

Unclassified

AGR/FI/HSA(2006)5

Organisation de Coopération et de Développement Economiques  
Organisation for Economic Co-operation and Development

04-Oct-2006

English text only

**DIRECTORATE FOR FOOD, AGRICULTURE AND FISHERIES  
FISHERIES COMMITTEE**

### **Expert Meeting on the Human Side of Fisheries Adjustment**

#### **KEY POLICY ISSUES AND CHALLENGES IN THE LINKAGE BETWEEN FISHERIES AND THE AQUACULTURE SECTOR IN MEXICO'S RURAL DEVELOPMENT STRATEGY**

**19th October 2006**

**Union de l'Europe occidentale, 43 avenue Président Wilson, 75116 Paris**

*This paper has been prepared by Claudia Beltrán of the University Santo Tomás de Aquino, Colombia.*

*It is submitted for discussion under Session 3 of the Programme.*

For further information, please contact:

Anthony COX (Email: [anthony.cox@oecd.org](mailto:anthony.cox@oecd.org))

Carl-Christian SCHMIDT (Email: [carl-christian.schmidt@oecd.org](mailto:carl-christian.schmidt@oecd.org))

**JT03214961**

Document complet disponible sur OLIS dans son format d'origine  
Complete document available on OLIS in its original format



AGR/FI/HSA(2006)5  
Unclassified

English text only

## TABLE OF CONTENTS

1. Background .....	3
2. Social, economic and demographic aspects of Mexico.....	3
3. General situation of fisheries and aquaculture in Mexico .....	4
4. Legal and institutional framework for fisheries and aquaculture sector in Mexico .....	9
4.1. Legal framework.....	9
4.2. Institutional frameworks.....	10
5. Policies for the fisheries and aquaculture sector .....	11
6. Legal and institutional framework for rural development in Mexico .....	13
6.1. Legal framework.....	13
6.2. Institutional framework.....	14
7. Policies for rural development .....	14
8. Issues and challenges for policy makers .....	17
8.1. Focus of fisheries and aquaculture policies.....	17
8.2. Linkage with policies of rural development.....	18
8.3. How to support strengths and overcome weaknesses in institutional frameworks.....	19
8.4. Participation of the private and academic sectors.....	21
9. Conclusions .....	23
BIBLIOGRAPHY.....	26

### Figures

Figure 1. Map of poor rural areas.....	4
Figure 2. Location of industrial and small-scale fleets .....	7
Figure 3. Mexican fisheries production.....	8
Figure 4. Mexican international trade .....	9

## **KEY POLICY ISSUES AND CHALLENGES IN THE LINKAGE BETWEEN FISHERIES AND THE AQUACULTURE SECTOR IN MEXICO'S RURAL DEVELOPMENT STRATEGY<sup>1</sup>**

### **1. Background**

1. The Organisation for Economic Co-operation and Development – OECD - has undertaken a revision of the issues and challenges that exist in the fisheries and aquaculture sector in Mexico and its link to the Mexican rural development strategy. Consequently, a literature review based on information from different governmental organisms, the academic sector, international organisms and specialist documents was undertaken. This information, alongside the author's own experience gathered in other countries of Latin America, contributed to the following analysis.

2. This document has been organised as follows: a) general description of Mexico's economic and social context until 2005, with a brief diagnosis of the current situation in its fisheries and aquaculture sectors, b) presentation of the institutional, legal and political framework for fisheries, aquaculture and the rural sector, c) the issues and most important challenges that the country has to overcome to ensure the development of even the most vulnerable communities. The result of this analysis will be presented at the workshop on "*The Human Side of Fisheries Adjustment*", organised by the OECD on 19<sup>th</sup> October, 2006.

### **2. Social, economic and demographic aspects of Mexico**

3. The Federal Republic of Mexico borders the United States to the north, the Gulf of Mexico and the Caribbean Sea to the east, Guatemala and Belize to the southeast, and in the south and west with the Pacific Ocean. It has 1 964 382 km<sup>2</sup> of surface, 3 149 920 km<sup>2</sup> of Economic Exclusive Zone, 8 475 km of coast line on the Pacific Ocean and 3 294 km of coastal line on the Gulf of Mexico and Caribbean Sea.

4. According to 2005 statistics from the *National Institute for Statistics, Geography and Computer Science (INEGI)*, Mexico has approximately 103 263 388 habitants, of whom 76.5% live in urban areas and 23.5% in rural areas. 7% of the population is indigenous. Fifty eight per cent of the population is economically active; 15% work in the primary sector (agriculture, livestock and fishing), 26% in the secondary sector (industry and mining) and 59% in services. Among people that are employed, 65% have a formal wage, 23% are independent and 9% are informal workers without fixed incomes. On the other hand, the national unemployment rate is 3.5% and the illiteracy rate is 8.4%, although in rural populations this increases to 23%. The participation of women in the economy is gradually increasing; women as head of household have increased from 17% to 23% from 1990 to 2005.

5. The average rate of growth of Gross Domestic Product (GDP) between 2001 and 2005 was 1.9%. The Mexican economy is highly diversified and is one of the four most important in Latin America. Over the last decade, there has been an important change in the primary sector (agriculture and mining) due to

---

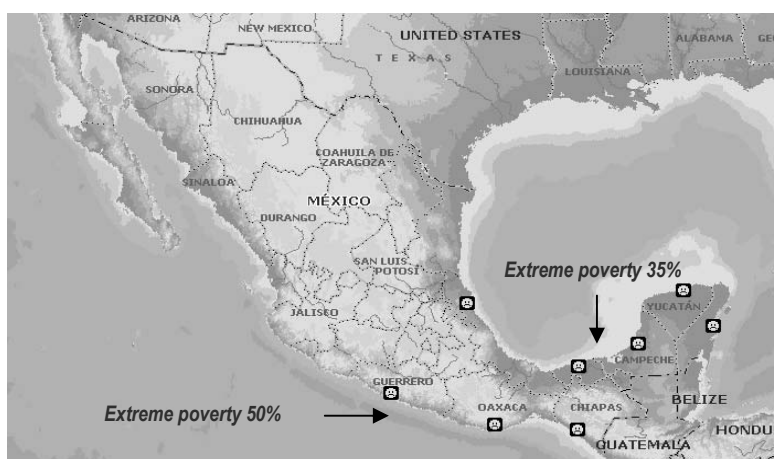
<sup>1</sup> Written by Claudia Stella Beltran Turriago, Economic Consultant, University Santo Tomás de Aquino, Colombia. Views expressed in this report are those of the author.

improved technology. In addition, growth has occurred in the manufacturing industry, oil industry, trade, communications and transport sectors. Strong foreign investment exists in these sub-sectors. It is also important to highlight remittances by Mexicans relatives who live outside Mexico and who have become an important variable in the economy; for 2005 remittances reached USD 20 million.

6. The World Bank's study on "*Poverty in Mexico, an evaluation of the conditions, tendencies and government strategies*", reports that in 2004, the proportion of households classed as living in extreme poverty was 20.3%. Those with moderate poverty were 51.7%, predominantly made up of the highly vulnerable indigenous population. This represents a reduction of 3% from 1996, although positive effects are more noticeable in rural areas than urban ones due to remittances and increasing government transfers. Despite this, national income levels remained relatively constant.

7. There are many differences in poverty between states. The south of the country continues to be one of the poorest areas, despite advances in basic social infrastructure. Poverty is higher in the states bordering the south Pacific (Chiapas, Guerrero and Oaxaca), where 50% of the population is extremely poor, followed by the south Gulf and Caribbean regions (Campeche, Quintana Roo, Tabasco, Veracruz and Yucatan) where 35% are extremely poor (World Bank 2004).

**Figure 1. Map of poor rural areas**



Source: Digital encyclopedia "Encarta 2006"

### 3. General situation of fisheries and aquaculture in Mexico

8. To elaborate on this diagnostic diversity, authors and bibliographical sources were consulted and are referred to at the end of the document, including FAO (2003, 2004, 2006), SAGARPA (2000, 2001, 2003, 2005), INP (2005), the Commission of Fishing of the Camera of Deputies (2001); Caso, Pisanty & Ezcurra (2004); Fitzsimmons (2000), DeWalt (2000), Díaz de León (2003) and Salas & Gaertner (2004), and Beltrán (2005), among others.

9. Around 320 species sustain fishing and aquaculture activities in Mexico. Since the 1990s, average production has been 1.2 million metric tons (mt), despite variations caused by diverse natural phenomena that occasionally increase or diminish the capture of some important resources. Since the middle of the 1980s, a gradual reduction in fishing has been noticed. This is due to sustained effort on the most important resources, a rise in the number of fishers, the use of gears and non-authorized fishing equipment and the weakness of management measures. An alternative to controlling over-exploitation of the resource, particularly freshwater resources, is to explore the utilization of new species such as shrimp in deep waters, green jack (*Caranx sp.*), sand weakfish (*Cynoscion sp.*), flatfish (*Ancylosetta sp.*), etc.

10. Although Mexico is one of the main Latin American producers of tilapia and marine shrimp due to its abundant bodies of water and technological developments since the 1980s, aquaculture is still an activity that is not fully developed. Nevertheless, the country can increase production because national demand is high and because rural producers can work with new species for cultivation in fresh and marine waters. As a result, the government and some universities are carrying out research in order to adapt some fishing resources to cultivation conditions.

11. Coastal lagoons have particular importance for the country and occupy around 1 567 500 hectares of estuary surface, most of them adequate for fishing and aquaculture. They are characterized by their high productivity and for their fragility under inappropriate capture practices as well as the effects of natural phenomena and contamination that have modified capacity, biodiversity and quality of water. The coastal lagoons of the Gulf of Mexico have a high production of oysters (50% of national production). In the Pacific, the main resource is shrimp (60% of total production). In both regions, there is fishing activity and also cultivation of these species. In addition, on the western coast of Baja California, mollusks such as clams and mussels are cultivated.

12. With the last changes to the institutional framework in 2001 as a result of the transfer of fishing authority from SEMARNAP to SAGARPA (as is explained in the next chapter), one of the objectives has been to strengthen inspection and surveillance activities to ensure that management measures are fulfilled and reduce infractions of fishing legislation. In CONAPESCA's structure there are two departments responsible for the administration of fishing resources (the Department of Fisheries and Aquaculture Management, and the Department of Inspection and Enforcement). If, at federal and state level, these are not well integrated and do not define joint priorities nor coordinate at high, middle and low levels as well as at the federal and state level, there is a risk that a legal or authority gap is created. Free-riders may take advantage of this, as is already occurring (Vidal, 2000).

13. Advancements on this matter have not been effective. Implementing restrictive actions has not been enough to control free-riders as well as illegal, unreported and unregulated fishing (IUU). It is also necessary to involve the producers linked to fishing and aquaculture and encourage them to participate actively in a concerted way on the design of management schemes and ensure their commitment to the implementation of regulatory measures. To fulfill this goal, it is necessary to design a strategy of communication, allowing them easy access (radio messages and printed pamphlets) to local meetings in order to explain current measures and those in development. In this way, it would be possible to receive their opinions, circulate more effectively the principles of responsible fishing and reduce infractions where they occur as a result of ignorance of the rules.

14. Changes in fisheries has generated changes in the behavior and fishing methods of fishers (particularly of small-scale fishers) that are not always known nor considered by managers when they design long term measures. As a result, they fail when they are implemented. These changes usually happen in the case of fishing resources, for natural phenomena or socio-economic hinge-points. The criteria, preferences, abilities and access opportunities of each fisher have a direct influence on capture behavior and distribution of fishing effort as a whole (Salas, 2004).

15. On the other hand, neither the economic impact of management measures, nor social and political effects or the collaborating or aggressive attitude of fishers in front of fishing authorities, are usually measured. This is particularly the case where measures motivate or force fishers to diversify their economy, or if the implementation of a measure generates political pressure on fishing authorities, such that they modify or postpone management measures.

16. In reference to marine fisheries, the country is divided into three regions: the north Pacific ocean - Gulf of California - that has cold waters and stocks of migratory species with high biomasses; the

south Pacific Ocean with deep and warm waters; and the Gulf of Mexico - Caribbean Sea - with a wide continental platform, warm waters, abundant coral reefs and great diversity of fishing resources but with lower population density that restricts the volume of production of their fisheries.

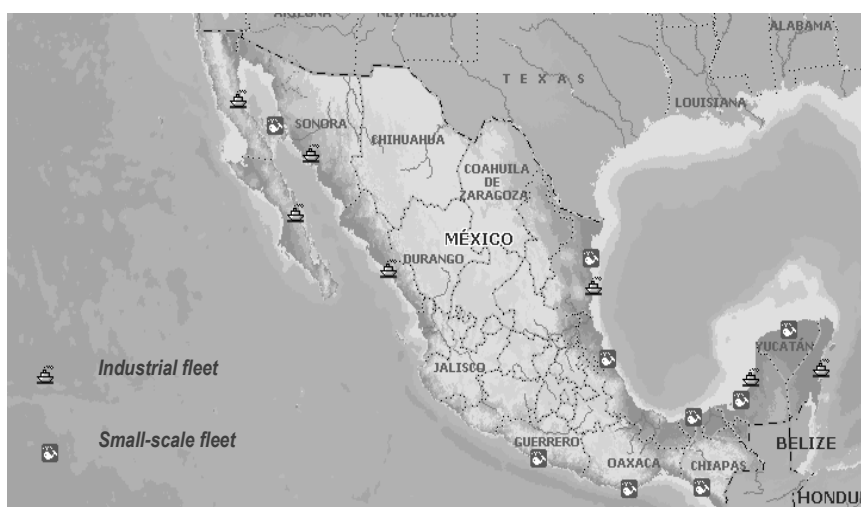
17. Levels of capture indicate that the Gulf of Mexico is maybe less productive and more fragile than the Mexican Pacific because it only contributes 21% to total marine fishing. However, this is explained in part because 79% of resources of more commercial interest have already reached their Maximum Sustainable Yield. The industrial fleet has diminished but it has more technology to improve its capture. Also, the number of artisanal fishers has increased and this implies that more management measures are required to recover fishing resources from the Gulf of Mexico and transform fishing into a sustainable activity in the future.

18. At a commercial level, the main marine resources are sardine, tuna and shrimp. For these species, there have been norms and management plans in place since 1994, with some specific dispositions regarding environmental attention. The number of participants in the tuna fishery has increased, while this has decreased for shrimp and sardine as a result of the high exploitation of these two fisheries, as well as the effects of regulation measures such as closures, gear specifications and effort limitations. Of the total fleet in 2003, 90% were catching shrimp, 6% tuna and 4% sardine.

19. At the artisanal level, the main marine fisheries are giant squid, shark, octopus, lobster, demersal fishes and oyster, among others. Shrimp is captured by the small-scale fleet in some fishing communities despite a total closure in estuarine areas from 1994. Some of the other species have management plans but most are mainly open access. During the last decade, the number of small-scale fishers has increased in most of the coastal area because people have perceived fishing as a potential source of income. Some of the species targeted by them are very profitable (lobster, conch, oyster). Others are sold nationally or for local consumption.

20. The distribution of the fleet (industrial, semi-industrial and small-scale) varies between regions. One of the most important is the Gulf of California. In 2003, 70% of shrimp trawlers (2 407 vessels), 78% of tuna purse seiners (132 vessels) and 100% of sardine seiners (89 vessels) operated in the marine waters of the States of Sonora, Sinaloa, Baja California and South Baja California. Shrimp trawlers in the Gulf of Mexico operate in the waters of Tamaulipas, Campeche and Quintana Roo States.

21. The small-scale fleet does not concentrate on a particular region but along coastal and riverside areas, albeit with an emphasis on traditional fishing areas. 97% of the small-scale fleet (102 800 units) is composed of fiberglass boats with outboard-engines (up to 36 feet long), popularly called "*pangas*". The other 3% (3 600 units) are wooden boats. This fleet is distributed as follows: 54% is based on the Pacific coast (half of them in the Gulf of California) and 46% in the Gulf of Mexico, which has increased by 700% since the 1970s. The States with largest small-scale fleet are Veracruz, Tabasco, Tamaulipas, Campeche and Yucatan (Díaz de León, 2003).

**Figure 2. Location of industrial and small-scale fleets**

Source: Digital encyclopedia "Encarta 2006"

22. According to information from CONAPESCA in 2003, fishing and aquaculture production was 1 555 000 mt. Of this, around 90% originated from marine landings, 5% from inland fishing and 5% from aquaculture (marine shrimp from the Pacific and carp, trout and tilapia from bodies of fresh water).

23. Inland fisheries capture was 77 800 mt in 2003, 90 400 mt in 2001 and 128 000 mt in 1990, demonstrating a gradual decline in capture as a consequence of over-exploitation and meteorologically adverse conditions that have increased in frequency over the last five decades. In addition, the weak application of management measures and bad quality of seed used to repopulate some water bodies have also contributed to this decline. In this context, the species of more commercial interest are tilapia, carp, trout and catfish, among others. However, aquaculture statistics could be misleading and only be 70% of the given amount. This is due to the fact that some records assume cultivated fish are used as seed to repopulate bodies of water for public use. Official records indicate that in 2003, marine shrimp represented 83% of cultivation, trout 5%, tilapia 4.7% and oysters 3.5% (FAO 2003).

24. Tilapia cultivation exists throughout the country and almost all production is for national consumption. It is the third product in volume after sardine and tuna and the fourth in value after shrimp, tuna and octopus. The first projects in 1970s were carried out for home consumption, but as production increased, demand also increased for fresh fish through producer cooperatives that worked jointly to process, pack and transport the products. However, the current trend of rural aquaculture production is to work independently or in small groups. The seed to cultivate tilapia and some native species come from State hatcheries. Tilapia cultivation is common on land with irrigation systems. In some cases, water that has already been fertilized is used for the cultivation of grains and vegetables (Fitzsimmons 2000). Shrimp cultivation has been a strategic aspect of social considerations since 1992, when the Government declared the end of agrarian reform and began to privatize public land in order to modernize production and to motivate investments, granting rights to those who worked the land.

25. At the moment, 80% of shrimp farms are semi-intensive projects with few technologies and operated by peasants who generate 48% of national production. Contrary to other Latin American countries, in Mexico rural producers are the main participants of this activity. However, some private producers interested in this cultivation have made agreements with peasants in States such as Sinaloa and

Nayarit, where the private sector contributes capital and construction while the peasants contribute the land and labour.

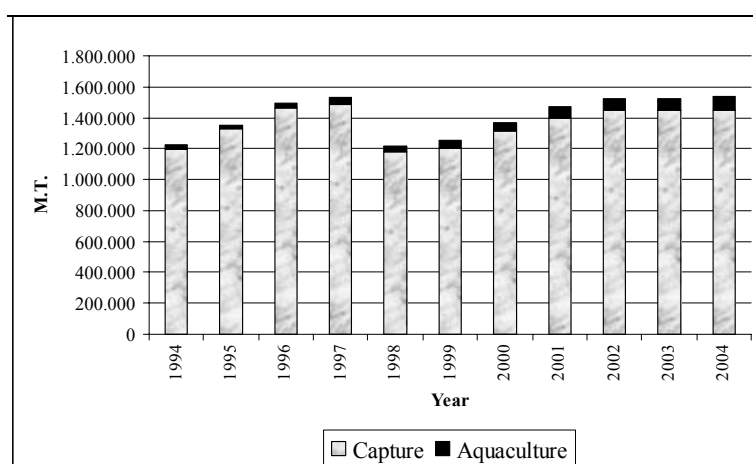
26. Regarding women in rural areas, their participation in fishing and aquaculture varies according to region. For example, in Yucatan they have more important roles, while in Veracruz their participation is limited as men prefer administrative, commercial and production functions continue to be led by them, although seemingly they recognize that women can participate. Nevertheless, women are in charge of elementary functions in fish cooperatives or work in occupations like sewing and hairdressing. On the other hand, the objective of many teenagers and young people is to migrate to the USA or Canada, as they believe that their towns have no attractive or high wage earning opportunities.

27. Mexico has high demand for fresh and frozen fish and shellfish, as well as canned tuna and sardines. For many consumers, prices dominate their purchase decisions more than quality and choice. This is due to the scarce education of consumers and the relatively low tradition of consumption of fish products. In fact, Mexicans prefer to consume chicken (with abundance) more than fish, cow and pig meat.

28. The time of major sales is Holy Week (March and April) and a little in December. On the other hand, limitations are that buyers do not fully trust product freshness. They consider fish expensive and sales decrease significantly between May and August, a time popularly known as "months without 'r' in their names" because it coincides with the winter season (abundant rains), winds and hurricanes, when catches decrease. It is also important to highlight that in the 1980s and 1990s, the United States imposed two tuna commercial restrictions on Mexico as a result of incidental captures of dolphins by the purse-seine fleet in the Eastern Pacific Ocean. Consequently, the country promoted the national consumption of canned tuna, which has improved the index of fish consumption.

29. The evolution of the Mexican fishing and aquaculture sectors between 1994 and 2004 is represented in the following graphs, showing production and international trade. It can be noted that fishing contributes 96.3% and aquaculture 3.7% to the national supply of fishing products, while in the international market, exports represent 81.4% and imports 18.6%. It is important to highlight that Mexico is one of the 55 main fishing producers in the world, with resources of high commercial interest. In 2004, it occupied the 16<sup>th</sup> position in terms of landings and the 28<sup>th</sup> position in aquaculture production.

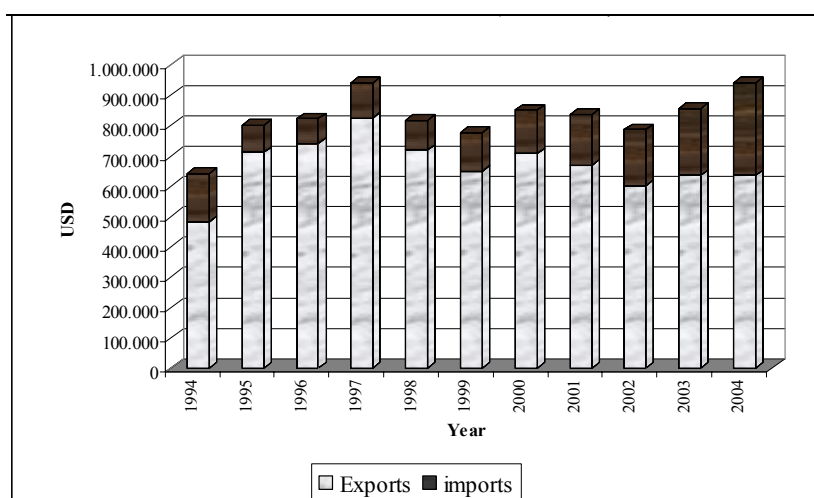
**Figure 3. Mexican fisheries production**  
(1994-2000)



Source: FAO



**Figure 4. Mexican international trade**  
(USD '000)



Source: FAO

#### 4. Legal and institutional framework for fisheries and aquaculture sector in Mexico

##### 4.1. Legal framework.

30. Mexico promulgated fishing laws in 1925, 1932, 1938, 1948, 1950, 1972 and 1986. The first three focused on granting permits and concessions to users. The following two encouraged investment for the development of the activity and improving fleet technology to increase production. From 1948 to 1992, some species of high value (shrimp, lobster, abalone) were reserved for the exclusive use of cooperative groups and subsidies were provided through the *"National Fund of Fishing Cooperative Development"* (law of 1972). However, since 1992, access to this species has changed, allowing fishing permits and concessions to any social or private agent that fulfills the requirements (Díaz de León, 2003). These changes of emphasis on legislation impacted on the way the activity has evolved at an industrial and artisanal level over the last 80 years.

31. The Federal Fisheries Law of 1992 is still in force and is based on article 27 of the National Constitution. It was amended in 2001 in order to respond appropriately to the evolution and requirements of the sector as well as to current management and development needs. Its objective is to guarantee the conservation and rational use of fishing resources and to establish the bases for its appropriate development and administration.

32. Nevertheless, some legal gaps have been overcome through the expedition of the National Fisheries Chart 2000 (CNP 2000) and through Mexican Official Norms (NOMs) that are based on important mandates and global initiatives to implant management measures, such as temporary closures of fishing resources and/or bodies of water, protected marine areas, defined fishing seasons, vessels and engine size restrictions, size and type of gears, fishing licenses, limited entry of new fishers and total allowable catch, among others.

33. NOMs are submitted for public consultation before being applied. Between 1993 and 2005, 31 NOMs for the diverse needs of fishing management were published, as well as three other NOMs

related to aquaculture between 1993 and 2000. Besides these, there are also 15 projects for new NOMs or for modification of those in force or in the process of public consultation.

34. Although the Fishing Law and its regulatory norms govern the sector, there are other related laws such as the Law of national waters (1992), the General law of ecology and environmental protection (1996), the Federal Law on metrology and normalization (1999), the Law of sustainable rural development (2001), the General law of national goods (1994 modified in 2004) and the Law of international trade (1993 modified in 2006), among others.

#### **4.2. Institutional frameworks.**

35. Since 2001, the Director of the fishing and aquaculture sectors has been the "*Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food - SAGARPA*", a department with ministerial status. SAGARPA is responsible for eight organisms. One of these is the *National Commission of Aquaculture and Fisheries (CONAPESCA)* as the regulatory agency, and another is the *National Fisheries Institute (INP)*, as the research entity. The *National Council of Fisheries and Aquaculture* is the consultation organisation of the National Government; it is independent and is made up of representatives of the public and private sector, *ad-honorem*.

36. CONAPESCA is in charge of the implementation of management measures, control and promotion of fishing and aquaculture, while INP carries out scientific and technological research of aquatic flora and fauna in order to provide advice and sustain the formulation of management measures and development of diverse programs.

37. This implies that the results of INP's research is an important basis for the work of CONAPESCA. Indeed, INP is CONAPESCA's scientific and technological consultation body and also for state government fisheries offices. Likewise, several research centers around the country (CICIMAR, CINVESTAV, CISEDCE, CIBNORT, ECOSUR, UNAM and some State Universities) are undertaking research on marine and fisheries issues. Over time, further interaction has been generated among these institutes and the federal and state governments to support management plans in coastal areas and provide advice for fisheries policies.

38. Marine fisheries and an important part of fresh water fisheries are under federal jurisdiction and as a result. CONAPESCA and INP have offices throughout the country. Some States have established their own agencies to carry out activities and promotion projects but they do not implant management measures as that comes under federal responsibility. In the specific case of CONAPESCA, their headquarters is not in the capital of the country (Distrito Federal) but in Mazatlán (on the Pacific coast) in order to decentralize institutions and provide institutional presence in one of the most important fishing areas. Delegations exist in a further 32 States.

39. As a result of the diverse restructuring of institutional frameworks, in November 2000 the environmental authority became the "*Secretariat of Environment and Natural Resources – SEMARNAT*", before functions were transferred to SAGARPA. As the protection of natural resources is part of its mission, SEMARNAT administers Protected Natural Areas (in some of which there is fishing activity). SAGARPA and SEMARNAT coordinate the formulation and execution of management measures.

40. SEMARNAT continues to ensure compatibility between resource conservation and the formulation of strategies for sustainable utilization. With the support of the CNP and SAGARPA that maintain an inventory of fishing resources available in the federal jurisdictions, SEMARNAT defines the maximum fishing effort levels applicable to the resource in specific areas and provides rules for their conservation, recovery and sustainable use in order to neither affect populations nor ecosystems.

41. In the year 2000, the CNP published information on 551 commercial fisheries in the Pacific, Gulf of Mexico and Caribbean Sea. Of these, 18% had development potential, 57% had reached the maximum level of exploitation and 25% were over-exploited (Diario Oficial de la Federación, 2000).

42. At state level, the federal government also relies on the State Committee of Fishing and Marine Resources, as well as the offices that have been created in some municipalities in order to offer more direct attention to users and to respond in a more effective and more punctual way to their needs and expectations.

## 5. Policies for the fisheries and aquaculture sector

43. The deep reforms to the fisheries framework influenced the formulation and implementation of fisheries policies. In 2000, public administration of fisheries and aquaculture was transferred from the *Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP)* to SAGARPA, and more specifically to CONAPESCA. As a result, policies moved from a less conservationist focus to one more concentrated on production that provides more attention to less favored communities.

44. During the period of President Vicente Fox Quesada, the National Plan of Development, fed by sectoral programs, was formulated. One of them is, "*the Sectoral Program of Agriculture, Livestock, Rural Development, Fisheries and Food 2001 – 2006*," also known as "*Alianza Contigo*", that contains the "*Program of Aquaculture and Fisheries*".

45. The Program has subsidies for fishers and aquaculture producers and contributes economic resources for training, construction and market infrastructure, as well as the formulation and execution of productive projects to promote the rational use of fishing resources. It is aimed at rural and industrial producers, although the most excluded communities have priority. Consequently, the amount of subsidy diminishes as economic capacity increases.

46. The exempted items for benefits are land, fishing gear, motors, boats, vehicles, seed and concentrated food. According to reports from CONAPESCA, between 2003 and 2005, 569 support applications for productive projects in rural communities and commercial producers from 26 states, were approved. The total value of these reached USD 59.2 million. The objectives of the Program are:

- To execute and to consolidate the "*Program of Fisheries and Aquaculture Management*". The participation of the productive and academic sectors as well as the three government levels (federal, state and municipal) is promoted in the definition of outlines for sustainable use and evaluation of development opportunities for fisheries and aquaculture.
- At a federal level, the creation or strengthening of offices in the state and municipal governments who participate in the administration and promotion of fishing and aquaculture. This is to more effectively meet the needs of the population, and also to look for their support to carry out federal government duties.
- To carry out projects aimed at increasing scientific and technical knowledge to define management measures, such as evaluation of fishing resources, the definition of management plans for fisheries and aquaculture projects, the identification of appropriate areas to develop aquaculture, the rehabilitation of coastal lagoon systems and the creation of national advisory committees.
- To promote the development from the sector as follows: to strengthen the development of aquaculture and the integrated use of inland water bodies, to advance sanitary conditions in aquaculture, to modernize capture methods and the fleet itself to allow advanced marine fishing, to evaluate the abundance of available species for marine sport fishing, to promote community

organization and the training of producers, to modernize infrastructure linked to fishing and aquaculture, to make more competitive and modern the industrial sector, as well as to develop productive chains of different fisheries and aquaculture sub-sectors.

- To support the commercialization and financial systems through: the improvement of storing centers and channels of distribution of fishing and aquaculture products, campaigns to promote consumption of fishing products and creation of appropriate economic and financial instruments for the sector.
- To carry out the “*National Program of Rural Aquaculture – PRONAR*”, to reduce poverty through the development of the rural economy, to solve problems of food insecurity and to offer new work sources to coastal fishers. The two main strategies are: to promote cultivation projects in inland and marine waters, and to consolidate outlines of financing, insurance and sanitary conditions.
- To adjust the legal framework of fisheries and aquaculture to respond appropriately to the needs and evolution of the sector, as well as consolidating Mexico's presence in the instances and events where fisheries matters are discussed at an international level.

47. Two of the sub-programs that have increased investments in the sector during the last five years are:

- ***PRONAR***: This supports commercial aquaculture projects for family and community units in 22 of the 32 states in the country, through: technical assistance, training, elaboration of studies and consultancies, construction and rehabilitation of physical constructions, endowment of equipment, inputs and creation of demonstrative modules. Their beneficiaries are inhabitants of towns more socially excluded, small proprietors of scarce resources, women’s groups, and indigenous and coastal fishers that have not had other Federal Government subsidies. The program began in 2002 and, until December 2005, had assisted 850 projects for 9 000 producers of tilapia, catfish, trout, carp, frogs, shrimp and marine fish at a cost of USD 5.7 million (CONAPESCA 2006).
- ***Fund of Fishing Conversion for the Gulf of Mexico – FIRA-FOPESCA***: This began to operate on December 2004. The objective is to improve the production conditions of fishing and aquaculture in the states of Yucatan, Veracruz, Tabasco, Campeche, Quintana Roo and Tamaulipas, through financing for the endowment of equipment and infrastructure for production projects, incorporation of new technologies developed by research institutes, improvement of commercialization systems, elaboration of feasibility studies, and technical and enterprise development training. Although it is not exclusively for rural producers, highly vulnerable populations can receive maximum financing of 80% of the value of the project, while other producers receive a maximum of 50% of the value of the project. Projects of USD 12.7 million had been approved until December 2005 (CONAPESCA 2006).

48. According to an interview of CONAPESCA's Director in the magazine, “*Panorama acuicola magazine*” on December 2004, granting these subsidies has not been a problem but it has been difficult to gather information on how beneficiaries use them, because the objective of “*Alianza Contigo*” is to support self-sustainable projects instead of being just a temporary help.

49. Success depends on the answer of producers and the cooperation of state governments; the most efficient have been Sonora, Sinaloa, Baja California, South Baja California, Tabasco, Yucatan and Campeche. In other states, the problems have been low levels of compromise and a lack of interest by public employees to diffuse and access the Program. Some representatives of fisher groups have weak leadership and potential beneficiaries are not committed to the program. Plus, some people may incorrectly

use the Program as political publicity to promote candidates or political parties, which distorts their true meaning, affects the image of the State and of the programs.

## **6. Legal and institutional framework for rural development in Mexico**

### ***6.1. Legal framework.***

50. The Federal Law of Sustainable Rural Development was proclaimed on November 13, 2001. Article 3 defines Sustainable Rural Development as, "*the integral improvement of population's social well-being and of the economic activities in territories considered outside the urban nuclei, according to applicable dispositions, assuring the permanent conservation of natural resources, biodiversity and environmental services in this territory*".

51. As Article 4 of the same law states, to reach sustainable rural development, the State - with the cooperation of diverse organized agents - will undertake a process of social and economic transformation that recognizes the vulnerability of the sector and drives the improvement of the conditions of the population through the development of productive activities and of social development, offering the sustainable use of natural resources, the diversification and competitiveness of the rural economy and the generation of alternatives of income and employment for the population.

52. This objective is achieved through the execution of policies and specific programs that should be included in the National Plans of Development, which also change the disparities inherent in regional development and give priority to regions of major poverty. Although the objective is to diversify the economy, it also highlights the relevance of agricultural production (that includes agriculture, livestock, forestry, aquaculture and fishing) as the best way to offer food security and to strengthen the sovereignty of the country.

53. The law also considers the capitalization of the sector through basic and productive infrastructure, services to production, direct support to producers, and promotion of alliances among the urban and rural environments to facilitate access by the peasantry to support services for their production activities and social well-being. All these actions can be executed directly by the Federal Government or in agreement with the state and municipal governments.

54. The most important aspects that include rural development, besides those dealing with production, are housing, health, food, family planning, school and production education, alleviation of poverty and marginalization, the environment, gender equity, protection for the family and vulnerable populations (children, old men, the terminally ill and disabled), special programs for women and young people, civic culture, the insertion of indigenous communities in rural development, land-holding, social security, attention to disasters and social peace.

55. Planning sustainable rural development has a democratic character; it means that federal and municipal governments participate jointly with producer organizations and other agents that represent rural society. However, it is the responsibility of the State to ensure the necessary financing resources exist in their budget to go ahead with programs and concerted projects, as well as to provide during emergencies or contingencies that require the execution of special programs. Although planning of rural development is a federal duty, the law promotes decentralization so that each state and municipality defines their priorities according to the needs and peculiar characteristics of each State.

56. The law creates the, "*Mexican Council for Sustainable Rural Development*" as an advisory organisation to the National Government, made up of representatives of the public, private and academic sector, as well as rural society. It also constitutes the "*Inter-secretariat Commission*", which coordinates the administration of government institutions through a complex network composed of nine systems and

six services in charge of covering all aspects linked to rural development, integrated with diverse public and private sector organizations, in order to take advantage of their operative capacity. The law also describes the objectives, functions and members of each one of the Systems and Services, denominated as follows:

- National system of research and technological transfer for sustainable rural development.
- National system of training and integral rural technical assistance.
- National system of development for rural social enterprises.
- National system for the fight against desertification and degradation of natural resources.
- National system of rural social well-being.
- National system of information for sustainable rural development.
- National system of sanitary, innocuous agricultural and alimentary quality.
- National system of rural financing.
- National system of support to programs inherent to promotion policies for sustainable rural development.
- National service of normalization and inspection of agricultural products and of storage.
- National service of sanitary, innocuous, agricultural and alimentary quality.
- National service of inspection and certification of seeds.
- National service of agricultural registration.
- National service of arbitration of the rural sector, and
- National service of training and integrated rural technical assistance.

## **6.2. Institutional framework.**

57. Inside SAGARPA's structure exists the *Sub secretariat of Rural Development*, whose objective is to improve the well being of the rural population through the support of production processes and the strengthening of producer organisations.

58. At a higher level, the *Mexican Council for Sustainable Rural Development*, the *Inter-secretariat Commission* exists. In addition to the 15 Systems mentioned before, 12 Programs have been derived, 6 Services and 4 Funds, in which 20 organisations participate. The Federal Government designed the "*Special Attendee Program for Sustainable Rural Development 2002 - 2006*" to harmonize administration of all the entities that work on rural areas. This includes three financing entities for specific sub-sectors, two universities, four institutions in charge of agricultural sanitation, certification of seeds, statistics and research for specific sub-sectors, two producer companies of veterinary medications and seeds, two committees for coffee and sugar sub-sectors and a mixed economy company that designs and executes education programs.

59. As a result of the above, we can conclude that the institutional framework in the rural sector is highly diversified and complex but there are also specific responsibilities for the development of policies. This means that Mexico is concerned about the development of their country and to satisfy the peasantry needs through the design of diverse support alternatives.

## **7. Policies for rural development**

60. Around 25% of the Mexican population inhabits almost 190 000 towns in rural areas, with a density average of 2 500 people per town. The rural sector is highly diversified, generally with basic levels of productivity, revenues, well-being and access to services of the State. Many contrasts exist regarding their economic activities and possibilities of achieving integrated development. It implies that the

execution of policies in rural development maybe does not have similar challenges, activities and results across the whole country.

61. López and Graillet (2002) indicate that 80% of agricultural properties have less than 5 Ha. Of these, only 7% have modern technology (industrial producers), 41% are transition agriculturists and 52% are traditional agriculturists. This is explained by the resistance to technological change that many peasants have as they have scarce formal education and little practical training as well as incipient community organization. This maintains cycles of low yields: inefficient marketing – low revenues – food insecurity – poverty – socio-economic and political marginality.

62. Historically, paternalistic and discontinuous government policies have existed with a high number of political actors who distort the true objective of those who should receive assistance. Most of these policies seek to push technological development but do not solve structural and basic socio-economic issues such as illiteracy and low motivation. This reduces the possibility that peasants understand what the technical assistant wishes to teach or will commit to a new project. Consequently, many cooperative projects fail a short time after they have finished, despite considerable investments carried out by the Government or international cooperation organisms.

63. In addition to fisheries and aquaculture policies, rural policies are included in the "*Alianza Contigo*". Their more important aspects are:

- To advance from a strictly productive focus (agriculture, livestock, fisheries, aquaculture) to integrated rural development. This means elaborating non-food products that satisfy the market's requirements, to produce healthy foods for consumers and profits for producers, to achieve human development and of rural communities, as well as to conserve and to improve the environment.
- The federal government requires coordinated activities between state and municipal governments to ensure participation by the production sector in taking decisions and also to apply policy instruments that allow a more appropriate response to the necessities of each region, considering the high heterogeneity of the Mexican country.
- For marginal rural areas and indigenous communities, it seeks to create new employment opportunities and to encourage the creation of small and medium enterprises not based exclusively on agricultural activities; this means exploring other alternatives such as eco-tourism, trade and handicrafts, among others.
- To promote the appropriate access by marginal and indigenous communities to services such as education, health, housing, technical assistance, culture, recreation and participation in political decisions related to rural development.
- To support the different productive chains in each one of their phases: production, processing, quality control, transport, commercialization and financing, in order to improve their competitive advantage at a national and international level.
- To adjust legislation related to marketing and to reduce the costs of a rural economy that has traditionally been higher than the urban economy, due to the non-existence of stable markets, high costs of transport and the precariousness of property rights.

- To evaluate the possibility of diversifying or changing the productive vocation of some rural areas due to their land, water and climatic characteristics. Also, historically, marketing has been difficult due to disasters as a result of the periodic occurrence of climatologic changes.
- To include supports aimed at implementing good agricultural and fishing practices, as well as to reduce the polluting effects that these projects can generate.

64. The Program "*Desarrollo Rural de la Alianza Contigo*" has three sub-programs and two of them benefit fishing and aquaculture communities. In that sense, PROFEMOR and PRODESA are complementary to the "*Program of Aquaculture and Fisheries*," as they are not aimed at financing productive projects but supporting enterprise development and strengthening the skills of communities. On the other hand, the PAPIR sub-program is for investments, and their beneficiaries are basically farmers and cattlemen:

- ***Sub-program to strengthen enterprises and rural organizations - PROFEMOR:*** Their general objective is to help rural producer organizations to formally enter the economy through the creation and consolidation of rural enterprises, as well as of the "*Councils of Sustainable Rural Development*", which are organizations in charge of elaborating plans for rural development in each municipality and of the Rural Financial Institutions (IFR). For this, the Subprogram also dedicates economic resources that allow them to cover operative costs and to offer loans to rural organizations that require them and fulfill the requirements established by IFR, that are adapted to each local reality.
- ***Sub-program of development of capacities in rural areas - PRODESCA:*** Was created to subsidize training services, technical assistance and consultancy advice provided by certified professionals. These services are aimed at peasants and organizations interested in the creation and strengthening of rural enterprises, production and micro-financing projects, and to identify new opportunities for production or commercial activities.
- ***Sub-program of support to projects of rural investment - PAPIR:*** It assists the investment in capital goods (except purchase of land) by the rural population via the presentation of production projects aimed at generating employment, services and modernizing production and commercialization systems.

65. According to reports from SAGARPA (2005) published on their website, the *Program of Rural Development* finances activities that are not covered in the *Program of Aquaculture and Fisheries*. In 2005, it supported two projects and in 2004 it financed 16 at a total value of USD 2.9 million, representing 10% of the execution of the *Program of Rural Development* over the last two years. The applications were made to build tilapia, catfish, marine shrimp and oyster cultivation infrastructure, as well as process fish products, store ornamental fish, capital and motors for the fishing fleet in Sonora, Tabasco, Morelos, Guerrero, Sinaloa, Durango, Puebla, Veracruz, San Luis Potosí and Tamaulipas States.

66. In addition to the programs for the agriculture and fisheries sector already referred to, Mexico has executed other social programs with important budgets that impact on the development of rural communities. According to a government report in 2005 by the President of the Republic, some prominent achievements are:

- The *Program of Rural Housing* awarded 33 269 subsidies at a cost of USD 45.4 million; 72% of these subsidies were assigned to the states of Chiapas, Guanajuato, Guerrero, Mexico, Michoacán, Oaxaca, Puebla and Veracruz. Four of these have high indexes of poverty, as was mentioned in number 2 of this document.



- The *National System of Social Protection in Health* is not a financial insurance for people covered by the social security system. In 2005, it had USD 781 500 (87% more than in 2004). for national cover. For December of that year it hoped to cover more than 3.6 million families.
- The *Program of Support to Training* covers small producers who want to improve their labor abilities. In 2005, 114 300 people benefited at a cost of USD 4.6 million.

## 8. Issues and challenges for policy makers

### 8.1. Focus of fisheries and aquaculture policies.

67. Policies for the fisheries and aquaculture sectors are generally formulated from biological and fishing concepts with the purpose of responding to management and technological development requirements. However, they disregard the social and economic aspects linked to communities that are normally excluded. Several examples can be cited, but this is more evident on the south coast of the country.

68. The orientation of fisheries and aquaculture policies has been changing. 60 years ago fishing was promoted, but during the last 15 years, regulators have been facing a decrease in catches around the coast and even inland waters. Measures aimed at regulating and organize the activity include: (a) to protect the most important fisheries which are reaching their maximum yield or are close to over-exploitation; (b) to stop the entry of new vessels to critical fisheries in order to control fishing effort; (c) to organize fisher access (artisanal, industrial and sport) to areas and/or fishing resources, among others.

69. On the other hand, aquaculture policies are oriented to the development of: (a) increasing the supply of fish for human consumption; b) optimizing the use of bodies of water and of non-capable land for agriculture; c) to diversify and to supplement the production of agricultural farms.

70. In some ways, aquaculture policies have more concordance with rural development because both of them basically refer to the rural population, who has traditionally worked the land (in fact, most aquaculture producers were or are also farmers) who know how to cultivate and wait patiently for crops. Due to their geographical location, they may also have more chance of enjoying the benefits of the State related to physical infrastructure (such as highways, aqueduct services, sewer systems, electric energy, telephones, etc.) and social well-being services (schools, hospitals, programs of governmental help, etc).

71. On the other hand, fishers are not rooted to the land and many of them live in remote towns or even in areas with minimum industrial or tourist development. Due to the reduction of harvests and the effects of natural phenomena such as hurricanes and storms, they are searching increasingly for alternatives such as eco-tourism, trade, ranching, and small-scale agriculture. Historically, fishers have been one of the most vulnerable groups and least assisted by governments. However, the policies in force over the last five years have opened new development opportunities for them.

72. The *"Program of Fisheries and Aquaculture Management"* promotes the sustainable use of resources and implies due environmental consideration. Mexico is perhaps the Latin American country that has granted the most importance to the execution of global agreements and world conventions on responsible fishing over the last decade, reflected in the NOM's produced since 1993. Also, SAGARPA and SEMARNAT are, respectively, the environment and fisheries sector authorities. They coordinate, formulate and execute management measures and define the rules of sustainable use in the Fishing National Chart – CNP. This means that there is coherence between both policies.

73. In this context, it would be convenient to undertake a new version of the CNP as their only formal publication was in 2000, although some upgrades have been made based on INP's reports. It is possible that the dynamics of some resources have changed or perhaps new development needs for the sector exist, particularly in advanced marine fishing. Although protection of resources is fundamental, it is also essential to ensure that the preventive principle of the CNP does not restrict fishing development. This is because it could predominantly affect artisanal communities, which require diversification in order to improve their profitability and to reduce the pressure on coastal resources.

74. Regarding user participation in the management system, it is normal that representatives of the industrial and artisanal sector participate in the process in an advisory capacity that partially shares the responsibility of management, but these are not formally established co-handling outlines. It means that participatory processes usually are not an official and necessary part of the management of fisheries resources and consequently, these procedures are not routine.

75. Regarding transparency of management processes, interested actors (unions and associations) have access to meetings where proposals and management measures are discussed. However, their opinions are not imperative in making decisions. The State discloses the proposals and decisions in printed form (notes, pamphlets, folding), mail (postcard and electronic), and on the CONAPESCA website. When they become law, they are also published in the country's official paper (*Diario Oficial de la Federación*). Nevertheless, the government's good intention, many artisanal fishers really cannot participate because the diffusion is sophisticated for them; maybe to appeal to radio messages and simple pamphlets with drawings can be more illustrative for illiterate people.

## ***8.2. Linkage with policies of rural development.***

76. Another important challenge is to harmonize the objectives of management and diversification of fisheries with those of rural development in order to formulate an integrated proposal. This would be included in the National Development Plans with specific and realistic programs and projects that have estimated budgets for fisheries, cultivation and/or concrete regions. These could be developed during each government's period, or even better, become part of State policies instead of Government policies. State policies respond to medium and long-term development needs and structural issues that traverse individual government tenures, while governmental policies are formulated by each President of the Republic and respond to the objectives outlined in the development plans proposed for their period of government.

77. It is normal that the Presidents of the Republic, chosen every six years in Mexico, formulate their own development plan. However the risk is that some important projects begun by previous governments may be interrupted and thus the opportunity to obtain results aimed at solving structural problems in the community and rural towns is lost. Therefore, another challenge is to design instruments to protect those policies, programs and projects that are strategically important, from the usual effects of government changes. A possible alternative could be that authorities work during pre-electoral periods with the different presidential candidates and their planning teams, in order to try to insert strategic State policies into potential future government proposals, independent of the political affiliation of each one of them.

78. In the case of the fishing sector, aquaculture and rural development, this task can be undertaken by SAGARPA as it has their global vision of management and development needs at national and state level. However to achieve a successful result, it also requires picking up information from other topics that directly affect the rural population, such as health, education, gender equity, housing, public services and physical infrastructure. This would allow SAGARPA to contribute to protecting policies that require continuity in the medium and long term, and simultaneously better organize their priorities and internal work methodologies.

79. Because fishing policies and rural policies are part of the same *"Sectoral Program of Agriculture, Livestock, Rural Development, Fisheries and Food 2001 - 2006"*, coherence and similar objectives exist between them. Maybe the main difference resides in the type of beneficiaries they assist, but both policies, economically and through training, support the rural population, and particularly the most vulnerable. The government of President Vicente Fox has dedicated an important quantity of economic resources and it has promoted the participation of the state and municipal governments. But the main problem is perhaps primarily due to the attention that has historically been offered to farmers and cattlemen. Fishers and aquaculture producers have been the last to access these programs.

80. To this is added the fact that some people wants to use the government's programs in an incorrect way for political objectives. To attack problems of corruption is one of the biggest challenges whose solutions escape the reach of the present document. This matter is so delicate that SAGARPA's website, where it publishes rural programs, has the following textual legend: *"This program is of public character, it is not sponsored neither promoted by any political party and its resources come from the taxes paid by contributors. It is forbidden to use this program with political or electoral ends or for reasons other than the established ones. Whoever makes undue use of the resources of this Program, will be denounced and sanctioned according with the applicable law of the competent authority"*.

81. Support programs such as PRONAR and FIRA-FOPESCA that are part of the *"Program of Aquaculture and Fisheries"*, have less than three years of full execution. Therefore, it is still not possible to conclude whether they are contributing to the true development of communities, or if beneficiaries are assuming the investments are non-reimbursable Government subsidies, albeit there are mechanisms designed to verify their effective contribution to projects. To build new relationships and expectations between the Government and peasants, it is necessary to work with the communities in order to promote a new attitude; they must face their responsibilities and abandon the idea that the State must be paternalistic. This task requires the incorporation of programs involving integrated training (technical and enterprise development matters). It would perhaps also be convenient to include banks or other financial entities that could administer funds and implement a control system by partial payments when it has been verified that investments are being executed by the beneficiaries according to the chronogram of activities included in the projects.

82. Social investments carried out by the National Government for the rural population in matters such as health, education and housing during 2005, reached USD 50.8 million. This demonstrates the interest of the State in improving the conditions of less favored populations. There are not enough elements to conclude whether these subsidies are producing a real change, but based on bibliographical revisions carried out for this report, there is no information that shows how the users invested housing subsidies, if they have improved the indexes of public health in rural areas, or if training activities are reflected in better levels of administration in small and medium enterprises.

### ***8.3. How to support strengths and overcome weaknesses in institutional frameworks.***

83. To strengthen institutional frameworks, it is necessary that CONAPESCA and INP improve their capacity through the appropriate quality and quantity of their technological and financial resources, as well as the best qualified human talent to efficiently fulfill their duties. It is also necessary to coordinate these entities with state and municipal governments in order to be able to efficiently implement management instruments established in an opportune and appropriate way. Among the weaknesses identified that should to be overcome are:

- Inside INP, a renovation program of technical and scientific personnel is necessary. This is because, according to the results of an evaluation carried out jointly by SAGARPA and FAO on 2005, 60% of the professionals in the Institute are close to retirement and, additionally, the

incorporation of economic and social evaluations in research projects are very low. Historically, research in fisheries and aquaculture has focused on biological and technological aspects but not socioeconomic ones, which are increasingly necessary in order to identify the true impact of management measures for users, as well as to have a more realistic vision regarding the socioeconomic well-being possibilities that a fishery or an aquaculture project can offer communities. However, it is also necessary to impart training to professionals in economic and social disciplines, to be able to know and understand the particular characteristics and behavior of fisheries and aquaculture, and in this way, to build successful interdisciplinary work teams.

- As INP has been operating for more than 40 years, its experience has concentrated more on fishing projects than aquaculture ones, so it is necessary also to reinforce technical capacity as aquaculture is an activity of high impact in programs of rural development.
- Due to institutional restructurings, it is possible that CONAPESCA has undertaken smaller actions compared to its predecessors because it does not have an independent budget, the quantity of personnel is insufficient to fulfill their management and development duties, and its officials are less well remunerated than in other dependences of SAGARPA. Experience of Mexico and other Latin-American countries such as Colombia, Peru and Panama, has demonstrated that because of macroeconomic or public administration policies, governments decide to reduce the status of the fisheries institutional framework alongside reductions in human and financial resources. This immediately affects their administrative capacity. Paradoxically, this happens when there are more and more demanding commitments on the State regarding the implementation of management measures, the generation of clean technologies in fishing and aquaculture, and of working with the most vulnerable communities in order to reduce their poverty indexes and food insecurity, more so in a country like Mexico that is highly complex and has an extensive territorial and marine sovereignty.
- A solution to the current weaknesses of CONAPESCA could be to establish strong alliances with state offices in charge of applying federal policies, as well as NGO's or international cooperation organizations that are technically and logistically able to execute development projects with communities. Nevertheless, to achieve a real synergy among public institutions, it will be necessary to work with previous official employees at the federal and state level in order to create an appropriate labor climate between them. This is because, sometimes, the execution of programs and projects can be affected or delayed, due to differences in work objectives or when people have opposing political affiliations.

84. The capacity of coordination by SAGARPA could also be a risk if the same attention to fishing and aquaculture communities is not given compared to traditional attention offered to farmers and cattlemen. In addition, to create the synergy between these three sectors and the fisheries and aquaculture sector requires time, training, and work as an integrated team, will and comprehension at the management and technical levels. This is because the specificity of the sector in research and management matters can not always be coordinated with agriculture and livestock, though this could be possible for promotion activities with rural communities or inland areas, more than with fishers established in coastal localities.

85. As for an institutional point of view, fishers often have the image that government employees wish to impose new norms instead of helping them to solve their problems. This is more common in communities more distant from cities and important towns, so another challenge of policies makers is to change the vision that fishers have of them and thus to win their trust, commitment and intention in order to execute fishing in a responsible way. Such collaboration facilitates the execution of management measures.

#### ***8.4. Participation of the private and academic sectors.***

86. To achieve the development of fisheries and aquaculture linked to rural development is not an exclusive responsibility of the State. It is also necessary for the private sector to show commitment to supporting the provision of inputs, production, commercialization and financing for rural producers. It is not advisable to create a paternal model of the State or of cooperation organisms for producers. Instead, theoretical and practical training should be the priority, perhaps complemented with minor donations for equipment and inputs. The main idea should be to help communities to create and strengthen their abilities, which will allow them to become small or medium enterprises. Indeed, the creation of new self-sustainable projects is a way of contributing to rural development because new alternatives of direct and indirect employment, food security and wealth are generated.

87. This means that the capacity of communities to go ahead with profitable and sustainable projects that represent a challenge for policy makers must be ensured, as often the good intention of donators (even of the State or international cooperation) who seek to facilitate the work and to reduce poverty through subsidies or donations of physical infrastructure, equipment, inputs and capital, do not always produce good results. This is because it is part of human nature to appreciate more things acquired by our own effort than received as a gift. People need to be empowered by building capacity in different areas and acquiring commitments. These principles should be part of policies in fishing, aquaculture and rural development, in order to replace medium or long term credits with low interest rates instead of subsidies.

88. In conclusion, assistance should be focused on the following areas and requires alliances between competent public and private organisms:

- To carry out rural diagnoses about productive vocations in each region; their socio-economic context, the endowment and lack of physical infrastructure and basic support services for production, processing and commercialization of products. This information is constituted in elements to formulate development programs that respond to the real needs and expectations of the population of each region.
- To involve a Social Work or Anthropology specialist who works full time with each community for at least six months in order to detect their strengths and weaknesses, to help to build a good labor climate in the group, to generate respect for the importance of independence from governmental support, to establish roles for women, particularly in marine-coastal communities where family structures are more traditional and the status and productive capacity of men are appreciated, as well as other aspects that the professional considers important for successful groups.
- Theoretical and practical training in topics such as enterprise development, marketing, market research for fishing and aquaculture traditional and potential products; business plan formulation adjusted to the needs and possibilities of each producer or rural enterprise, improvement of production systems and process of products with added value, quality control and good manufacturing practices, financing sources and duties that enterprises should fulfill in Mexico (including payment of taxes, application of permits and identification of public and private entities which they will need to be in touch with), amongst others.
- To recognize the abilities and preferences of community members in order to design programs that can lead to improve their skills and learning new ones if necessary, so that they can move from primary production to another level that allows them to be involved in management, production, marketing, administration and finances. This also implies to support and advice given

to the community during the initial phase of new micro-enterprises or formal businesses that could be created as a result of integral training.

- Support for the formulation of new projects for communities to be able to request banking credits or participate in governmental support programs or of organisms of international cooperation.

89. Subsidies and donations could affect the desire and commitment of beneficiaries to undertake efforts for their own development. However, the most vulnerable communities need some level of support (preferably in training and such elements) to undertake new activities that allow them to diversify or to improve their productive projects. In the case of fishing and aquaculture, is important that government and NGO's link to rural development to promote activities that do not affect over-exploited resources, or cultivate aquaculture that is technically and economically viable for small producers.

90. As an example in 2001, an integral study was conducted in Colombia for the rural cultivation of three species (tilapia, trout and ray-finned fish). In the case of tilapia it was concluded that: a profitable cultivation should produce at least 9 tons per month of gutted fish, which requires 2 hectares of land for 28 ponds, an area for processing products and a water body of 24 - 30°C with a flow of 70 liters/second. The cycle takes 7 months and results in 400g fish. The project needs two people full time, another four people for crops and ten for processing for six days per month. Total investment in land, construction, equipment, materials and financial costs during the first seven months of the project are USD 82 900. The monthly average profitability during the first three years is 6% and for the following three years it increases to 9% (Beltrán and Villaneda, 2001).

91. The bureaucratic schemes at federal, state and municipal level are not often as efficient as they should be. Thereby, it could be convenient to include competent civil or international organizations with experience of working with rural communities in Mexico, selected according to their experience, professionalism and transparency in administering governmental financial resources. Thus, it could be more efficient to aim cooperation at fishing and aquaculture producers and to guide technical, social and enterprise assistance according to the real requirements of each community.

92. Although the public sector is principally responsible for the formulation and execution of policies on fisheries and aquaculture research, since the 1990s it has been the participation of the academic sector that has been very important and has formed highly qualified personnel. At the moment, there are diverse work groups inside both public and private universities in specific topics such as ecology, fisheries and aquaculture. Nevertheless, the emphasis has been on scientific and technological topics more than on socio-economic ones. It is necessary to generate technologies in fishing and aquaculture validated with an integral perspective in order that the work of promoters with rural producers can be more effective in the development of projects adapted to the reality of small producers that also need to be technically viable, profitable and truly sustainable according to their economic possibilities and marketing capacities.

93. Though there is important infrastructure by research institutes, centers and universities in Mexico, not all of them work in a coordinated way, hence overlapping efforts can exist. Important issues can also be misleading if they do not fall within the priorities of the National Council of Science and Technology (CONACYT) or the goals of each center or university. Consequently, it could be useful to assign duties of research coordination for fisheries and specific cultivations to some entities already existent (assigning them the necessary budget if so) or to international cooperation organizations who can take charge of this task. However, the viability of this alternative depends on the objectives and methodologies of each research institution, as well as the will of integration of the scientific personnel's in different organisms, and of the specific characteristics of each fishery, cultivation or geographical area subject to research.

## 9. Conclusions

94. According to official statistics, the rural population has diminished gradually due to migration to coastal zones, urban areas or to the USA or Canada. Currently 23.5% of Mexicans are classed as rural population with a high level of poverty, particularly in the south Pacific where 50% of the population is rural and poor. This group registers a high level of illiteracy (23%), scarce formal participation in sectors of major wealth (manufacturing, the oil industry, trade and services) but rather on primary production. The rural population has a marked tendency to migrate out of the country looking for better personal opportunities and to contribute to the support of their families with remittances from abroad.

Although the Government has carried out important investments to improve people's lives, it is still necessary to reinforce social work and integral training to generate changes of attitude and development of new skills in people that allow them to overcome poverty through profitable projects. It would be convenient to build new relationships and expectations between the Government and peasants in order to strengthen the concept that Government subsidies are to impel the creation of new projects instead of being considered as a mandatory and long term source of money.

95. Mexico's effort to advance on the development of rural communities is admirable. This is reflected in the policies and programs in force, as well as the important quantity of financial funds and organisms working on specific topics. Although advances have been made, there are still many communities to assist. These include artisanal fishers who continue to be the poorest among rural producers. Although some rural areas have problems of food security and even a lack of water, it is perhaps only natural that historically Mexico has given bigger attention to farmers because there is a bigger productive vocation in land, wider knowledge about its evolution, issues and because there are more people linked to agriculture than fisheries.

However, during the last six years, the country has turned its attention toward fishing and aquaculture that represents a new opportunity for the sector, although care should be taken in not adopting paternalistic schemes as the results could be frustrating due to the possible lack of commitment of the community beneficiaries because they have not been forced to invest their own money, to respond to formal credits or to inform how they are using equipment and construction donated. It is important to have in mind that development is not a consequence of a high quantity of technical and financial assistance but of training to use them rationally, to choose appropriate technologies and to apply them correctly, and finally to be able to be autonomous.

96. "*Alianza Contigo*" has included vital aspects of rural development such as: financing for agriculture production, livestock, fishes and aquaculture; animal and vegetable sanitation, promotion to technological modernization, support to rural women and research and promotion for exports, among others. However, the results have been far from expectations due to government weaknesses, a high intervention of political representatives as well as the fact that some communities prefer to continue with the paternalistic model.

This means that there are serious issues in agricultural development that motivate some populations to emigrate to the cities or to other countries like Canada and the USA, or even to practice fishing; an activity they consider as the last employment alternative to obtain immediate income, despite limited profitability. This situation contributes to an incremental rise in effort in fisheries, over-exploitation and consequently the deepening of fisheries management issues.

97. Not all rural planners know that history, culture, work practices and the problems of fishers are different from farmers, so it is not convenient to outline similar strategies for both types of producers. To this is added the fact that fishers tend to be individualistic rather than trusting cooperative organizations

that reduce their approach capacity and negotiation with other entities. This is particularly problematic as the Government prefers activities with unions more than individual fishers. Furthermore, not all communal leaders are truly vocal regarding the expectations of fishers and aquaculture producers, due to the lack of trust generated by their associations.

98. To simultaneously achieve both objectives of long term sustainable fisheries and fisher well-being, it is necessary to eliminate the open access of small-scale fishers. Although they have smaller technical capacity than the industrial fleet, the major quantity of fishers leads to over-exploitation and low yields per capture unit.

Management measures should not be based exclusively on fishing criteria but also take into account the connection between resources and their ecosystems, the socio-economic circumstances of the communities and even the political effects of measures, as well as the study of alternatives of economic diversification for fishers when measures impede small-scale fishing.

99. Marine and fresh water aquaculture has wide possibilities of growth with traditional species (marine shrimp, tilapia and trout) and other species, thanks to the potential of water bodies and variety of adaptive fishing resources to cultivation. To generate self-sustainable projects it is necessary to identify the really capable such as those with suitable soil properties and the presence of enough clean bodies of water in order to develop aquaculture. It is also important to elaborate productive packages and evaluate them integrally, including technical assistance, enterprise development training and accompaniment of social work, which will allow them to transform their traditional activity into a profitable and organized business. It would be also convenient to change or to combine subsidies for cheap medium and long term loans with the purpose of instigating a culture of credit and savings in the rural population.

100. In the case of artisanal fishers, it would also be convenient to work with a similar methodology to the one described for aquaculture producers in the sense of undertaking a general diagnosis of areas and communities, as well as to teach managerial abilities, offer technical assistance and social work. At a productive level, it is necessary to motivate coastal fishers toward advanced fishing in order to search resources of high commercial value, while simultaneously diminishing pressure on coastal resources. The training should also include the use of new capture technologies and recommendations for fishing. However, this usually generates resistance among coastal fishers that have little experience in advanced fishing.

101. Most fishers and aquaculture producers require training on processing of traditional and high value (fillet, gutted and canned food), quality control, marketing, client's attention and sales strategies, publicity, mathematics, basic accounting and formulation of business plans, among others. Recent experiences of three training projects by the FAO and INFOPECA in Mexico, Honduras and Colombia with fishing communities, demonstrated that the mentioned topics are not widely disseminated. However, they generate high interest because they are practical, relatively easy to learn, require little investment of money, can be applied immediately and are reflected quickly in better business results.

102. A frequent weakness of fishing communities is the scarce division of labor and concentration on fishing tasks (or cultivation) and sales, while other administrative, commercial and production tasks are not assisted appropriately due to a lack of training or awareness. Also, women's roles have still not been claimed appropriately in all rural Mexican areas because prevailing traditionalist schemes privilege the status and economic capacity of men. This attitude can diminish opportunities because women are highly productive in processing, commercialization and administration. The fact that women can have the opportunity to work reduces the risk of poverty in the case where the man lacks employment temporarily or definitively.



It is also important to consider that the occurrence of non predictable events including natural phenomena, change the dynamics of fishing stocks or the presence of illnesses in cultivations like shrimp, which can force producers to change economic activity. For that reason, it is important that men and women have other alternatives such as agriculture, eco-tourism, handicrafts and elaboration of other non grocery products, which are compatible with the rural development policy content.

103. The relationship between fishing authorities and users is important for the success or failure of government policies; some communities perceive fishing authorities as restrictive more than representatives sensitive to their needs. This means that CONAPESCA, INP and State fishing offices should offer a balance between their role as management and research authority and their role as development promoters and to project an appropriate image in order that communities do not understand this role as a contradiction. To achieve it, the creation of strategic alliances with NGO's and local authorities that participate in the development of promotion and training projects or activities would be useful.

As CONAPESCA and INP do not have enough human, technological and financial resources, it is necessary to evaluate their real needs in this sense, as the quality of service is not dependent on size. It would be convenient to advance training programs and the development of public employee ability to improve work methodology, external coordination with NGOs and other public entities, as well as to advance integration with other dependences of SAGARPA, upgrade technical knowledge and learn about realities in other areas of the country in order to join efforts and to learn from other experiences. This can be a big necessity as a consequence of diverse institutional restructurings is that personnel have received insufficient consideration. An important proportion of professionals with training and experience are already out of these entities or are nearing retirement.

## BIBLIOGRAPHY

Commission of Fishing, Camera of Deputies (2001) “Informe sobre la consulta nacional del sector pesquero. Enero – abril de 2001”. Mexico, D.F.

Caso, M; Pisanty I; Ezcurra E. (2004), “Diagnóstico ambiental del Golfo de México”. Mexico, D.F. August.

CONAPESCA (2001) “Programa de Acuicultura y Pesca”. Mexico, D.F.

Congreso de los Estados Unidos Mexicanos (1999) “Reglamento de la ley de pesca”. Mexico, D.F. September 28.

\_\_\_\_\_ (2001) “Ley de Pesca”. Mexico, D.F. January 8.

\_\_\_\_\_ (2001) “Decreto por el cual se crea la Comisión Nacional de Acuicultura y Pesca”. Mexico, D.F. May 31.

\_\_\_\_\_ (2001) “Ley de desarrollo rural sustentable”. Mexico, D.F. November 13.

DeWalt, B. (2000) “Social and environmental aspects of shrimp aquaculture in coastal Mexico”. In: Conference Mangrove 2000: Sustainable use of estuaries and mangroves: challenges and prospects. Recife, Brazil. May.

FAO (1993) “Manejo y aprovechamiento acuícola de lagunas costeras en América Latina y el Caribe – Proyecto Aquila II – El caso de México” By: de la lanza, Guadalupe. Rome.

\_\_\_\_\_ (2003) “México. Resumen informativo sobre la pesca por países”. Rome., December.

\_\_\_\_\_ (2003) “Information on fisheries management in the United Mexican States”. Rome, December.

\_\_\_\_\_ (2004) “Estado mundial de la pesca y la acuicultura 2004”. ISSN 1020-5500, Rome.

\_\_\_\_\_ (2004) “Estado de la ordenación de las pesquerías marinas de captura en el Pacífico Centro-Oriental (México, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica y Panamá)”<sub>2</sub> by Beltrán, C., Bogota.

\_\_\_\_\_ (2006) Proyecto FAO/LDED-INFOPECA: Procesamiento y mercadeo de productos pesqueros para la comunidad pesquera de Tamiahua, Veracruz – México. “Informe de consultoría en desarrollo empresarial” by Beltrán, C., Bogotá, March.

\_\_\_\_\_ Fisheries statistics. Web site FAO [www.fao.org](http://www.fao.org) .

- FAO, SAGARPA. UTF/MEX/053/MEX Project (2005) “Informe de la evaluación para el fortalecimiento del Instituto Nacional de Pesca de México”, Rome, September.
- Fitzsimmons, K. (2000) “Tilapia aquaculture in Mexico”. University of Arizona. Tucson, Arizona, US.
- Froese R. and D. Pauly, (2006) Fishbase Website.
- IIESCA (2002). “El desarrollo rural en México. Una breve revisión descriptiva de los modelos aplicados”. By: López, B. and E. Graillet, México.
- INFOPECA INTERNACIONAL Magazine (2001). “La institucionalidad pesquera en América Latina y el Caribe”. by: Beltrán, C. Montevideo, Uruguay, April.
- Instituto Nacional de Estadística, Geografía e Informática. Statistic information. INEGI Website. México <http://www.inegi.gob.mx/inegi> .
- Instituto Nacional de Pesca y Acuicultura (2001) “Fundamentos de acuicultura continental. Capítulo XX – Parámetros técnicos y económicos para un proyecto piscícola rentable” By: Beltrán, C.; A. Villaneda *et.al.* ISBN 9589356060. Colombia, December.
- López, B. and E. Graillet, (2002) “El desarrollo rural en México. Una breve revisión descriptiva de los modelos aplicados”. Universidad Veracruzana. México.
- Panorama Acuícola Magazine (2004), “Entrevista con el Comisionado de CONAPESCA, Ramón Corral Ávila”, December.
- Presidence of the Republic of México (2005), “Quinto informe de gobierno del presidente Vicente Fox Quesada”, Mexico, September.
- SAGARPA. (2000) “Acuerdo por el que se incorporan las Subdelegaciones de Pesca a la estructura orgánica y administrativa de las delegaciones estatales de la SAGARPA”. Mexico, D.F. December 28.
- \_\_\_\_\_ (2001) “Programa sectorial de agricultura, ganadería, desarrollo rural, pesca y alimentación 2001 – 2006”. Mexico, D.F.
- \_\_\_\_\_ (2001) “Reglamento interior de la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación”. Mexico, D.F. July 10.
- \_\_\_\_\_ (2003) “Reglas de operación de la Alianza para el Campo para la reconversión productiva; Integración de cadenas agroalimentarias y de pesca; Atención a factores críticos y atención a grupos y regiones prioritarios (Alianza Contigo 2003)”, México D.F. July 25.
- Salas, S. and D. Gaertner, (2004) “*The behavioral dynamics of fishers: management implications*”. In: *Fish and Fisheries*, Blackwell Publishing, Ltd.
- WORLD BANK (2004), “La pobreza en México, una evaluación de las condiciones, las tendencias y las estrategias del gobierno”. Washington, D.C. June.