FISHERY COUNTRY PROFILE	Food and Agriculture Organization of the United Nations	FID/CP/UKR January 2004
PROFIL DE LA PÊCHE PAR PAYS	Organisation des Nations Unies pour l'alimentation et l'agriculture	
RESUMEN INFORMATIVO SOBRE LA PESCA POR PAISES	Organización de las Naciones Unidas para la Agricultura y la Alimentación	

UKRAINE

GENERAL ECONOMIC DATA

Area:	603 700 km²
Territorial waters (Black Sea):	24 850 km²
Shelf area (to 200 m) (Black Sea):	77 514 km²
Exclusive Economic Zone (Black Sea):	ca 131 000 km²
Length of coastline:	1 278 km
Population (2001):	49 112 000
Population (2003):	48 523 000
GDP (2001):	US$ 43 000 million

PCE per caput (2001):	US$ 888.4
Agricultural GDP (2001):	ca US$ 1 000 million

FISHERIES DATA

Commodity balance (2001):

	Production	Imports	Exports (estimated)	Total supply	*Per caput* supply

	'000 tons live weight				kg/year
Fish for direct human consumption	382	266	36	612	12.5
Meal	50	9.6	-	9.6	

Estimated employment (2001):	
Fish production sector, including: distant-water fisheries Azov and Black Seas inland waters	31 000 9 000 16 000 6 000
Aquaculture sector:	12 000
Processing sector:	2 000
Gross value of fisheries output (estimated) (2001):	US$ 240 million
Trade (2001):	
Value of imports (estimated):	US$ 93.4 million
Value of exports (estimated):	US$ 33.1 million

Commodity balance for 2003:

2003	Production	Imports	Exports	Stocks variation	Total Supply	Per Caput Supply
	tonnes liveweight					kg/year
Fish for direct human consumption	247 965	394 254	42 331	0	599 888	12.4

Fish for animal feed and other purposes	0	-	-	-	-	-

Trade **(2003):**	
Imports:	US$ 112 538 000
Exports:	US$ 17 636 000

STRUCTURE AND CHARACTERISTICS OF THE FISHING INDUSTRY IN 2002

Ukraine has fisheries operations on international high seas, in the Black and Azov Seas, and in national inland waters (reservoirs, lakes and rivers, as well as freshwater aquaculture). In 2001, total landings from capture fisheries and aquaculture production was 381 000 t. This was lower than 1995–2000 catches, which were in the range of 400 000 to 450 000 t/year. Distant-water fisheries account for about 70 percent of the Ukraine catch. Fisheries and freshwater aquaculture are traditional occupations, especially for the population living in the coastal zone and near rivers, lakes and water reservoirs. Fish products play an important role in the nutrition of the Ukraine population and are considered strategically important food. However, in the present economic situation, it is most profitable for Ukrainian companies involved in distant-water fisheries to sell most of the high-seas catch (up to 80 percent) in the countries situated close to the fishing areas.

In the 1980s, when Ukraine was part of the USSR, its total production of fish products from all sources peaked at 1.1–1.2 million tonnes, and fish consumption in the country was about 18–19 kg per person per year. Fishermen's associations did not pay taxes and had State subsidies. In the 1990s, following Ukraine's independence, subsidies were cancelled due to the economic crisis, and capture catch and aquaculture production declined sharply, falling to a low of 313 000 t in 1994, when imports were at a low level and annual fish consumption fell to 5–6 kg per capita.

In 2001, of Ukraine's total fish production of 381 000 t, about 325 000 t was processed for human consumption, with 50 000 t processed into fish meal and 159 000 t of fish for human consumption exported. Imports of fish products increased markedly in the late 1990s, and in 2001 imports of fish products were 328 000 t. In total in 2001, Ukraine's population consumed 494 000 t of fish products, or 10.2 kg per capita. The percentage of fish protein in the total animal protein consumption in 2001 increased to 12 percent, while in 1993–1995 it was only 3–4 percent. The share of fish products in the population's nutrition is greatest among inhabitants of coastal zones and near rivers, lakes and reservoirs.

In 2000, the fisheries industry comprised about 2 300 vessels, including 1 450 motor vessels and 850 unpowered vessels. There were 47 large trawlers with overall length (LOA) of 82–128 m and 2 600–6 300 GRT and 39 medium trawlers (55–62 m LOA and 600–700 GRT), and 14 fish carriers (124–172 m LOA and 5 500–13 000 GRT) for

transporting products from ocean fishing areas. Fishing vessels in the Azov and Black Seas basin were 95 small vessels, purse seiners and trawlers of 16−36 m LOA and 30−350 GRT, the majority being vessels of 25−26 m LOA and 96−104 GRT, and 165 motor boats of less than 16 m LOA designed for netting and trap setting and long-lining. More than 30 small transport vessels (27−55 m LOA and 80−700 GRT) transport fish products.

In 2001, only 20−25 large fishing vessels operated in international waters, supported by several fish carriers. In the Azov and Black Seas, fisheries involved about 20 seiners and trawlers, 30−40 motor boats and several transport vessels. The other vessels in the national fleet were inactive port.

An important problem for Ukrainian fisheries is the ageing of the fleet, where vessels are generally between 20 and 27 years old. That may result in scrapping of more than 90 percent of the fleet by 2010−2015. At present, only 7 Ukrainian large-tonnage vessels are between 2 and 8 years old.

The catch per fisherman in 2001 in high seas fisheries was 28.3 t; 4.3 t in the Azov and Black Seas, inland reservoirs and natural waterbodies; and 2.6 t in aquaculture production. The number of professional workers directly working in the fishery industry in Ukraine was about 45 000 people, but some 500 000−1 000 000 people are connected to some extent with fisheries, processing, transportation and sale of fish products, ship building and ship repairs. This equates to less than 5 percent of the economically active population. For these people, fisheries and fishery-related activities are the main source of earnings. Fisheries have greatest economic importance in the coastal areas. In the Autonomous Republic of the Crimea, Odessa Region, Kherson Region, Nikolaev Region, Zaporozhje Region and Dnepropetrovsk Region, fisheries and ship building are important sources of employment.

In 1995, Ukraine established its Exclusive Economic Zone (EEZ) in the Black Sea, on the basis of the UN Convention on the Law of the Sea. Biological resources in the Azov Sea form a common resource for the two countries on the basis of the Agreement with the Russian Federation (1993). In 1999, Ukraine ratified the United Nations Convention on the Law of the Sea of 10 December 1982. In 2002, Ukraine ratified the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFA).

Current problems in Ukrainian fisheries are connected with the general crisis in the economy of the country, following the transition from a centrally-planned to a market economy. The development of fisheries in Ukraine is impeded by high costs for supplies of materials and machinery, an absence of circulating assets in enterprises, high credit costs, extremely strict taxation, imperfect privatization legislation, absence of laws concerning fisheries and aquaculture, criminalization of fisheries business, and shadow turnover of the greater part of the capital. Formation of a competitive environment is still at an early stage. Government support for fisheries as it exists in many countries has not yet been established in Ukraine. Ukraine has no wholesale markets for fish products, so expenses for sale of fish products in the domestic market approaches half of total commercial costs.

MARINE FISHERIES

Marine fisheries of Ukraine are historically divided into two independent parts: fisheries in the Black and Azov Seas within the EEZ of Ukraine and neighbouring countries; and distant-water fisheries beyond the Azov and Black Seas area. Total catch in the Azov and Black

Seas in 2001 was 87 000 t, and 255 000 t in the waters beyond.

Fisheries in the Azov and Black Seas

Under Ukrainian law, biological resources and the sea bed within the territorial waters are the property of the State; the biological resources in the EEZ and the sea bed are under the jurisdiction of the State; and marine areas and the sea bed cannot be assigned as private property.

The bulk of Ukrainian catch in the Black Sea originates from territorial waters and the EEZ. In the Azov Sea, Ukrainian fishermen have the right to fish over all the sea area in accordance with the Agreement with the Russian Federation, but, in 2002, Ukraine unilaterally limited the area permitted for Ukrainian fishing activities to the country's own waters following establishment of a presumed marine border with the Russian Federation. Ukrainian fishermen seasonally fish anchovy (*Engraulis encrasicolus*) in the waters of Georgia on the basis of a bilateral agreement.

In 2000−2001, the catch quota for fisheries in the Black and Azov Seas was allocated to some 200 fisheries companies, cooperatives, fish canneries and private persons. About 20 000 people were involved in fisheries on a temporary or permanent basis. Starting from 2002, a fisheries licence system was introduced. The legislative basis for fishing is the Fisheries Regulation ("Rules of Fisheries"). Control and surveillance for Fisheries Regulations compliance are carried out by the Regional State Inspectorates of Fish Protection, integrated into the Chief Administration for the Protection and Reproduction of Water Living Resources "Holovrybvod".

Ukraine's catch in the Black Sea in 2001 was 58 000 t, worth about US$ 21 million, and in the Sea of Azov it was 29 000 t, worth about US$ 14 million. The principal species in the Azov and Black Seas catch are European sprat, *Sprattus sprattus* (local name: *shprot*) − 49 000 t; Azov tyulka, *Clupeonella cultriventris* − 18 000 t; European anchovy (local name: *khamsa*) − 17 000 t; pike-perch (zander) (*Stizostedion lucioperca*) − ~1 000 t; mullets (*Mugilidae*) − 2 500 t; turbot (Psetta maxima) − ~1 000 t; cumulative catch of mussels (*Mytilus galloprovincialis*) and rapa whelks (*Rapana venosa*) is about 1 000 t. Whiting (*Merlangus merlangus*) and dogfish (*Squalus acanthias*) are taken as bycatch in the sprat fishery.

More than 90 percent of Ukrainian catches in the Azov and Black Seas are caught by small-tonnage motorized seiners and trawlers of 16−36 m LOA and 30−350 GRT. About 10 percent of the catch is taken by coastal fishing gears − set nets, set gillnets, traps and other stationary nets and hooked fishing gears (generally longlines) − using open boats.

Mechanized fisheries in the Azov and Black Seas began to be developed in the 1960s. The most intensive purse seine and trawl fisheries for anchovy are in autumn and winter for the aggregations of this species in the Kerch Strait, along the Ukrainian and Russian coasts of the Azov and Black Seas, and in the waters of Georgia. Sprat is fished by trawl fisheries, mainly in summer, on the northwestern shelf of the Black Sea and near the Crimean coast. Tyulka purse seining is conducted in the Azov Sea in winter, while turbot fisheries are distributed along the southern coast of Crimea. Pike-perch and Pacific mullet (*Mugil soiuy*) (haarder; local name *pilengas*; acclimatized in the 1980s) are fished by purse seines and traps (stationary uncovered pound nets) in the Azov Sea, in winter generally. Harvesting of mussels and Rapa whelks is carried out over the northern shelf of the Black Sea using bottom dredges. In the low-saline waters of the northwestern Azov Sea, Ukrainian

fishermen fish for freshwater species such as pike-perch, freshwater bream (*Abramis brama*), roach (*Rutilus rutilus*) and others.

Till the early 1990s, Ukraine's catch in the Azov and Black Seas was some 180 000−200 000 t, reaching in some years 230 000−260 000 t. Anchovy was the principal species caught, forming approximately 80 percent of the catch. In 1989−1991, Ukraine and other countries of the region faced a sharp, crisis decrease in biomass of anchovy and other small pelagic fishes, which resulted in decline of the Black and Azov Seas catches. The crisis resulted from an intense impact on the food chain by an Atlantic intruder − the ctenophore *Mnemiopsis leidyi* − as a food competitor of anchovy and other small pelagic fishes. The ctenophore had probably been introduced into the Black Sea with tanker ballast water; it was recorded for the first time in the Black Sea in 1982, and reached a peak in 1989−90. Moreover, the collapse in Ukrainian catches, as well as catches in other Black Sea countries (except Turkey), was aggravated by a sharp reduction in fishing effort due to the economic crisis. In 1993, Ukraine's catch in the Azov-Black Sea basins reached its lowest value for 50 years − 26 000 t, and then the catch began to grow again.

Ukrainian fishermen in the coastal fisheries use small vessels, mainly near the coastal cities and villages. Fishing gear is set no farther than 2−3 hours′ motor boat travel from landing sites. The coastal fisheries are the oldest sources of employment and income for the coastal communities, the most important source of food, and successfully keep their ancient traditions. Most of these fisheries target species with higher market price. Till recently, coastal fisheries targeted sturgeons, but after the ban on sturgeon fisheries from 2000, they instead targeted mullets. In catches of set (fixed) nets and traps, about 40 fish species are recorded, but the bulk comprises European anchovy, European sprat, tyulka, silversides, haarder and flatfishes. Dogfish, skates and rays and turbot are harvested with gillnets and longlines. Cases of violation of the Fisheries Regulations are rather frequent in the coastal zone, so the State Fish Protection agencies are very active there. Nevertheless, poaching for sturgeon occurs and is resulting in a continuing decline in its biomass in the Azov Sea.

Distant water fishery

In 2001, 20−25 large Ukrainian fishing vessels were operating on high seas outside the EEZs of Ukraine and other countries. Their total catch was 255 000 t of fish, cephalopods and crustaceans (about 70 percent of total Ukrainian marine production, worth about US$ 180 million. In total, some 3 000 persons were directly involved in the distant water fishery.

In 2001, in the Central and Eastern Atlantic (FAO Statistical Area 34), 12−14 vessels operated in the EEZs of Guinea [Conakry], Mauritania, Morocco and Senegal. The target species included horse mackerel (*Trachurus* spp.), European pilchard (*Sardina pilchardus*), chub mackerel (*Scomber japonicus*), and sardinellas (generally round sardinella, *Sardinella aurita*). Ukraine took the greater part of its oceanic catch in the Eastern Central Atlantic − 187 000 t in 2001. In the EEZ of New Zealand, five vessels operated and caught 59 000 t, targeting hoki (*Macruronus novaezelandiae*), snoek (*Thyrsites atun*), horse mackerel (*Trachurus* spp.) and squid (*Nototodarus* spp.). At the seamounts of the Western Indian Ocean, one vessel caught 800 t of demersal fishes, mainly alfonsino (*Beryx splendens*) and bluenose warehou (*Hyperoglyphe antarctica*). In the Antarctic part of the Atlantic Ocean, two Ukrainian vessels fished Antarctic krill (*Euphausia superba*), catching 4 000 t. About 80 percent of the distant-water catch was sold in the countries located close to the fishing area, and the remaining 20 percent was landed in home ports.

INLAND FISHERIES

Ukraine has about 71 000 rivers, with a total length of 248 000 km. Among them, 3 212 rivers have a length of more than 10 km and total 73 700 km in length. The largest rivers are the Danube, the Dnieper and the Southern Bug. The country has more than 8 000 lakes and estuaries, 953 of the lakes have an area of more than 1 km^2, and their total area is 3 790 km^2. In the basins of the largest rivers in Ukraine, generally near hydropower stations, there are 1 157 artificial waterbodies (reservoirs) with a total area of 9 680 km^2. The largest such dams are in the Dnieper Cascade, with a total area of 6 920 km^2, and about 20 percent of the area has a depth of more than 2 m, allowing aquaculture.

The total area of all inland freshwater waterbodies in Ukraine is about 24 000 km^2 (4 percent of the territory), but only 32 percent is used for fisheries and controlled by Holovrybvod. This government agency controls 2 028 rivers with a total length of 68 000 km; 1 767 lakes with a total area of 1 574 km^2; 557 water reservoirs, with an area of 6 085 km^2; and biological resources of the Azov and Black Seas within the jurisdiction of Ukraine and important for reproduction of living water resources.

Fisheries in inland waterbodies are operated by 40 cooperatives and by several hundred private persons, licensed for fisheries and assigned a catch quota. Approximately 7 000 people are engaged directly in fisheries.

In 2001, the total catch in inland waters, including marine estuaries, was about 8000 tonne, with a value of about US$ 3.7 million. The main part of the inland waters catch comes from reservoirs. The Dnieper-Bug estuarine system, at over 1 000 km^2, plays a great role in these fisheries. The Danube lakes are also very productive. Fish catches in small rivers and lakes reach about 1 000 t annually. The main fish species caught in rivers and lakes are common carp (*Cyprinus carpio*), goldfish (*Carassius* spp.), silver carp (*Hypophthalmichthys molitrix*), roach, tyulka, freshwater bream and pike-perch.

About a quarter of all lakes and estuaries and almost two-thirds of artificial waterbodies – reservoirs and cooling systems of electricity generation plants – are stocked with fry of common carp and other herbivorous fishes in order to rehabilitate stocks and increase productivity, and for bio-melioration. In Ukraine there are now 5 fish-farming factories and 13 hatcheries, designed for production and cultivation of carp, trout and mullet juveniles. The State owns 6 hatcheries; the others are part of the industrial association "Ukrrybkhosp", or subsidiaries of the fish protection agency.

Natural waterbodies and reservoirs in Ukraine are restocked with fish every year. This activity is funded from the State budget. Moreover, in accordance with national law, fish stocking is also carried out by private persons and companies involved in fisheries in such waters. The budget fund for the stocking of natural waterbodies and reservoirs is divided among 20 fish farming enterprises on the basis of an annual tender. In 2001, 33.7 million carp and other herbivorous fish juveniles were released into lakes, estuaries and reservoirs. However, many lakes and estuaries are not stocked with fish due to their remoteness from towns, absence of road communication, or non-suitability for fish farming.

In order to maintain sturgeon stocks in the Black and Azov seas, Ukraine continues the

artificial replenishment of sturgeon stocks started in the 1960s, using primarily stocks of Russian sturgeon (*Acipenser gueldenstaedtii*). All the operations are funded by the state budget. Sturgeon juveniles are produced at the Dnieper sturgeon-farming factory, located at in the mouth of the Dnieper (Dneprovskoye village, Kherson Region), and at three fishery cooperatives. Viable sturgeon juveniles are released into the lower reaches of rivers flowing into the Black and Azov Seas. The annual release of sturgeon juveniles in the Azov Sea increased from 0.7 million individuals annually in the 1980s to 3 million individuals in 1994, but decreased to 2 million individuals in 2000–01. After some decline in the numbers of juveniles released during the 1990s, the State has taken measures to increase reproduction and improve the quality of sturgeon brood stock.

Aquaculture

The predominant form of aquaculture in Ukraine is freshwater aquaculture. Initial experiments on marine mollusc aquaculture were started in the early 1960s, but culture on a commercial scale did not start until the 1980s and 1990s. In 2001, freshwater aquaculture produced 31 000 t of commercial fishes, worth approximately US$ 81.6 million. About 25 000 people were engaged in fish farming.

Ukraine has the largest artificial waterbody system in Europe, consisting of 2 780 freshwater ponds, with a total area of more than 2 230 km^2, including about 530 km^2 of specialized feeding ponds, 0.15 km^2 raceways, pens and cages, part of which is operating in warm discharge waters of power stations. These pond farms were build in the Soviet period, in the 1960s to 1980s, and were designed for commercial production of common carp using intensive technology with 2-year cycle. In the 1980s, 120 000–140 000 t of commercial fish were farmed annually. At present, the greater part of the pond farms are under the "Ukrrybhosp" association, at the base of which it is planned to establish a State stock company. Ukrrybhosp integrates 158 industrial companies, enterprises and agencies, with a total staff of about 22 000.

Besides specialized fish farming waterbodies, Ukraine has other waterbodies suitable for commercial fish production. These include the numerous cooling ponds for power generation station, with a total area of 135 km^2; lake-based commercial farms using 865 km^2; and 59 km^2 of estuaries suitable for commercial production.

The main species for freshwater farming are common carp, silver carp (*Hypophthalmichthys molitrix*) and bighead carp (*Hypophthalmichthys nobilis*). Freshwater species from cultivation have an important role in the food supply of Ukraine, providing high quality fish. Most cultured fish is sold alive or chilled in domestic markets.

At present, only a fifth to a quarter of freshwater pond potential in Ukraine is used. Almost half of the total pond area is restocked, and most ponds need cleaning and repairing. By 2002, all ponds in Ukraine had become private, and fish farming on an individual or cooperative basis is developing in the country. Nevertheless, the level of investment is low, and the share of private capital invested into fish farming barely reaches 10 percent of key assets cost.

The crisis in the economy associated with the transitional period resulted in great increases in prices for fuel, fish meal and feed micro-additives, resulting in a sharp decline in supply and use of feed in aquaculture. At present, Ukraine has four plants that can produce

specialized freshwater aquaculture feeds, although their main production is feed for agricultural livestock.

In 2001, only 20 percent of the 530 km^2 of specialized feeding ponds were suitable for farming using intensive technology. Under these conditions, most owners of farms are developing polycultural farming using extensive technology, increasing the percentage of herbivorous fishes up to 70−80 percent. However, the breed stocks of the herbivorous fish populations were formed about 40 years ago and therefore need new selection and interbreeding with wild fish. Many pond farms stock pike-perch, catfish (*Silurus glanis*), northern pike (*Esox lucius*), tench (*Tinca tinca*), crucian carp and goldfish (*Carassius* spp.), in addition to the traditional species − common carp and herbivorous fishes. In the southern part of the country, many farmers use extensive farming of haarder; in the western part of the country, experiments were carried out with stocking of peled (*Coregonus peled*).

The farming of some new species is developing, including buffalo fishes (*Ictiobus* spp.), channel catfish (*Ictalurus punctatus*), brown bullhead (*Ameiurus nebulosus*), tilapia (*Tilapia* spp.) and black carp (*Mylopharyngodon piceus*), together with species with high market price, such as rainbow trout (*Oncorhynchus mykiss*), giant river prawn (*Macrobrachium rosenbergii*) and crayfish (*Astacus* spp.). Experiments have also been undertaken on cultivation of Mississippi paddlefish (*Polyodon spathula*), and for freshwater Ampullaria mollusc (*Ampullaria glauca*) in the warm discharge waters of power stations. Attempts are being made to breed new ecologically sustainable carp stocks by hybridization of the Ukranian carp with wild carp from Amur River (in the Far East) with a view to making possible a three-year cycle of farming. Some farmers with artificial waterbodies near large cities have re-stocked them with several fish species, feed them intensively and use the waterbodies for the commercial recreation fisheries.

In 2001, the share of the herbivorous fishes among the farmed species was almost half; the average productivity of the artificial waterbodies was 54−64 t/km^2. In some regions of the country, the waterbodies where fish is farmed are also used for field irrigation, water fowl growing, and the ooze taken away during pond cleaning is used as a fertilizer for fields.

The prime costs for commercial pond fish in 2001 were 2−2.5 times less than the prime costs for meat, but the retail prices for fish were only 25−30 percent less than prices for meat, so there is some possibility of reduction in prices of fish products in future, in the process of development of a competitive market in fish products.

Restoration of the share of farmed fish in national fish production and further development of freshwater aquaculture are constrained by poor legislation concerning water utilization and land utilization in the private sector. To intensify freshwater farming, there are plans for increased brood stock, improved selection, an expanded range of farmed species, improved species balance, a move to intensive technology farming with strict adherence to technical standards, enhanced control of all farming stages, and greatly enlarged aquaculture staff training.

To compensate for the reduction in sturgeon stocks at sea, it is planned to develop commercial sturgeon farming in nurse ponds incorporated in natural waterbodies and in the discharge waters of power stations.

MARICULTURE

Marine aquaculture − both artificial rearing and breeding of marine fishes and molluscs at sea and in marine bays − is being developed. In the late 1960s, YugNIRO began research into mariculture prospects on the Black Sea shelf. In the 1970s and 1980s, YugNIRO and the Academy of Science of Ukraine developed techniques for commercial rearing of Mediterranean mussels, various mullet species, turbot, flounder, striped bass (*Morone saxatilis*) and steelhead salmon (*Oncorhynchus mykiss*), and for adaptation to local environmental conditions. Starting in the 1980s, small cooperatives have reared Mediterranean mussels on a commercial scale on the Black Sea shelf, applying developed and adapted technologies. Research and experiments have been undertaken for the artificial breeding of different mullet species, including flathead grey mullet (*Mugil cephalus*), golden grey mullet (*Liza aurata*) and haarder in estuaries and nurse ponds with full-cycle culture. In the 1990s, pilot activities were carried out to rear Pacific cupped oyster (*Crassostrea gigas*).

At present the main product of the Ukrainian mariculture is mussels, with some 200 t produced in 2001.

In some Black Sea estuaries, different species of mullet are reared from juveniles of the natural population, which are released to the estuary for foraging. Moreover, various species of mullet are bred for release into the sea. These constituents of marine aquaculture have old traditions. Commercial rearing is being developed of bester (a hybrid of beluga and Siberian sterlet, *Huso huso x Acipenser ruthenus*) in nurse ponds in the Black and Azov Seas, and different species of mullet in brackish-water estuaries of the northwestern Black Sea.

SUBSISTENCE, RECREATIONAL AND SPORT FISHING

In Ukraine, from 1 to 3 million people, mainly men, are engaged in subsistence, recreation and sport fisheries, constantly periodically. Different types of fishing are used, including underwater harvesting of molluscs − mussels and rapa whelk − on the marine shelf. Small boats, unpowered or with outboard engines, and inflatable rubber boats are widely used.

In rural areas − in rivers, lakes and water reservoirs and in coastal areas − subsistence fisheries predominate. In waterbodies near large cities with a population of more than 1 million (Kiev, Kharkov, Dnepropetrovsk, Donetsk, Odessa) and in the provincial capitals, besides subsistence fisheries, there are recreational and sport fisheries − a traditional activity. The annual catch in subsistence and informal fisheries is estimated to be 8 000−10 000 t country-wide, but is not included in official statistics. Ukrainian legislation considers all such informal fisheries to be amateur and sport fisheries. In accordance with the Law of Ukraine "On the Animal World (Fauna)" (2001) the sale is prohibited of fish caught by amateur fishing.

UTILIZATION OF THE CATCH

In 2001, more than 85 percent of fish products produced in Ukraine were used for food, and the remainder was processed into fishmeal. In 2001, consumption was 494 000 t of fish products, including imports of 328 000 t (66 percent); 40 000 t (8 percent) harvested by Ukrainian vessels on the high seas and foreign EEZs and delivered to home ports; 87 000 t (18 percent) harvested in the Azov and Black Seas; 8 000 t (2 percent) harvested in inland waters; and 31 000 t (6 percent) produced in aquaculture. Thus, according to official statistics, only 34 percent of consumed products are supplied from national fisheries. According estimates, an additional 10 000−15 000 t of fish products are sold in the domestic market without being included in official statistics.

About 80−90 percent of aquaculture products and fish harvested from inland waters are sold fresh (alive or chilled), the rest (large-sized silver carp and freshwater bream) are salted or smoked. Up to 70−80 percent of catch from the Azov and Black Seas (anchovy, tyulka, sprat) are sold salted or smoked, about 10 percent is canned, and about 10 percent (anchovy, mullets, pike-perch, red mullet (*Mullus barbatus*)) are sold fresh or frozen.

Of the 40 000 t of ocean fish caught by Ukrainian vessels and delivered to the country frozen, most goes for canning. About 200 000 t of ocean fish are processed aboard large vessels in the fishing areas. Frozen fish is the principal product, and 4−6 trawlers can fish and krill. About 3−5 percent of ocean fish is processed into fillet, about 10 percent is canned, and 15−20 percent of fish and more than 70 percent of krill is processed into fishmeal.

In 1995, Ukraine introduced obligatory certification of canned products, and in 1998 certification became obligatory for smoked, cured and salted fish.

Only about 20 percent of the processing capacity available in Ukraine is used for fish processing. Raw material comes from fish caught by Ukrainian distant-water fisheries, fish caught in the Azov and Black Seas, and imported fish. The under-utilization of processing capacity is connected in the first instance with high prices for fresh or frozen fish, and secondly because processing results in significant increase in the final cost of products, making marketing difficult in view of the limited purchasing capacity of the population. Many fish canneries therefore process cheap agricultural products.

In 2001, the basic products of Ukrainian fish processing plants were canned, salted, dried and smoked fish. In total in 2001, the combined production from onboard vessels and coastal enterprises was about 80 million cans of fish, worth US$ 20 million. Small packages and vacuum packed dried and smoked fish products are becoming increasingly popular.

Since the early 1990s, production in Ukraine of biologically active and medicinal preparations made from fish, marine molluscs and algae are developing on the basis of technology developed in the country.

STATE OF THE INDUSTRY

The fish industry of Ukraine, as well as the whole economy of the country, reflects the effects of reconstruction and movement to a market economy. Therefore, the main problem for the fisheries sector is structural reform, with creation of new structures for production and management that correspond to market-driven requirements. Legislation for fisheries is still developing, directed to promotion of business activities in capture fisheries and aquaculture, conservation of aquatic living resources, and governmental management of the resources and fisheries.

Ukraine inherited from the USSR a strong fishing fleet (332 fishing vessels), the greater part of which, due to lack of operating funds, have been sold out of the country, rebuilt as transport vessels, or scrapped. In 2000, the Ukraine fishing fleet consisted of 47 large, 39 medium and 95 small fishing vessels, 165 motor boats and about 850 non-powered vessels, 11 ocean-going trawlers and 31 marine fish carriers. In 2001, 20−25 large, 20 small and 30−40 motorboats and transport vessels were operational.

The State Register of Ukraine is responsible for technical surveillance and classification of marine vessels. The primary problem is ageing of the vessels. Vessels are generally 20−27 years old, implying that more than 90 percent of the fleet may be scrapped by 2010−2015. At present, only 7 Ukrainian large-tonnage vessels are recent, 2−8 years old. About 30 old

large vessels have been on demurrage for 8–10 years due to lack of funds for repairs and operation. They are the property of the State.

An extensive network of artificial waterbodies remain in the country – 2 780 ponds with a total area of more than 2 230 km^2, designed for rearing freshwater fishes using intensive technology. However, due to economic problems, only just over half of the ponds are exploited. Utilization of the marine and freshwater aquatic living resources of Ukraine is under the control of the powerful and developed fish protection service, with its own fleet.

The coastal infrastructure for fisheries purposes comprises 4 large fishing ports (Sevastopol, Ill′ichevsk, Kerch and Mariupol), 10 specialized fishing berths, 20 large fish canneries, and about 70 small regional enterprises for fish processing, 4 enterprises for the production of cans and other packaging, 10 shipyards and 4 ship repair plants, located in Nikolaev, Kerch, Sevastopol, Kiev and Kherson. These enterprises were built 30-40 years ago and designed for the servicing of the large ocean-going vessels and for processing up to 2 million tonnes of raw fish annually. At present the fishing port and berths are used for transhipment of mainly non-fish products, as the volume of fish products has sharply decreased. The shipyards are working generally for foreign orders.

By 2001, the greater part of fish canneries and regional enterprises for fish processing had been privatized. These enterprises are capable of processing freshwater and marine fresh and frozen fish, invertebrates and algae, and of producing more than 100 kinds of salted, dried and smoked products, as well as canned and semi-canned products, feeds and technical products. However, with insufficient raw material, only 20 percent of fish cannery processing capacity is used.

The Soviet system for fish product sales (special shops, departments, equipment for the sale of frozen and live fish) was restored recently. Ukraine till recently has not had wholesale markets for fish products, making marketing expensive and pushing up costs and therefore retail prices. Some canneries have established a vertical structure: their own fisheries, processing and sale in internal markets or for export.

The greater part of the state fishing enterprises are now private, although along the Azov and Black Sea coasts there are numerous fishing cooperatives, established as far back as the mid-twentieth century.

As fisheries legislation is still developing, private investment in the fisheries sector in Ukraine has been limited.

Fisheries research and planning institutions still exist in the country. Ukraine has great industrial and scientific potential in fisheries and aquaculture, and there are active specialized high schools and educational institutes for the fish industry. There are programmes for professional re-qualification and certification for fisheries.

For shipowners and leasers operating on the high seas, the primary problem is to provide the vessels with the circulating capital for fisheries. Bank credit in Ukraine is very expensive, so the main source of circulating capital is the fish caught. Unlike the fish caught in the Azov and Black Seas and in inland waters, the sale of frozen Ukrainian fish products delivered from distant waters is difficult in the domestic market due to the high prices demanded, which are aligned with world prices and almost double prices for equivalent fresh fish from inland waters. As a result, more than 80 percent of the ocean catch is sold on a wholesale basis, mainly in countries situated close to the fishing areas. The ocean catch delivered to Ukraine is used mostly for canning.

Until the mid-1990s, Ukraine applied Soviet standards for fish products, their processing, storage, packaging and sale. Starting from 1992, Ukraine has been developing and adopting new standards for fish products, including those aimed at satisfying EU requirements.

ECONOMIC ROLE OF THE INDUSTRY

The role of modern fisheries in the economy of Ukraine is not great if one considers only quantity and cost indicators. The value of harvested and reared fish products in 2001 was US$ 240 million, or 0.005 percent of GDP. The number of professional staff, as well as people connected with fisheries, fish products processing, transporting, sale, shipbuilding and ship repairing, is about 0.3 percent of the economically active population. However, as in the 1970s and 1980s, fish products still play a remarkable role in the population's nutrition, in spite of the fact that prices for fish products (in terms of their price:average salary ratio) have increased by 6−10 times compared to the 1980s. In 2001, the Ukrainian population consumed 10.2 kg of fish products per capita, half of which derived from imports. Fish protein as a proportion of total consumed animal protein is 12 percent. The population in the different regions in Ukraine have traditionally consumed freshwater or marine fish products. For the greater part of the population in coastal areas and near rivers, lakes and reservoirs, fish products are the most important source of animal protein.

Fisheries play a most important role in the economy of coastal areas. The fish industry and associated activities are one of the most important sources of employment and income in the Autonomous Republic of the Crimea, and in Odessa, Kherson, Nikolaev, Zaporozhje and Dnepropetrovsk Regions. Ukraine considers fish and fish products to be strategically essential and indispensable food sources, and recognizes their important role in the provision of valuable nutritional elements for the population and in the maintenance of the nation's health.

Development of business undertakings in Ukraine since the 1990s, with establishment of market relations in the country, have resulted in stirring up fisheries in the Black and Azov Seas. Between 1996 and 2001, Ukrainian catch in the Azov and Black Seas increased threefold. The further development of marine fisheries − requiring the creation of markets for fish products and services associated with fisheries, shipbuilding, ship repairing, processing and trade in fish products, and staff training − has resulted in increased employment and attracted investments into fisheries.

The key current problem for fisheries in Ukraine is the growing impact of imported fish products on the domestic fish market. The main imports are Atlantic herring (*Clupea harengus*) and Atlantic mackerel (*Scomber scombrus*); the demand for these in the country is traditionally high. High levels of imports have been recorded for European sprat (imported from the Baltic States) and Alaska pollock (*Theragra chalcogramma*) from Russia. The sharp increase in fish imports into the country began in the late 1990s. In 2001, 328 000 t of fish products were imported, worth about US$ 246 million, representing more than two-thirds of fish products consumed in Ukraine. More than 70 percent of imports originated from Norway, where the fishery industry receives government support. Tax on imports is nominally 30 percent of the declared cost of products, but importers often have tax allowances. Ukraine has not yet established a comprehensive system of fishermen's support. Since 1999, the government has supported fishing cooperatives: taxes were halved and they received privileged credits for diesel fuel. However, most fishermen are operating under the general, rather severe taxation. Therefore, Ukrainian fish products and their traders cannot yet compete in the domestic market with subsidized

imported products, despite the existing tax on imports.

Exports of fish products from the Ukraine in 2001 were about 160 000 tonne, worth US$ 110 million. From 80 to 90 percent of Ukrainian fish products are exported directly from the fishing areas and 10–20 percent comes from Ukraine itself. Fish products from ocean fisheries (sardinellas and pilchard, chub mackerel, squid, Antarctic krill, canned fish and krill) are exported from the fishing areas to countries of Africa, Europe and South America, and to Japan. From Ukraine itself, the principal export commodity is canned fish, shipped to Belarus, Georgia, Kazakhstan, Russia and Turkmenistan.

DEVELOPMENT PROSPECTS

In the new millennium, Ukrainian fisheries and aquaculture are overcoming the crisis situation and transforming. The Ukrainian economy is moving towards a free market basis, so for fisheries enterprises the most urgent need is to arrange their activities on the basis of up-to-date efficient management, with development of market studies.

The reference points for development are still the achievements of the 1980s, which were based on a centrally-planned economy and no private property. The disappearance of this economy, beginning in 1990–1991, resulted in a sharp decline in national output of fish products. From 1989 to 1994, fish production in Ukraine fell from 1 145 000 t to 314 000 t, mainly due to the greatly diminishing fishing effort and corresponding catch on the high seas and in the Black and Azov Seas, and declining aquaculture production. It was induced by the severe economic crisis in the country.

Based on analysis of fisheries and aquaculture development in Ukraine in the 1990s, it should be noted that in the economic crisis, the marine and oceanic fisheries were more attractive for business than aquaculture. For the period from 1993 to 2001, the catch in the Azov and Black Seas increased from 26 000 to 91 000 t. The high seas catch increased in 1995–1998 from 217 000 to 414 000 t, but then began to decline. Output from aquaculture in the late 1990s decreased from 136 000 to 30 000 t and stabilized at this level. Interest in pond farming was re-kindled following privatization in 2000–2001.

In the near future, with the improving economic situation in Ukraine, expansion of business initiatives could be expected in all fisheries spheres. The basis for development is the availability of underexploited bioresources in the Azov and Black Seas and on the high seas, plus the technical inheritance from the USSR in material and technical terms, including the fleet, the system of pond farming, facilities for fish food processing, fishing ports, fish processing enterprises, old traditions in fisheries and aquaculture, fish products consumption, and availability of skilled staff and an education system for their training.

The immediate requirement for fisheries development in Ukraine and expansion of domestic market for fish products is to attract investment, and particularly from Ukrainian sources. It is assumed that the investment attractiveness of fisheries increases with the establishment of a system of state support for fisheries and aquaculture, similar to EU countries. This should allow a doubling of production, together with improved fish product quality by 2010. Together with imported fish products, it should allow annual fish consumption in Ukraine to reach 15–18 kg per capita.

Development prospects for fisheries in Ukraine are tied to growth of business activity in the country. The greatest business interest lies in the bioresources of the Azov and Black Seas. The efficiency of the fisheries is good due to the proximity of markets for the sale of fish products. In the Sea of Azov, the stocks of the fish species with high market prices (pike-perch and haarder) are fully exploited; the stocks of sturgeon are depleted; the

stocks of tyulka and the Azov population of anchovy are underexploited. In the Black Sea within Ukrainian waters, according to YugNIRO assessments, the stocks of European sprat, whiting, dogfish, rays, haarder, rapa whelk are underexploited. The wintering concentrations of Black Sea anchovy in the waters off Georgia is fairly exploited; this stock is accessible to Ukrainian fishermen in accordance with the Ukraine-Georgia Agreement on fisheries.

On the world's oceans and in the EEZs of the coastal countries of the Eastern Central Atlantic, South-Eastern Atlantic, South-Western Atlantic, South-Eastern Pacific and the open waters of the South-Eastern Pacific, South-Western Pacific and the Southern Ocean, by YugNIRO estimates, there are large underexploited stocks of the traditional target species for Ukrainian fisheries – horse mackerel, chub mackerel, sardinellas, blue whiting, squids and Antarctic krill. The attractive aspect of the sea fisheries in the Azov and Black Seas and on the high seas is the good efficiency of the fisheries, especially of small pelagic fishes. Modernization of large old trawlers increased their productiveness by a factor of two to three, but such fleet re-equipment, management and operation in marine fisheries in an efficient and profitable way requires high preliminary and ongoing investment.

Under the current conditions in Ukraine, where commercial bank credit is expensive, the alternative to the long-term bank credit may be leasing in the form of credit-rent, which is widely used in many countries for fleet shipbuilding and technical re-equipping.

The development of fisheries in inland waters are attractive for business due to a low level of non-recurring costs of fisheries and a reliable market for cheap fish products, which are delivered to consumers alive.

In Ukraine there is a traditional high demand for live or chilled common carp and silver carp from aquaculture, so aquaculture is attractive in business terms as a way of farming traditional fish species and other aquatic organisms to a size and quality corresponding to market demand. Farming requires constant and substantial expenses at all stages, especially for pond maintenance, restocking, and feeding of fish farmed using intensive technology. In connection with high stocking density, the risk of disease epidemics is rather high. At present, farming of species with high market price – crayfish, sturgeons and giant river prawn – is of great interest in Ukraine. In prospect for the future, there is development of mariculture, including assimilation of known technologies for salmon farming, increased mussel production, and improvement in turbot farming technology.

In the course of the economic development and well-being of the population, it is expected that demand for fish products, as well as for fish-based feeds, will increase, stimulated by the slogan "fish consumption is the healthy way of life". Prices for fish products are expected to increase, alongside the appearance of wholesale markets.

It is also expected that following Ukraine's joining the World Trade Organization and the abolishment of import taxes, the poor showing of Ukrainian fish products in the domestic market will be aggravated if Ukrainian fisheries are not by then supported by the government.

DEMAND

The State Department of Fisheries of Ukraine is responsible for estimates of demand for fish products and monitoring of prices in the domestic market.

Traditionally, most Ukrainians consider fish products less valuable in dietary terms than meat products, but fish products, whose prices are much less than for meat products, are

in high demand in the country.

At present, Ukrainians prefer live or fresh (chilled) Cyprinids. These are common carp, silver carp, bighead carp, grass carp, freshwater bream, crucian carp and roach, which are delivered to the domestic market from freshwater waterbodies. All these fish products are sold quickly due to reasonable prices (US$ 0.75−1.2/kg) and high quality.

The principal markets for fish from the Azov and Black Seas are in the coastal areas. The main products are salted, smoked and semi-preserved products from small pelagic species − sprat, anchovy, tyulka (US$ 0.5−1.0/kg), as well as demersal and bottom fishes − mullets and flounder, fresh or frozen (US$ 1.0−1.6/kg).

Imported fish products are taking a larger share in total consumption, and between 1997 and 2001, the volume of imported fish products increased more than by 75 percent. The products imported include Atlantic mackerel, Baltic herring and capelin (*Mallotus villosus*) and have a tradition of good demand. They are sold frozen at reasonable retail prices (US$ 1−1.5/kg). Similarly for a new product in the Ukrainian market − frozen Atlantic herring, which sells quite successfully. Cod (Alaska pollock and Atlantic cod (*Gadus morhua*)) are in little demand due to poor quality and very high prices (US$ 1.5−2.0/kg). Moreover, Alaska pollock is known in the former Soviet area as a feed fish − it was sold at low price for feeding domestic animals; cod has never been considered desirable. Attempts to sell farmed salmon were of little success due to the exceedingly high retail prices (salmon fillets at US$ 15/kg or more) that greatly exceeded the prices for the best meat cuts. There is high and stable demand for canned Baltic sprat in oil (US$ 0.35−0.40/can). Attempts have been made to sell frozen northern shrimps and they are readily available in shops, but demand is poor due to the very high prices and very short shelf life.

There is traditional demand for Ukrainian canned fish (mackerel, pilchard, sardinella, horse mackerel) produced from fresh fish aboard Ukrainian factory vessels on the high seas. The demand for other fish caught by Ukrainian vessels on the high seas (frozen horse mackerel, pilchard, chub mackerel and sardinella) is not high. The average prices are rather high (US$ 1.4−1.7/kg), but the species are more suitable for canning than for direct consumption. Moreover, until 2002, fish caught by Ukrainian vessels on the high seas and delivered to Ukraine was taxed as imported, increasing its cost. Hence it was difficult to sell much frozen fish at a reasonable price. A portion of the fish from the distant-water fishery is purchased as raw material by the fish canneries, and the government purchases canned fish for the army and for official reserves.

RESEARCH

Ukraine inherited from the USSR a well organized and strong system of fisheries research, which in the current severe economic conditions is gradually being transformed and reduced. Fisheries research in Ukraine is funded from the State budget (30−50 percent), as well as by interested private or government agencies (50−70 percent). In 2001, the following institutions were active in research:

- Southern Scientific Research Fisheries of the Marine Fisheries and Oceanography (YugNIRO), Kerch (E-mail: yugniro@kerch.sf.ukrtel.net), with subsidiaries in Odessa, Berdyansk and Sevastopol.
- Sevastopol State Planning and Design Institute "Yugrybproekt"
- Public Corporation "Yugrybtekhtsentr"

- Institute of Fisheries of the Ukrainian Academy of Agrarian Sciences (E-mail: ukrfish@ambernet.kiev.ua).
- Ukrainian State Institute for the Projection of Fisheries Enterprises "Ukrrybproekt".
- The Central Scientific Research Institute of Economics.
- Special Experimental Design Office "Tekhrybvod".
- Public Corporation – Central Design Office "Shkhuna" (E-mail: shuina@ukrpack.net).
- Southern State Scientific Research and Planning Design Institute of the Fishing Fleet "Yuzhgiprorybflot", Nikolaev.

The total number of employees in the above-mentioned organizations was approximately 700.

Research undertaken by YugNIRO and the Institute of Fisheries is connected with implementation of State policy and national laws concerning rational long-term utilization, conservation and replenishment of the natural populations of aquatic organisms, their artificial rearing and farming. The main research is ordered by the State and funded from the State budget.

YugNIRO (until 1989 known as AzCherNIRO) is situated in Kerch (the Crimea), with subsidiaries in Odessa and Berdyansk. It is the only fisheries research institution in Ukraine that has carried out marine fisheries research in the waters of Ukraine and beyond. There are some 280 staff. YugNIRO activities aim to develop the scientific background of responsible fisheries, conservation and restoration of marine fisheries ecosystems. On behalf of the State, YugNIRO has a mandate to assess fisheries resources in the territorial waters and the EEZ of Ukraine, to estimate stock abundance and allowable catch for exploited species, to monitor marine fisheries ecosystems and carry out scientific monitoring of Ukrainian fisheries.

To undertake fisheries research in the Black and Azov Seas, YugNIRO hires small vessels. It has established a network of sampling sites along the coastline and scientific observers collect biological and fisheries data three to four times a year in the distant-water fishing areas. YugNIRO has access to various global oceanographic databases and to its own database of biological and oceanographic data, where the results of half a century of research on the Black and Azov Seas and the world's oceans are integrated. Fisheries research undertaken by YugNIRO corresponds to EU principles and standards.

Major thrusts of YugNIRO activities include:

- Monitoring of the state of fish resources in the Azov and Black Seas Basin, ecosystem research in the Black Sea and in the Sea of Azov, and studies of biological productivity.
- Determining TAC and catch limits for commercial species, associated or dependent species in the Black and Azov Seas.
- Monitoring the state of aquatic living resources and establishing TAC estimates for the distant-water fishing areas of the Ukrainian fleet, and in prospective fishing areas.
- Studying impact of long-term fluctuations in the atmosphere-ocean system on biological productivity in distant-water fishing areas of the Ukrainian fleet, and in

prospective fishing areas.

- Scientific control and monitoring of the fishing operations of Ukrainian fishing vessels, and collection and processing of fisheries statistics.
- Developing long-term (1−2 years) and short−term (1−3 months) fishing forecasts of the potential catch for the Ukrainian fleet in national and international waters.
- Studying the spatial-temporal variability of the water structures in international fishing areas used for distant-water fishing by the Ukrainian fleet.
- Studying the marine fisheries ecosystems and elaborating the theory of their functioning under anthropogenic pressure.
- Cooperating with international global and regional fisheries organizations, including FAO, CCAMLR, NAFO and the Danube convention, and cooperating in the development of the Black Sea convention and bilateral cooperation.
- Developing draft fisheries legislation for Ukraine.
- Developing techniques to obtain juveniles of valuable sea fishes (turbot, mullets) for mariculture.
- Comprehensively evaluating anthropogenic pollution of the Sea of Azov, Kerch Strait and the adjacent area of the Black Sea, and developing recommendations to avoid crisis situations.
- Developing technology for the rearing of commercial fish and brood stock in polyculture (haarder, flounder, herbivorous fishes) in brackishwaterbodies of Southern Ukraine.
- Developing methods to extract biopolymers and other biologically active substances from marine organisms (mussels, rapana, phyllophores).
- Designing and improving fishing gear for coastal fisheries.
- Harmonizing normative documents for production of food and technical fish products in accordance with EU requirements and international standards, including patent research.

The Institute of fisheries (IRKh), situated in Kyiv, provides training in and development of freshwater aquaculture in Ukraine, and undertakes a broad range of research activities in inland waters. It has a staff of 140.

The main activities of the Institute of Fisheries include:

- Developing technology for the optimal utilization of the natural food supply of waterbodies in the various physical and geographical regions of Ukraine.
- Developing optimal regimes for waterbody utilization for fisheries purposes in the light of anthropogenic pressure.
- Improving Ukrainian races of carp, and breeding new, highly productive, scaleless carps for warm water and pond farms.
- Developing and improving technology for reproduction of herbivorous fishes, salmon and others, by artificial and natural methods.
- Developing methods to increase the efficiency of fish feeds for carps of different

ages, and developing technology for production of fish feeds from non-traditional raw materials.

- Developing technology for the commercial rearing of crayfish and freshwater Ampullaria mollusc.
- Developing new approaches to prevention and therapy of fish diseases on the basis of natural resistance and creation of medicated and prophylactic mixed feeds.
- Developing the main directions for reforming collective fish farms under market conditions.
- Evaluating the ecological state of waterbodies in Ukraine, and developing methods for reducing toxic concentrations of pollutants in the water, bottom sediments and fish tissues.
- Developing ways of fishing and fish farming in conditions of radioactive contamination of waterbodies.
- Marketing studies, patent research, publicity for the institute's activities, and establishing international links.
- Training specialist fish technologists through annual courses and postgraduate education.

Research in various aspects of fisheries is periodically undertaken by divisions of the Academy of Science of Ukraine, namely the Institute of the Biology of Southern Seas (Sevastopol), the Institute of Zoology (Kyiv), the Institute of Hydrobiology (Kyiv), Odessa and Dnepropetrovsk State Universities, and Kyiv National University.

The current major problem in Ukrainian fisheries research is financial. There has been a gradual decrease since 1996 in real terms of funding from State budget, which is the major source of funding. The studies involved can not be realized with private funding or donations as they are connected with assessment of the state of bioresources belonging to the State and with implementation of Ukraine's international obligations. In 2002, budget funding for marine fisheries research was in fact stopped due to the national budget deficit.

Such a state of affairs demonstrates that the problem of state management of Ukrainian fisheries is still seeking a solution. Ukraine will accelerate solution of these problems, as it demonstrates its European choice, selecting European standards, and is planning to join EU, NATO and FAO. In the light of this, Ukraine should assess the need for reliable funding for fisheries research in accordance with EU standards.

POLICY AIMS

Fisheries policy in Ukraine is still developing. In 2000, the Ukrainian Parliament approved a Concept Paper on fisheries development of Ukraine. The Concept Paper outlined the strategic directions of government policy in the sphere of fisheries. The most important elements are creating favourable conditions for stabilization and steady improvement in production of competitive fish products; and fulfilling the population's needs for fish products. The Concept Paper recognizes the important role of fish products in national food security.

In accordance with the Concept Paper, the most important objectives are renewal and modernization of the fishing fleet and the technology of the fishing and processing companies; improved efficiency in fish stocks utilization; ensuring the reproduction and

protection of fish stocks; improved quality and increasing range of fish products; development of international scientific and technical cooperation and external economic links in the sphere of fisheries; harmonization of the laws of Ukraine on quality of fish products with standards of the EU and other countries; structural reforms and property reforms; and improvement in the quality of staff training to meet international standards.

The Concept Paper envisages that the main directions in fisheries development are: intensification of fisheries in global open waters, the Azov and Black Seas Basin and in inland waters; keeping at the present level or increasing fisheries in the EEZs of other countries; restoring and developing aquaculture; and increasing fish stock reproduction.

The Concept Paper indicates that implementation should be through State regulation and management of aquatic living resources and fisheries on the basis of scientific data, monitoring of the state of resources and fisheries control.

Under current Ukrainian laws, aquatic organisms inhabiting inland waters, the territorial sea and the EEZ of Ukraine are natural resource of national value and the property of the State. In accordance with current laws, aquatic resources pass to private ownership only after removal from their natural habitat.

It follows from Ukrainian legislation that commercial utilization of aquatic organisms takes place on a scientific basis and envisages their conservation and restoration. The State assumes obligations to restore valuable species of water organisms in their natural environment; to protect stocks; to determine ??? and catch limits on the basis of scientific data; to license, permit and regulate fisheries; to execute monitoring and accounting of aquatic living resources; provide for statistical registration of harvesting; and to maintain a State register of aquatic organisms.