FISHERY COUNTRY PROFILE: THE REPUBLIC OF BOLIVIA

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REPUBLIC OF BOLIVIA

STRUCTURE OF THE FISHERIES SECTOR

Overview of the Fisheries Sector

Bolivia has no marine resources, but has extensive freshwater resources with a great diversity of fish species (>400). Fishing occurs nationwide, involving both capture fisheries in rivers and open waterbodies, and aquaculture. Geographically, there are three major basins − Amazon basin, Del Plata basin and the "landlocked" or Altiplano basin. These originate in the Andes, and consist of an extensive system of rivers, lakes and seasonal waterbodies.

The fishery resources are susceptible to direct human impact affecting stocks, conservation activities and sustainable use. Depletion of fishery resources can be a consequence of various factors, including inadequate knowledge regarding the resources − both physical and biological − and their interactions. Thus limited knowledge of reproductive biology, stock levels and sustainable fishery management render difficult the adequate management of the resources. The fishers' ignorance concerning basic ecological information related to fishery results in indiscriminate fishing practices, and unsuitable development constrains fishers' incomes. There is a clear need for legislation to control fisheries and support their sustainable management.

Fishery is a traditional activity that generates income and provides a source of animal protein. The introduction of new fishery techniques since colonization has led to overfishing and stock depletion. This, coupled with ecological degradation of the basins, has meant that over the last 400 years the indigenous groups, together with the newcomers that also work as established fishermen, have become extremely vulnerable in terms of socio-economic standing and food security.

Aquaculture started with the introduction of many species of freshwater salmonids during the 1930s. Trout (*Oncorhynchus mykiss*) adapted well to extensive pisciculture in the Altiplano basin. In 1955, the silverside (*Odontesthes bonariensis*) − known in Spanish as *pejerrey*, and originating from Argentina − was introduced into the valleys' region, and later accidentally introduced to the Altiplano Basin, where it competes with the local fish fauna. Attempts to repopulate rivers with subtropical and tropical species started in 1962 with the

introduction of the common carp (*Cyprinus carpio*) − known in Spanish as *carpa*. The programme was operated by Universidad Mayor de San Simón (UMSS), the local state university in Department of Cochabamba. Around 1964, evangelical missions were responsible for the introduction of the Nile tilapia (*Oreochromis niloticus*) − known in Spanish as *tilapia nilótica* − and the Mozambique tilapia (*Oreochromis mossambicus*) − known in Spanish as *tilapia mozambica* − into the Yungas region. The latter species was introduced again by USAID in 1990 with the aim of promoting semi-intensive fish culture.

Inland Water Fisheries Subsector

Amazon basin

The Amazon basin in Bolivia contains some 145 important rivers, 37 lakes and 202 permanent lagoons, with a very large area that is prone to flooding during February and August. The fishery resources are estimated to be able to yield 9 000 t/year, although the size of the potential fishing resources is believed to be much higher. During 1996, the catch was estimated at between 2 000 and 2 500 t. At present, the fisheries in the region are only slightly developed because of communication difficulties, and the long distances between the fisheries and the commercial centres increase the costs of fishing and of distribution of the products. However, there is great potential for increasing the commercial catch, as well as for extending and diversifying the production of native and exotic species.

In this region, 389 species have been identified so far, with many more still to be identified, although they are probably not of commercial value. In the main system of the flood-prone territory and in the Mamoré River, which has been intensively studied, 327 have been identified. Fish of the suluriforme type (like the *surubí* (*Pseudoplatystoma fasciatum*) and the *chuncuina*) and characoidei (*pacú*, *tambaqui*) are the more prominent species, forming about 45% and 39% of the catch, respectively.

The fishery resources that can be exploited commercially are of two types: those that migrate long distances for spawning (e.g. *surubí* and *sábalo* (*Prochilodus lineatus*)), and those that travel laterally to the adjacent flooded plains to spawn and to feed (e.g. the pacú). The migrating fish are caught in the river channel, mainly during the dry season migrations. The fish of the flood-prone lands are caught all year round, especially during the later part of the dry season (September and October) when the size of the lagoons is reducing, thus facilitating capture. These lagoon areas are productive fishing zones and are important for breeding and feeding.

The fishing techniques used in the Amazon basin include the use of nets of several sizes without lines at the end, to minimize damage by river obstructions, and the use of long lines with 10 fishhooks. Three types of boats are used for fishing: canoes, boats and *potons,* which are largish, motorized, wooden vessels about 10 m LOA by 1.60 m wide.

Del Plata basin

The Del Plata basin has three major rivers, of which the Pilcomayo and Bermejo rivers in the upper part of the basin are the more important. The Pilcomayo river catchment drains an area of 272 000 km^2, which is 36% of the national territory.

This basin has more than 320 identified fish species. Recent studies have identified 44 species in all the water sources (rivers, lakes, lagoons and reservoirs) of the Department of Tarija. Of these species, the most important for artisanal and subsistence fishery is the sábalo. The sábalo fishery in the proximity of Villamontes, a town very close to the Pilcomayo river, is probably the best-studied fishing operation because the studies were

done by national and international research agencies specialized in administration and management of fisheries. Sábalo fishery assessment is based on egg counts from samples taken when the river is low. At present, the fishing season (15 April to 15 September) covers the period of up-river migrations.

The catch from these fisheries has often exceeded 2 000 t/year, with an average of 1 400 t/year during 1970–1980. There has been a sharp decrease in the production of sábalo since 1990 because of contamination of the Pilcomayo river with heavy metals and the extraction of water for agriculture purposes that occurs in the Argentinean lagoons.

The fishing techniques used in the Del Plata basin are mainly scissor nets, and nets called locally *chinchorro*, *polera* or *atarraya*, as well as traps. The scissor net, operated by individual fishermen, is the most used instrument because of its traditional use among the native population. The chinchorro and pollera or atarraya nets were introduced in 1960–1970 and are made from synthetic materials. The traps are constructed with stones, poles and fishing nets and are designed to form a wall that guides the migratory fish toward the trap. Because of the characteristics of the zone, there are very few boats, and none with motors; at best, fishers use canoes.

Altiplano basin

The landlocked Altiplano hydrographic basin consists of two great lakes: Lake Titicaca and Lake Poopó, and many small, high-plateau lakes, as well as the rivers that feed them. There was a great decrease in production from this basin between 1990 and 1992 because of a drastic decrease in fishery production from Lake Poopó, which in the 1988–1992 period had contributed around 2 000 t/year.

In 1994, the Lake Poopó fishery collapsed because increases in the levels of salts and heavy metals in the waters and in the rivers feeding the lake; at present, Lake Poopó is slowly recovering. However, on Lake Titicaca (a transborder lake shared by Bolivia and Peru), fishery continues without controls and with sustained production performances of pejerrey, which is an introduced species, and the *carache* (*Orestias agassii*) and *ispi* (*Orestias* spp.), which are native species. Production of rainbow trout (*Oncorhynchus mykiss*), which is an exotic species, is much lower than the other species. The potential fishery production from Lake Titicaca, where fishery is mainly for surface species, is not known, but the fishing effort judged can be judged from the numbers of fishers (an estimated 1 258 Bolivian fishermen in 1993, and an unknown number of Peruvian fishermen). There is evidence that the catch could have reached an unsustainable level. If no urgent measures are taken to manage the fishery resources in this basin, there is risk of overexploitation and stock collapse.

Predictions have been made regularly regarding the potential fishery production from Lake Titicaca, indicating a potential yield of between 40 000 and 60 000 t/year, although actual production has never exceeded 10 000 t/year, of which 2 000 t/year are taken by Bolivia. It seems that this level of production has been reached at the expense of the stock, with negative trends in fishing indexes. There is concern about the future of the trout and the survival of some *Orestias* native species.

Fishing production at Lake Poopó was among the highest in Bolivia (with a production level of 2 437 t/year during 1989–1991). In the early 1980s, the Cooperatives of Artisanal Fishermen, which brought together fishermen from the Urus, Muratos and Aymaras ethnic groups, expanded fishery production rapidly. During the 1980s, the Lake Poopó fishery produced thousands of tonnes of pejerrey and carache. In 1992, the lake dried up and fishery ended abruptly. The disappearance fishery activity from Lake Poopó has had strong adverse socio-economic effects on the lives of 4 000 people who depended on this activity for their livelihood.

In the Altiplano, only two types of nets are used: gillnets (used to catch deep-water fish

such as the ispi, carache and mauri), and trawls made from three different types of very light materials. The most common vessels are wooden boats that can be motorized, but generally are operated by oar or sail.

Table 1. Main fishery resources by basin.

Basin	Main species	Scientific name
Amazonas	Surubí *	*Pseudoplatystoma fasciatum*
	Pacú *	*Colossoma macropomum*
	Corvina	*Plagioscion squamosissimus*
	Tambaqui *	*Piaractus mesopotamicus*
	Dorado (de escama)	*Pellona flavippinnis*
	Dorado (de piel)	*Brachyplatystoma flavicans*
	Paleta *	*Surubimichthys planiceps*
	General	*Phractocephalus hemiliopterus*
	Blanquillo	*Callophysus macropterus*
	Sábalo *	*Prochilodus nigricans*
	Piraiba	*Brachyplatystoma filamentosum*
	Tucunaré *	*Cichla* sp.
	Palometa	*Serrasalmus* spp.
	Muturu *	*Paulicea lutkeni*
	Benton	*Hoplias malabaricus*
	Bagre Pintado *	*Leiarius marmoratus*
	Paiche	*Arapaimas gigas*

Del Plata	Yatuarana	*Brycon eriptherus*
	Surubí	*Pseudoplatystoma coruscans*
	Pacú	*Colossoma macropomum*
	Denton or Boga *	*Leporinus obtusidens*
	Tambaqui	*Piaractus mesopotamicus*
	Dorado *	*Salminus maxillosus*
	Salmón	*Schizodon fasciatum*
	Bagre	*Pimelodus clarias*
	General	*Phractocephalus hemiliopterus*
	Sábalo *	*Prochilodus lineatus*
	Trucha Arco Iris *	*Oncorhynchus mykiss*
	Trucha Marrón	*Salmo trutta*
Altiplano	Trucha (Salmón)	*Salvelinus namayacush*
	Trucha (Arroyo)	*Salvelinus fontinalis*
	Pejerrey *	*Odonthestes bonariensis*
	Carache Amarillo	*Orestias luteus, O. albus, O. jussiei*
	Carache Negro *	*Orestias agassii*
	Ispi *	*Orestias ispi, O. forgeti*
	Boga	*Orestias pentlandii*
	Mauri *	*Trichomycterus* spp.

	Suche	*Trichomycterus* spp.

Note: * indicates a commercial species.

Fishery activity is regulated by the Aquaculture and Fishery Law, which established the former Centre for Fishery Development (CDP) as the entity in charge of granting licences and permits. However, under the Law of Administrative Decentralization (Law No. 1654 of 1995), the process of allocating permits for the installation of aquaculture farms is managed by the departmental prefectures, but because the Law that regulates the use of water has not been approved yet, and because problems have arisen related to the use of land and water resources, the permit-granting processes are currently paralysed. Regulation of closed seasons is also in the hands of the decentralized governments.

Indigenous groups, native and colonizers that belong to the different ethnic groups form the fisher communities. The fishers are organized in associations or cooperatives. In the Altiplano basin, the Lake Titicaca Fishermen's Association is an institution that is very influential because is located close to the national centre of government.

Table 2. Native and colonizing ethnic groups that are linked to fishery activity.

Basin	**Ethnic groups**
Amazonas	Tacanas, Araonas, Chimanes, Mosetenes, Yuracares, Yuquis, Mojeños, Movimas, Reyesanos, Sirionos, Guarayos, Cavineños, Ese ejjas, Pacahuaras , Mores and Aymaras-quechuas migrantes
Del Plata	Guaranis, Weenhayeks, Tapietes, Chiquitanos, and Aymaras-quechuas migrantes
Altiplano	Aymaras, Uro-mulatos and Quechuas

AQUACULTURE SUBSECTOR

At present, aquaculture is not very important in the Bolivian economy. Even though there have been numerous efforts to develop aquaculture projects, only trout breeding in the Altiplano has reached a commercial level, operated by small enterprises that have access to the necessary inputs (eggs, alevins and balanced feed). These enterprises have been successful to a certain extent; they receive support from the Bolivian Aquaculture Centre for Research and Development (CIDAB), which is the national entity in charge of research and development in the field. However, the majority of the communities involved in this activity are not yet self-sufficient.

Aquaculture in the Amazon basin is minimal, despite having ideal conditions. Only native species are cultivated (mainly pacú and tambaqui), with some exotic species (tilapia) cultivated in extensive systems. The two regional pisciculture stations are producing small quantities of alevins of tilapia; these stations are also importing tambaqui and pacú alevins. The two stations have brood parents but have not yet managed artificially stimulate the spawning process of these two species. There is potential for the introduction of freshwater lobster production, either alone or in conjunction with other fish production projects.

The development of aquaculture in the Del Plata basin is based on the common carp. The governmental sector, through the San Jacinto pisciculture station, has implemented a programme for populating the hydroelectric dam. The introduction of the common carp for

subsistence fisheries has been successful because of the reduced sábalo population; moreover, because carp has a national demand, there is the possibility of further development based on this species.

Table 3. National aquaculture production.

Species	Production (tonnes)			
	1992	1993	1994	2004
Oncorhynchus mykiss	186	525	519	310
Ciprinus carpio	29	45	30	40
Oreochromis niloticus	51	79	68	70
Colossoma macropomun	–	–	–	20
Piaractus brachypomus	–	–	–	10
Total	266	649	617	450

Source: Based on data from FAO, the Centre for Fishing Development and Pisciculture, and the Directorate of Fishery.

Table 4. Species cultivated and systems used.

Common name	Scientific name	Year introduced	Source	Breeding system
Amazonas basin				
Pacú	*Colossoma macropomun*		Autochthonous and Brazil	Breeding in tanks and reservoirs
Tambaquí	*Piaractus brachypomus*		Autochthonous	Breeding in tanks and reservoirs
Tilapia	*Oreochromis niloticus*	1962	Brazil and Colombia	Breeding in tanks and reservoirs
Tilapia roja	*Oreochromis* sp.	1990	Colombia	Breeding in tanks and reservoirs

Tucunaré	*Cichla monoculus*		Autochthonous	Breeding in tanks and reservoirs
Boga	*Schizodon fasciatum*		Autochthonous	Breeding in tanks and reservoirs
Paiche	*Arapaima gigas*	1990	Peru	Caching and trade in Brazil
Camarón gigante	*Macrobrachium rosemberguii*	1990	Peru	Experimental shrimp breeding
Del Plata basin				
carpa	*Ciprinus carpio*	1962	Brazil	Breeding in tanks and reservoirs
carpa herbívora	*Ctenopharyngodon idellus*	1992	Brazil	Breeding in tanks and reservoirs
carpa cabezona	*Aristichthys nobilis*	1992	Brazil	Breeding in tanks and reservoirs
Carpa plateada	*Hypophthalmichthys molitrix*	1992	Brazil	Breeding in tanks and reservoirs
Sábalo	*Prochilodus nigricans*		Autochthonous	Breeding in tanks and reservoirs
Altiplano basin				
Trucha arco iris	*Oncorhynchus mykiss*	1939	USA	Traps in the lakes, tanks and dams
Trucha marrón	*Salmo trutta*	1939	USA	Extensive breeding in mountain rivers

salvelino	*Salvelinus fontinalis*	1939	USA	Extensive breeding in mountain rivers
pejerrey	*Odonthestes bonariensis*	1946	Argentina	Extensive breeding in lakes and rivers

Source: Based on data from Directorate of Pisciculture and Fishery of the Ministry of Agricultural and Rural Affairs.

Recreational fishing is minimal. There are some specific initiatives in Beni, Santa Cruz and La Paz, where tourist services are offered associated with hunting and fishing in lakes and rivers. It is expected that such activities will increase in the future.

POST-HARVEST USE

Use of the Catches

The main part of the production is for human consumption while the fish is still fresh. A very small amount is dried for human consumption and another, even smaller, portion is destined for the production of animal feed. For this last purpose, a small manufacturing plant has been installed in Santa Cruz that is producing balanced feed.

Fish markets

Fish products are mainly commercialized at the local or national levels, with only a very small volume exported, despite the potential of the external markets. The national market is also supplied by imports of fishery products (fresh fish, frozen fish, dry, salted or smoked fish, crustaceans, molluscs, fishmeal and fish and oils). In 2000 Bolivia imported 10 874 t of fish and fishery products. Imports fell in the following years reaching only 4 717 t (US$ 3.6 million) in 2003.

Very few Bolivian fishery products are exported. Some fish from the Amazon region, in the northern part of Beni, are exported to Brazil. These exports represent, most probably, less than 40 t/year.

PERFORMANCE OF THE FISHERY SECTOR

Role of Fisheries in the National Economy

In 2003, national fishery and aquaculture contributed US$ 7 510 815 to national GDP, representing 10% of forestry, hunting and fishing sector. Continental capture fishery accounted for US$ 6 977 547 (92.9%), and the aquaculture subsector for US$ 533 268 (7.1%).

Demand

In 2003, the annual per capita consumption of fish in Bolivia was 1.6 kg (one of the lowest in Latin America). Household expenditure on fish products is very low, approximately 0.8% of total food expenditure. Studies of meat consumption preferences in Bolivia show that in

the three main cities (La Paz, Cochabamba and Santa Cruz), the population prefers beef and poultry, and fish comes a very distant third. Among reasons given for the low consumption of fish were inadequate hygiene during the selling procedure, limited supply and elevated prices.

Trade

The commercialization of fishery products is directed towards the national market. Exports are insignificant in relation to imports of fish products that help to satisfy national demand. Traders buy fish in remote regions and then transport the products to the towns and cities. These products are transported with or without some prior processing. Warehousing and cold storage infrastructure is limited.

Food security

An important part of fishery production is for self-consumption, and consequently fish is very important in the diet of the indigenous populations and the colonizers that inhabit riverine and lacustrine sites, groups that are generally among the most vulnerable groups in terms of food security. Aquaculture in cold waters in the occidental region is directed mainly to the market, and consequently is regarded primarily as an income source. The projects based on carp and tilapia in the valleys and tropical areas are mainly directed to help the food security of the most vulnerable populations. However, there has been no adequate evaluation of the real contribution of these activities.

Employment

In 1999, the fishery sector provided employment to about 3 600 fishermen, implying that almost 20 000 people depend on fishery. Of all fishermen, only 568 derived all their income from fishing. The median fishermen age was 41 years, and they were mainly male (98%). At the same time, there were between 2 000 and 4 000 fish sellers that were mainly women. These women worked in small fish sales places, mainly in the urban centre markets.

Table 5. Social indicators by basin.

Indicator	Altiplano	Amazonas	Del Plata	Total
No. of fishermen	2 588	412	600	3 600
Average age	43	39	40	41
No. of dependants	14 281	2 609	2 670	19 560
Proportion women	0.63%	2.15%	7.00%	2.00%
Proportion of men	99.37%	97.85%	93.00%	98.00%

Source: Assistance project for fishery and aquaculture in Bolivia (ADEPESCA), 1999.

FISHERY DEVELOPMENT SECTOR

Obstacles

Fishing is primarily artisanal and small scale, and it is spread out across the country. The distribution of fishing has changed significantly in the last twenty years, with increased production in the Amazon basin and a reduction in the Altiplano and Del Plata basins.

Extension services are weak or absent in most of the fishing regions, although some NGOs and universities undertake limited extension work in the fishery sector. Fishermen constitute a marginal group in the priorities of assistance projects and extension services. Women, in particular, are poorly represented in the associations.

Generally, information and statistics on this sector are limited and unreliable. In particular, estimating gross national fishery production is difficult because of the difficulty of monitoring all the many small landing places, and it is difficult to estimate the total number of fishers. The absence of a fish consumption culture means that there is very little social interest in the sector. This situation is reflected in the constraining absence of financing resources to assist development of fishery sector activities by the private sector.

Perspectives

The fisheries, in general, have an interesting potential based on the important biodiversity present in the national territory. However, immediate action is needed to preserve these resources and to promote their sustainable use, directed mainly to the food security of the fishing and indigenous communities.

Due to the primitive developmental stage of aquaculture activities, semi-extensive cultivation is the system that has the greatest potential for expansion, especially in the Amazon region.

Development Strategy

The fishing development policy promoted by the Ministry of Agricultural and Rural Affairs through the Unit of Fishery and Agriculture has one main objective: To promote the regulation and the sustainable socio-economic development of the fishery and aquaculture sectors in the three main basins, protecting the food security of the population and improving the socio-economic conditions of artisanal fishermen, fishery entrepreneurs, processors, marketing and last, but not least, the end consumer. The strategy of development envisions among its main lines of action the following:

- To promote research, management and administration development related to fishing resources and to aquatic ecological environment.
- To give incentive to the technological and productive development of aquaculture with the objective of attaining sustainable socio-economic conditions.
- To support the technological processes after fishing products are caught to contribute to the improvement of the socio-economic conditions of the agents involved and the satisfaction of the nutritional necessities of the population.
- To develop a programme of technical training and to promote the preparation of

extension workers to help with technology transfer and support to the fishery extension services.

- To support the financial and technical assistance services to provide incentives for fishery and aquaculture production in the Amazon basin.
- To establish and implement fishery information services that provide information on a continuous basis through a database, thus facilitating formulation of policies, planning of regulatory actions and development of the capture fishery and aquaculture sectors.
- To strengthen and regulate the social organizations and the fishery and aquaculture enterprises to allow self-sustainable development and efficient economic administration.

RESEARCH

The research centres are closely linked to the Bolivian state. The majority of them depend on the work of state universities, while complementary research is undertaken by the Bolivian Centre for Research and Development of Aquaculture (*Centro de Investigación y Desarollo Acuícola Boliviana* – CIDAB). There are some other specific efforts, such as the Hoyam NGO helping development of aquaculture in Beni.

CIDAB is located in Tiquina, near Lake Titicaca. The centre undertakes research projects related to the reproduction, nutrition and other issues related to trout. This centre also undertakes research projects related to Altiplano endemic species, applying pisciculture practices for repopulation purposes. The unit for freshwater studies and aquatic resources – *La Unidad de Limnología y Recursos Acuáticos* (ULRA) – that is associated with Universidad Mayor de San Simón undertakes freshwater-related research studies, while the Pirahiba station of the university, is investigating artificial reproduction of alevins of native species, such as pacú, tambaquí and surubí.

Institut de recherche pour le développement (IRD), through French international development assistance, is collaborating with the state universities in La Paz, Santa Cruz, Cochabamba and Beni. The investigations are mainly focused on the study of interactions between the ecology and structure of aquatic populations.

Table 6. Main research centres.

Centre	Institution type	Site(s)	Professional staff
Bolivian Centre for Research and Development of Aquaculture (CIDAB)	State project with Government of Japan support (JICA)	La Paz, Lake Titicaca	7
Institut de recherche pour le développement (IRD)	Collaborative project of UMSA and IRD with French development support	La Paz	9
El Prado	State university (UGRN)	Santa Cruz	3

Pirahiba	State university (UMSS)	Cochabamba	2
Water resources research centre	State university (UTB)	Trinidad – Beni	3

Hoyam	NGO	Beni	3
Pisciculture station of San Jacinto	Prefecture project	Tarija	n.a.

Education

National universities have courses in biology that prepare professionals in the field, but there are very few scientists and technicians in the fishery and aquaculture areas. It is therefore necessary to supplement university course. Research stations such as El Prado, Pirahiba and San Jacinto could operate as training centres, but they lack the financial and human resources to develop practical training programmes.

With the exception of short occasional courses, there are almost no opportunities for university-level training or field training in the sector, hence the paucity of well-trained fish farmers in the country. Almost all technicians working in the aquaculture industry have learned the technology through their work.

Foreign Aid

The development and sustainability of aquaculture depends on state support through the research centres of the universities and bilateral or multilateral support projects. FAO is the main international agency for technical assistance. There is significant participation by international agencies like JICA (Japan), IRD (France) and USAID (United States of America). There are also some NGOs that are specialized in these fields. These organizations have financed investigations and production projects in the main basins.

FISHERY SECTOR INSTITUTIONS

The Organization Law of the Executive Power (Law No. 1788) created the Ministry of Agricultural and Rural Affairs, giving this institution the responsibility for regulation of fishery and aquaculture. The operative arm of this institution is the Bolivian Aquaculture Centre for Research and Development (CIDAB). Furthermore, this law ratifies the duties of the Ministry of Sustainable Development and Planning, giving this institution specific responsibilities concerning hydrologic, biological and biodiversity resources. The Ministry of Defence is in charge of the authorization of licences for the operation of fishing boats. This institution defines the limits for these operations, especially regarding protected species, geographical areas of operation, certification and inspections, and other matters.

The departmental prefectures in 1995 took over the functions that previously belonged to the Regional and Subregional Centres for Fishery Development. These activities have not been implemented completely. Weak coordination with the municipal governments that have specific competences in rural and subsector development has had a series of negative consequences for the fishery resources, as well as a reduction in income and loss of quality of life for the fishermen.

This institutional framework is complemented by the Research Centres of the State Universities.

Figure 1. Fisheries administration in Bolivia.

INTERNET LINKS

htpp://www.agrobolivia.gov.bo/

htpp://www.mds.gov.bo/

htpp://www.tramites.gov.bo/tramite.php?cod=158

htpp://www.ine.gov.bo/

htpp://www.aguabolivia.org/

http://www.ird.org.bo/Hydrobio.htm

htpp://www.octa.org.br/

htpp://www.cicplata.org/

htpp://www.pelt.org/

GENERAL LEGAL FRAMEWORK

The main instrument for fishery legislation that is in force in Bolivia is the Regulations for Fishery and Aquaculture – an annex to Supreme Decree No. 22581, published on 14 August 1990. These regulations have been developed through a series of Administrative Resolutions of the Fishery Development Centre. This normative framework is completed with the Law on wildlife, national parks, hunting and fishing, Supreme Decree Law No. 12301 of 14 March 1975; the Environment Law, Law No. 1333 of 27 April 1992; and a series of regulations under Supreme Decree No. 24176 of 8 December 1995. These laws

penalize some offences and crimes such as poisoning, contamination and adulteration of waters that are used in aquaculture (Article No. 105) and the crime of fishing using prohibited means (Article No. 110).