest diversity of fish species is produced by fish farms in Issyk-Kul Oblast, which reported up to 9 of the 13 species recorded in fish farms throughout the country.

TABLE 7

Main species of fish grown or found in fish farms (key informant estimates)

Oblast	Chui	Issyk-Kul	Talas	Naryn	Jalal-Abad
Cultured species					
Common carp (“sazan”) (<i>Cyprinus carpio carpio</i>)	✓	✓	✓	–	✓
Bream (<i>Abramis brama</i>)	✓	✓	✓	–	–
Silver carp (<i>Hypophthalmichthys molitrix</i>)	✓	✓	✓	✓	✓
Grass carp (<i>Ctenopharyngodon idella</i>)	✓	✓	✓	–	✓
Crucian carp (<i>Carassius carassius</i>)	–	✓	–	–	✓
Rainbow trout (<i>Oncorhynchus mykiss</i>)	–	✓	✓	–	✓
Whitefish (<i>Coregonus lavaretus ludoga</i>)	–	✓	–	✓	✓
Pike-perch (<i>Sander lucioperca</i>)	✓	–	–	–	–
Peled (<i>Coregonus peled</i>)	–	–	–	✓	–
Other species¹					
Tench (<i>Tinca tinca</i>)	–	✓	–	–	–
European perch (<i>Perca fluviatilis</i>)	✓	–	–	–	–
Balkhash marinka (<i>Schizothorax intermedius</i>)	–	✓	–	–	–
Snakehead (<i>Channa argu arguss</i>)	✓	–	–	–	–
Total	7	9	5	3	6

¹ Non-targeted species that are found in ponds and harvested along with targeted species.

According to the survey results, common carp is the most common species farmed in ponds, followed by silver carp and grass carp (Table 8). Farms in Chui Oblast often farm common carp (36.8 percent) and silver carp (28.9 percent). In Issyk-Kul Oblast, farms most often raise common carp (40 percent), silver carp (20 percent) and grass carp (18.2 percent). In Talas Oblast, farms culture common carp (45.5 percent) and silver carp (18.2 percent), while in Naryn, peled (50 percent) and whitefish (*Coregonus lavaretus ludoga*) (50 percent) are cultured. Jalal-Abad has only one rainbow trout farm.

During the study, an effort was made to determine how many fish of a particular species were produced by farmers. However, this effort was not successful, as farmers do not keep records of how many fish are stocked into their ponds and how many are harvested to assess the efficiency of production.

It was also noted that many farmers stock delicate fish larvae into ponds rather than larger sizes such as fry or fingerlings, and that they practise extensive methods of fish culture. When the stocking stage

is fish larvae, the return in terms of production is very low when compared with stocking with fry or fingerlings, as larval fish are more easily stressed than older fry or fingerlings if pond conditions are suboptimal. Moreover, if predators occur in the pond as non-targeted species, larvae are more prone to predation than are older fry and fingerlings.

TABLE 8
Species of fish farmed or found in ponds (farmers' estimates)

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Grass carp	23.7	20.0	9.1	–	–	19.4
Common carp	36.8	40.0	45.5	–	–	37.9
Silver carp	28.9	23.6	18.2	–	–	24.1
Tench	–	5.5	–	–	–	2.8
Crucian carp	–	5.5	9.1	–	–	3.7
Rainbow trout	23.7	23.6	9.1	50.0	–	22.2
Whitefish	–	1.8	9.1	–	–	1.9
Freshwater bream	–	–	9.1	–	–	0.9
European perch	5.3	–	–	–	–	1.9
Balkhash marinka	2.6	–	–	–	–	0.9
Pike-perch	–	–	–	–	100	1.9
Snakehead	–	–	–	50.0	–	0.9
Peled	36.8	40.0	45.5	–	–	37.9
Total	100.0	100.0	100.0	100	100	100.0

¹ n = number of farmers surveyed.

3.4 Reasons for growing specific fish species

“The trout grown and presented in the market is not an endangered species. It is an introduced species that is now widespread in Lake Issyk-Kul. Unfortunately, up to now even farmers think that this is an endangered species. It is a misbelief. However, the rainbow trout grown in cages in Lake Issyk-Kul seriously endanger endemic species. – Key informant.

When deciding on which species to culture in ponds, farmers are primarily guided by the time it takes to make a profit. Thus, it is not surprising to learn that farmers prefer fast-growing species (Table 9). For 31 percent of respondents, this is the main criterion for selection. The second set of criteria were the desire to satisfy local demand for fish and fish products, and conditions appropriate for farming for a certain type of fish species.

Other reported reasons included: “I like to grow herbivorous species”, “this species is appropriate for growing in a pond without additional feeding”, “it is an environmentally friendly species” and “I produce trout because it is an endangered species” (see key-informant note above). Only 5.2 percent of respondents were guided exclusively by profitability, and only 5.0 percent viewed fish farming as an additional source of income.

The species selection criteria vary from region to region within the country. While farmers in Chui and Issyk-Kul Oblasts prefer fast-growing, easy-to-care-for species, farmers in Talas Oblast are attracted not only by ease of care and fast growth but also by unsatisfied market demand for fish. Naryn farmers choose to produce species that can survive under local conditions. Jalal-Abad fish farmers strive to supply fish to the local population.

TABLE 9
Criteria given by respondents for selection of fish species for commercial production

Reasons	%
Grows fast and needs little care	30.8
Desire to supply fish for public consumption	17.9
Appropriate farming conditions for this species	12.8
There is an unsatisfied demand for fish in the market	10.3
Easy to reproduce this species	7.7
It is a profitable business	5.2
Additional source of income	5.1
I like growing herbivorous fish	2.6
Appropriate for production in a pond	2.6
Trout is endangered species, I help with its reproduction	2.6
It is an environmentally suitable species	2.6
Total	100

Detailed analysis of choice of species suggests that the main reason for growing grass carp, common carp, crucian carp, silver carp, and pike-perch is their fast growth rates and relative ease of care. Tench and crucian carp are produced because of “insufficient supply on the market”; trout are selected for their fast growth and for the belief about their “endangered status”; while European perch and snakehead are chosen for their “high commercial value and demand”. It should be noted that it is a misconception that rainbow trout is an endangered species in the Kyrgyz Republic.

Perhaps because fish production is heavily influenced by seasonality, some farmers (38 percent) do fish farming as a hobby (Table 10). This reason for fish farming was particularly high in the oblasts of Talas (67 percent) and Chui (58 percent). Of the surveyed fish farmers, 32.4 percent recognized fish farming as a profitable business with many benefits for both the general public and the farmer (16.2 percent).

3.5 Fish farmers associations

The study has revealed that a significant number of fish farmers are members of various associations and cooperatives (Figure 1). However, 44 percent of respondents were not members of any association or cooperative, and about 15.6 percent had difficulty in responding. The latter suggests that even if farmers are members of certain public or socio-professional associations/unions, such entities are rather passive.

TABLE 10
Reasons for fish farming rather than some other business, by oblast

Oblast:	Chui (n=12)¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Fishing business is very “effective”	16.7	26.7	–	–	–	16.2
Bilateral benefit: fish to population, profit to farmer	–	20.0	33.3	–	33.3	16.2
High demand for fish and fish products	–	13.3	–	–	33.3	10.8
“Hobby, I like it”	58.3	26.7	66.7	–	16.6	37.8
“I have necessary skills and knowledge”	16.7	–	–	–	–	5.4
Family business	8.3	6.7	–	–	–	5.4
Civil service	–	–	–	100.0	–	2.7
Recreational fishing	–	–	–	–	16.6	2.7
Difficult to answer	–	6.6	–	–	0.2	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

The results of the study also suggest that the public activities of fish farmers in Issyk-Kul Oblast are greater than those of farmers in other oblasts. Respondents in this oblast belong to the greatest number

of associations and cooperatives that unite fish farmers. Only 20 percent of respondents in Issyk-Kul Oblast said that they were not members of any association (13 percent did not respond). In comparison, in Chui Oblast, these numbers were 50 percent and 25 percent, respectively. In Talas, Naryn and Jalal-Abad oblasts, none of the respondents were members of fish farmers associations or cooperatives (Table 11).

FIGURE 1

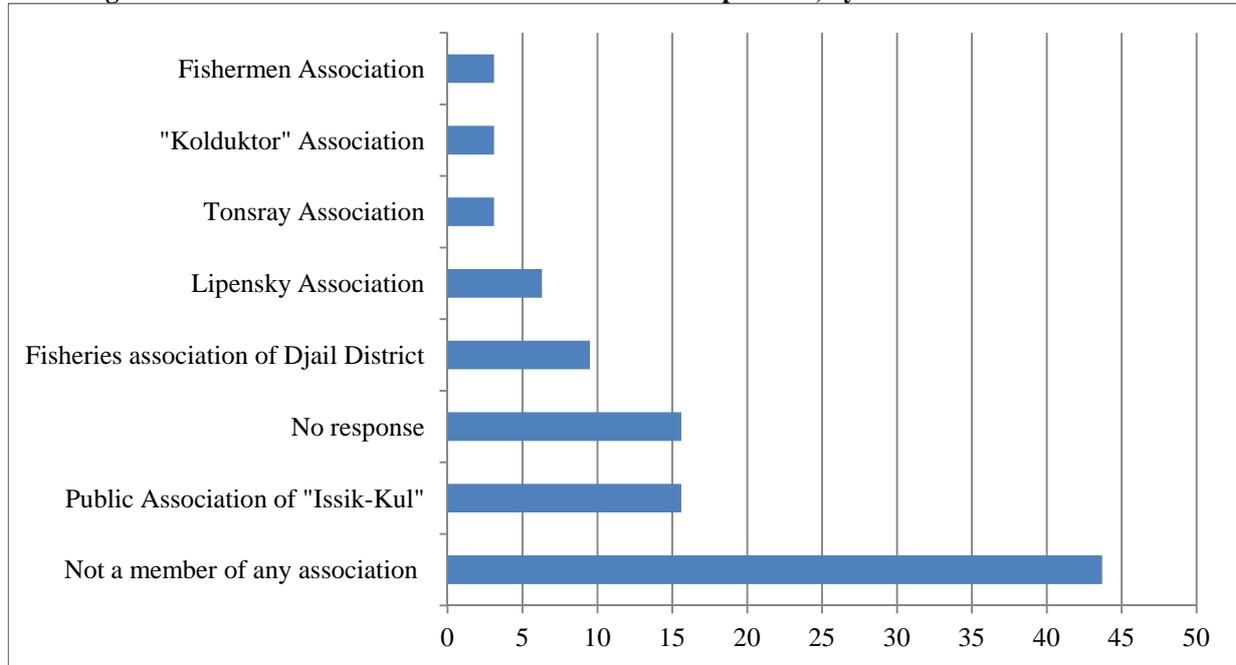
Percentage of fish farmers as members of an association or cooperative, by name

TABLE 11

Percentage of fish farmers that are members of associations or cooperatives, by oblast

Oblast	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Not a member of any association	50.0	20.0	100.0	100.0	50.0	43.7
No response	25.0	13.3	–	–	–	15.6
Public Association of "Issyk-Kul"	–	33.3	–	–	–	15.6
Fisheries Association of Djayil District	25.0	–	–	–	–	9.4
Lipensky Association	–	13.3	–	–	–	6.3
Tonsray Association	–	6.7	–	–	–	3.1
Kolduktor Association	–	6.7	–	–	–	3.1
Fishermen's Association	–	6.7	–	–	–	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

3.6 Some practices of fish farmers

According to the surveyed farmers, one fish farm can produce from 1 to 15 tonnes of fresh fish per year. About 36 percent of all farmers produce about 1 tonne of fresh fish a year. Fish farms in Issyk-Kul Oblast are smaller and most (57 percent) produce 1 tonne of fresh fish per year, while other farmers produce well above one tonne per year. Farms in Chui and Talas Oblasts are larger. The average tonnage of fish produced by fish farmers by region is given in Table 12. This reported average is per farm and not the production per unit area. The production per unit area is low (as reported by Alpiev *et al.*, 2013), varying from 0.1 to 0.34 tonnes/ha.

TABLE 12
Average production of live fish by oblast

Oblast:	Chui	Issyk-Kul	Talas	Jalal-Abad	Overall average
Average quantity (tonnes)	7.8	14.1	13.3	2.5	10.6

3.6.1 Use of fish feed

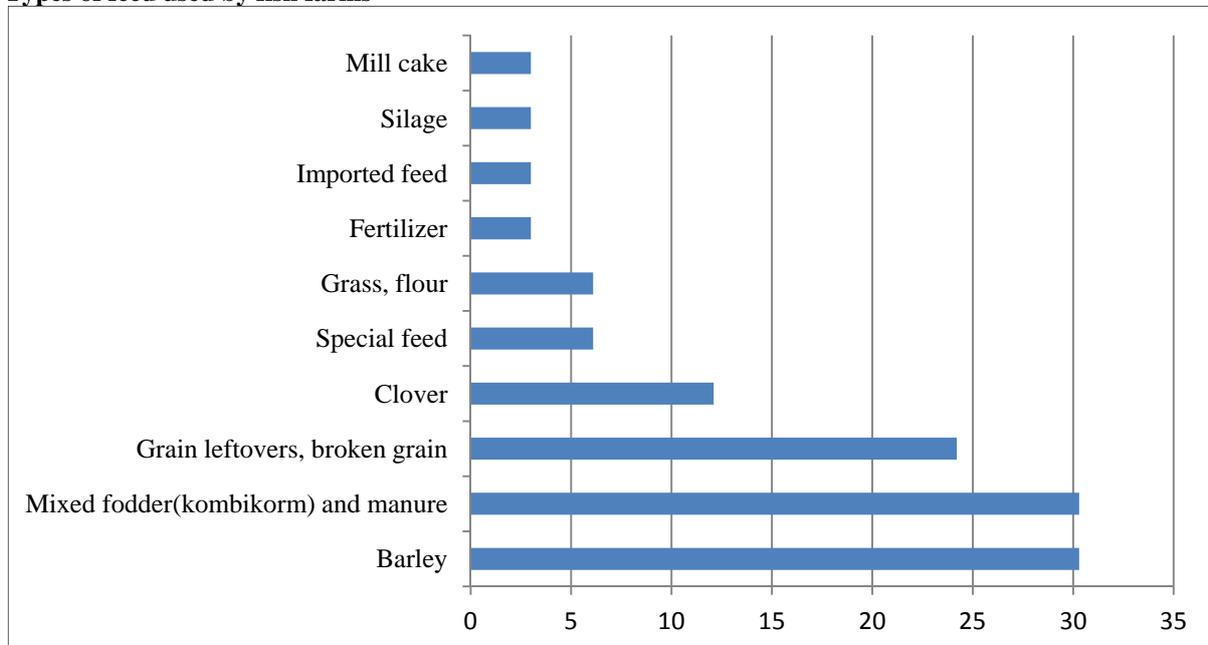
“The Kyrgyz Republic doesn’t have fish feed manufacturers for omnivorous and herbivorous species, as well as for carnivorous species of fish. Only fish feed manufactured locally could be produced cheap. Well-balanced feed (in terms of content of fat, protein, vitamins and mineral elements) could stimulate increased productivity in fish farms.” – Key informant.

In general, feed cost is the main component in the operating cost in aquaculture. However, according to the survey findings, wages are the main component in the operating cost of pond aquaculture. In contrast to pond aquaculture, cage culture of rainbow trout employs nutritionally balanced, manufactured, imported feeds (Sarieva, Niazov and Siriwardena, 2012), which are the main component in the operating cost.

Surveyed pond farmers either use no feeds at all or use simple farm-made aquafeeds prepared by mixing a few ingredients. One in three farmers uses mixed fodder (“kombikorm”) together with manure. This practice is widespread in Issyk-Kul and Talas Oblasts. Grain leftovers and broken grain is the second widely used fish feed in Issyk-Kul Oblast. Barley and clover are third and fourth preferences as fish feeds, respectively, and are mostly used by farmers in Chui Oblast. Other kinds of fish feed include special fodder, grass, flour, fertilizers, silage, mill cake and other. Note that 3 percent of the surveyed farmers do not use any special feed, which can cause low fish productivity in a pond (Figure 2). None of the farmers uses formulated commercial fish feeds, perhaps, for because of the high cost.

FIGURE 2

Types of feed used by fish farms



Note: The total exceeds 100 percent because respondents use more than one type of feed.

According to key informants, farmers’ knowledge of fish feeds and feeding, and of the technology of fish production, is very poor. Farmers often use mixed feed ingredients that are often imported and

expensive. Instead of using fish feeds, some farmers use animal manure to increase fish productivity by increasing natural food availability in fish ponds.

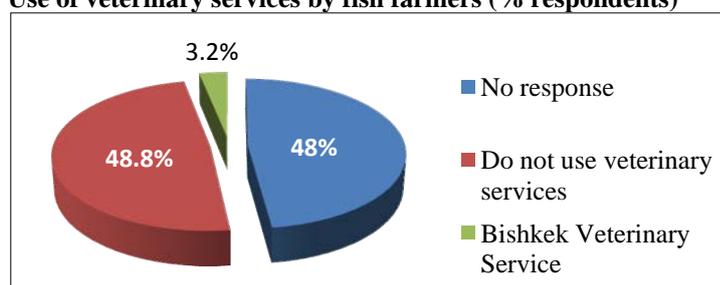
3.6.2 Use of veterinary services

“The country has almost no specialists in fish diseases at present. There used to be a fish diseases unit in the Republican Veterinary Bacteriological Laboratory, but they no longer operate, and no medicines to treat fish are imported to Kyrgyzstan.” – Key informant.

Only 3 percent of the surveyed farmers use veterinary services to control, diagnose and treat diseases of fish. Almost half of the farmers surveyed have never used veterinary services. The rest of the respondents (48 percent) had no response (Figure 3). It can be assumed that these respondents most likely do not use veterinary services.

FIGURE 3

Use of veterinary services by fish farmers (% respondents)



The very low percentage of farmers who consult or obtain veterinary services indicates either that they do not encounter fish health problems or that they are not aware of any health problems in their ponds. Sometimes farmers do not obtain veterinary services because of the cost involved.

Fish farmers in Issyk-Kul Oblast are the only farmers who obtain veterinary services based in Bishkek. Although Bishkek is located in Chui Oblast, no fish farmer from this oblast reported having used this service.

3.6.3 Processing fish

“If the farmers don’t sell chilled fresh fish and live fish, it can spoil quickly. Thus, they use traditional methods of curing and drying fish to preserve it. Cured fish stores well and later can be smoked. Some fish is also sold in marinated or salted form.” – Key informant.

Some 18 percent of the surveyed farmers are engaged in some sort of fish processing (Table 13 and Plate 3). On-farm processing is found in all oblasts, but to a greater degree in Jalal-Abad, Talas and Issyk-Kul. Chui Oblast stands out with the greatest number of farmers (92 percent) who do not process fish. This may be attributed to their ability to supply fresh fish to the main markets in Bishkek because of their close proximity. In Naryn Oblast, no farmers are engaged in processing; however, this statement should be interpreted carefully, as only one farmer was surveyed from this oblast. According to the Department of Fisheries, Naryn Oblast has virtually no other fish farms.

TABLE 13

Percentage of fish farmers engaged in processing fish by oblast

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Yes	8.3	20.0	33.3	–	50.0	18.2
No	91.7	80.0	66.7	100.0	50.0	81.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

PLATE 3

Small-scale farmer- processor with dried and smoked fish

Courtesy of FAO/Sunil Siriwardena

In terms of type of processed product, 50 percent of farmers who do fish processing do curing/drying of fish, about one in five smoke fish, one in ten salt fish, and the same number marinate fish and cook (Table 14). Cured/dried fish is the main type of processed fish in almost all regions surveyed (Table 15). Although only 18 percent of farmers engage in fish processing, 39.4 percent have special rooms/space that can be used for treating, processing and selling fish.

TABLE 14

Main types of fish processing by fish farmers

Fish product	Total (%)
Cured/dried fish	49.3
Smoked fish	21.7
Salted fish	14.4
Marinated fish	7.3
Cooked fish	7.3
Total	100.0

TABLE 15

Main types of fish processing by fish farmers by oblast

Oblast:	Chui (n=12)¹	Issyk-Kul (n=15)	Talas (n=3) (%)	Naryn (n=1)	Jalal-Abad (n=1)
Dried/ cured fish	50	66.6	40	–	50
Salted fish	–	16.7	20.0	–	14.4
Marinated fish	–	–	20.0	–	7.1
Smoked fish	50	16.7	20.0	–	21.4
Cooked fish	–	–	–	100.00	7.1
Total	100.0	100.0	100.0	100.0	100.0

¹n = number of farmers surveyed.

3.7 Storing fish products

Many farmers (42.1 percent) do not have equipment for storing fish to keep them for long periods without affecting their quality (Table 16). This may be due to the fact that most farmers (56 percent) sell their production soon after harvest to buyers who come to their farms. Available storage equipment includes tubs for temporary fish storage and freezers; 26 percent have tubs and 10 percent have a freezer at the farm. Refrigerated showcases (7.9 percent) and refrigerated fish containers (5 percent) are rare. A few farmers have special trucks (2 percent) or other specialized vehicles (3 percent) for transporting fish. Special trucks for transporting fish and freezers are available only in Issyk-Kul Oblast. However, 62 percent of fish farms in Issyk-Kul and 36 percent in Chui do not have

any equipment for storing fish (Table 16). According to the farmers, all the available equipment for storing fish is in working condition.

Ice is rarely used for storing and showcasing fresh fish products. Only 9 percent of surveyed farmers said that they used ice to chill fish, almost all in Chui Oblast. The low percentage of farmers using ice to keep fish fresh is due to the lack of ice manufacturing in the Kyrgyz Republic. The few people who produce ice do so by freezing water.

3.8 Selling fish

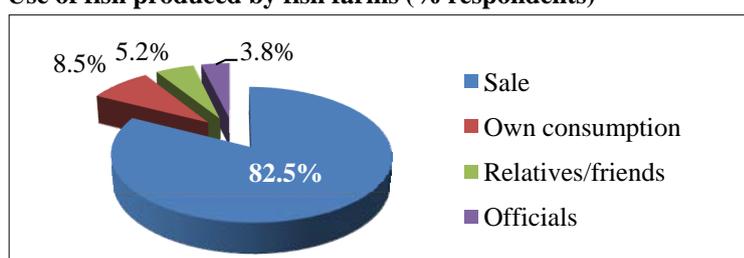
Most of the fish produced by the fish farms is sold (82.5 percent); 8.6 percent is consumed by the farmer-household, 4.9 percent is given to relatives and friends, and almost 5 percent is given to officials and local authorities to maintain “good relationships” (Figure 4). The maintenance of “good relationships” with officials in the form of giving fresh fish is highest in Jalal-Abad (25 percent). In all other oblasts, the offering of fish to maintain “good relationships” does not exceed 3 percent of the production. However, there are differences in the use of produce between oblasts.

TABLE 16
Availability of equipment to store fish and fish products (% respondents)

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal- Abad (n=1)	Total (n=32)
	(%)					
No equipment	35.7	62.5	–	100.0	–	42.1
Tubs	28.6	6.3	75.0	–	66.7	26.4
Freezers	–	25.0	–	–	–	10.5
Refrigerated showcases	14.4	–	–	–	33.3	7.9
Refrigerated containers	7.1	–	25.0	–	–	5.3
Special trucks for transporting fish	–	6.2	–	–	–	2.6
Special vehicles	7.1	–	–	–	–	2.6
No response	7.1	–	–	–	–	2.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

FIGURE 4
Use of fish produced by fish farms (% respondents)



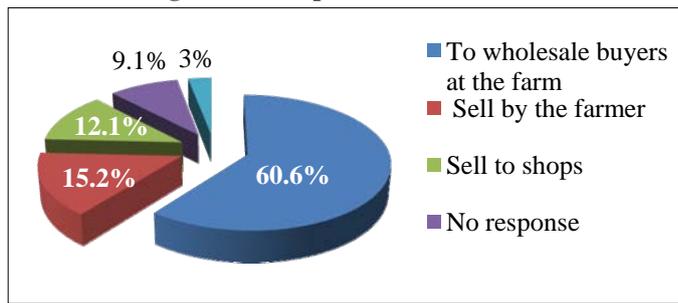
Jalal-Abad and Issyk-Kul Oblasts reported the highest number of farmers that keep fish for personal consumption (26 and 13 percent, respectively) and up to 8 percent goes to friends and relatives (Table 17). In other oblasts, the sale of fish ranges from 87 to 100 percent.

TABLE 17
Use of produced fish by oblast

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=1)	Naryn (n=1)	Jalal-Abad (n=1)
	(%)				
Sale	96.6	73.1	87.0	100.0	42.5
Personal/domestic consumption	1.2	13.3	5.3	–	26.0
Relatives, friends (assistance)	1.1	8.0	5.0	–	6.5
Officials (bribes, presents)	1.1	5.6	2.7	–	25.0
Total	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

FIGURE 5

Mode of selling fish (% respondents)

Generally, fish is sold at the farm to wholesale buyers (61 percent) (Figure 5). This is especially true for Chui, Jalal-Abad and Talas Oblasts. In Issyk-Kul Oblast, 40 percent of farms sell directly to wholesale buyers and 33 percent sell their production in local markets. Some farmers deliver fish to shops and markets (Table 18).

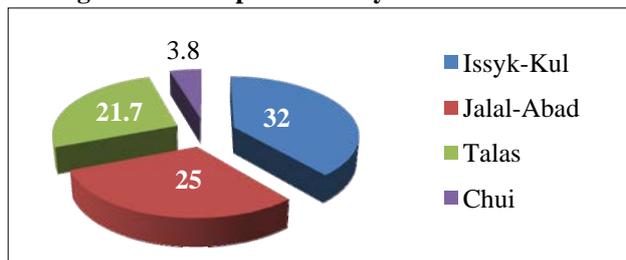
TABLE 18

Mode of selling fish by oblast

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)
			(%)		
To wholesale buyers	75.0	40.0	100.0	–	100.0
Sell in public places	–	33.3	–	–	–
To shops and small retail outlets	25.0	–	–	100.0	–
No answer	–	20.0	–	–	–
Do not sell	–	6.7	–	–	–
Total	100.0	100.0	100.0	100.0	100.0

¹n = number of farmers surveyed.

FIGURE 6

Average number of potential buyers of fish at one farm

The average farmer has 19 potential buyers of fish. Farmers in Issyk-Kul Oblast tend to have the greatest number of potential buyers, followed by those in Jalal-Abad and Talas Oblasts (Figure 6). Farmers in Chui Oblast have the lowest number of potential buyers (4 percent). Overall, 29 percent of the farmers sell fish and fish products at wholesale points

(Table 19). This is especially true for Chui Oblast (44 percent). One in four farmers supplies fish to local markets in Issyk-Kul (30.5 percent), while one in four sells produce to fish specialty stores in Chui Oblast (24 percent). According to farmers, specialized stores are unavailable in Issyk-Kul, Naryn and Jalal-Abad Oblasts. One in ten farmers takes produce to other oblasts or exports it.

TABLE 19

Points of sale of fish by farmers (% responses)

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
			(%)			
Wholesale outlets	44.0	30.5	8.3	–	–	29.2
Sold at local market	24.0	30.5	16.7	–	25.0	24.6
Specialized shops	24.0	–	8.3	–	–	10.8
Grocery stores	8.0	8.7	–	–	–	6.2
Cafes and restaurants	–	–	16.7	–	75.0	4.7
Sold to other oblasts or exported	–	4.4	41.8	100.0	–	13.9
Security units	–	4.4	–	–	–	1.5
No response	–	21.5	8.2	–	–	9.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹n = number of farmers surveyed.

Other points of sale include grocery stores (6 percent) and cafes and restaurants (5 percent). Only 1.5 percent of the fish farms supply fish to security units.

In Chui Oblast, the main points of sale are wholesale outlets, while in Issyk-Kul Oblast, they are wholesale outlets and local markets. In Talas Oblast, the main point of sale is local markets, while in Jalal-Abad Oblast, restaurants/cafes are the main points. Fish from Naryn Oblast mostly goes to other oblasts.

3.9 Price of fish

*“I sell fish to frequent buyers – fish processors, cafes, restaurants, as well as to ordinary people at the market. Fish processors cure and smoke fish and then sell it in stalls by the side of roads, and at small markets. The price of fish triples from the producer to the seller at the market. For instance, chebak (Issyk-Kul dace, *Leuciscus bergi*) that fishermen sell for KGS200 per kilogram is sold at the market in the ready to eat form for KGS800–1 000.” – Key informant.*

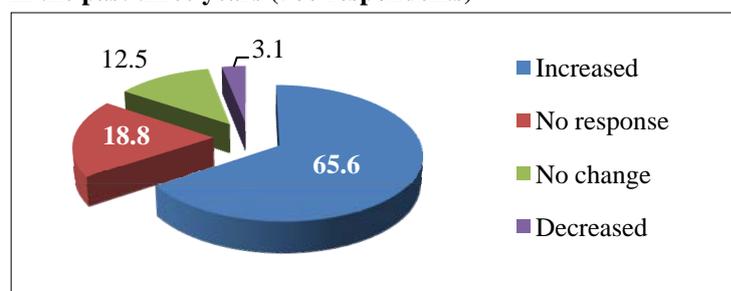
“We grow three species of fish – silver carp, common carp and grass carp (Amur). We deliver common carp to stores, silver carp and grass carp to the market. Common carp is costly to produce – 1 kg of carp takes 5 kg of feed. Silver carp feeds on phytoplankton and water plants; thus it costs less – KGS70–80/kg. Wholesalers/intermediaries usually add another KGS100/kg. We produce it for KGS80 and they add another KGS100 just for selling it. Of course, it becomes expensive for the final consumers.” – Key informant.

On average, the price charged per kilogram of fish is KGS52. Depending on species, the average price ranges from KGS90 to 266 (Table 20). Thus, the most expensive fish sold by fish farms is rainbow trout, which is sold at an average price of KGS266/kg, and the cheapest is European perch (*Perca fluviatilis*), which is sold at KGS90/kg.

TABLE 20
Price variations for fish sold by fish farms

	Average price	Lowest price	Maximum price	Price range
	(KGS/kg)			
Rainbow trout	266	242	360	118
Common carp	119.8	92.6	140	47.4
Grass carp	108.3	82.8	122.8	40
Silver carp	101.2	86.2	125	38.8
Snakehead	100	80	120	40
Crucian carp	98.6	80	121.4	41.4
European perch	90	70	110	40

FIGURE 7
Trend in prices of fresh fish sold by farmers
in the past three years (5% respondents)



According to 66 percent of the respondents, the price of fish has increased in the past three years (Figure 7). About one in five respondents (18 percent) were unable to respond. The greatest number of respondents who noted a price increase was reported for Talas, Jalal-Abad and Issyk-Kul Oblasts

(Table 21). Thirty-three percent of the surveyed farmers in Chui Oblast thought that price had not changed in the past three years. Generally, it can be assumed that the supply of fish in Chui Oblast in the past three years has increased significantly (compared with other oblasts), which has led to no observed price change.

TABLE 21

Trend in prices of fresh fish sold by farmers over the past three years by region (% respondents)

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Increased	58.3	60.0	100.0	–	100.0	65.6
Difficult to answer	–	40.0	–	–	–	18.8
Has not changed	33.3	–	–	–	–	12.5
Decreased	8.4	–	–	–	–	3.1
No answer/refusal	–	–	–	100	–	–
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹n = number of farmers surveyed.

3.10 Recreational fishing

Fifty-eight percent of the surveyed farmers allow recreational fishing in one way or another in their ponds. In Chui Oblast, 67 percent of the fish farmers permit recreational fishing, while in Issyk-Kul and Jalal-Abad, the figure is 47–50 percent. In Talas Oblast, practically all farmers allow recreational fishing in their fish farms. No recreational fishing was reported in Naryn (Table 22).

TABLE 22

Famers allowing recreational fishing in fish farms by region

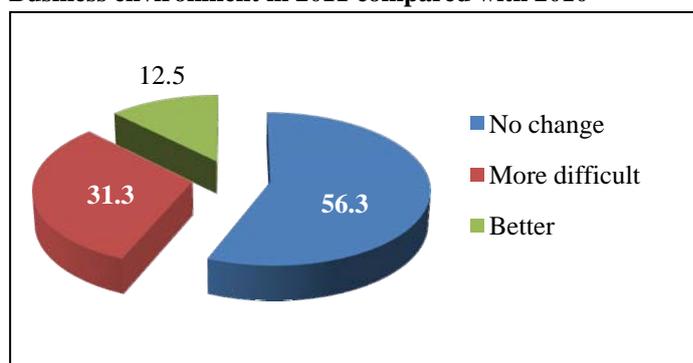
Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Yes	66.7	46.7	100.0	–	50.0	57.6
No	33.3	53.3	–	100.0	50.0	42.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹n = number of farmers surveyed.

3.11 Farmers' perception of their business environment

During the study, farmers expressed their views on queries related to the development of their businesses such as: “Has it become more difficult to operate business this year as compared to past years?”; “Has production of fish increased over the past three years?”; “Are there more competitors on the market?”; and “Would you like to increase production of fish on your farm?”.

FIGURE 8

Business environment in 2011 compared with 2010

The survey revealed that 56 percent of respondents think that nothing has changed in the past year (Figure 8). However, one in three farmers felt that it had become more difficult to run their business, while 13 percent felt it had become easier. While representatives from Chui Oblast generally (75 percent) felt that nothing had changed in the past years in terms of running a fish farm, 100 percent of Jalal-Abad fish farmers

felt that it had become more difficult (Table 23).

Additional difficulties farmers faced include:

- drought and higher cost of fodder (60 percent in all oblasts);
- difficulties in “cleaning the pond”; and
- higher gas and fuel prices.

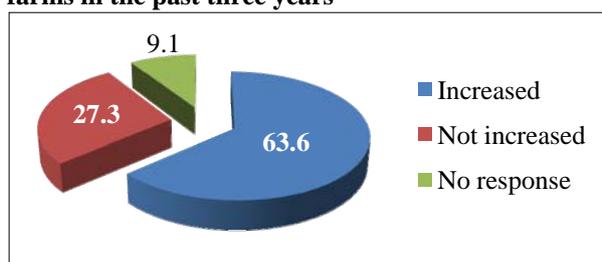
TABLE 23

Fish farming business environment in 2011 compared with 2010, by region

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)
			(%)		
No change	75.0	46.7	66.7	–	56.3
Become more difficult	16.7	33.3	33.3	100.0	31.3
Become better	8.3	20.0	–	–	12.5
Total	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

FIGURE 9

Trend in fish production on respondents' farms in the past three years**3.11.1 Development prospects**

Despite all the difficulties experienced by fish farmers in the past three years, fish production has increased, as indicated by 64 percent of the respondents (Figure 9). Fish production has increased in all oblasts, particularly in Issyk-Kul (73 percent of respondents in this region reported

increased fish production on their farms) (Table 24). However, 27 percent of all respondents said that fish production had not increased.

TABLE 24

Trend in fish production on farms in the past three years, by region

Oblast:	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
						(%)
Yes	50.0	73.3	100.0		50.0	63.6
No	25.0	26.7		100.0	50.0	27.3
Difficult to answer	25.0					9.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

Almost all (91 percent) of the respondents claimed that they could increase their fish production, the exceptions being a few respondents in Issyk-Kul Oblast (7 percent) who think that increased production is impossible owing to limits on the extent of ponds. At the same time, 6 percent were undecided.

3.11.2 Perceived competition in the sector

More than half of the respondents (56 percent) thought that the fish farming industry was highly competitive. The survey also suggested that current fish production does not meet the demand for fish. Almost one in three respondents (28 percent) noted some competition in this business. Sixteen percent of the respondents did not respond as they were not sure of the competition in the sector (“no response” was particularly high in Chui Oblast).

3.12 Problems with fish farming

“The first problem is lack of fish seed supply for stocking of ponds. This is yet to develop in our country. The second problem is availability of balanced fish feeds for growing various species of fish. Carp needs one kind of diet, trout needs another diet. Every species needs its own specialized fish feed. But we feed the same feed to all fish and therefore, it doesn’t grow well.” – Key informant.

“The problem is with marketing and sale. If there were more specialized stores, farmers would be able to bring their fish to stores that have water tubs and fridges to clean fish and refrigerate. It would be convenient both for the farmer and for the buyer. The buyers would not be looking for farmers, they would know where to go to buy fish. Presence of a specialized store is a must.” –Key informant.

“Problems with sales and marketing have to be addressed in some way. For instance, when a pond is drained and harvested, there is a greater production of fish than expected. Farmers bring large quantities of fish, around 300 kg at a time, but we physically cannot take that much fish at one time. Our purchasing capacity is small. That is why poor farmers run around trying to sell fish to anybody. They end up selling to small fish processors and small vendors in the market, incurring much cost in the selling process.” – Key informant.

“It is imperative that people should eat more fish. Thus local producers should be supported. We wrote a letter to the ministry, to the President’s Office suggesting to require fish on the menu in hospitals, security units, jails, etc. We were told that there is a law on public tenders and until amendments are made to that law they wouldn’t be able to buy from us.” – Key informant.

“In order to develop fish farming in the country, we need specialists. The Department of Fisheries should play the lead role. Of course, we need money to train people, to carry out practical activities and raise awareness among farmers. Farmers should undergo practical training, share experience, and go on study tours.” – Key informant.

According to 45.7 percent of the respondents, the main problems in fish farming are lack of soft loans or financial assistance to develop the business and the high cost of fish feeds (Table 25). Seven percent of farmers cited inadequate infrastructure for fish farming, such as lack of electricity, poor water supply and inadequate security at the farm.

TABLE 25
Current issues/problems facing fish farmers

Issues/problems	Chui (n=12) ¹	Issyk-Kul (n=15)	Talas (n=3)	Naryn (n=1)	Jalal-Abad (n=1)	Total (n=32)
	(%)					
Lack of affordable credits	53.9	46.1	100.0	–	–	43.5
High cost of fish feeds	–	–	–	–	20.0	2.2
Instability in the country	15.4	3.9	–	–	–	6.5
Lack of support from government	–	3.9	–	–	20.0	22.2
Lack of support from local authorities	–	3.9	–	–	–	2.2
Lack of legal framework	7.7	–	–	–	–	2.2
Lack of knowledge/experience	–	11.5	–	–	–	6.5
Lack of fish seed supply	–	11.5	–	–	–	6.5
Lack of equipment	–	–	–	100.0	40.0	6.5
Lack of machinery to expand fish farms	7.7	3.9	–	–	–	4.4
Lack of proper fish feeds	–	7.7	–	–	–	4.4
Lack of hatcheries	–	3.9	–	–	–	2.2
Open ponds freeze in winter	–	–	–	–	20.0	2.2
Lack of electricity	–	3.9	–	–	–	2.2
Problems with water supply	7.7	–	–	–	–	2.2
Lack of security of the farm	7.7	–	–	–	–	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

¹ n = number of farmers surveyed.

3.13 Help that farmers need

“Production of fish should be developed in all Naryn river cascades. Fish should not be raised in cages, so that Lake Issyk-Kul would not be contaminated by large-scale production. The lake is unique and should be preserved. Farmers need help with chilling and refrigeration. Many do not have the necessary equipment; as a result, fish spoils and farmers lose money.” – Key informant.

According to the responses received, the main help that farmers need is financial support in the form of soft loans (81 percent of surveyed farmers) (Table 26), especially farmers in the oblasts of Chui (83 percent) and Issyk-Kul (87 percent). Availability of fish seed supply is the second-largest problem for fish farmers, as was noted by one in five respondents, especially farmers in Issyk-Kul Oblast. Specialized equipment is third in importance, while training in fish farming is the fourth-most important area related to the poor practical and theoretical knowledge of farmers on fish farming.

TABLE 26

Assistance needed by farmers

Type of assistance needed	Total (%)
Financial support	81.3
Supply of fish seed	18.8
Machinery/equipment	15.6
Training in fish farming	9.4
Investment in fish farming	3.1
Stability in the country	3.1
No help needed	3.1
Supply of covered pools	3.1
Total	137.5¹

¹Total exceeds 100 percent because respondents were permitted to give more than one answer.

The other needs mentioned by farmers include:

- investment in fish farming;
- stability in the country;
- covered ponds/pools.

Analysis of responses showed that only 8 percent of farmers have been trained in issues related to their business. Generally, the training was related to pricing policy of competitors and pricing mechanisms. On average, 71 percent of the surveyed respondents would like additional training on various topics related to fish farming. However, almost one-third of the respondents had difficulties in specifying their training needs, which could be explained by their limited awareness of various issues.

Of the suggested training topics (Table 27), farmers were most interested in:

- new technologies of fish farming;
- fish disease prevention, control and treatment;
- access to credit;
- forecasting need and demand for fish products;
- placing, timing and pricing of fish for sale; and
- marketing.

TABLE 27

Training needs of fish farmers

	Trained	Interested	No response
		(%)	
Latest technologies of fish production	–	100.0	–
Fish disease prevention, control and treatment	–	100.0	–
Fish larvae rearing	–	100.0	–
Affordable/accessible credit	–	71.9	28.1
Marketing	–	71.9	28.1
Forecasting consumption and demand for fish products	–	68.8	31.3
Place, time and pricing of fish for sale	–	68.8	31.3
Taxation issues	–	68.8	31.3
Quality requirements of fish	–	65.6	34.4
Quantity and species of fish produced	–	65.6	34.4
Information about competitors	–	65.6	34.4
Government policy in the sector	–	65.6	34.4
Processing fish products	–	65.6	34.4
Pricing policy of competitors and market prices	6.3	59.4	34.4
Formulating pricing policy	–	59.4	40.6
Averages	0.4	73.1	26.5

4. TRADE

4.1 Exportation of fish and inter-oblast trade

4.1.1 *General profile*

There are only a few exporters of fish and fishery products in the Kyrgyz Republic. The respondents who consider themselves exporters can have three forms of ownership: state-owned, limited liability company (LLC) or private. Exporters export fish and fishery products mainly to Kazakhstan. The usual kinds of products exported from the Kyrgyz Republic are chilled and frozen fish, while the products distributed within the Kyrgyz Republic are frozen, salted, chilled, marinated and canned fish. Fish species exported usually include rainbow trout, whitefish and peled.

Companies exporting fish also deliver fish to other parts of the Kyrgyz Republic. Generally, they employ 10–20 individuals, two-thirds of whom are men. In addition, they also employ 10-40 temporary staff in processing activities. However, in 2011, part-time additional staff averaged 10–20 individuals, 50–80 percent of them men.

The respondents were reluctant to reveal what they pay staff. However, surveyed employees revealed that full-time permanent staff receive pay equivalent to 100 kg of fish delivered by the enterprise, and that the average salary of temporary staff is up to KGS5 000 per month.

According to the exporters themselves, they are diligent taxpayers and pay the following taxes:

- profit tax;
- payments to the Social Fund;
- retail tax;
- income tax.

Exporters registered as LLCs are well equipped with refrigerators, refrigerated showcases, fish chests and special trucks for exporting fish products.

Private entrepreneurs seem to have basic equipment, and are mainly equipped with refrigerators for fish products and refrigerated showcases. According to all exporters, the available equipment and machinery is in working condition and is constantly in use.

The availability and use of a particular piece of equipment is governed by the technological process followed by the company, starting from receipt of fish (purchase from a supplier or own production) and ending with the delivery of fish and fish products to clients. Those enterprises that sell fish on a daily basis are unlikely to have cold storage or chilling facilities. If produce is moved out from the enterprise less often (e.g. 12 times a month), then it is likely to have cold storage and refrigerating equipment.

The LLCs usually deliver to specialized shops, large wholesale buyers and state-owned enterprises. They also deliver their products to large chain stores, large shops, retail outlets and markets. Private entrepreneurs usually sell their produce to markets.

4.1.2 *Means of communication*

The means of communication used by respondents who consider themselves exporters are rather weak. Enterprises registered as LLCs use several means of communication more often than other types of exporters. Apart from telephone and face-to-face meetings, they use Internet and e-mail. To keep operating costs to a minimum, exporters rarely use faxes and trade fairs as a means of communication.

4.1.3 Sale of fish and fish products

The study shows that one exporter produces fish by himself for export purposes, while the others buy fish from wholesale traders to export. All exporters are engaged in fish processing activities such as curing, freezing or salting fish for export. Some exporters deliver live fish. Exporting takes place 2-7 times a week, 12–30 times a month. Usually, from 200 kg to 15 tonnes of chilled fish and from 200 kg to 25 tonnes of frozen fish are exported per month. Almost 200 kg of chilled and frozen fish is stored at one time by exporters in order to satisfy the demand of buyers.

Exporters who buy fish from suppliers consider the size of the lot and reputation of the supplier during purchase. Much attention is paid to the colour and smell of the fish, and to the technology used in fish production. Suppliers usually bring a batch of fish by themselves for selling, and they are usually from another oblast, while the exporter is located in the capital city. The price for the batch is decided through negotiation and is determined by the quality of the product and market prices. The export price of fish rarely changes and depends on the season. According to the exporters, the cost of exported fish is high from May to August (i.e. in summer) and is low from October to January (i.e. in winter). The price usually rises in the summer months coinciding with the tourist season (in Issyk-Kul Oblast) and during the holiday season.

All exporters wish to maintain long-term relations with foreign and Kyrgyz clients. For foreign clients, exporters use incentives such as discounts and packaging. For clients within the Kyrgyz Republic, they use:

- renewed payments;
- delivery of products to the client;
- discounts; and
- giving products for sale with the right to return unsold produce.

4.1.4 Competition in the business

Exporters generally refused to respond to questions such as: “How many competitors do you have at present?” Usually, exporters who export fish mainly to Kazakhstan do not have competitors, and those who distribute fish to other oblasts in the Kyrgyz Republic have about ten competitors. However, the number of competitors can vary widely. Less competition for exporters trading internationally may be due to the fact that very few companies are engaged in this market, as opposed to those who distribute fish for domestic markets.

The exporters who have competitors revealed that the level of competition depended on the price of the exported fish, the level of exports, the product range, the level of fish supplies, investments in the fish industry, and the buyers’ demands for product quality.

An exporter who mostly delivers to other parts of the Kyrgyz Republic noted reduced investments in the fish industry, and therefore the number of fish products stayed the same at the enterprise.

It should be noted that exporters rarely advertise their products. Most large-scale exporters use the Internet and invest in advertisements (almost 10 percent of their income), while small-scale exporters rely on the telephone and do not spend any money on other forms of advertising.

4.1.5 Problems and needs of exporters

The main problems faced by exporters who sell fish to other countries are high taxes, customs duties and corruption in the state authorities.

Exporters who sell fishery products abroad need effective legislation and low-interest credit. The study showed that respondents do not have experience in obtaining credit. The fish processors who distribute

their products to other parts of the country recognize the importance of upgrading fish processing plants, facilities to produce fish roe, expansion of the network of large specialized fish shops, and access to fish cold-storage facilities.

The development of the fish and fishery products export sector will require: development of fish processing technology and the upgrading of facilities to international hygiene and other standards; the organization of a network of fish supplies and sale outlets; the production of roe; and the importation of fish for processing, owing to the low local production of fish. For business expansion, the respondents mostly rely on their own funds, rather than on credit, as formal credit is hard to obtain.

The study shows that exporters have never been trained in processing technologies and related business skills. There is a great need for training in the following areas:

- information about competitors;
- pricing policy of competitors and market prices;
- formulation of pricing policy;
- marketing;
- place, time and prices of sale fish;
- quality requirements for fish products;
- number and types of products and imported fish products;
- affordable credits;
- forecasted consumption and demand for fish products;
- state policy in the fish industry and market;
- taxation of similar companies; and
- processing technologies of fish products and international standards.

4.2 Importation of fish

4.2.1 General profile

According to importers, there can be various forms of ownership, such as LLCs and private entrepreneurs. According to experts, the Kyrgyz Republic has many physical and legal entities engaged in importing fish. According to the Statistical Committee of the Kyrgyz Republic, up to 7 500 tonnes of fish and fish products were imported into the country in 2010.

Fish is imported mostly from the Russian Federation and Norway, and less often from Kazakhstan. To communicate with partners, importers usually use the telephone and the Internet/e-mail. Unlike other importers, LLCs actively use other means of communication, such as fairs, workshops and face-to-face meetings.

Importers usually employ 3–10 full-time permanent staff, 60–80 percent of whom are men. Temporary staff vary from one to ten persons, who may all be men or up to 50 percent women. Importers registered as LLCs tend to have the highest number of workers, up to 20 persons during the peak season.

According to importers, remuneration of workers does not strongly depend on gender or full-time or temporary basis of employment; in all cases, remuneration does not exceed KGS5 000 per month.

Imports usually involve frozen, salted, smoked or canned fish, or seafood in the form of fillets, minced fish, caviar, squid, shrimp, halibut or lobsters. Atlantic herring and walleye pollock make up the bulk of imported fish.

The LLCs prefer to procure fish from large suppliers' warehouses located in other countries, while other importers buy fish from wholesale traders who deliver fish to them. Most LLCs buy fish from the same supplier, relying on reputation, quality certification, product range and the environmental

conditions used for growing fish. Other importers do not always buy fish from the same supplier (or suppliers) and are more often guided by colour and smell of the fish, the reputation of the company, the availability of quality certificates, the provision of goods with the possibility of returning unsold stock, and cheapest access to the supplier. Private entrepreneurs and heads of private enterprises think that buying fish from various suppliers is more effective because this way they can find the lowest price.

According to importers, the price of imported fish rarely changes and is determined by the market and during negotiations with the supplier. The prices of fish are reported to be highest in summer (May-July, especially in July) and lowest in winter (October-December, especially in November). According to respondents, these trends are set by the market and the seasonal availability of fish species.

Importers usually have refrigerators and refrigerated showcases; a few have freezer showcases. According to respondents, all equipment is in working condition. Cans, caviar and seafood are usually imported once a month, while frozen fish sometimes arrives once a week. Frozen fish makes up the bulk of imported fish products, accounting for up to 80 percent of the assortment. One respondent said that he could import up to 10 tonnes of frozen fish per month and store up to 3 tonnes of fish in cold storages at one time. Other respondents declined to answer questions related to the amount of imported fish and fish products.

Without exception, all importers are engaged in the processing of fish products. Most of them salt, smoke and marinate fish.

The LLCs supply fish to all available outlets, i.e. specialized stores, large trade centres, large wholesale buyers (resorts, cafes and restaurants), markets, retail shops and households. Most private enterprises deliver fish to more focused outlets, mainly specialized stores, households and markets.

4.2.2 Competition in the business

Large importers think that they have many competitors on the market, while smaller importers feel that they have few competitors. Large importers tend to have friendly relations with their competitors, while smaller ones do not maintain contacts with their competitors and have neutral relations. This may be why many of them do not know who their competitors are.

The study revealed that large and small importers perceive differently the changes that their businesses have undergone in over the past year. According to large importers, no significant changes in business took place, and nothing has significantly changed in terms of:

- competitiveness and number of competitors;
- level of importation of fish and volume of supplies; and
- number of fish in the assortment/product range.

According to smaller importers, the situation has changed, but not to their benefit, in terms of:

- price of imported fish products;
- price of supplied fish;
- quantities of imported fish; and
- number of fish in the assortment.

However, smaller importers think that consumer demand for quality fish has increased in recent years, but that the following have not changed:

- investments in the fishing industry; and
- fish supplies.

The study showed that importers generally do not use any marketing/advertising tools. To a large degree, importers limit their advertising to hoardings. Correspondingly, no major funds are spent on advertisements.

Business stimulation elements include:

- discounts; and
- moderate pricing.

Large importers tend to offer the following incentives to their clients:

- delivery of produce to clients;
- discounts; and
- providing fish for sale with the right to return unsold fish.

All importers believe that the following factors are important in maintaining long-term relations with their clients.

- delivery services;
- discounted prices;
- quality of goods; and
- diversity of products.

4.2.3 Problems and needs of importers

In their words, all importers are obedient taxpayers (including payment of the “patent tax”), make payments for space in the market, and observe local quality standards. However, many are not aware of the international quality standards such as International Organization FOR Standards (ISO) standards for the traceability of fish products. Usually, the potential users of the new ISO standards are fishers, fish farms, fish processing companies, fish auctions, transport companies, distributors, wholesalers and retailers. One ISO standard applies to wild fish (ISO 12875:2011), while another applies to farmed fish (ISO 12877:2011).

Importers believe that they may face the following problems in order trying to observe ISO standards:

- high customs duties (large importers);
- poor quality of fish (small importers); and
- difficulties with sales (small importers).

According to importers, flexibility on the part of authorities, strategic support for the fisheries sector at the country level, and affordable credits could all contribute to improving business and larger supplies of fish. While large importers tend to have experience in obtaining credit from banks and have a good credit history, smaller importers have less access to credit owing to the need for collateral and the inability of small businesses with limited turnover to keep up repayment of credit. All respondents planned to expand their businesses in 2012, with large importers striving to increase the diversity of fish products by obtaining bank credit, and with smaller businesses increasing the number of outlets by using their own funds.

4.3 Sellers of fish and fish products

4.3.1 Profile of sellers of fish and fish products

One-third (33 percent) of the surveyed respondent sellers were men and two-thirds (67 percent) were women. Among the sellers, 69 percent were retailers. Females who manage the business (79 percent) outnumbered male managers (21 percent) by almost four times. The distribution of large suppliers⁵ by oblast and other information about them is presented in Figures 10–13.

⁵ Hereafter, “large suppliers” is used to indicate “large suppliers of fish and fish products”.

FIGURE 10
Distribution of sellers by oblast (% respondents)

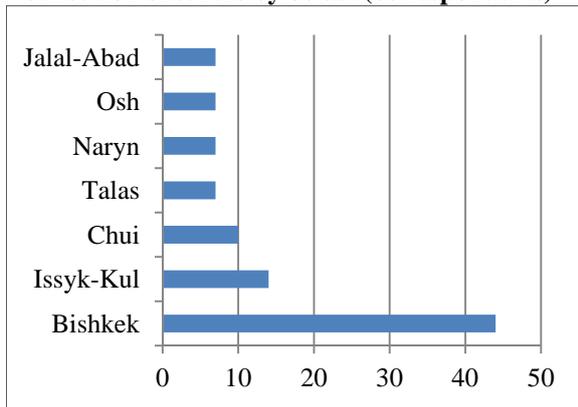


FIGURE 11
Types of sellers (% respondents)

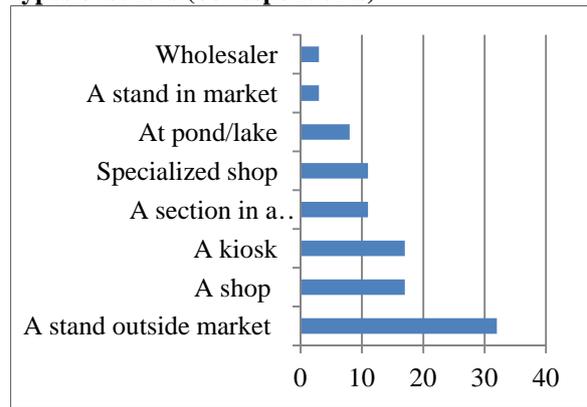


FIGURE 12
Location of seller's point of sale (% respondents)

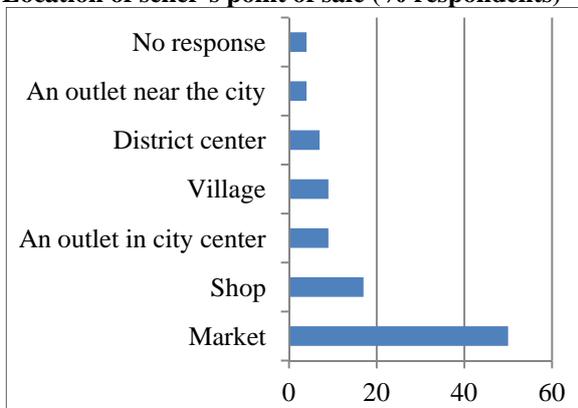
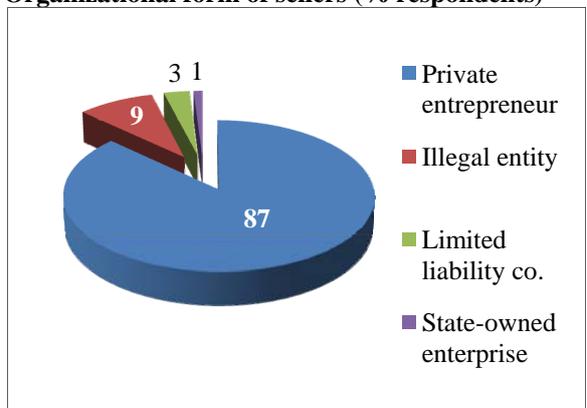


FIGURE 13
Organizational form of sellers (% respondents)



Trade in fish and fish products is the main activity for 55 percent of the surveyed respondent sellers (Figure 14). Others specialize in selling other food products as well as fish. Figure 15 presents the share of income received from trade in fish and fish products.

FIGURE 14
Specialization of fish sellers (% respondents)

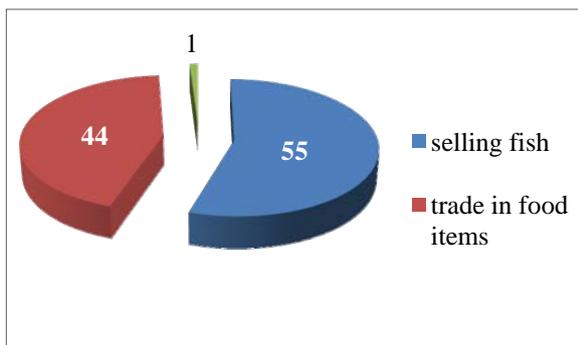
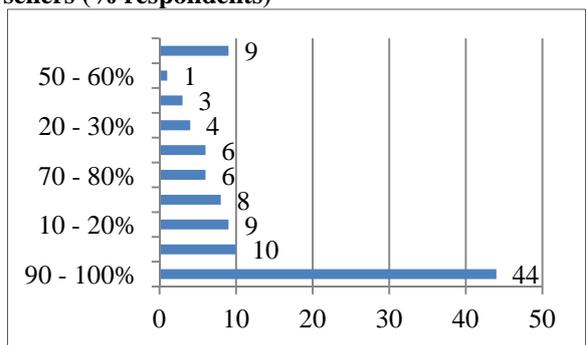


FIGURE 15
Share of fish and fish products in total revenue of sellers (% respondents)

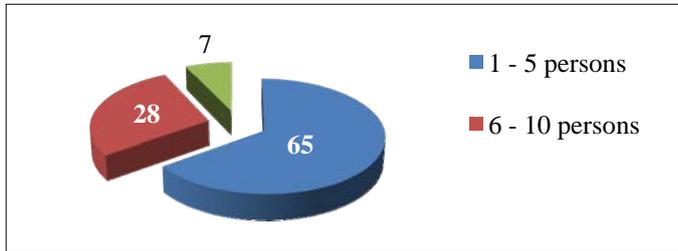


The study data indicate that 50 percent of large suppliers prefer to have the sale point at the market, and that 17 percent have shops. A smaller number of sellers have an outlet in the downtown area, in a village (9 percent), in the district centre (7 percent) or near the city/town (4 percent). Most sellers (87 percent) are registered as private entrepreneurs. Only 3 percent are registered as an LLC. One in ten (9 percent) runs an unregistered/informal business, and one company is a state-owned enterprise.

Enterprises specializing in fish trade receive an average of 90 percent of their income from fish sales, (Figure 15) while outlets specializing in sales of general food items receive almost 40 percent of their

income from the sale of fish, indicating that fish is an important component of their trade. The income of fish wholesalers comes 100 percent from the sale of fish.

FIGURE 16
Number of full-time staff at large suppliers (% respondents)



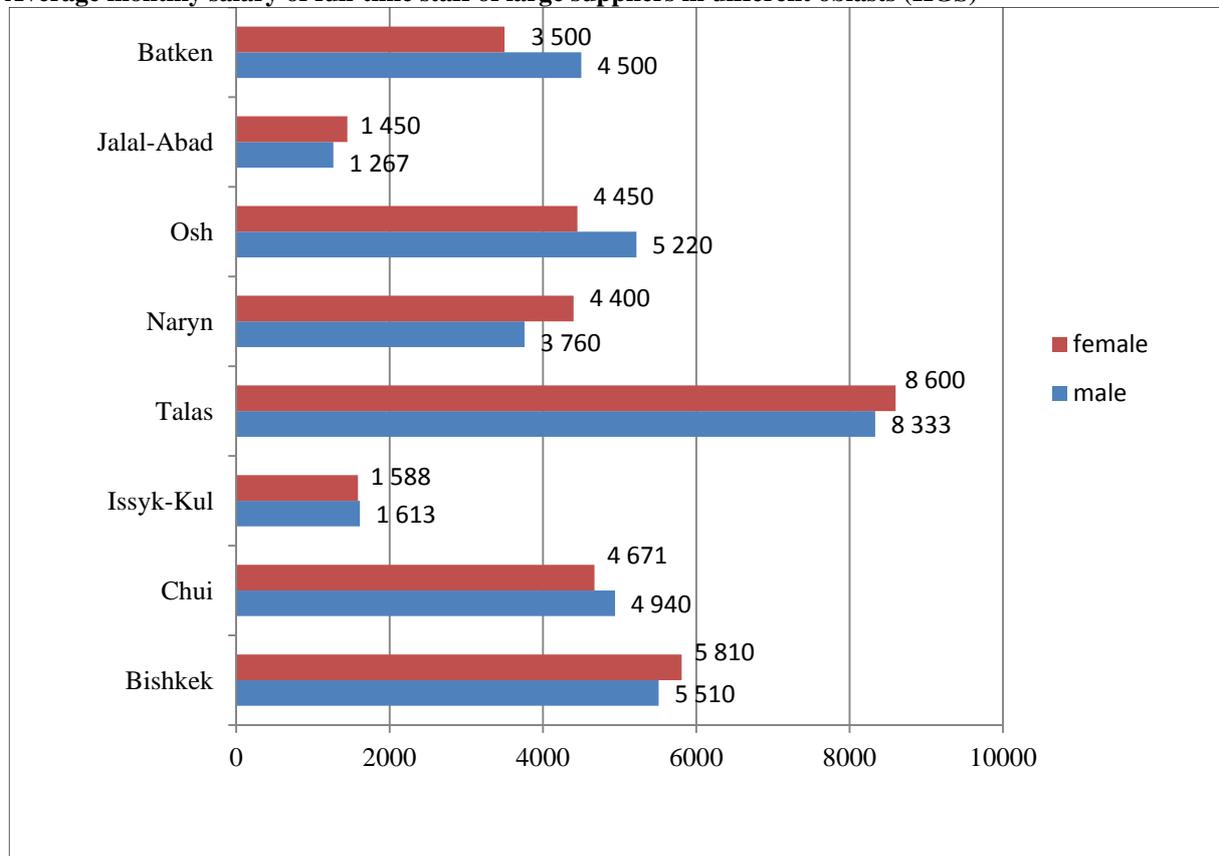
According to the study, about two-thirds of sellers are small companies with fewer than five full-time employees (Figure 16), while the other one-third have 6–10 full-time staff. Among large sellers, only 7 percent employ 11–30 full-time staff. In total, the surveyed sellers employ

207 women and 136 men on a full-time basis, reflecting the dominance of women as sellers.

Almost one-third of sellers increase their staff with part-time or seasonal employees during the peak season of sales. According to the survey, some companies quadruple their staff during the peak sales season. However, two-thirds of the companies work without additional staff during the peak seasons.

Analysis indicates that the average salary of female employees (KGS4 831) of large sellers exceeds that of males (KGS4 559) by about 6 percent (Figure 17). However, wages range widely across oblasts. As can be seen from Figure 17, sellers in Talas Oblast reported the highest salaries, and their income is significantly higher than that in the capital city. The salary of men exceeds that of women only in Batken, Osh and Issyk-Kul Oblasts. The salaries of temporary employees are 1.5–2.7 times lower than those of permanent employees.

FIGURE 17
Average monthly salary of full-time staff of large suppliers in different oblasts (KGS)



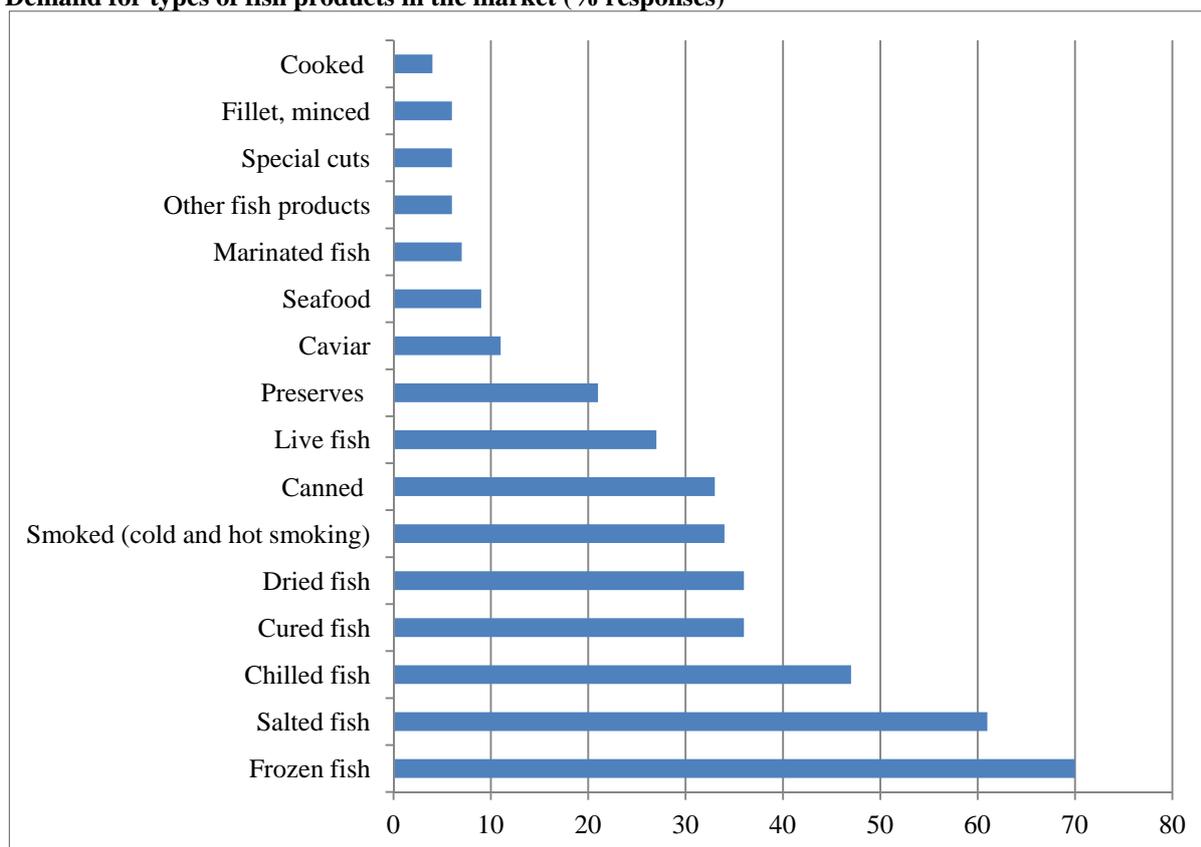
4.3.2 Key parameters of fish market

4.3.2.1 Main segments of fish and fish products in the market

The study suggests that the highest demand is for frozen (70 percent), salted (61 percent) and chilled fish (47 percent), while dried (36 percent), cured (36 percent), smoked (34 percent) and fresh/live fish (27 percent) are bought less often.⁶ Specialized products such as caviar (11 percent), seafood (9 percent), marinated fish (7 percent), special fish cuts (6 percent), other fish products known as balyk products (6 percent) and cooked fish (4 percent) are in less demand (Figure 18).

FIGURE 18

Demand for types of fish products in the market (% responses)



Data on the average number of procurements per week show that most kinds of fish and fish products are procured from 1.4 to 3 times per week (Figure 19). Procurement frequency varies with the product type. Fish and fish products with a long shelf-life (frozen, cured, dried, salted and canned fish) are procured on average 1.4–1.6 times a week, while marinated, live, filleted and minced fish are procured on average 2–2.4 times a week. Fish products and special fish cuts, as well as cooked fish, are bought on average three times a week. The fish offered by 81 percent of sellers is limited to six of the most popular types. The widest range is reported in Bishkek and Chui Oblasts, while in other oblasts it is less diverse. For example, 80 percent of Osh sellers have three types of fish in an assortment, while 90 percent of suppliers in Issyk-Kul have no more than four kinds of fish in an assortment (Table 28).

Among the fish products sold, the most popular is frozen fish (24 percent), followed by salted (19 percent) and chilled fish (16 percent) (Figure 20), while the most frequently sold species of fish are herring (17.9 percent), common carp (14.5 percent), bream (9.8 percent), walleye pollock (8.5 percent), trout (7.2 percent) and pike-perch (7.2 percent) (Figure 21).

⁶ Most sellers sell more than one fish product and, hence, the total percentage of fish products adds up to more than 100 percent.

FIGURE 20

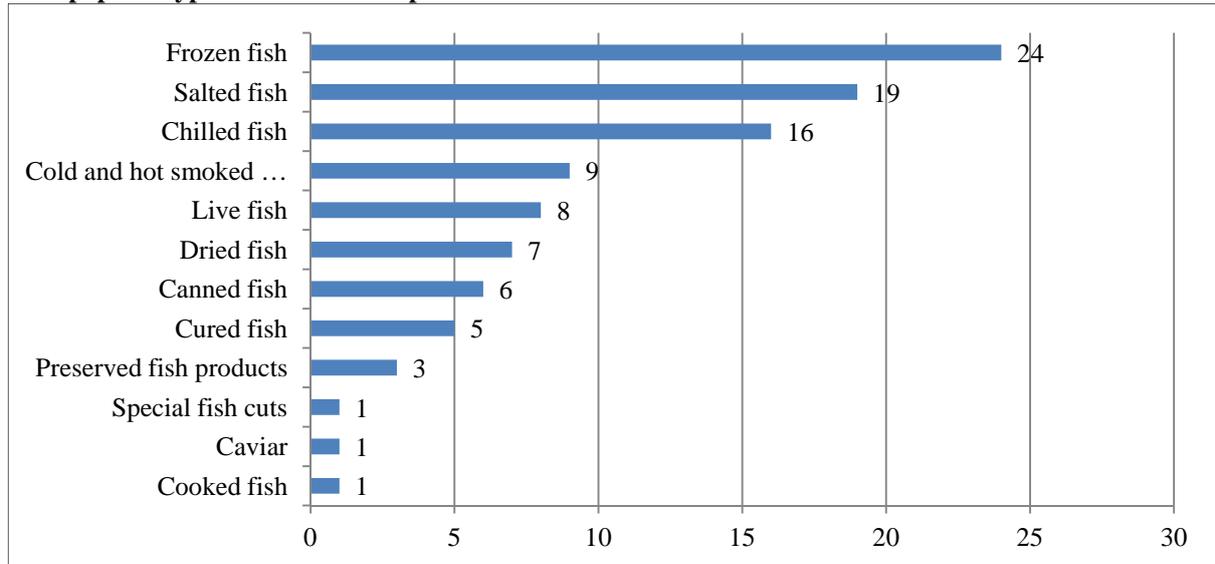
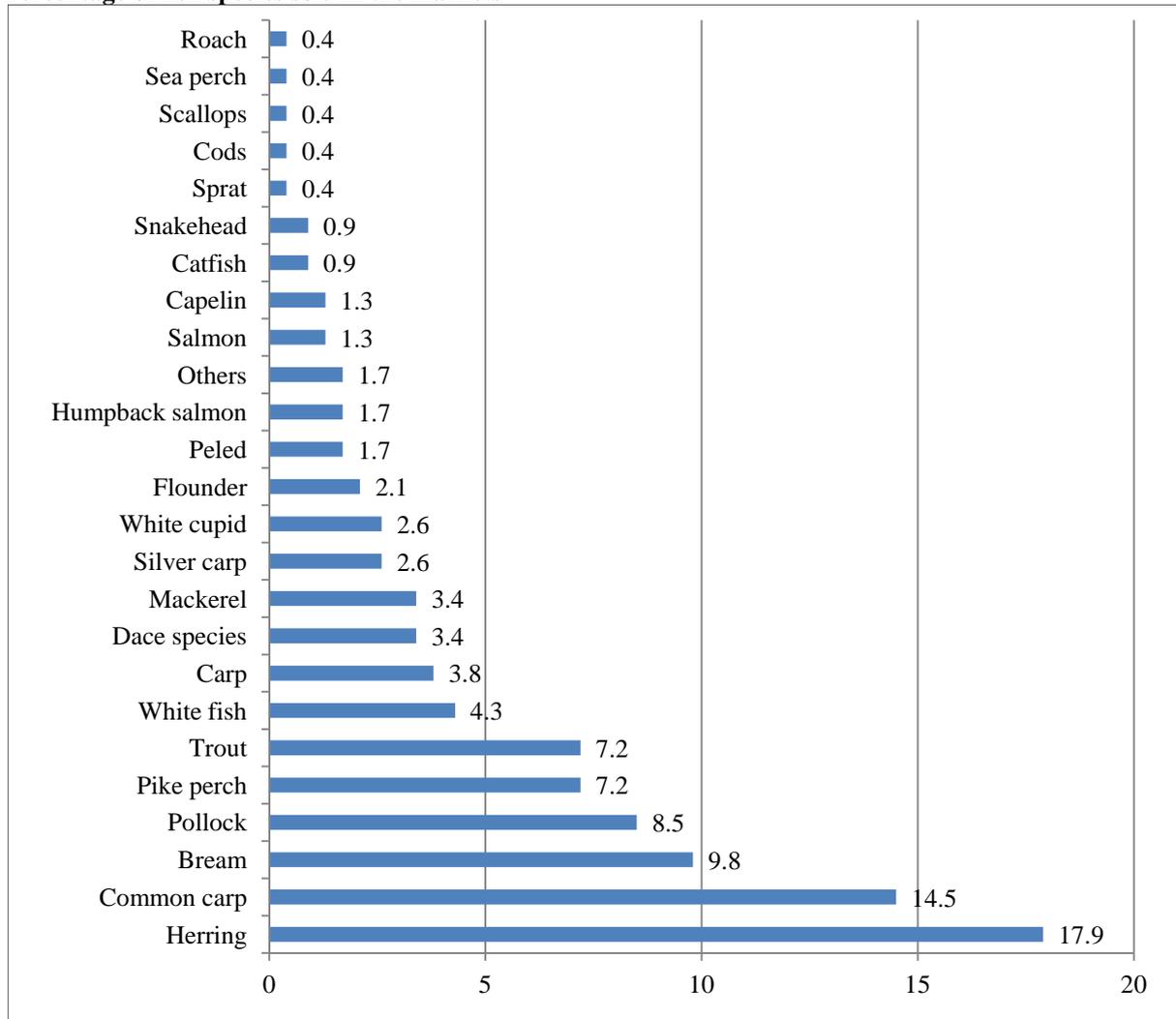
Most popular types of fish and fish products sold in the markets

FIGURE 21

Percentage of fish species sold in the markets

The sales volumes for fish and fish products are presented in Table 29. The best-selling type of fish in the market by volume is frozen fish; on average, each seller sells almost 2 tonnes of frozen fish per month. The amount of dried fish sold in the market is about 1 279 kg per month, while the average sale of fresh/live fish is about 296 kg and that of chilled and smoked fish is about 440 and 276 kg, respectively.

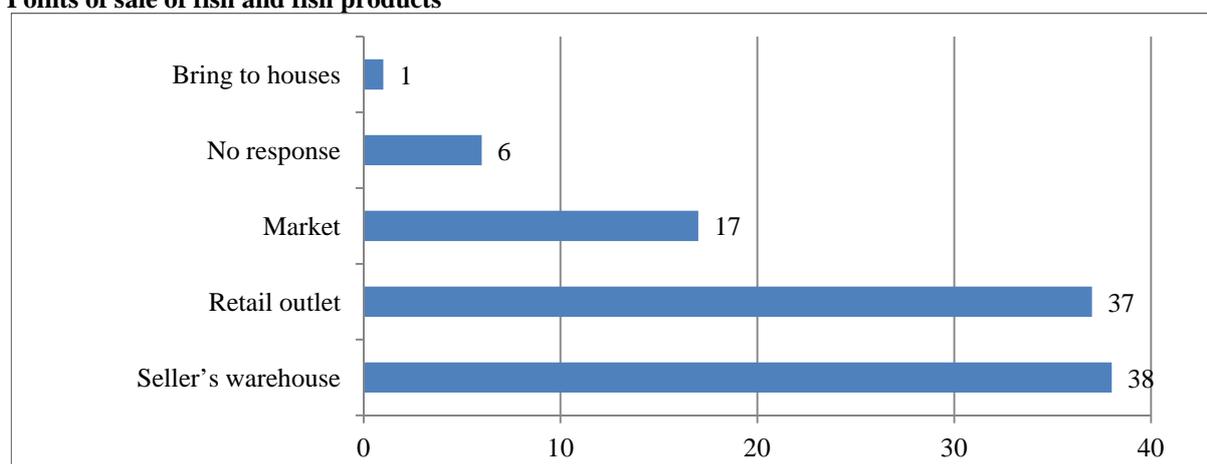
TABLE 29
Monthly volume of fish sales in markets

Type of fish product	Average volume of fish sold (kg/seller)
Live	296
Chilled	438
Frozen	2 158
Dried	92
Cured	71
Salted	1 279
Marinated	52
Smoked	276
Canned	47
Preserves	61
Fillet, minced meat	18
Special fish cuts	38
Balyk products	52
Cooked fish (fried fish, fish dumplings, etc)	6
Caviar	28

4.3.2.2 Points of sale

The study indicates that there are two main points of sale of fish and fish products: at supplier's warehouses (38 percent) and at retail sale outlets (37 percent). Less often, the sale takes place at the market (17 percent) (Figure 22).

FIGURE 22
Points of sale of fish and fish products



4.3.2.3 Suppliers of fish and fish products to the markets

Table 30 indicates the main delivery channels of fish and fish products to fish sellers in the markets. Wholesale sellers are the main supplier of all kinds of fish and fish products, except for live fish. Live fish comes to the market mostly from private fishers (42 percent) and wholesale sellers (32 percent), and less often, directly from fish farmers (26 percent). The main suppliers of chilled (84 percent) and frozen fish (80 percent) are wholesalers. Caviar and fishery products come from wholesalers (50 percent), as well as from specialized fish shops (50 percent).

TABLE 30

Types of fish suppliers to fish sellers in the market by type of fish product

	Fish farms	Private fishers	Wholesalers	Specialized fish shops
	(%)			
Live fish	26	42	32	–
Chilled fish	–	6	84	10
Frozen fish	–	8	80	12
Dried fish	–	8	72	20
Cured fish	–	11	69	20
Salted fish	–	7	78	15
Marinated fish	–	–	80	20
Smoked (cold and hot smoked)	–	12	71	17
Fillet, minced fish meat	–	–	75	25
Special fish cuts (vacuum packed, in plastic containers)	–	–	75	25
Balyk products	–	–	50	50
Cooked fish (fried fish, fish cutlets, other)	–	–	33	67
Caviar	–	–	50	50
Seafood (squid, shrimp, spiny lobster, lobster, crabs, other)	–	17	50	33

Improvement of the marketing system depends upon the overall level of national development. A vigorous attempt to improve the system should begin with a thorough evaluation of the problems in the market system (Alam *et al.*, 2010). Before breaking the power of traders to control the market, it is important to address the constraints in the supply chain from producer to the market, such as cold storage, hygienic handling, and transportation.

4.4 Buyers of fish and fish products

The study suggests that in most cases (73 percent), the buyers are ordinary households. Less often, the buyers are entrepreneurs engaged in petty and retail trade. More details on buyers are given in Chapter 5 Fish Consumption.

4.5 Price of fish and fish products

“There is a belief among people in the Kyrgyz Republic that fish sales are good in those months of the year that have the letter ‘R’ in their name. This belief is supported by the trend that starting from May, demand drops and doesn’t pick up until September.” – Key informant.

More than half of the respondents (56 percent) indicated that the price of fish and fish products was negotiated between the buyer and seller; one in three thought that prices were decided by the supplier. Only 9 percent of the respondents believed that there were established market prices for fish (Figure 23).

Figure 24 suggests that the prices of all types of fish have increased steadily since 2007. It also shows that the rate of increase in the price of common carp and silver carp in 2010–11 exceeded that of grass carp and rainbow trout.

The change in price against baseline price for other types of fish is presented in Table 31 and Figure 25. Analysis of this change suggests that in the past five years the price per kilogram of wels catfish (*Silurus glanis*) grew most rapidly, on average by 280.8 percent, while that of freshwater bream increased by 180.2 percent. According to key informants, the reason for these price increases is that most of these fish are imported from Kazakhstan. Participants of in-depth interviews reported that, more than five years ago, most of the fish that came from Kazakhstan went through illegal channels, without payment of customs duties, and thus the price was kept low. However, because of tighter customs control in the past three to four years, most of the fish now goes through official customs

clearance, and thus the price of wels catfish and freshwater bream has increased sharply. Change of the prices per kilogram of other kinds of fish for same period averaged 137.4–156.1 percent.

FIGURE 23

Decision-making on the price of fish and fish products (% respondents)

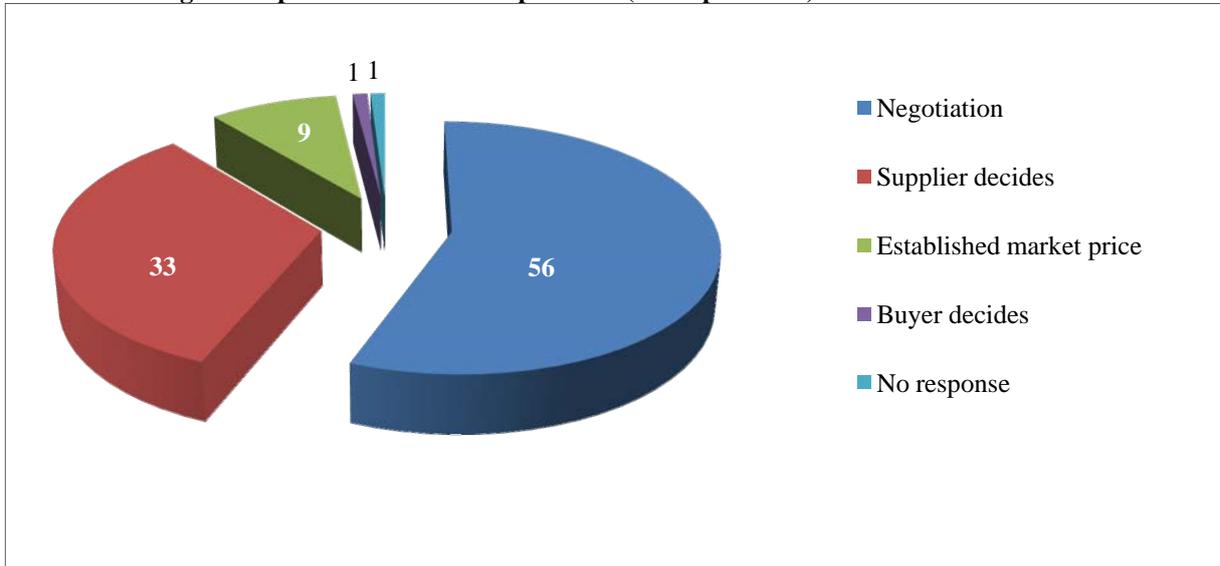


FIGURE 24

Change in average prices, 2007–2011

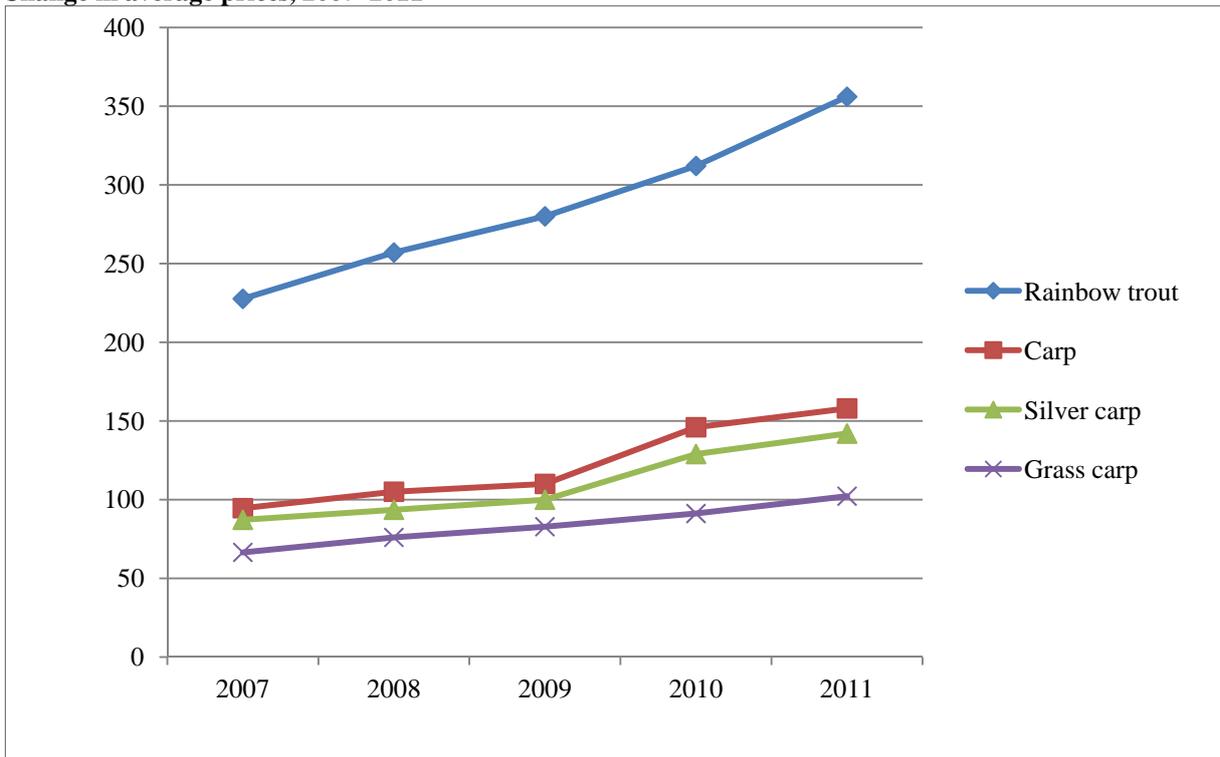
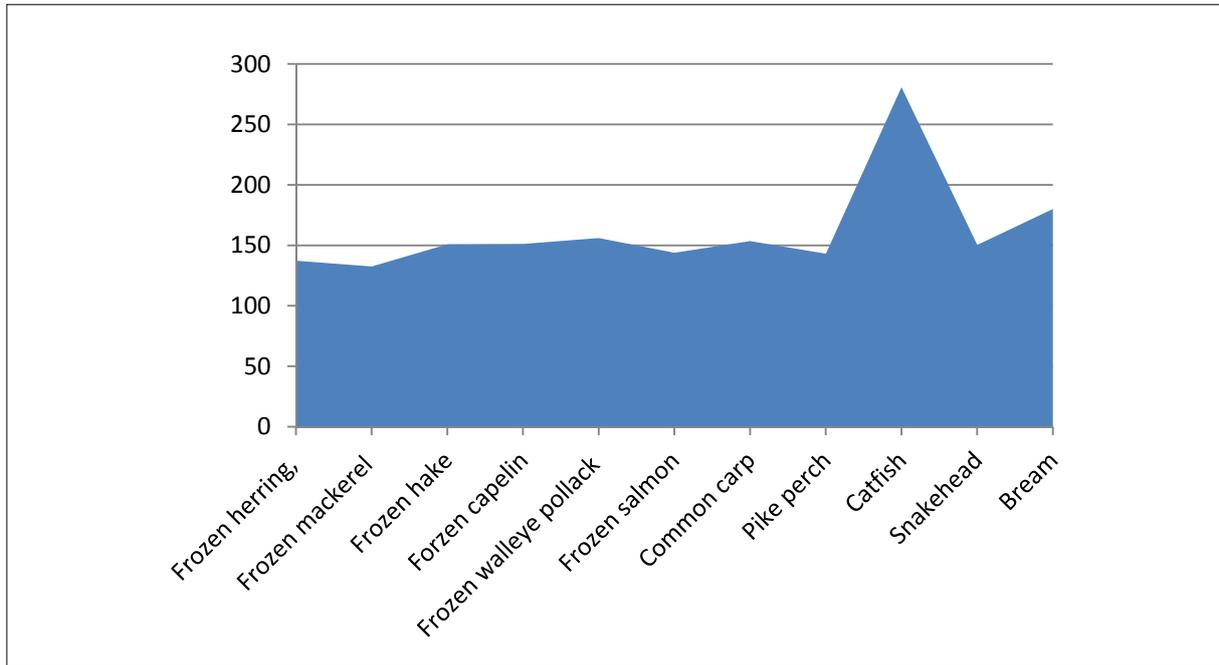


TABLE 31

Percentage change in prices against baseline price for certain types of fish

Fish	Year	Average price/kg (KGS)	Change in price
Herring (<i>Clupea harengus</i>), frozen	2007	73.1	Baseline
	2008	91.6	125.2
	2009	88.4	121.0
	2010	96.9	132.6
	2011	100.5	137.4
Mackerel (<i>Scomber scombrus</i>), frozen	2007	161.3	Baseline
	2008	174.7	108.3
	2009	186.7	115.7
	2010	200.7	124.4
	2011	213.9	132.6
Hake (<i>Merluccius</i> sp.), frozen	2007	88.3	Baseline
	2008	100.0	113.3
	2009	114.4	129.6
	2010	125.6	142.2
	2011	133.3	151.0
Mallotus capelin (<i>Mallotus villosus</i>), frozen	2007	70.5	Baseline
	2008	79.1	112.2
	2009	87.7	124.4
	2010	98.6	139.9
	2011	106.7	151.3
Walleye pollock (<i>Theragra chalcogramma</i>), frozen	2007	156.7	Baseline
	2008	178.8	114.1
	2009	231.0	147.4
	2010	241.1	153.9
	2011	244.6	156.1
Salmon (<i>Salmo salar</i>), frozen	2007	458.2	Baseline
	2008	493.0	107.6
	2009	549.0	119.8
	2010	598.0	130.5
	2011	660.0	144.0
Common carp (<i>Cyprinus carpio carpio</i>)	2007	87.1	Baseline
	2008	94.0	108.0
	2009	105.3	120.9
	2010	119.2	136.8
	2011	133.8	153.6
Pike-perch (<i>Sander lucioperca</i>)	2007	116.5	Baseline
	2008	131.5	112.9
	2009	137.2	117.8
	2010	152.7	131.1
	2011	166.9	143.2
Catfish (<i>Silurus glanis</i>)	2007	84.4	Baseline
	2008	95.6	113.2
	2009	103.3	122.4
	2010	121.1	143.5
	2011	237.0	280.8
Snakehead (<i>Channa argus argus</i>)	2007	97.5	Baseline
	2008	108.8	111.5
	2009	123.8	126.9
	2010	138.9	142.5
	2011	146.7	150.4
Freshwater bream (<i>Abramis brama</i>)	2007	46.4	Baseline
	2008	53.6	115.5
	2009	61.2	131.9
	2010	69.1	148.9
	2011	83.6	180.2

FIGURE 25

Percentage change of price against baseline price for 2011 for selected fish species

According to the survey, the price of fish and fish products fluctuates seasonally. Prices increase during most of the winter months (November, December and January), especially before the New Year holidays. A relative majority of suppliers (35 percent) link seasonal price hikes to increased costs (i.e. labour and power). At the same time, none of the respondents indicated that the demand for fish and fish products increased in the winter months to affect the price. According to the survey, in the summer months (June, July and August), prices increase the least.

Twenty-seven percent of study participants do not monitor the prices of fish and fish products. This group of respondents had difficulties in determining the frequency of price changes. More than half of fish suppliers' markets indicated that the price of fish rarely changed for them (with perhaps some change depending on the season). According to 17 percent of the respondents, the price of fish and fish products changes often, almost every month. Only 2 percent believe that fish prices are stable; this group too may not monitor fish prices.

Monitoring of price changes is important because a common indicator of marketing efficiency is the size of price margin, which is the difference between the farmgate price and the next price level, such as retail price (Alam *et al.*, 2010). The margin could be high if the marketing costs and/or profits made by intermediaries are high. Marketing costs are high if marketing functions are not performed efficiently owing to functional difficulties such as poor roads, inadequate storage leading to losses and poor handling. Profits may be high if there are high risks of losses and huge capital investment (Rahman *et al.*, 2009). Therefore, these aspects of marketing efficiency should be addressed and improved to regulate the price margin.

Moreover, through strengthening and building the confidence of fisheries associations and community organizations and their networks in marketing management, a long-term solution for price issues can be found. Providing fishers with market information (including greater market transparency) and better fish-care practices may be a short-term solution permitting fishers to obtain better prices for their catch (Alam *et al.*, 2010).

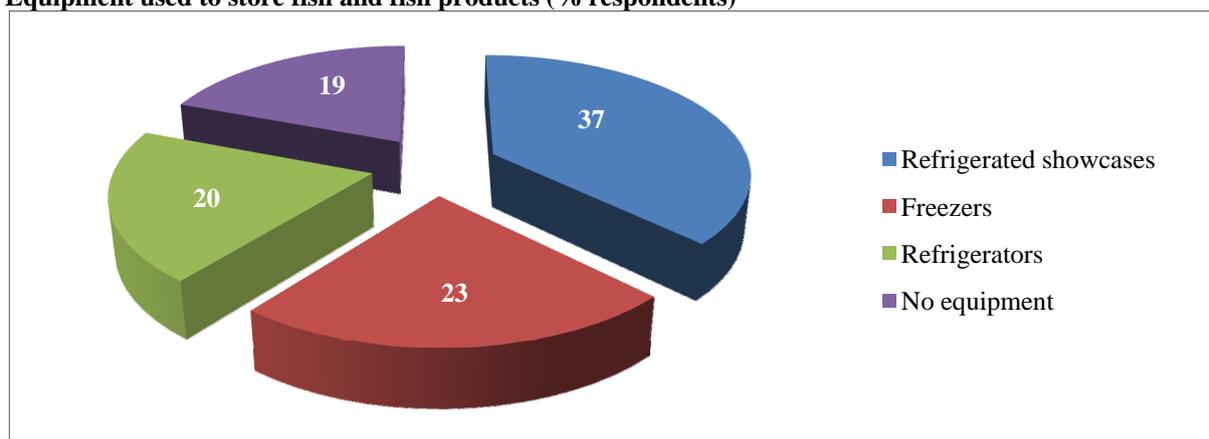
4.6 Marketing environment

4.6.1 Equipment availability

To store and sell fish and fish products, sellers in the markets use refrigerated showcases (37 percent), freezers (23 percent) and refrigerators (20 percent). However, 19 percent of sellers of fish and fishery products do not use any chilling equipment, and only 13 percent use ice to keep and showcase fresh fish (Figure 26).

FIGURE 26

Equipment used to store fish and fish products (% respondents)



More than half of the respondents (54 percent) admitted that the equipment they use is often out of order. About 25 percent of the large suppliers have the ability to store unsold fish and fish products for up to two months. Unsold fresh/live fish can be kept for five days and then they are usually frozen and stored for two more months. According to large producers, the main reasons why fish stay unsold are low demand (83 percent) and a seasonal drop in demand in summer (12 percent).

4.6.2 Business environment

According to respondents, there were no major changes in the business environment in 2011 compared with 2010. It is important to note that the number of respondents that were unable to assess the business environment is considerable, and that for some indicators it reached 13-38 percent (Figure 27). This suggests that most large suppliers do not monitor or evaluate the business environment.

Most sellers noted increasing concerns in quality requirements by buyers. One in five or six respondents noted greater competition in the market. From 10 to 16 percent of the respondents noted an increase in other parameters of the business environment, such as price, import, supplies and product range.

Figure 28 shows that the respondents expressed the need for marketing information. For example, they are interested in information on: competitors, pricing policies and market prices (50 percent); formation of pricing policy (53 percent); quality requirements for fish produce (51 percent); taxation (49 percent); government policy in the fish market (49 percent); and forecasted consumption and demand for fish (47 percent).⁷ The demand for training and information on treating fish (41 percent) and processing fish (37 percent) is a bit lower but is still significant.

⁷ The total exceeds 100 percent because one respondent identified more than one type of information.

FIGURE 27

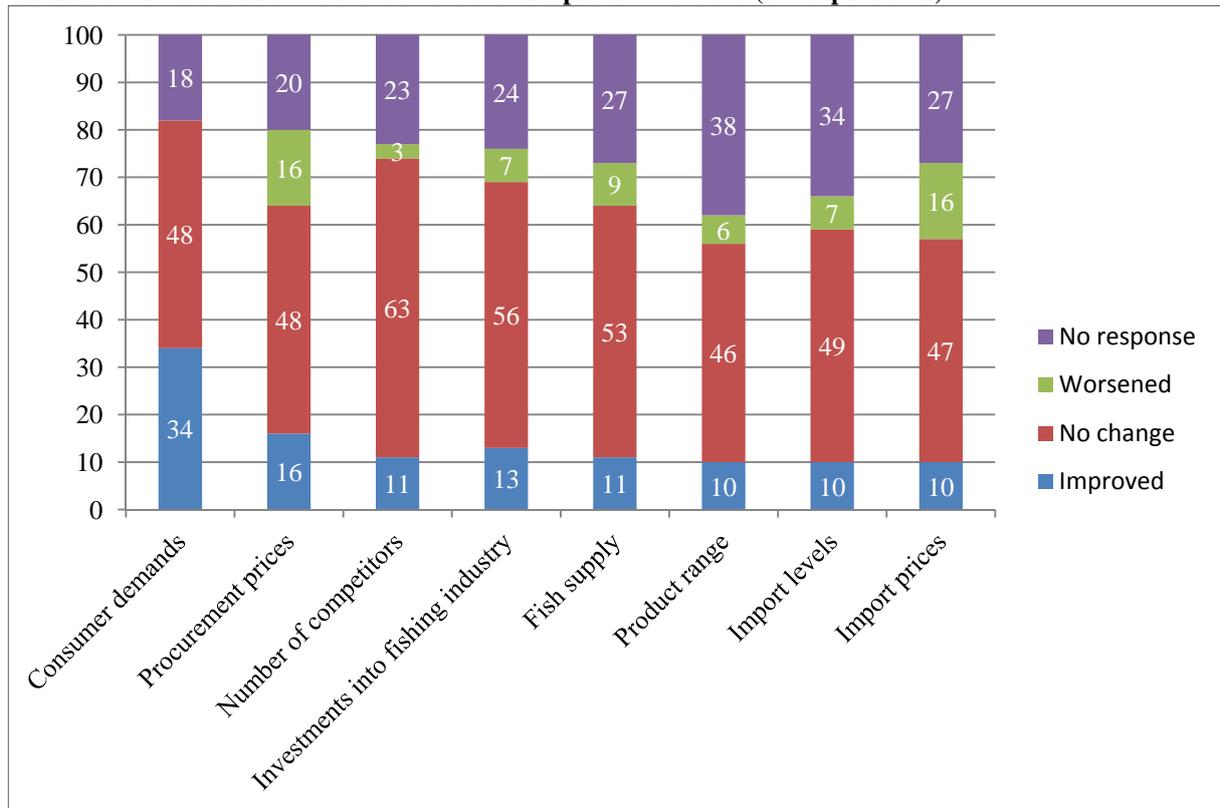
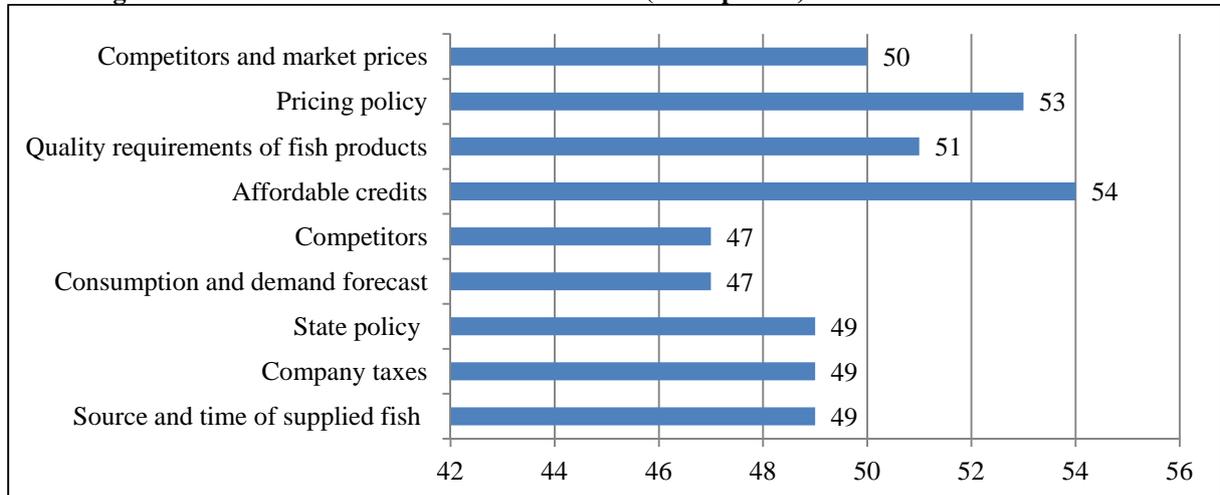
Assessment of business environment in 2011 compared with 2010 (% respondents)

FIGURE 28

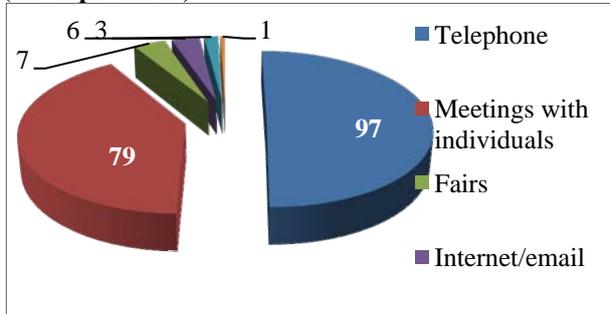
Marketing information fish sellers would like to receive (% responses)**4.6.3 Means of communication**

The study data showed that most sellers use two means of communication with partners, by telephone (97 percent) and through personal meetings (79 percent) (Figure 29). Other means of communication such as e-mail, fax, fairs and workshops are used by only 2–7 percent of sellers.

The study data also showed that a relative majority of sellers (34 percent) spent 5 percent of their income on advertising in 2010 (Figure 30). The share of suppliers who did not advertise their business was also high (28 percent) in 2010. Only four sellers spent more than 10 percent of their income on advertising in 2010.

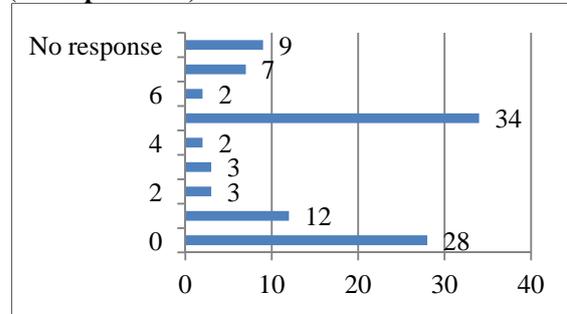
Analysis of data by region suggests that sellers who work in the capital city pay more attention to advertising than do suppliers in other areas. For example, 100 percent of suppliers in Osh and Batken Oblasts, as well as 71 percent in Issyk-Kul Oblast, do not allocate any money for advertisements and do not carry out any advertising activities.

FIGURE 29
Means of communication with partners
(% respondents)¹



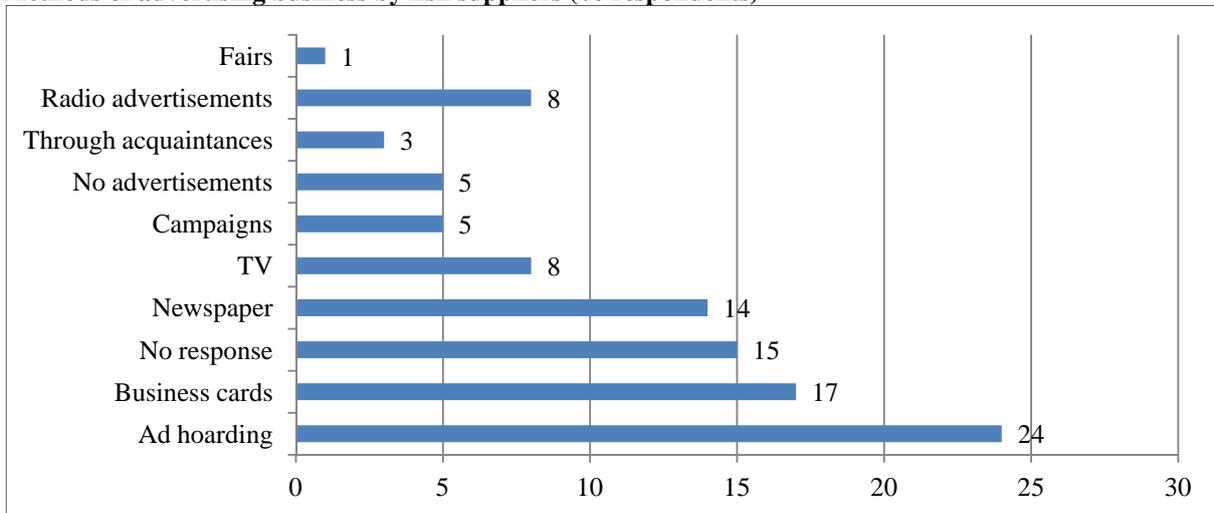
¹ The total exceeds 100 percent because each respondent selected more than one choice.

FIGURE 30
Expenditures on advertising in 2010
(% respondents)



The three most-used forms of advertising include advertising hoardings (boards) (24 percent),⁸ giving business cards to potential clients (17 percent), and newspaper advertisements (13 percent) (Figure 31). About 15 percent could not recall using any type of advertisement. This can be interpreted as an absence of any advertising activity.

FIGURE 31
Methods of advertising business by fish suppliers (% respondents)

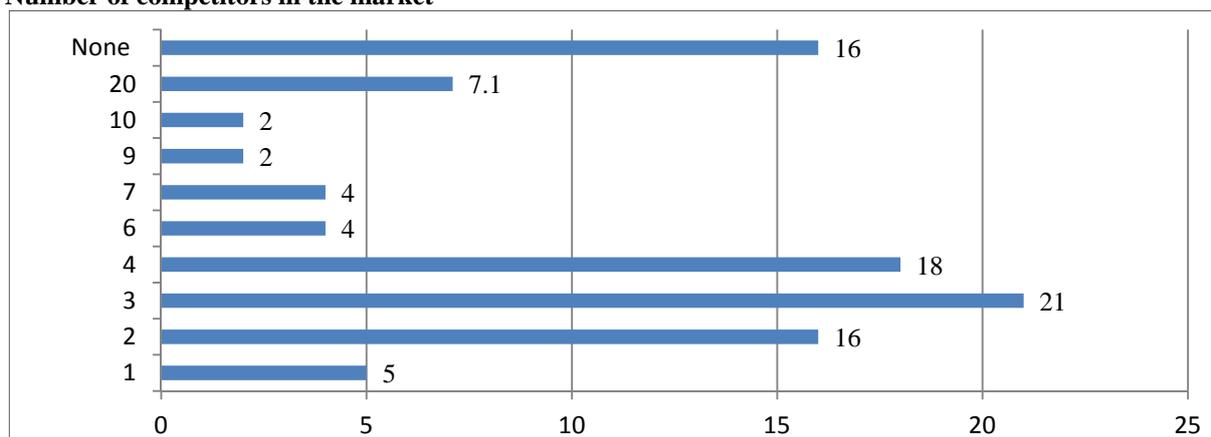


4.6.4 Competition

Almost one in six (16 percent) surveyed respondents felt that they did not have competitors in their sector (Figure 32). The majority of respondents (54 percent) indicated that the number of competitors in the market ranges from two to four. This figure varies widely by oblast. For example, the average number of competitors was: Bishkek, 5.4; Talas, 5.3; Chui, 4.0; Issyk-Kul, 1.4; and Osh, none. At the same time, it appears that the level of competition among those who specialize in the sale of fish is low (22 percent), the specialized sellers feeling that they do not have competitors.

⁸ Here, the term advertising hoardings includes posted or take-out stand-alone signs advertising the sale of fish and fish products.

FIGURE 32

Number of competitors in the market

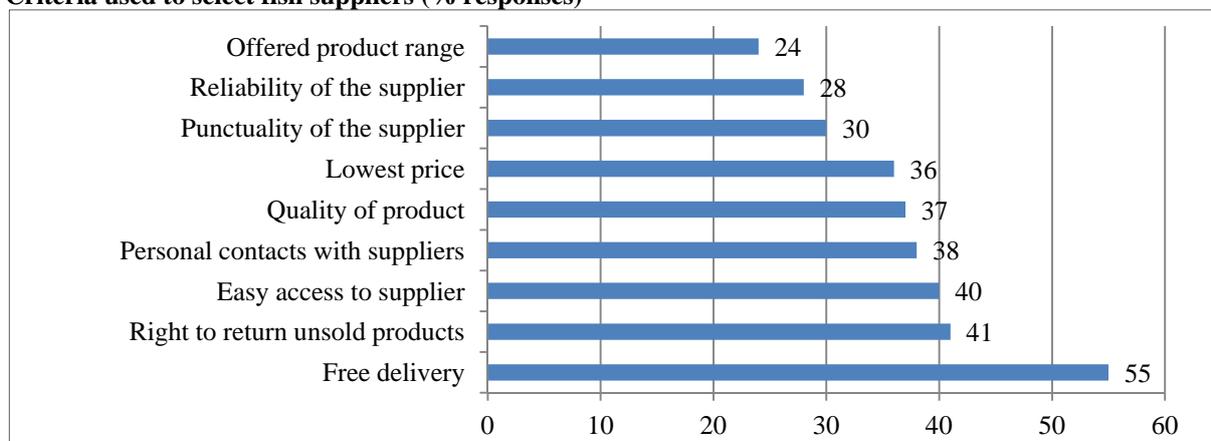
Generally, 68 percent of sellers feel that the competitive environment is generally “friendly”; 24 percent characterize it as “neutral”; and only one respondent felt that his competitors were “hostile”. In Bishkek, Chui and Talas Oblasts, the competitive environment was mostly characterized as “friendly”, while in Issyk-Kul and Osh it was considered “neutral”.

4.6.5 Trade stimulation

“Local people do not traditionally eat fish. Only in the past few decades has the situation changed slightly, but fish consumption is still insufficient. Nobody – neither the healthcare system, nor the education authorities, nor fish sellers – explains that fish is one of the most important products in the diet and should be consumed at least one or two times a week. That is why the demand is insufficient. In rural areas, fish is almost never consumed. A well-thought-out public campaign and explanations that consumption of fish will reduce diseases, together with adequate advertising, will raise demand. Promotions could include fairs, fish days and food recipes on TV. This could help to reverse the trend.” – Key informant.

There are two main criteria that respondents usually use when choosing suppliers. One is free delivery (55 percent) and the other is the option to return unsold fish (40.6 percent). Among the other criteria, easy access to suppliers (39.6 percent), better quality of products (37.4 percent) and personal contacts with the supplier (38.2 percent) are considered (Figure 33).

FIGURE 33

Criteria used to select fish suppliers (% responses)¹

¹ Total exceeds 100 % because respondents selected more than one response.

Practically all large producer-suppliers offer delivery service. The mode of transportation is mainly via passenger cars (54 percent) and trucks (38 percent). However, the respondents were reluctant to

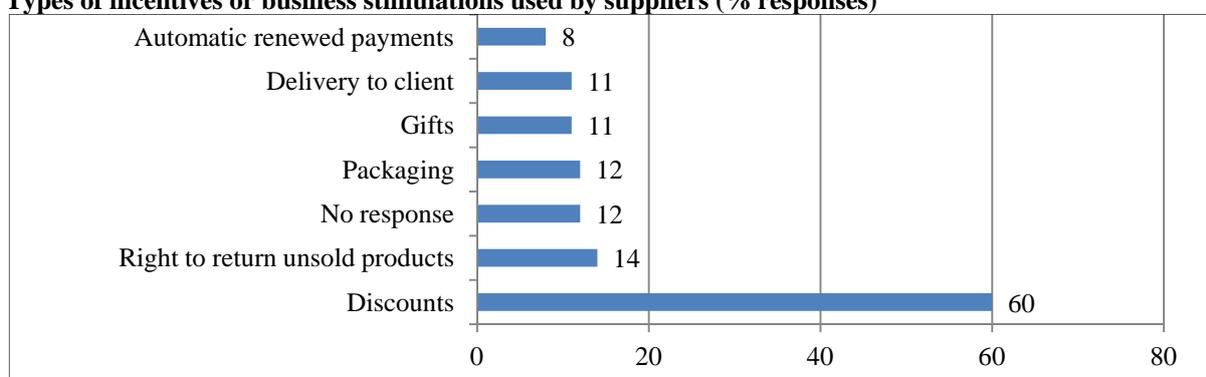
answer more detailed questions about transportation, which might suggest that specialized equipment for transportation of fish is practically never used. On very rare occasions, fish is delivered by bicycle (4 percent).

The survey showed that the majority of suppliers practise one or more stimulations or incentives in their business. Nevertheless, business stimulations as a strategy to attract and retain clients is used insufficiently. Five out of 70 companies (7 percent) do not use any kind of business stimulation, 16 companies use two (23 percent), and only 2 companies (3 percent) use three or more forms of business stimulation method. The rest (67 percent) use only one type of business stimulation.

The data indicate that the most popular forms of incentives used are discounts (Figure 34), including frequent client discounts, wholesale discounts and seasonal discounts. Other incentives such as giving goods for sale with the right to return unsold products, attractive packaging and free delivery are used less frequently.

FIGURE 34

Types of incentives or business stimulations used by suppliers (% responses)¹



¹ Total exceeds 100 % because respondents selected more than one response.

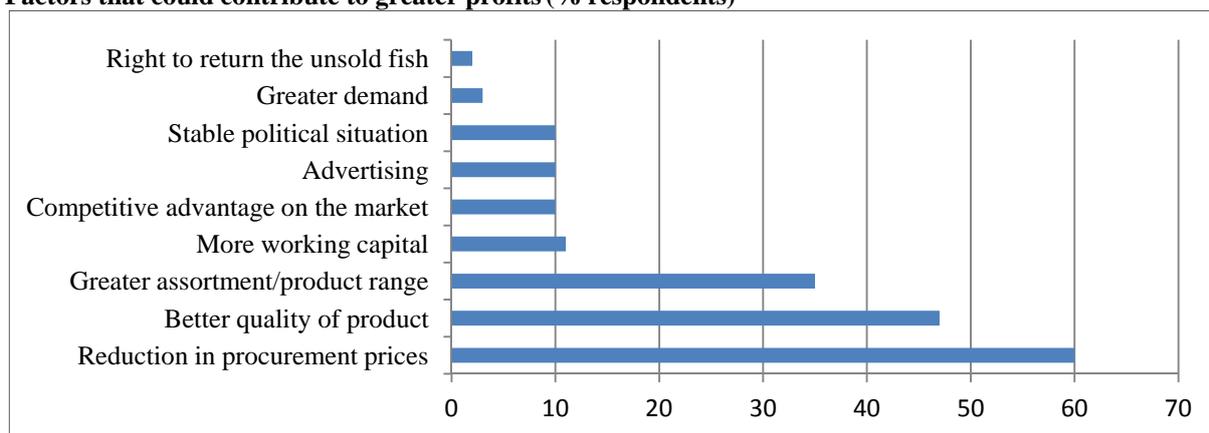
According to key informants, most large suppliers do not have a strategy to attract clients. Moreover, some key informants think that business operators in the fish market do not realize the importance of working with clients and for now follow the principle of “who needs the product will buy anyway”. Key informants feel that targeted activities to attract consumers could significantly increase the market for fish and fish products and reduce seasonal fluctuations in consumption.

According to the respondents, among the factors that are key to increasing profitability, the three most important are: reduction in procurement prices (60 percent); improved quality of products (47 percent); and increased fish species in an assortment (35 percent) (Figure 35). Few respondents recognized advertising (10 percent) and creating consumer demand (3 percent) as important factors.

Problems faced in the past year with respect to making profits out of the business included low market demand (31 percent), higher procurement prices (23 percent), high competition in Bishkek and Chui Oblasts (21 percent), lack of funds for procurement of fish (13 percent), and high fuel cost and as a result, increase in transportation cost (7 percent) (Figure 36).

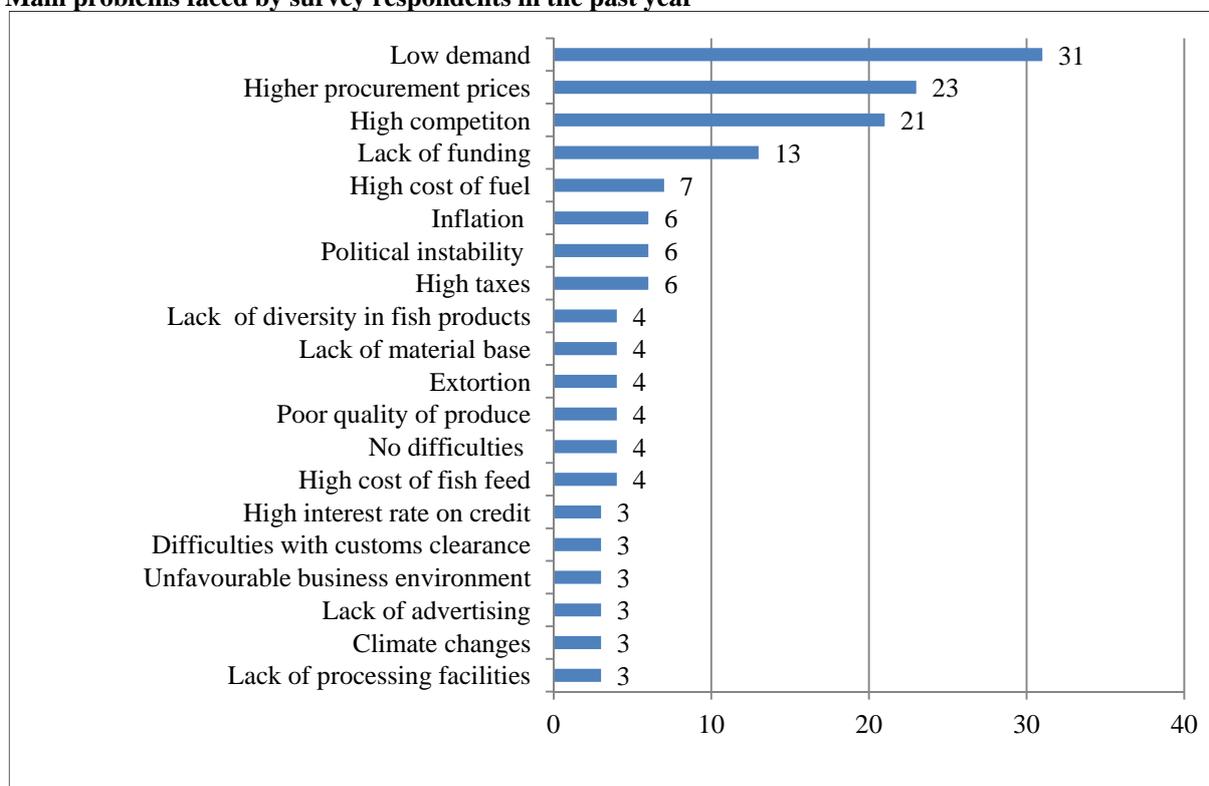
From the respondents’ answers, it appears that sellers have paternalistic expectations about the State. For example, a relative majority (38 percent) suggested “make prices more affordable for people”, thinking that the increase in demand will lead to higher revenues (Figure 37). However, it is unclear who will address these issues and how they would be addressed. Other suggestions were more realistic and in many ways depend on the suppliers themselves: increase the number of species in an assortment and/or increase the product range (16 percent); improve logistics and handling, storing and transport equipment (16 percent), and improve the quality of fish and fish products (13 percent). Some respondents think that a reduction in the interest rate on credit would help to increase their income.

FIGURE 35
Factors that could contribute to greater profits (% respondents)¹



¹ Total exceeds 100 percent because respondents could choose more than one answer.

FIGURE 36
Main problems faced by survey respondents in the past year¹

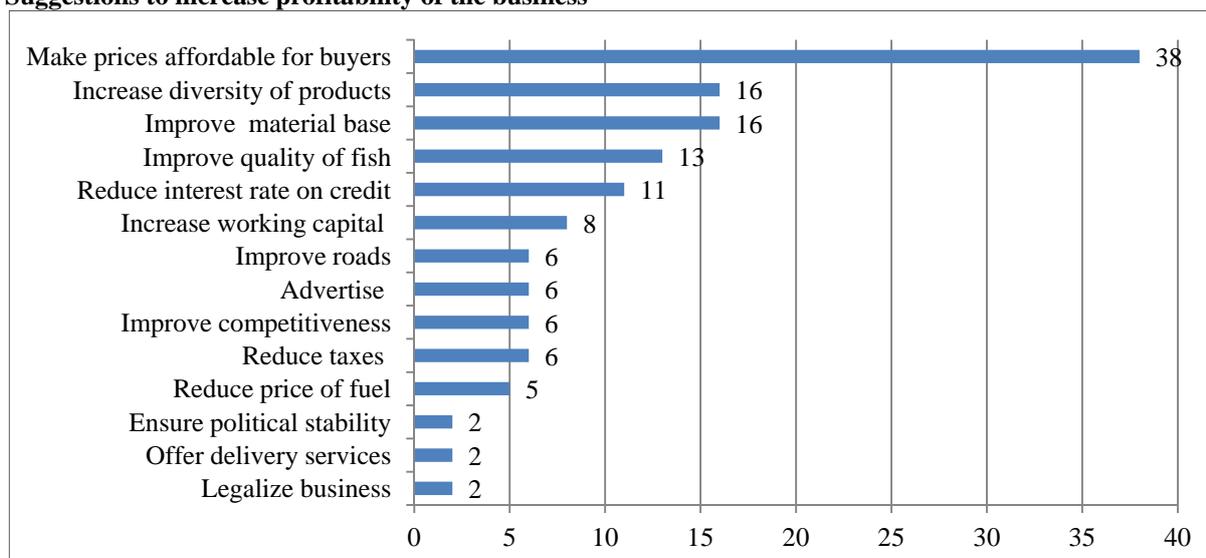


¹ Total exceeds 100 percent because respondents selected more than one response. Data do not include “no response”.

4.6.6 Taxation

Only one respondent admitted that he did not pay taxes and that his business was part of the “grey economy”. One-quarter of respondents refused to answer the question whether they are taxpayers, which might indicate a high degree of grey economy in the fish market. At the same time, 73 percent of the study participants indicated that they did pay taxes. Taxpayers pay income tax and make payments to the Social Fund. About one in three (30 percent) pays taxes through the volunteer patent system (which covers the cost of the patent (license) and the social insurance). Enterprises that have means of transportation pay tax on transportation and road tax. Apart from taxes, sellers pay fees for the market facilities and obtain permits from the veterinary services.

FIGURE 37

Suggestions to increase profitability of the business

¹ Total exceeds 100 percent because respondents could choose more than one answer. Data do not include “no response”.

4.6.7 Quality standards

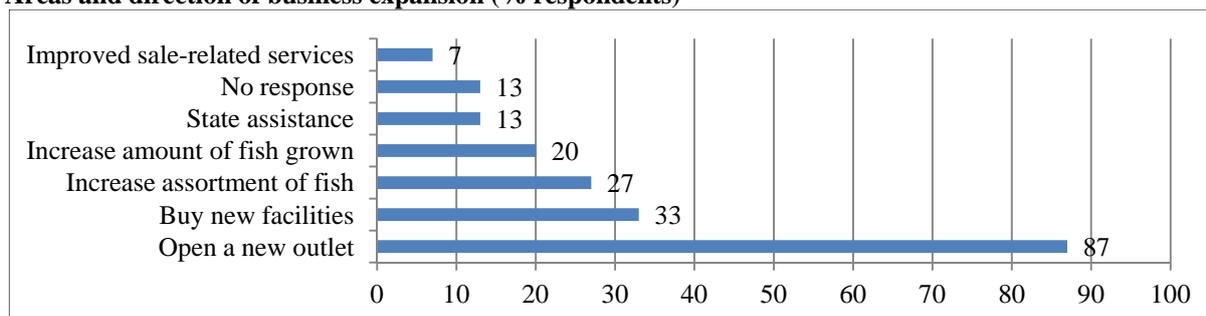
Most sellers (56 percent) indicated that they observe quality standards set by the Kyrgyz Agency for Metrology and Standardization; only 6 percent do not observe this standard. However, 38 percent of the study participants declined to answer the question. Regarding observation of the state of the quality of fish, the survey results indicate that standards are either not observed or that respondents are not informed about the existence of such standards. A similar situation is found with regard to international standards (e.g. ISO quality standards); only four respondents were aware of these international standards and claimed to observe them.

4.6.8 Business expansion plans

One in five study participants (21 percent) planned to expand their business during the period 2011-12. The majority of survey participants (87 percent) in 2011 planned to open a new outlet for the sale of fish and fish products, widen the assortment of fish sold (27 percent), install refrigerators and showcases (7 percent), and/or offer new sale services (7 percent). Fish producers planned to buy new space/area and increase production of fish (Figure 38).

Fish sellers showed interest in training related to aquaculture; 41 percent of the surveyed participants would like to learn more about treating fish and fish products, 37 percent want to learn about processing fish, and 41 percent are interested in the amount of fish produced in the country.

FIGURE 38

Areas and direction of business expansion (% respondents)¹

¹ Total exceeds 100 percent because respondents could choose more than one answer.

5. FISH CONSUMPTION

5.1 Household consumption

5.1.1 Profile of study participants

The study included 1 000 individuals in the household survey, of whom 66 percent were women and 34 percent were men. Information on the age and educational level of respondents is presented in Figures 39 and 40). A majority of household respondents have adequate literacy, which should make it easier to convince them of the benefits of fish consumption.

FIGURE 39
Age of respondent households
(% age groups)

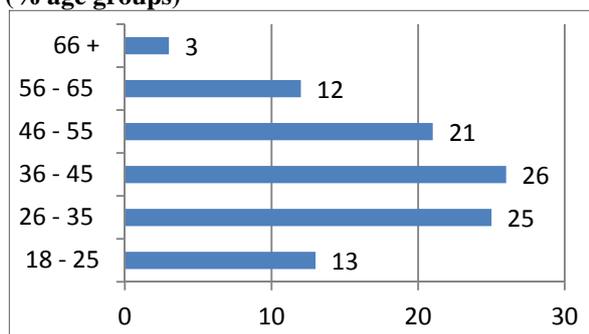
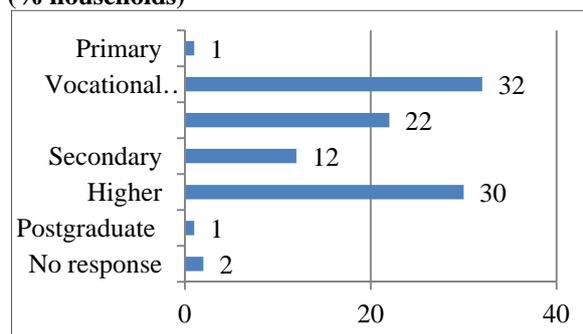
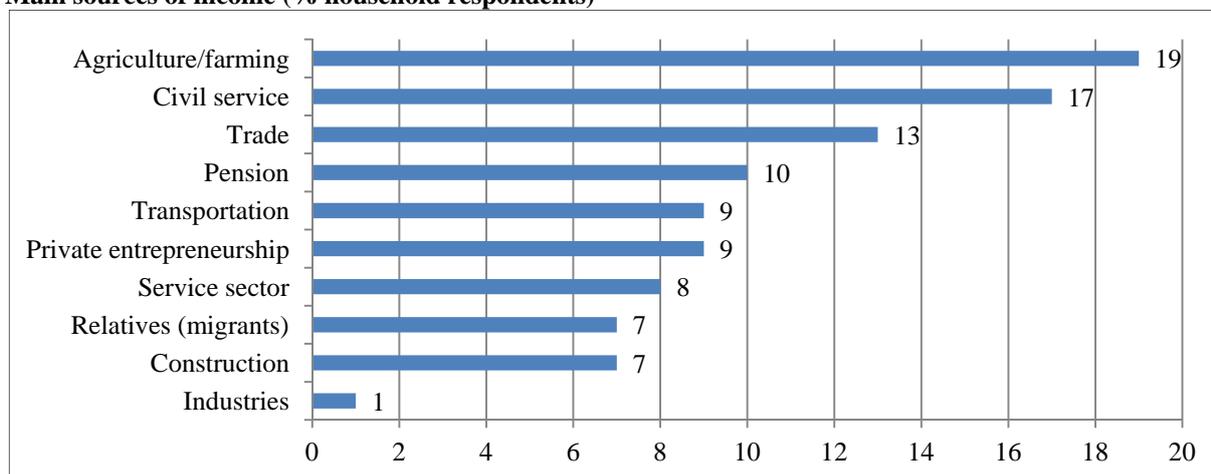


FIGURE 40
Educational level of respondent households
(% households)



The data show that the main sources of income of the surveyed households are agriculture (19 percent), government (civil) service (17 percent), trade (13 percent) and pensions (10 percent) (Figure 41).

FIGURE 41
Main sources of income (% household respondents)



The monthly income averages KGS10 833.6, and the average number of persons in a household is 5.1 individuals. Thus, average monthly income per family member amounts to KGS2 124. The average number of income-earning household members is 2.1 individuals per household.

According to the survey, 16 percent of all household respondents do not use refrigerators in their houses. By oblast, the percentage of households without refrigerators is highest in Issyk-Kul (31 percent) and Osh (26 percent), and lowest in the capital city of Bishkek (6 percent).

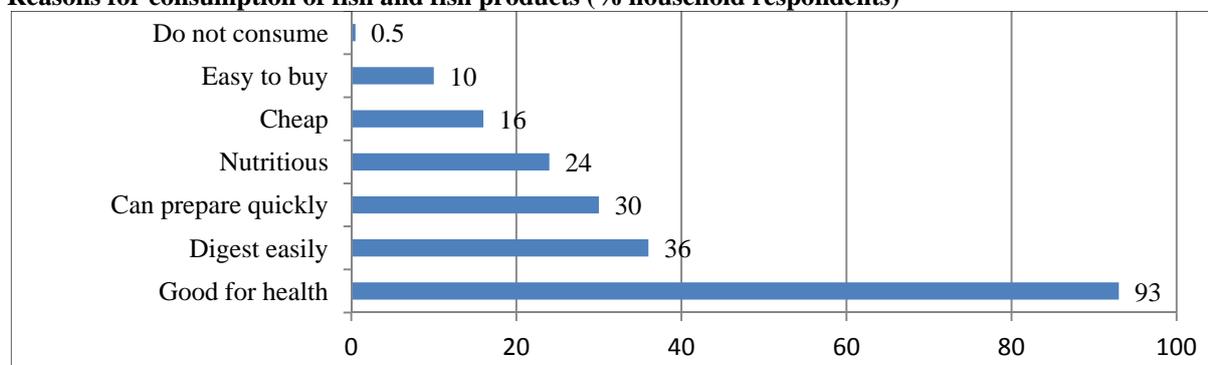
5.1.2 Consumption of fish and fish products

“Most households know only how to fry fish and make fish soup. However, women always complain that frying requires a lot of oil, which must be discarded after frying. Considering today’s price of oil, frying fish at home is not economical for many families. That is why people do not eat enough fish. It is important to promote other ways of cooking fish and healthy eating, so that each mother and father realizes how important it is for children to eat fish. Housewives should be taught how to make tasty and nutritious dishes with fish.” – Key informant.

People’s opinions on why they consume fish and fish products varies widely (Figure 42). Most respondents believe that fish and fish products are good for health (93 percent). Other stated reasons include: easy to digest (36 percent), quick preparation (30 percent) and high nutritious value (24 percent). Reasons such as low price (16 percent) and affordability (10 percent) were mentioned less often. Only 5 out of the 1 000 respondents indicated that they had never eaten fish or fish products.

FIGURE 42

Reasons for consumption of fish and fish products (% household respondents)¹

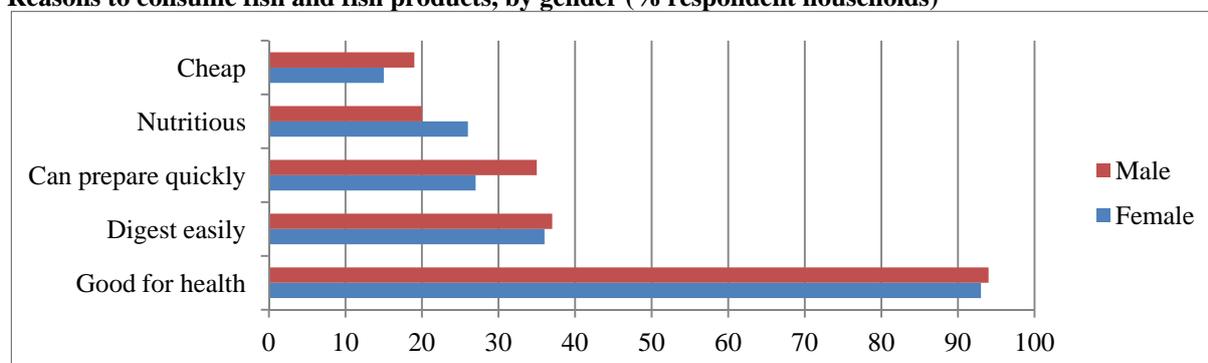


¹Total exceeds 100 percent because each respondent gave more than one reason.

However, there are some differences between the responses received from men and women (Figure 43). More men prefer fish for the reason that it can be prepared quickly, while more women prefer fish for its nutritive value. The study revealed that respondents in the 35–46 years old age group liked fish because of the short time needed to cook it. However, those older than 46 years mainly appreciated fish for its easy digestion. Residents of Bishkek city and Chui Oblast liked fish products because they are “nutritious”. Residents of Naryn, Issyk-Kul and Batken liked fish for the key reason that it takes a short time to cook, while those and in Osh and Talas liked it because it is “easy to digest”.

FIGURE 43

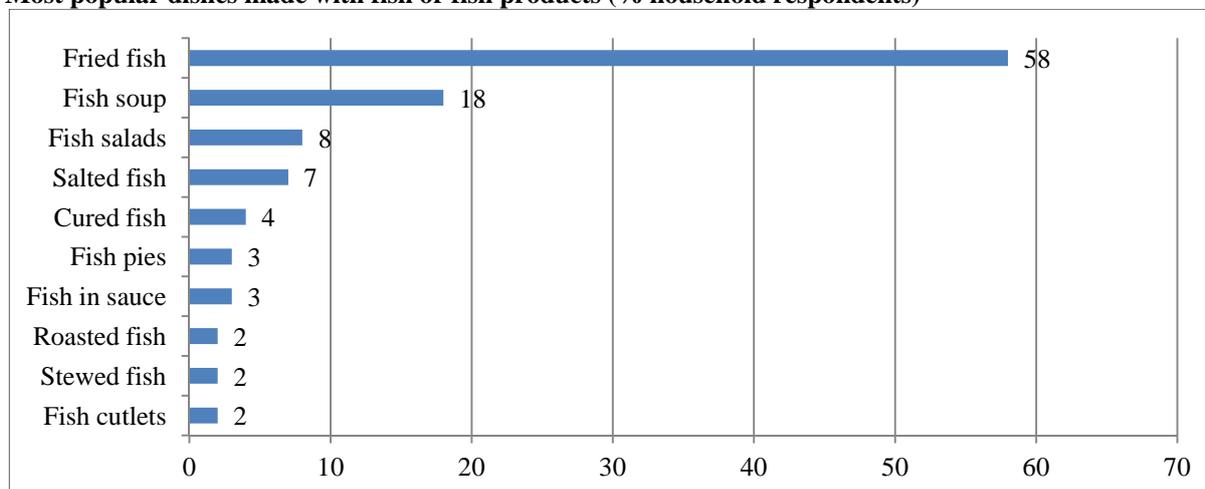
Reasons to consume fish and fish products, by gender (% respondent households)¹



¹Total exceeds 100 percent because each respondent gave more than one reason.

With regard to preferred dishes of fish and fish products, respondents named more than 20 dishes. However, most fish is consumed in fried form (Figure 44). Fish soup (15 percent), fish salads (8 percent) and salted cold appetizers (7 percent) were mentioned less often. Other dishes, such as pies, rolls, baked fish and fish cutlets are consumed very rarely.

FIGURE 44

Most popular dishes made with fish or fish products (% household respondents)¹

¹ Total exceeds 100 percent because each respondent had more than one preference.

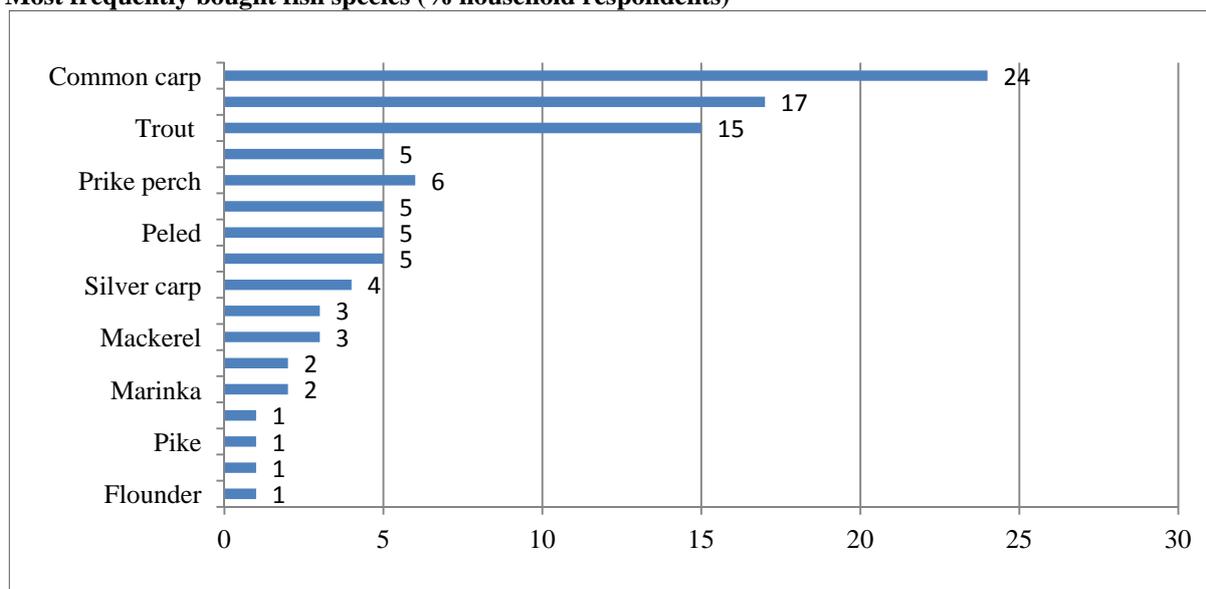
For cooking purposes, households usually buy canned (53 percent), live (36 percent), chilled (25 percent) or frozen fish (22 percent). Other types of fish products are bought less often. Canned fish is mostly bought in Bishkek, Talas and Jalal-Abad Oblasts. Fresh/live fish is bought in Bishkek, Chui, Issyk-Kul and Batken, while chilled fish is purchased in Naryn. The main reasons for choosing canned fish include its being considered “tasty” (297 respondent households), “ready for consumption” (243 respondent households), “good for health” (113 respondent households) and “affordable” (106 respondent households).

The main reasons given for the use of fresh/live fish include “good taste” (186 respondent households), “good for health” (145 respondent households) and “fresh product” (125 respondent households). With regard to chilled fish, respondents said that they prefer it because it is “tasty” (112 respondent households), “good for health” (84 respondent households), “affordable” (69 respondent households) and “convenient for consumption” (61 respondent households). According to respondents, frozen fish is usually bought because it is “tasty” (121 respondent households), “ready for cooking” (82 respondent households) and “good for health” (51 respondent households). Cured fish is often chosen as a good appetizer with beer.

As far as the type of fish species is concerned, 24 percent often buy common carp, while 17 and 15 percent buy Atlantic herring and rainbow trout, respectively. Other kinds of fish seem to be less popular with respondents (Figure 45).

Analysis shows that all age groups tend to buy common carp. Younger people and those in the 35-45 years age group like herring, while trout is preferred by both the younger age group and the 55-65 years age group. Silver carp is often chosen by consumers in the 35-45 years and 55-65 years age groups. Note that response varied widely depending on the respondent household’s income.

FIGURE 45

Most frequently bought fish species (% household respondents)**5.1.3 Eating out**

According to the survey, some households consume fish outside their homes. A relative majority of respondents (38 percent) have lunch once or twice a week at their friends or relatives, while (27 percent) visit a café once or twice a week. Twenty-six percent have lunch in a canteen, and about the same number visit a canteen from one to seven days a week. One in five participants (18 percent) has a fish snack in the street. Least often, respondents visit restaurants (5 percent), with the frequency of visits ranging from two to three times a week.

Fried fish is preferred in public eateries and at home. According to the survey, the average cost of a portion of fried fish is KGS158.5. In addition to fried fish, respondents from Bishkek, Chui and Issyk-Kul also order fish salads, appetizers, and steamed and baked fish at public eating facilities. Respondents from other oblasts order only fried fish at public eating facilities.

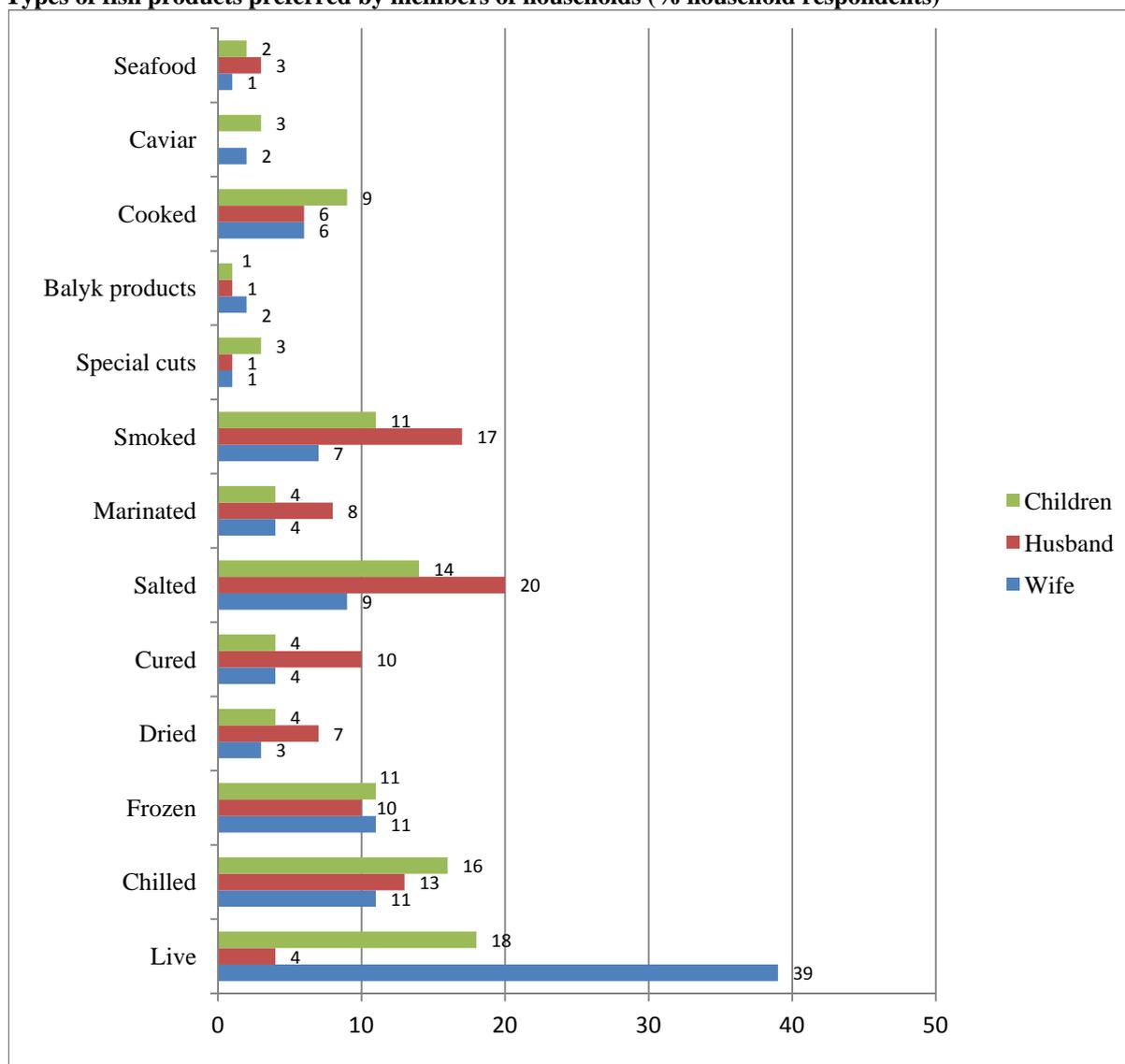
5.1.4 Taste preferences of household members

The study data show varying preferences for fish products among family members in a household (Figure 46).

A relative majority of respondent household women (34 percent) prefer to eat cooked fresh fish. Unlike them, a relative majority of men prefer canned (19 percent), salted (16 percent) and smoked fish (13 percent). In most cases, children like canned fish (41 percent). One-sixth of respondents said that they liked all types of fish and fish products, while one in ten could not decide on a preference.

Most household respondents voiced many complaints about dried, salted and cured fish, as well as caviar and canned fish products. From 6 to 8 percent of respondents do not like these types of fish products. The main reasons for non-preference of dried, cured and salted fish included “hard texture”, “no nutritious value” and “not good for health”. The main criticisms of frozen fish included “poor quality” (frozen and defrosted many times), “poor taste” and “additional time needed to defrost”. The major factor in the reluctance to buy fish caviar was its high price. According to respondents, fresh fish is “difficult to clean”, “has lots of bones” and “has an odd taste”. The main negative factor of canned fish as seen by the respondents is that it is often sold after its expiry date. For many participants, seafood is unusual, because their bodies are unaccustomed to it. Criticisms of chilled fish include its “poor taste” and “high price”.

FIGURE 46

Types of fish products preferred by members of households (% household respondents)**5.1.5 Place of purchase and satisfaction with quality of fish and fish products**

“Just take a look at how and where the fish is sold. For instance, there is an outlet on the market near the church. They sell peled. One of the problems is that they catch really young fish, just 10–15 cm long, and most likely by poaching. Another problem is that fish is piled on newspapers without any refrigeration. In the spring, fish spoils in such conditions in just two hours. In the ‘staryi tolchok’ (old bazaar), this same fish is fried right on the streets. Just look at how fish is sold at the Osh Market, also without refrigeration. Some have their fish in showcases, but refrigerated showcases are out of order. Generally, what quality are we talking about? Only large suppliers are concerned about (proper) storage of fish.” – Key informant.

“Peled mostly comes from Lake Son-Kul, but the government has enacted a moratorium on fishing in the lake until August 2013. Another lake that has peled is Lake Kara-Kul, but the population of peled at Kara-Kul is very small. Thus, all peled sold in Bishkek is poached from Lake Son-Kul. This business is based on corruption that encourages illegal fishing and selling of fish.” – Key informant.

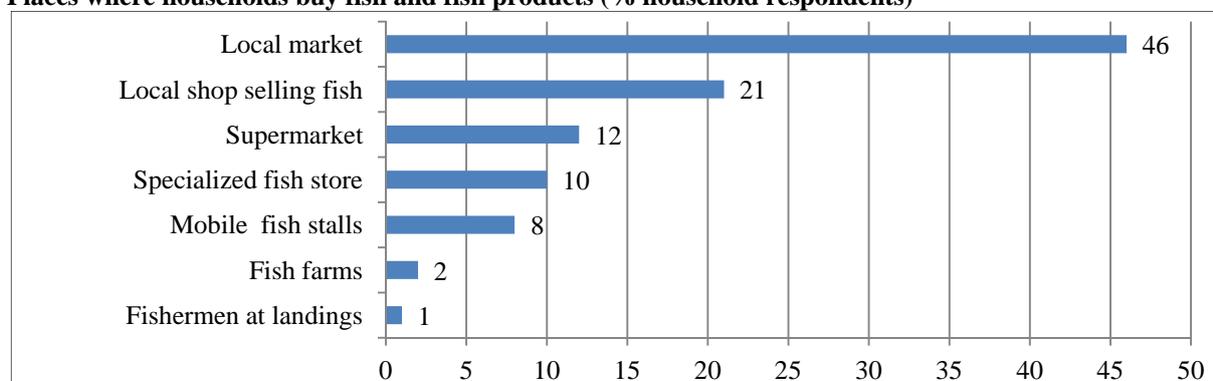
“Some citizens know how to choose fresh fish – they check the gills, eyes and smell. Most rural people don’t know anything; they are not accustomed to eating fish; they fry it in the same oil several times.

But after such cooking the fish becomes unfavourable to eat, rather than good for health. Few people know how to choose smoked fish, canned fish or frozen fish. There should be (TV) programmes in the Kyrgyz language about how to judge the quality of fish. Schools should have classes on healthy eating, as should health clinics, especially for pregnant women. Army units have very poor menus; they should also be inspected in order to increase consumption of fish and meat. There should be a targeted wide-scale campaign. One of the public activities could include a ‘fish fair’ like the ‘honey fairs’. In short, people should be educated about the benefits of fish consumption, so that they could live long like people in Japan.” – Key informant.

A relative majority of the household respondents (46 percent) buy fish and fish products at the local market (Figure 47). About one in five (21 percent) buys fish at a specialized retail outlet, while around one in ten buys at a supermarket (12 percent) or specialized fish shop (10 percent). Very rarely, households buy from a fish farm or from fishers at the landings (Figure 47). In most cases, the choice of the place where fish is bought is determined by three criteria:⁹ price (76 percent), quality (62 percent) and availability of the product (43 percent).

FIGURE 47

Places where households buy fish and fish products (% household respondents)



Eighty-nine percent of the survey participants were satisfied with the quality of the fish and fish products they bought, while 5 percent were not satisfied and 6 percent were undecided. Satisfaction with the quality of fish and fish products varied widely across oblasts. Most of those who were dissatisfied with the quality of fish lived in Bishkek (28 percent), Chui (26 percent), Batken (20 percent) and Jalal-Abad (13 percent). In other oblasts, the proportion of respondents dissatisfied with the quality of fish and fish products did not exceed 6 percent.

Respondents who were dissatisfied with the quality of fish and fish products indicated that in some cases the product sell-by date was past, and that sanitary norms were not observed.

5.1.6 Frequency and volume of purchases of fish and fish products

“Our doctors have been warning us for a long time that people eat improperly. Children do not get nutrients; especially, they do not get enough meat, fish and poultry. Go to any village and ask any kid whether he likes fish or not. Of course the answer will be “no”, because they were not taught to eat and enjoy fish from a small age.” – Key informant.

“The Ministry of Education says that the educational achievements of students decline every year, and that teachers complain that children have poor memory. All of these are symptoms of a lack of nutrients that fish is abundant with – especially the omega-6 fatty acids. It used to be that every school and every vocational college or university had fish on their menu at least one day a week as a ‘fish eating day’. That way the government forced people to consume fish. Now, all of that is gone. That needs to be restored.” – Key informant.

⁹ Some respondent households selected more than one criterion.

“Ask any resident of Toktogul how much fish he/she consumes and you will find out that they produce it but don’t eat it – there is no culture of consuming fish. Kyrgyzs historically do not eat fish, and that is why we need programmes to encourage people to consume more fish.” – Key informant.

“I think that people do not eat fish due to poverty. A poor person might consider “what is better to buy, a kilogram of (beef/lamb) meat or a kilogram of fish”? Of course, the meat would win, because it is more traditional and rich in calories. Besides, fish is a highly perishable product that needs to be refrigerated and not everybody has a refrigerator.” – Key informant.

The frequency of buying fish and fish products in a household averages 24 days in a year. This number varies widely by region. The frequency of buying fish and fish products in a year averages 30 days in Osh, 27 days in Batken, 22–24 days in Bishkek city and Chui, and 18-19 days in Jalal-Abad and Issyk-Kul. Talas residents tend to be the most frequent buyers of fish, making purchases once in two weeks. The variation is extremely wide, thus some households buy fish every week, while others buy it once in 5–6 months or even only once a year.

On average, every buyer spends about KGS288 during an individual purchase. Analysis of regional averages suggests that Talas, Issyk-Kul and Jalal-Abad buyers spend the most during one purchase (KGS333–370) (Figure 48), while in Bishkek and Chui this amount averages KGS298 and KGS323, respectively. Residents in Batken spend the least amount of money on one purchase of fish or fish products (KGS199).

FIGURE 48

Average amount of money spent on fish and fish products per purchase (KGS)

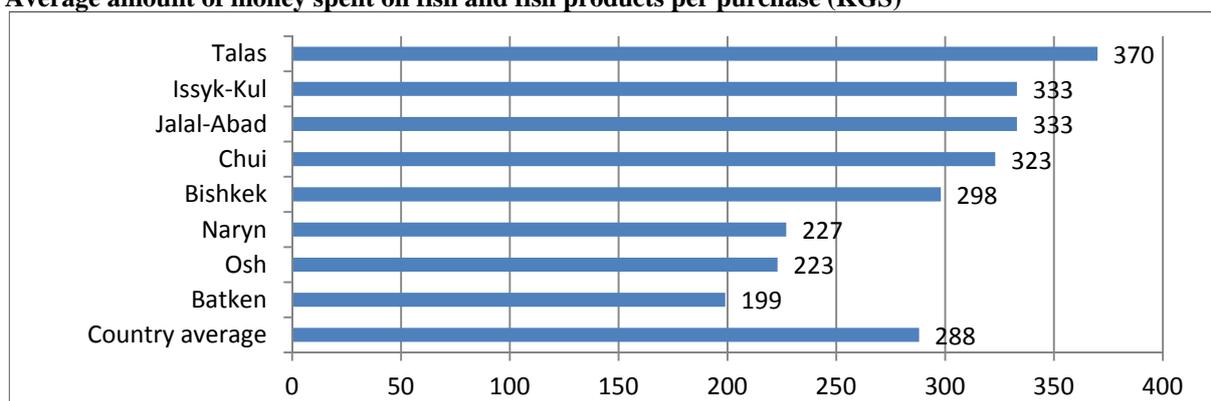


Table 32 shows that, in terms of monthly consumption of all types of meat, lamb (4 kg/household) and beef (3.9 kg/household) rank highest, followed by chicken (3.2 kg/household).

The lowest level of monthly meat consumption was reported for pork (2.4 kg/household), which is consistent with the fact that most residents in the Kyrgyz Republic associate themselves with Islamic culture and do not consume pork. Although there is no such restriction on the consumption of fish, it is the least consumed.

The study suggests that consumption of fish and fish products varies widely. Some households consume only one type of fish, while others consume two; in some cases, households consume three or more types of fish and fish products. Consumers of fresh/live fish buy the largest quantities of fish, 2.4 kg a month per household, while consumers of chilled and frozen fish buy an average of 2.2-2.3 kg per month. On average, caviar consumption is about 200 g per month, while seafood-eaters buy an average of 300 g of seafood a month.

TABLE 32

Average monthly consumption and average prices of meat, poultry, fish and fish products per household

Product	Household/	Per capita monthly	Average
	month	consumption	price
	(kg)	(kg)	(KGS/kg)
Poultry / chicken quarters	3.2	0.63	140
Pork	2.4	0.47	229
Beef	3.9	0.76	261
Lamb	4	0.78	277
Live fish	2.4	0.47	196
Chilled fish	2.2	0.43	177
Frozen fish	2.3	0.45	164
Cured fish	1.4	0.27	229.8
Salted fish	1.7	0.33	120
Marinated fish	1.3	0.25	162
Smoked fish	0.9	0.18	154
Canned fish	0.2	0.04	99
Preserved fish	0.2	0.04	164
Fillet, minced fish meat	0.2	0.04	236
Special fish cuts (vacuum packed, in plastic containers)	0.2	0.04	225
Cooked fish (fried fish, fish cutlets, other)	1.2	0.24	211
Caviar	0.2	0.04	80–2 000
Seafood	0.3	0.06	80–350

Thus, the range of fish and fish products can be grouped into three categories: the first group with the highest consumption level includes live, chilled and frozen fish, with an average consumption of 2.2-2.4 kg per month; the second group includes salted, cured, marinated and smoked fish, with an average consumption of 0.9–1.7 kg per month; and the third group includes fillet, minced fish meat, special fish cuts and caviar, with an average consumption of 0.2–0.3 kg per month.

Per capita fish consumption in the Kyrgyz Republic is far below the average per capita fish consumption of 18.5 kg/year in Asia (FAO, 2010) and the country's own recommended per capita consumption of 9.10 kg/year as per the Resolution of the Government of Kyrgyz Republic No. 111 of 19 February 2010 on "Approval of average physiological consumption rates of food products for the population of the Kyrgyz Republic". Based on this standard, the average per capita consumption of fish and fish products in the country is only 10 percent of the recommended value. Analysis of average per capita consumption of fish products shows insufficient fish consumption in all regions, especially in Naryn, Jalal-Abad, and Batken (Table 33).

TABLE 33

Average per capita consumption of fish products per month, by oblast

Type of fish product	Bishkek	Chui	Naryn	Issyk-Kul	Talas	Osh	Jalal-Abad	Batken
	(kg)							
Live fish	0.6	0.7	0.3	0.7	0.5	0.3	0.4	0.3
Chilled fish	0.5	0.4	0.3	0.6	0.5	0.3	0.4	0.3
Frozen fish	0.7	0.5	0.3	0.7	0.5	0.3	0.3	0.4
Dried fish	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Cured fish	0.3	0.3	0.0	0.2	0.4	0.0	0.2	0.3
Salted fish	0.3	0.4	0.0	0.3	0.5	0.3	0.2	0.2
Marinated fish	0.3	0.4	0.2	0.2	0.5	0.2	0.1	0.2
Smoked fish	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.2
Canned fish	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Preserved fish	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Fillet, minced	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Special fish cuts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooked fish	0.2	0.3	0.1	0.2	0.0	0.2	0.3	0.0
Caviar	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1
Seafood	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0

On average, the share of fish and fish products in total fish and meat consumption makes up no more than 9.7 percent. Apart from fish and fish products, the surveyed households consume meat and poultry; 72 percent of households consume beef, 58 percent consume lamb and 58 percent consume poultry and poultry products. Only 8 percent of household respondents consume pork.

A significant share of the respondents do not monitor how often prices change on the market. Thus, 67–90 percent of the respondents had difficulty in recalling how often the price of fish and fish products changed. Those who responded recalled that prices changed rarely, and mostly seasonally. Only 1–3 percent of respondents noted monthly price changes. Information on changes in consumption of fish and fish products compared with the previous year is presented in Table 34.

Analysis of the data presented in Table 32 suggests that respondents noted a reduction in consumption of fresh/live (15 percent), frozen (8.1 percent), chilled (7.5 percent) and salted fish (6.2 percent). The number of respondents who noted an increase in consumption of all types of fish and fish products is very small. Sixty-eight percent of the surveyed household respondents expressed readiness to increase consumption of fish and fish products if prices fall. This readiness varies widely by region. Among the respondents, the percentage of those who are ready to increase consumption of live fish in Osh (92 percent), Bishkek (75 percent) and Chui (69 percent) was higher than in Batken (49 percent), Talas (41 percent) and Naryn (17 percent) (Figure 49). The respondents speculated that if the fish prices were reduced by 20–35 percent from their current levels, then fish consumption would increase.

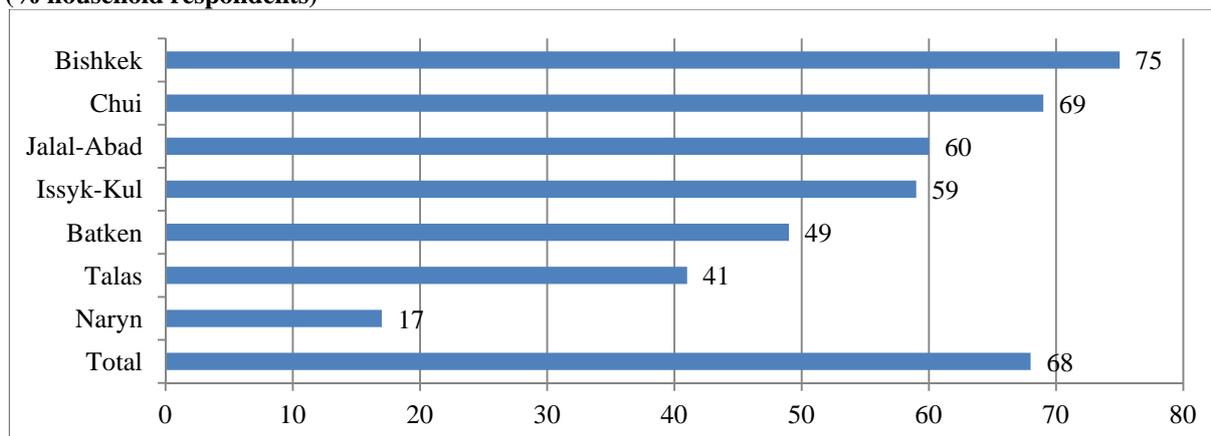
TABLE 34

Changes in consumption of fish and fish products compared with previous year (% household respondents)

Type of fish product	Consumption						Total
	Increased significantly	Increased slightly	No change	Declined slightly	Declined significantly	Cannot say	
				(%)			
Live fish	2.9	6.9	20.8	6.1	9.2	54.1	100.0
Chilled fish	0.4	3.6	23.0	2.9	4.6	65.5	100.0
Frozen fish	0.6	2.3	20.9	4.1	4.0	68.1	100.0
Salted fish	0.8	2.1	14.6	3.1	3.1	76.3	100.0
Cured fish	0.1	1.1	11.1	1.6	3.5	82.6	100.0
Dried fish	0.1	1.2	8.3	2.0	3.5	84.9	100.0
Canned fish	1.2	6.7	34.5	6.8	5.6	45.2	100.0
Preserved fish	0.1	1	6	1.4	2.7	88.8	100.0
Smoked fish	0.8	2.4	10.0	2.2	3.4	81.2	100.0
Marinated fish	0.5	1.3	7.6	2.4	2.6	85.6	100.0
Cooked fish	0.3	1.3	7.6	1.7	4.5	84.6	100.0
Caviar	0.5	0.6	6.2	1.8	3.0	87.9	100.0
Fillet, minced fish meat	0.1	1.2	6.2	1.2	3.3	88.0	100.0
Special fish cuts	–	0.6	5.1	1.1	3.2	90.0	100.0
Balyk products	–	0.5	5.2	0.9	3.2	90.2	100.0
Seafood	0.4	0.5	5.0	1.2	2.9	90.0	100.0
Average	0.6	2.1	12.0	2.5	3.9	78.9	100.0

FIGURE 49

**Readiness to increase consumption of fish and fish products by region, if prices reduce
(% household respondents)**



5.1.7 Opinions and attitudes

Ninety-six percent of household respondents agreed that fish is a very good food commodity for human health, and that every individual should eat fish at least once a week. Sixty percent indicated that fish is expensive, and thus they buy it rarely. Forty-five percent of the surveyed households agreed that the Kyrgyz traditionally do not eat fish, and thus people will not start eating more fish or fish products. Thirty-nine percent of the participants did not agree with this response, and 15 percent did not respond at all.

5.2 Institutional consumers

5.2.1 Profile of large consumers of fish and fish products

All large consumer respondents of fish and fish products are catering entities, which include owners and managers of private cafes (46 percent) and restaurants (25 percent), managers of public kindergartens (2 percent) and boarding schools (4 percent), as well as two private canteens and one public canteen (10 percent).

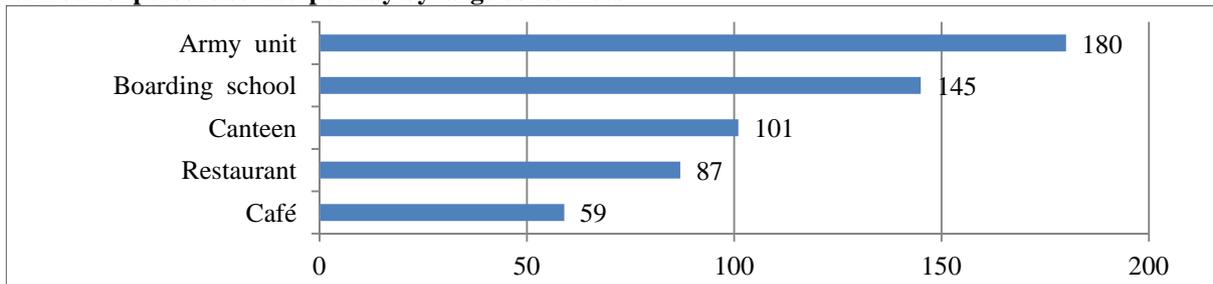
Sixteen percent of large consumer respondents do not have equipment for storing fish and fish products. The remaining enterprises have freezers that are in working order. No specialized equipment to transport fish is available to the surveyed respondents.

Each army unit provides meals every day to 180 individuals. Boarding schools cater for up to 145 individuals, and canteens for up to 101. Restaurants (87 customers per day) and cafes (59 customers per day) have fewer clients (Figure 50).

5.2.2 Types of fish and fish products purchased

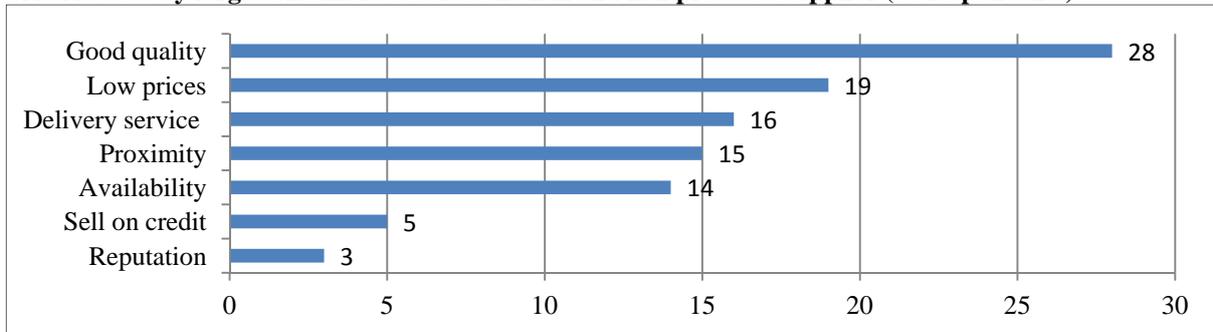
A relative majority of large consumer respondents buy frozen fish (27 percent), live fish (14 percent) and chilled fish (10 percent). Salted, smoked and other kinds of fish are bought much less often. Preference is given to frozen fish due to its “easy storage”. For main dishes, large consumer respondents usually buy trout (16 percent), common carp (13 percent), canned fish (13 percent) and walleye pollock (11 percent). Nevertheless, restaurants and cafes prefer trout, common carp and grass carp, while state institutions (kindergartens, boarding schools and army units) prefer herring and walleye pollock.

FIGURE 50
Number of persons served per day by large consumers



A relative majority of large consumer respondents buy live fish from private fishers (42 percent) and wholesale sellers (42 percent). Few buy from fish farmers (14 percent). Twenty-five percent of the study participants buy chilled fish in specialized stores. The main criteria used by large consumers during selection of a supplier to buy fish are: “good quality of products” (28 percent), “low prices” (19 percent), “delivery service” (16 percent), “proximity” (15 percent) and “consistent availability of good assortment of fish and fish products” (Figure 51).

FIGURE 51
Criteria used by large consumers to select the fish and fish products supplier (% respondents)



5.2.3 Menu

Fifty-eight percent of the surveyed catering outlets served fried fish, 29 percent offered various fish salads, and 15 percent offered deep-fried fish in dough crust (Figure 52). Fish soup was offered by 13 percent of respondents. Less often, the menu contained other fish dishes, such as fish with vegetables, fish cutlets, roasted fish and others. The study showed that in the majority of cases (78 percent), when ordering fish dishes, clients preferred fried fish and less often fish salads (17 percent). On average, fish accounts for about 19 percent of products available in the surveyed catering enterprises. This figure varies widely depending on the type of institution. The smallest share of fish in the total volume of food offered is in boarding schools (15 percent) and cafes and restaurants (17 percent each) (Figure 53). In army units, this figure reaches 25 percent, and in canteens, 29 percent (Figure 53).

FIGURE 52

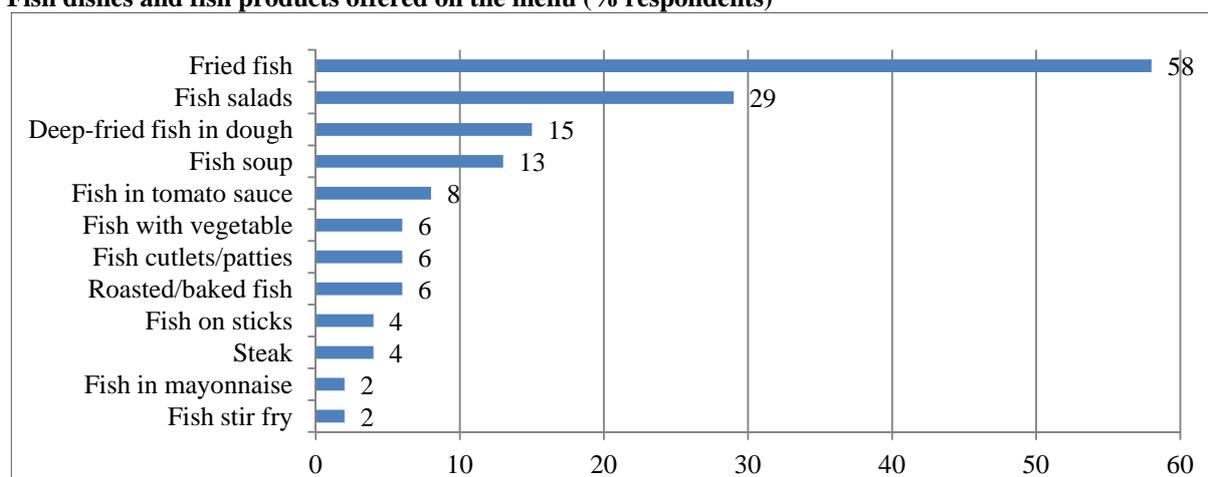
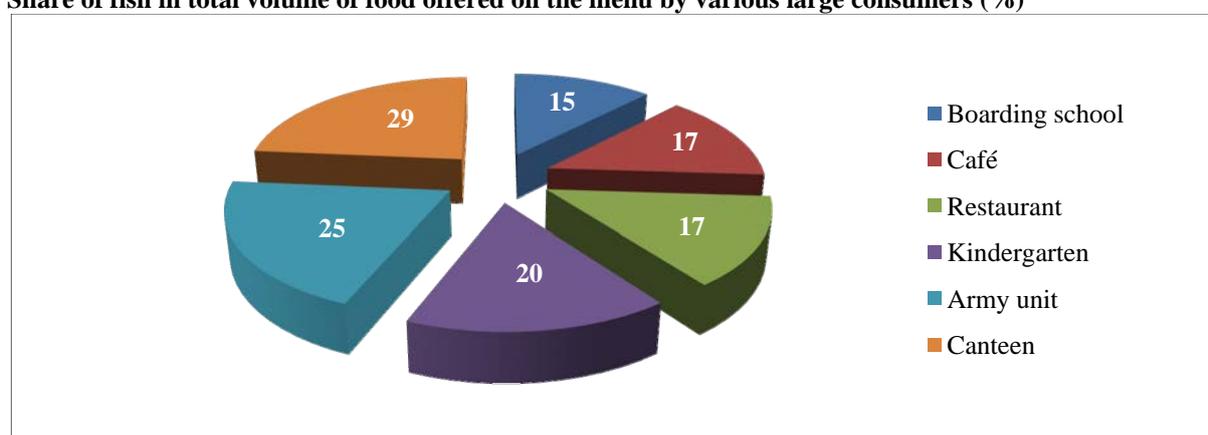
Fish dishes and fish products offered on the menu (% respondents)

FIGURE 53

Share of fish in total volume of food offered on the menu by various large consumers (%)**5.2.4 Consumption and prices**

Information on average volume of consumption and prices of fish and fish products is presented in Table 35.

TABLE 35

Consumption of fish and fish products by institutional consumers and average price

Type of fish products	Average monthly consumption of fish products	Average consumption of fish products	Average price
	(kg/institution)	(%)	(KGS/kg)
Frozen fish	77	38.5	254
Live fish	65	32.5	168
Chilled fish	18	9.0	162
Salted fish	15	7.5	135
Dried fish	10	5.0	440
Smoked (cold and hot smoked)	10	5.0	120
Cured fish	5	2.5	130

The study data show that large consumers, as other respondents, do not monitor the market prices of fish and fish products. No respondent had consolidated information on market price changes over the past year or the past three years. Thus, 85–100 percent of large consumers had difficulty responding as to how the market price of fish had changed in the past few years.

Large buyers agreed with the general opinion that prices for fish and fish products are subject to seasonal fluctuations, with increased consumption of fish and fish products in the cold months of the year (November, December and January) and reduced consumption in the warmer months, especially in June, July and August. The exception is Issyk-Kul, where consumption and prices rise in summer owing to the seasonal arrival of tourists.

Generally, public catering institutions did not notice any increased consumption of fish and fish products in 2011 compared with the previous year. At the same time, 46 percent of large buyers expressed readiness to increase purchases of fish and fish products if prices decline.

5.2.5 Consumption of other food products

According to the survey, apart from fish and fish products, large consumers buy meat products. Information about volume of consumption and average buying prices of meat products by large consumers is presented in Table 36. The average percentage of fish consumption per large consumer/institution of the total meat and fish consumption basket of 24.3 percent is skewed by the large number of consumers in military units compared with other large consumers.

TABLE 36

Consumption of meat products by institutional consumers and average prices

Type of product	Average monthly consumption (kg/institution)	Average consumption (%)	Average price per kilogram (KGS/kg)
Chicken / poultry	88	11	124
Duck / goose	57	7	200
Beef	228	28	257
Lamb	177	22	263
Horse meat	37	5	293
Pork	35	4	243
Fish	200	24	201

5.2.6 Opinions and attitudes

As in the case of household consumers, a majority of the large consumers (89 percent) are certain that fish is a very good product and that every individual should eat fish at least once a week. Forty-four percent feel that one of the reasons for the lack of demand for fish is that the Kyrgyz Republic does not have a tradition of eating fish, and that this stereotype still exists, especially among rural residents.

5.2.7 Problems

Some of the main problems faced by large consumers include: high price of fish and fish products (50 percent); low level of product quality (35 percent); limited product range offered by suppliers and markets (23 percent); and poor sanitation in trade outlets (8 percent). Some are of the opinion that a reduction of the informal payments to customs and tax services that large suppliers are subjected to would significantly reduce market prices.

Large consumers feel that the creation of a specialized shop or fish market, improved sanitation and a large product range would help to address some of the current problems. Many noted that there is a need to work with consumers and improve awareness of the health benefits of fish and fish products among consumers. Some have suggested the designation of “fish days” in catering institutions, the holding of “fish fairs” and the advertising of events and campaigns.

6. ISSUES AND TRENDS

6.1 Issues and trends emerging from the survey

The following sections present the major issues and trends emerging from the survey.

6.1.1 *Farm and farming practices*

- Farmers perceive that government should take steps to provide support and specialized services to improve their production capacities and to make their businesses sustainable.
- They also identified the need for a consistent supply of quality fish seed, nutritionally balanced fish feeds and access to credit.
- Fish farmers do not have a habit of record-keeping of inputs, production and cost data to assess the efficiency of production.
- Many farmers stock fish larvae into ponds, rather than fry or fingerlings, and practise extensive fish culture. When larvae are stocked, the return in terms of production is very low compared with when fry or fingerlings are stocked, because these stages have a greater ability to survive in a new pond environment.
- Farmers do not have a good set of criteria to select fish species for culture. The criteria used are mainly guided by the desire to earn profits, rather than by the availability of inputs such as fish seed and feeds, and local demand for the produce.
- A misconception among some farmers is that the rainbow trout, an introduced predatory fish, is an endangered species. This may lead to negative impacts on local biodiversity by farmers not paying attention to restricting the movements of trout within the farm and preventing their possible release into natural waterways.
- A significant proportion of fish farmers are members of various associations and cooperatives. Such a situation favours the promotion of good management practices in fish farming and the increase of national fish production in an environmentally and socially responsible manner.
- The main reasons for the lack of development in fish farming practices (leading to low levels of national fish production) are a lack of: support services organized by the government and local authorities, a conducive legal framework, assistance from financial institutions, and incentives for business promotion.
- Only a few farmers are engaged in fish processing. Among those who are, drying, smoking and salting are the most common processes employed. Fish farmers are perceived as primary producers and not regarded as secondary producers such as processors or fry traders.
- Many perceive that it has recently become harder to develop the fish farming sector, and that there is no state support to the development of this sector in the Kyrgyz Republic.
- Many farmers allow recreational fishers to fish in their ponds for a fee as part of their fish farming business.

6.1.2 *Markets and marketing*

- To increase the productivity of fishers and fish farmers and ensure their livelihood security, an efficient fish marketing system is a vital requisite; fish farmers are confident that the sector can be developed if support services are provided.
- Market facilities are integral to the task of improving and maintaining proper hygiene standards of food handling and processing. In the survey, they served as an indicator of the working conditions and environment of the fish trader.
- The main constraints to fish marketing are related to infrastructure and institutional management. With regard to infrastructural constraints, the most severe issues that need to be addressed are: (i) lack of modern hygienic fish landing centres; (ii) illiteracy, ignorance, lack of awareness and poor socio-economic conditions of fishers; (iii) non-existence of ice plants with sufficient capacity, cold and freezer storage; and (iv) lack of handling and preservation facilities.

- Most markets are rather poorly endowed in terms of basic infrastructure and services for food handling. Basically, the picture is one of deficiency and neglect on the part of the authorities that collect revenue and are responsible for market maintenance and improvement.
- Problems are particularly serious in certain inaccessible areas with inadequate transportation and distribution facilities and lacking insulated and refrigerated fish transportation, causing considerable wastage, and lack of electricity. In such areas, open trucks are the main means of fish transportation.
- Other constraints in fish marketing are: lack of proper knowledge on modern sanitation techniques and quality control; ignorance or carelessness in the management of personal hygiene of fish handlers; and fishers located far away from markets or selling facilities.
- Facilities considered essential to fish handlers include cleaned selling stalls or tables, and storage facilities. Abundant clean water, sheltered facilities with cement floors to sell fish, and sanitary facilities are considered very important to maintaining hygiene standards. Electricity and telephones are desirable amenities.
- The present system of official inspection and quality control is restricted mainly to processed fish products. Inspection and quality control is not done for marketed fresh and frozen fish. This leads to deterioration of the quality of such products. Therefore, the quality of unprocessed fish during transit from harvest to the consumer cannot be assured.
- The consumers have to pay higher prices due to the participation of intermediaries in the marketing channel, but the actual fishers/fish farmers do not receive a desirable price for their products and most of the proceeds go the intermediaries.
- Organized landing sites for fish and wholesale facilities for fish handling do not exist.
- For almost all fish traders, fish trading is not a family tradition. The self-esteem of the traders to do their job is expressed as the level of interest. If they are not satisfied with their work, there is always the chance to change to another job. Most fish traders seem to be unsatisfied with this job and some provided no comments on the issues raised, which may be interpreted as dissatisfaction.
- It is very important for a market to supply a good product to its customers. Fish is one of the most perishable of food commodities. Knowledge on the ways of maintaining the quality of fish and fish products is essential. Most of the fish traders have a poor or incomplete knowledge, and only a very few have considerable knowledge on this aspect.
- There are no organized fish landing sites near the main waterbodies with fishery interest. The lack of organized landing sites prevents the gradual development of proper auction sheds, packing sheds and landing terminals.
- There is a lack of ice plants and ice storage facilities in fishing areas to make ice or cold storage accessible to fishers, fish farmers and fish markets. This absence of cold storage leads to deterioration of fish quality from harvest to the retail market.
- For marketing fisheries products domestically and to develop markets, infrastructure is most important. Infrastructure for marketing and markets varies from place to place according to the conditions in different parts of the Kyrgyz Republic. However, suitable infrastructure is not developed throughout the country, including urban markets.
- Increased consumer demand is an important factor in marketing. Attempts have not been made by the State, development projects or non-governmental organizations (NGOs) to increase fish consumption in the country.

6.1.3 Price and pricing

- Fish sellers and traders are not aware of any fish and fish product pricing policy nor do they have access to local or in-country regional fish prices and trends, let alone international fish prices.
- The price of fish is fixed neither by the government nor by the fisheries cooperatives, nor even by the trade associations. However, the price is influenced by the price at which the intermediaries/wholesalers buy their fish and the amount of profit they intend to gain, and it is fixed through supply and demand interaction.

- Generally, in proportion to other commodities, fish prices have recently increased. According to the species and size of fish, the price of fish varies with the season and the freshness of the fish. The price of fish varies irregularly and more widely than that of other agricultural commodities.
- The production area of the fish tends to influence its price. There is a variation of price between fish produced in the Kyrgyz Republic and that brought from Kazakhstan. The price of fish imported from Kazakhstan is determined by the waterbody of its origin. Fish originating from water sources regarded as unhygienic, fetch lower prices than local fish. The price of fish depends on market structure, location, species, quality, size and weight.
- The price is also influenced by supply and demand, and there are generally seasonal variations in price, with the highest in summer (March–May) and the lowest in winter (November–January).
- The fish producers lack mechanisms to access market price information, giving an advantage to intermediaries to earn large profits, with lower benefits to the producer.
- Linked to the above, both sellers and buyers do not monitor market prices of fish and fish products owing to difficulties in determining the frequency of price changes. Many believe that the price of fish changes depending on the season and have no idea of monthly fish and fish product prices.

6.1.4 Fish traders

- Of the individuals operating exclusively as fish sellers, 33.0 percent were males and 67.0 percent were females, indicating that the fish selling business is dominated by women.
- The fish selling business is dominated by retailers (55 percent). Wholesalers account for about 1.0 percent, and the rest are food retailers who sell fish (44 percent).
- The study identified three processors, who were all male. Relatively little processing is done in the markets; most of the processed fish being brought in from outside areas. Therefore, the number of processors in the fishing industry may be far higher than that indicated by the study.
- There has been an increase in female participation in the fisheries industry in recent decades, mainly in the post-harvest sector. This is attributed to recent trends in household-based small-scale fish processing such as drying and smoking, which thrust many women into the role of family providers and household heads, in addition to their traditional role in general household activities. However, women's involvement in the fish trade is still limited to the retail level, mainly in the sale of processed products and mainly because of lack of capital. It was not clear from the survey whether many women in the fish business depend on small amounts of credit and if so, from what source.
- Major constraints facing exporters include: high taxes, lack of credit at affordable interest rates, and corrupt practices. Exporters perceived the following as being major factors to improve the export industry: low-interest credit and improved legislation to streamline export procedures, elimination of corruption, and access to information, particularly on pricing policies, quality standards, and forecasted fish consumption and demand.
- Large-scale importers have not observed any changes in the business environment in the past year, although small-scale importers felt that the business environment had deteriorated. All importers claim to abide by local product quality standards, but they were not aware of required international standards.
- As reported in the case of exporters, the main constraints on importers' businesses are high rate of tax payment and the unavailability of credit at low interest rates to invest in improvement of facilities and enhancement of the business.
- The exporters have never been trained in processing technologies and related business skills. There is a great need for training in the cold supply chain of fish.
- Fish sellers do not monitor or evaluate their business environment and they have not noticed any differences in the business climate compared with previous years. As a result, they are unaware of the competition that exists around them.
- Sellers use business stimulation methods such as discounts to frequent buyers, wholesale discounts and seasonal discounts. Other forms of incentive are selling products with the "right to return unsold products", packaging, and delivery services.

- Most sellers do not receive any marketing information and are thus unaware of any standards to be maintained. They understand the importance of receiving information on competitors' pricing policies, market prices, crediting, method of taxation, place and time of fish sale, as well as forecasted fish consumption and government policy.
- It is important to note that the number of those who had difficulties in assessing the business environment is quite high, and, for some, indicators reach 13–38 percent. This suggests that most large suppliers do not monitor or evaluate the business environment.
- According to key informants, the majority of large suppliers do not have a strategy to attract clients; moreover, some key informants think that “businessmen in the fish market do not realize the importance of working with clients and for now follow the principle ‘who needs the product will buy anyway’”.
- It is unclear who will address these issues and how they will be addressed. More realistic suggestions depend on the suppliers themselves: widen the assortment/product range, improve logistics and equipment, and improve the quality of fish and fish products. Some respondents think that reductions in the interest rate on credit would help to increase turnover of financial resources and increase income.
- Most sellers observe the quality standards as set by the Kyrgyz Agency for Metrology and Standardization. However, a large percentage of the study participants declined to answer the relevant question, which may indicate that the standards are not observed or that the respondents were not informed about their existence.

6.1.5 Buyers and consumers

- Many fish farmers keep some of their production for personal consumption.
- Most households buy fish and fish products from local markets rather than from fish specialty shops or supermarkets; hence, there is a need for improvements in local market conditions to increase fish consumption.
- Many households have refrigeration facilities to keep fish at home, and the average frequency of purchase of fish or fish products is once in three weeks.
- The level of fish consumption is low when compared with meat and meat products, except for pork and pork products (which are not consumed for religious reasons).
- People do not traditionally eat fish. Only in the past decade has the situation changed slightly; however, fish consumption is still insufficient. Neither the healthcare system, the educational authorities or the fish sellers explain that fish is one of the most important products in the diet and should be consumed at least once or twice a week.
- The average monthly consumption of fish varies depending on the type of product. In households, live, chilled, frozen, cured, salted and marinated fish are consumed more often than canned, smoked or preserved products. Large or institutional buyers prefer frozen, live and chilled fish.
- It is not clear whether household fish consumption has changed in comparison with previous years. However, a significant proportion of people are willing to increase fish consumption.
- The share of fish in the food basket offered by catering entities averages 19 percent, while the share of fish and fish products in the total food basket of a household amounts to less than 9.7 percent. The indications are that to increase this share, fish prices must go down.
- Both in restaurants and households, cooking of fish is limited to fried fish, fish salads and fish soup, and it seems that households are insufficiently informed of various recipes to prepare fish. This is one of the factors contributing to low fish consumption.
- Many of the respondents are aware that fish and fish products are good for health and easy to digest. However, there is a lack of awareness of the way these health benefits are accrued.
- Preference for fish consumption is dependent on gender and age.
- Problems faced by buyers include the high price of fish and fish products, the low level of product quality, the limited product range, and the poor sanitation in trade outlets. Buyers believe that having more fish specialty shops or fish markets, improved sanitation and a large product range would address these problems.

7. RECOMMENDATIONS

- The Department of Fisheries should take the lead in the adoption of good management practices in fish culture and should provide technical training to fish farmers.
- Many farmers perceive that the fish farming sector can be developed if the necessary input support services (e.g. availability of fish seeds, feed and fertilizers) are available within the country. The government should encourage the private sector to venture into supplying basic inputs such as fish seed and feed through the use of soft loans and tax- and duty-free equipment import incentives.
- Capacity building for the public and private sectors for the production and distribution of fish feed and seed should be considered as the priority initiatives for the Kyrgyz Republic.
- Many fish farmers act as primary producers engaging in production of fresh fish for marketing. In order to act as secondary producers such as processors, traders and fish seed suppliers, the fish farmers need entrepreneurship skill development. The Department of Fisheries should explore the possibilities for development projects and NGOs to organize entrepreneurship skill development programmes for fish farmers.
- Allowing recreational fishers to fish in fish farming ponds is a very popular activity and is part of the fish farming business. Fish farmers may improve facilities for angling such as resting huts and standing or sitting facilities to attract recreational fishers, as this generates good income for farmers.
- To increase the productivity of fishers and fish farmers and ensure their livelihood security, an efficient fish marketing system is essential. Before breaking the power of traders to control the market, the recommendation is to first address the constraints in the supply chain from producer to the market, such as cold storage, hygienic handling, and transportation.
- The Department of Fisheries should encourage potential entrepreneurs to develop public–private partnerships to address the constraints that have a negative impact on marketing efficiency.
- The Department of Fisheries should play a lead role in the transfer of technology and good management practices to fish farmers and fishers to increase production, and the State should introduce appropriate price control mechanisms to monitor and regulate intermediaries in dictating fish prices.
- Providing fisheries associations and community organizations with market information (including greater market transparency), and strengthening and building their confidence in marketing management, should be adopted as a long-term solution for price issues.
- Despite the many problems that exist in the markets in urban and rural areas, they are regarded as important fish trading places, and the government earns significant taxes from such places. Hence, government intervention and public–private relationships are necessary to improve the existing system of fish marketing in the Kyrgyz Republic.
- Improvement of the existing fish market structure is needed for an efficient marketing system. The development of a series of modern facilities in these market places to improve hygiene practices and reduce physical handling may lessen losses related to qualitative damage. Training and extension in improved handling are required for all those involved in fish handling, including fishers, farmers and traders.
- As there is a preference among consumers for live fish, market structure improvements should include facilities to hold live fish in market places.
- Improvements in sanitation, hygiene conditions, drainage and washing facilities through improvements in existing market structures will be wasted if proper attention is not paid to the personal hygiene of fish handlers. Therefore, training and extension in personal hygiene standards are equally important.
- The fish processing sector should be strengthened with training in appropriate fish-processing technologies, maintenance of product quality, and upgrading of processing plants and practices to international standards so that the Kyrgyz Republic can expand its export arena.
- The above training and extension needs also emphasize the need for an extension arm of the Department of Fisheries to be involved in such important extension work.
- Improvement and development of the national fisheries post-harvest sector can only be achieved through proper planning, investment and management. Yet this, in turn, cannot be achieved

without sound knowledge of the sector and a reliable base of statistical data. Marketing studies done in the past have been valuable but need to be updated. Therefore, there is a need to develop a statistical base with updated market information.

- The chilling of fish in ice is a simple and convenient method of preserving its quality from harvest to marketing. Therefore, establishment of ice plants, either by the government or the private sector (by offering incentives), is critical to maintaining cold-chain supply.
- The introduction of insulated and refrigerated fish vans and fish carriers and the provision of cold-storage and preservation facilities for harvested fish will help to increase the shelf-life.
- The present inspection and quality control system should be improved to international standards and should not be restricted to the processed fish products, but to extend it to transit from harvest to the consumer to ensure quality of fish.
- Organized landing sites are needed in the main fishing areas. Such landing sites will facilitate the collection of reliable catch statistics, which is not being undertaken at present. Catch data are not merely statistics to record, they are valuable scientific data to develop management measures for fish stocks and programmes for restocking and/or fish enhancement practices. Such landing sites will eventually lead to the development of organized landing centres, proper auction sheds, packing sheds and landing terminals.
- It is evident from the survey that the lack of pricing policies and support services such as training and extension in marketing, management and market research needs to be addressed to improve fish markets and the marketing environment. Providing producers with reliable information on current market status, price trends and pricing policies, and strengthening associations, will help to enhance the bargaining power of the producers.
- The government should provide incentives across the whole supply chain in the form of tax relief, the duty-free import of equipment and inputs, and soft loans to develop the sector. Without such incentives, potential entrepreneurs may not be stimulated to invest in the development of the sector.
- Considering the proven health benefits of fish consumption, the Health Promotion Centre of the Ministry of Health should launch a countrywide campaign to promote fish consumption and healthy ways of preparing fish for consumption.
- The Ministry of Education should include the health benefits of fish consumption in school curricula as a means of targeting parents to promote household fish consumption. In this regard, the government should also seek donor support to launch a suitable fish consumption promotion campaign.
- The Department of Fisheries should take the lead role in securing the necessary finances to implement a detailed study on socio-economic development, credit systems, financial and technical assistance, and training needs in order to make recommendations to the government and proposals to potential donors for the development of the fish supply chain and marketing.
- To provide a conducive legal environment that will assist and protect the stakeholders in the fish supply and marketing chain, the Department of Fisheries should assess the gaps in the relevant legislation and take action to remedy them.

REFERENCES

- Alam, M.J., Yasmin, R., Rahman, A., Nahar, N., Pinky, N.I. & Hasan M.** 2010. A study on fish marketing system in Swarighat, Dhaka, Bangladesh. *Nature and Science*, 8(12): 96–103.
- Alpiev, M., Sarieva, M., Siriwardena, S.N., Valbo-Jørgensen, J. & Woynárovich, A.** 2013. *Fish species introductions in the Kyrgyz Republic*. FAO Fisheries and Aquaculture Technical Paper No. 584. Rome, FAO. 108 pp.
- FAO.** 2010. *The State of World Fisheries and Aquaculture 2010*. Rome. 197 pp.
- Sarieva, M., Niazov, E. & Siriwardena, S.N.** 2012. Fisheries and aquaculture in the Kyrgyz Republic: status and prospects. *Journal of Natural Resources of the Kyrgyz Republic*, 2: 158–168.
- Turdakov, F.A.** 1963. *Fishes of Kirgizia*. Frunze, Ilim.

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