NAFTA, ENVIRONMENT & INSTITUTIONS

A CRITICAL ANALYSIS OF THE NATIONAL & MULTILATERAL ENVIRONMENTAL INSTITUTIONS IN MEXICO, IN LIGHT OF TRADE LIBERALIZATION IN THE AGRICULTURAL SECTOR

by

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ABSTRACT

This dissertation argues that environmental damage in the agricultural sector in Mexico has been exacerbated by the weak environmental institutional framework which complemented The North American Free Trade Agreement (NAFTA). This research first characterizes the negative environmental impacts of agricultural liberalization in Northern and Southern Mexico using Scale, Technique and Composition effect economic analysis. Second, the analysis explores how weaknesses in the national and multilateral environmental institutional framework are partially responsible for these negative environmental impacts. A lack of adequate objectives, structure and funding in relevant institutions has limited their ability to deal with the increased environmental stresses brought about by NAFTA's agricultural liberalization. Furthermore, lack of access to rural credit and a scarcity of funding for rural development plans has generated socio-economic difficulties that exacerbate environmental damage caused by the Southern peasantry. Key recommendations to improve the national and multilateral institutional framework, as well as access to adequate financing schemes are proposed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

BANRURAL	Bank of Agricultural Development (Mexico)
BECA	U.S.-Mexico Border Environmental Cooperation Agreement
BECC	Border Environmental Cooperation Commission
CEC	North American Commission for Environmental Cooperation
CNA	National Water Commission (Mexico)
CONASUPO	Price Support Mechanism (Mexico)
DEFRA	Department of Environment, Food & Rural Affairs (UK)
DG	Directorate General
EPA	Environment Protection Agency (US)
EU	European Union
FAO	Food and Agriculture Organization
FTAA	Free Trade Area of the Americas
GAC	Government Advisory Committee
GATT	General Agreement on Trade and Tariffs
GDP	Gross Domestic Product
IMF	International Monetary Fund
INE	National Institute of Ecology (Mexico)
JPAC	Joint Public Advisory Committee
NAAEC	North American Agreement on Environmental Cooperation
NAC	National Advisory Committee
NADBank	North American Development Bank
NAFTA	North American Free Trade Agreement
OECD	Organization for Economic Co-operation and Development
PROCAMPO	Income Support Mechanism (Mexico)
PROFEPA	Office of the Attorney General for Environmental Protection (Mexico)
SAGARPA	Ministry of Agriculture, Ranching, Rural Development, Fisheries and Feeding (Mexico)
SAN	Sustainable Agriculture Network (US)
SARE	Sustainable Agriculture Research and Education Program (US)
SEMARNAT	Secretariat of the Environment & Natural Resources (Mexico)
UK	United Kingdom
UNEP	United Nations Environment Program
US	United States
USDA	United States Department of Agriculture
WTO	World Trade Organization

Chapter 1

INTRODUCTION

1.1 Introduction

International trade between developed and underdeveloped countries is becoming increasingly important worldwide, currently representing US$6 trillion yearly, and expanding at almost twice the pace of total global economic activity for the past 15 years (UNEP and IISD, 1999). Governments around the world, especially in developing countries, are rapidly integrating to the global market in the hope of fostering sustained economic growth and welfare. Neoclassic economic theory, on which trade liberalization treaties are usually based, highlights the positive effects of trade liberalization upon economic growth. However, much modern economic theory insists that without appropriate policies, regulations and institutions, trade liberalization can exacerbate economic and social inequalities, especially in developing countries (Rodrik, 2001; Oxfam, 2002).

A similar debate is taking place in the environmental sphere. Free trade advocates assert that trade liberalization promotes environmental protection directly, through the efficient allocation of resources, and indirectly, by increasing incomes resulting in greater investment in environmental projects (Tietenberg, 2000). Opponents argue that trade liberalization promotes large Scale production which degrades environmental and natural resources. Moreover, it is argued, the wealth created by trade does not necessarily result in environmental improvements (Oxfam, 2001; 2002).

A synthesis of these two positions might appear difficult. Nevertheless, it has been argued extensively that trade liberalization brings positive economic, social and environmental effects, *provided that* it is based on an adequate set of national, bilateral and international policies and institutions. Prima facie evidence for this

assertion is not lacking. In recent decades, developing countries that have rapidly opened their economies without an adequate institutional framework, particularly those in Latin-America and the Caribbean, (WorldBank, 1998) have not reaped the expected economic, social and environmental benefits. Of course, the relationship between an inadequate institutional framework and an absence of benefits from international trade does not imply any causal link, but it certainly suggests further investigation is clearly warranted.

This research analyses the connection between liberalization and institutional structure, using Mexico as a case study. Trade barriers in Mexico fell in the mid 1980s when it became a member of the General Agreement of Trade and Tariff (GATT). Rapid liberalization continued in the 1990s with the signature of several trade agreements the most influential being The North American Free Trade Agreement (NAFTA) with the United States of America and Canada. The environmental impact of Mexican trade liberalisation does not appear to have been positive. Various studies show that post-NAFTA, water, air and soil pollution has increased in Northern Mexico due to the growth of manufacturing industry and the controversial "maquiladora" sector along the border with the United States. Furthermore, over the last few years, the environmental impacts of NAFTA in the agriculture sector, particularly corn production, have been better understood. However, perhaps surprisingly, there has not been a thorough analysis on the capability of the institutional framework to minimize the environmental impacts of trade in the agricultural sector (McKinney, 2000).

This dissertation conducts such an analysis. It contributes to existent literature by critiquing the environmental impacts of NAFTA from an institutional perspective. It demonstrates that the weak environmental institutional framework which complemented NAFTA, both at the national and the multinational level, has contributed to environmental damage in the Mexican agricultural sector. Based upon this finding, this dissertation sets out the elements of an adequate institutional framework for better managing the environmental impacts of agricultural trade in Mexico. This is important, as almost 10 years after NAFTA's signing, its environmental effects in the agricultural sector in Mexico appear to be significant. The fact that Mexico is continuing with the liberalization process, currently negotiation free trade agreements with the European Union, Japan and the rest of the Americas only amplifies the need for such a review.

1.2 Aims

This dissertation will argue that the weak environmental institutional framework which complemented NAFTA, both at the national and the multinational level, contributed to environmental damage in the agricultural sector in Mexico. The dissertation is divided into three main sections, with the aims as follow:

Chapter 2: Demonstrate the links between increased trade liberalization and environmental damage in the Mexican agricultural sector.

Chapter 3: Demonstrate how a weak national and bilateral institutional framework, coupled with inadequate rural development plans, have failed to prevent the negative environmental effects exacerbated by NAFTA in the agricultural sector in Mexico

Chapter 4: Based on the above conclusions, propose a set of interventions needed at the national and multilateral environmental institutional level to better manage environmental impacts in the agricultural sector in Mexico. Additional recommendations will focus on improving the financial sustainability of the rural peasantry, as this is a key determinant of the environmental outcomes in the agricultural sector.

1.3 Scope

Given the complexities of the trading system and the time restrictions of an MSc dissertation, the environmental effects of NAFTA are analysed from the point of view of national and multilateral governmental institutions[1] only. Regional and local governmental institutions, non-profit organizations, and international organizations such as the United Nations or the World Trade Organization, although relevant, are not of the focus of this dissertation. Further, reference to policy changes and regulation is only made to the extent that these are relevant to national or bilateral institutional capacity. Further, it is important to recognize that NAFTA was part of a wider package of neo-liberal policies and economic strategies pursued by the Mexican government during the 1980s and 1990s, such as privatisation, reduction of government support for agriculture and tighter fiscal policies. It is impossible

[1] There are a variety of definitions attached to the word "institution" (World Bank, 1998), we employ Haas [1993 #40] definition of "*persistent and connected sets of rules and practices that prescribe behavioural roles, constrain activity and shape expectations. They may take the forum of bureaucratic organizations, regimes, or conventions*".

to completely disaggregate NAFTA's economic and environmental effects from the rest of the "package", but the underlying assumption is that NAFTA was a key contributor. Finally, as 85% of Mexican agricultural trade is with the US (Patel and Henriques, 2003), we omit Canada from the analysis.

1.4 Methodology

Data was collected from academic publications, books, journals, newspapers and the internet, between June and August 2003. Database analysis was conducted to obtain the most updated agricultural statistics in Mexico. This was complimented with interviews with experts on the subject. Most of the interviews were held personally in Geneva, Switzerland during the period of July 8th-14th, 2003, while others were held in Oxford or via telephone in Mexico and Uruguay during June-August 2003.

The interviewees were selected to cover the range of questions relevant to the thesis, as well as to cover most stakeholder point of views. The interviewees were initially contacted by email, and were briefed beforehand with a topic guide, while cross reference questions were also included in most of them. Most interviews were recorded, unless requested otherwise by the interviewee. All tapes and notes were transcribed, and when appropriate, translated to English, to facilitate referencing and quoting.

Wengraf (2001) was referred for interview Technique guidance.

Importantly, references and quotes attributed to an interviewee will be referred to in text by an asterix (*) after the surname.

See table 1.a. for a detailed list of interviewees, and Annex 1 for all topic guides used to conduct the interviews.

Table 1.a. List of Interviewees

NAME, INSTITUTION & POSITION	CONTACT DETAILS	PLACE & DATE
Dr. Edmund Valpy Fitzgerald Director of the Finance & Trade Research Center **Queen Elizabeth House** **University of Oxford**	21 St Giles, Oxford, OX1 3LA United Kingdom (+441865) 273642 edmund.fitzgerald@qeh.ox.ac.uk	Oxford, UK July 1st, 2003
Mr. Mark Halle European Representative and Director Trade and Investment **International Institute for Sustainable Development (IISD)**	C-403 Environment House 13 Chemin des Anemones 1219 Chatelaine, Geneva Switzerland + (41 22) 979 9353 mark.halle@iprolink.ch	Geneva, Switzerland July 9th, 2003
Mr. Angel Lopez-Hoher Minister **Permanent Mission of Mexico to the WTO**	16 Avenue de-Bude 1202 Geneva Switzerland +(41 22) 748 07 51 alopezh@economia.gob.mx	Geneva, Switzerland July 10th, 2003
Peter F. Smit Chief – Division of product and market development **Jaime Crespo Blanco** Coordinator – Export-led Poverty Reduction Programme. **International Trade Center – UNCTAD-WTO**	ITC Offices 54-56 Rue de Montbrilliant 1211 Geneva Switzerland +(4122) 730 02 62 smit@intracen.org +(41 22) 730 03 00 crespo@intracen.org	Geneva, Switzerland July 10th, 2003
Francisco Lima Mena Embazador **Permanent Mission of El Salvador to the WTO**	65 Rue de Laussane 1202 Geneva Switzerland +(41 22) 732 7036 flimamena@minec.gob.sv	Geneva, Switzerland July 11th, 2003
Mr. Erik Wijkstrom Counsellor Trade and Environment Division World Trade Organization	154 Rue de Lausanne 1211 Geneva Switzerland +(41 22) 739 57 29 eric.wijkstrom@wto.org	Geneva, Switzerland July 11th, 2003
Mr. Charles Arden-Clarke Senior Programmer Officer Economics and Trade Branch **United Nations Environment Programme**	11-13 Chemin des Anémones 1219 – Chatelaine Switzerland (+4122) 917 81 68 charles.arden-clarke@unep.ch	Geneva, Switzerland July 11th, 2003
Rafael Sanchez Project Leader BIOTRADE Initiative **UN Conference on Trade and Development** **UNCTAD**	Palais de Nations 1211 Geneva Switzerland +(41 22) 917 2116 rafael.sanchez@unctad.org	Geneva, Switzerland July 14th, 2003

Table 1.a. List of interviewees (continuation…..)

Nuria Castells Economic Affairs Officer Trade, Environment & Development Section **UN Conference on Trade and Development** **UNCTAD**	Palais de Nations 1211 Geneva 10 Switzerland + (41 22) 917 17 96 nuria.castells@unctad.org	Geneva, Switzerland July 14th, 2003
Alberto Villareal Environment and Sustainability Programme **Friends of the Earth Uruguay**	San José 1423 Montevideo, Uruguay + (598) 522 8481 comerc@redes.org.uy	Telephone Interview July 24th, 2003
Lic. Israel Núñez Birrueta **General Director of Biodiversity and Hemispheric Matters.** International Affairs Coordination Unit **Mexican Ministry of Environment and Natural Resources** **SEMARNAT**	Ave. San Jerónimo 458, piso 3 Col. Jardines Del Pedregal Del. Alvaro Obregón C.P. 01900 México D.F. +(5255) 54 90 21 18 inunez@semarnat.gob.mx	Telephone Interview August 15th, 2003
Dr Ezcurra Director **National Institute of Ecology**	Periférico 5000, Col. Insurgentes Cuicuilco, Del. Coyoacán, C.P. 04530, México D.F. + (5255) 5424-6418 presiden@ine.gob.mx	Telephone interview August 27th, 2003

Chapter 2

Environmental Impacts of Agricultural Trade Between Mexico and USA

"Mexico's experience of liberalization is a canary in the mineshaft for other agricultural economies in the Global South"

(Patel and Henriques, 2003)

2.1 Introduction

The North American Free Trade Agreement (NAFTA) between Mexico, the United States and Canada came into effect on 1 January 1994. The agreement accelerated the reduction in trade barriers commenced a decade earlier. Although the economic effects of NAFTA have been well-researched, its environmental effects, especially in the agricultural sector, are still controversial and not properly understood. Understanding the environmental effects of NAFTA in the agricultural sector in Mexico is important; although agriculture only represents 5% of the National GDP, it is the main source of income for 20% of the Mexican workforce (CIA, 2003) and uses over 40% of the country's surface area (USDS, 2000).

This chapter seeks to demonstrate that trade liberalization, specifically NAFTA, promoted environmental degradation in the agriculture sector in Mexico.

The analysis proceeds by decomposing the effect of NAFTA on the environment into Technique, Scale and Composition effects, in the style of Copeland and Taylor (1994). For this, we employ the environmental findings of previous studies such as Nadal (2000) and Porter (2002), plus own database research. We then are able to compare the NAFTA agricultural and environmental objectives versus the actual results to date.

The analysis will show how trade liberalization has led to the intensification of production methods in the Northern areas of the country, exacerbating the problem of excessive chemical use, water depletion and reliance on monoculture. In the South, economic hardship exacerbated by NAFTA has promoted expansive and less skilled agriculture methods, further nurturing deforestation, soil erosion and usage of less endemic crop varieties, specially corn.

To this point, it is important to highlight that the levels of development and economic, social and environmental circumstances in Mexico differ greatly between regions. Accordingly, this chapter examines both the environmental impacts caused by the industrialized and subsistence agriculture in the different areas of the country. See table 2.a. for a more detailed description of these producers.

Table 2.a. The Mexican Agricultural Producers

Mexico's agricultural sector is characterized by different types of producers, with contrasting economic and social realities, which also affect their environmental footprint. These producers can be divided into roughly two groups, the industrialized producers and the subsistence producers. This is an oversimplification, of course (as there is a range of producers falling in between these two categories), but it permits a cleaner analysis.

Industrialized. They are basically large agro-enterprises, using intensive agricultural procedures, that rely heavily on input-intensive technologies. They are mostly in irrigated lands, in plots of land that are bigger than the average, with higher yields and better soil quality. They are mostly focused on the export market and have the flexibility to shift to other basic grains, horticultural crops or non-traditional commercial produce. They are economically competitive and enjoy relatively good profit margins. They use irrigation systems, fertilizers, pesticides and mechanized traction. Although they are present along all the Mexican territory, they are mostly concentrated in the Northern and Northwestern parts of the country, thus we will refer to them as the "Northern" producers.

Subsistence. Constitute 45% of all Mexican agriculture producers and operate under difficult conditions of inferior soil, slopping terrain, irregular rainfall, and small landholdings. Production is for family consumption only and there is no surplus to sell. Poor soil quality and small land (usually less than 5 hectares) means that there is usually no possibility of converting to other crops. Although they are also present along all the Mexican territory, they are mostly concentrated in the Southern, central and high parts of the country, thus we will refer to them as the "Southern" producers.

Table by: S.Vilas, Source: Partially based on Nadal (2000), although with own inputs.

Finally, this analysis contributes to the small, but growing, literature highlighting how environmental problems in the Mexican agriculture result from a fast and poorly-planned liberalization without the support of an adequate institutional framework and rural development transition plans.

2.2 The "Modernization" of Mexican Agriculture – NAFTA's unmet Objectives

Mexico's agriculture was by far the most protected sector under NAFTA (Sarmiento, 2003). The inclusion of agriculture, and specifically of corn, as part of chapter VII of the agreement was presented by the US, Mexico and Canadian governments as a strategic decision that would bring greater economic efficiency and environmental benefits to the three countries. However, there were no technical studies to support the latter contention (Nadal, 2000; Lopez-Hoher*, 2003).

NAFTA agriculture objective was to link crop liberalization in Mexico with horticultural reform in the United States. In other words the United States would increase its exports of grain, oil seed, and meat products that are land and capital intensive, as well as of certain fruits that are better produced in Northern latitudes. Mexico would increase its exports of products where it was considered to enjoy significant comparative advantages, such as labour intensive vegetables, nuts, coffee and tropical fruits. As a result, it was considered desirable for Mexican producers to move from corn and grain production to cultivation of other crops that where, in theory, economically and environmentally more adequate (Nadal, 2000).

It was assumed that an adequate flow of public resources throughout a 15 year tariff reduction period would facilitate a smooth transition to greater efficiency in Mexican agriculture (Sarmiento, 2003). This would help transform rain-fed land into irrigated land and was seen as a means of countering the negative wealth effects brought about by reduced prices (Nadal, 2000). However, the 15 year transition period was accelerated and most of the agricultural produce, including corn, was liberated in less than 3 years[2]. In addition, the 1995 economic crisis in Mexico made it impossible for the government to invest in irrigation infrastructure, technical assistance and research and development (Nadal, 2000; Fitzgerald*, 2003; Rodriguez, 2003). Further, official credit institutions were dismantled, and rural transition plans under funded (Fitzgerald*, 2003). These, coupled

[2] By significantly exceeding the quota-based import system agreed by NAFTA (Nadal, 2000)

with inadequate national and multilateral environmental institutions undermined NAFTA's ability to reach its environmental objectives.

2.3 Scale, Technique & Composition Effects

The debate over the effect of international trade on the environment is extremely heated. This is partly because international treaties bring with them a combination of positive and negative effects and the net environmental impact is difficult to quantify (USDA, 2002). Fortunately, the decomposition of the effect of trade liberalization into Scale, Technique and Composition effects provides a useful way of isolating the different impacts (Copeland and Taylor, 1994). A basic explanation of the Technique, Scale and Composition effect is presented in table 2.b.

Table 2.b. Technique, Scale & Composition Effects Theory

Scale Effect. Empirical evidence has long linked open economies to economic growth. Increased output and scale of production resulting from trade liberalization, however, may have negative environmental effects, as it generates additional pollution emissions and accelerates the depletion of natural resources.

Technique Effect. All else being equal, increasing per capita income tends to result in calls for increased regulation mandating cleaner technologies. According to economic theory, trade liberalization increases per capita incomes, and therefore result in greater pressure on producers to alter production methods to adopt cleaner production technologies.

Composition Effect. Trade liberalization may also affect the composition of output produced in an economy, as resources formerly devoted to protect inefficient industries will be utilized elsewhere. Environmental effects can be positive or negative, depending on the composition of industry and economic sectors.

Based on information from (Copeland and Taylor, 1994; USDA, 2002)

Translating NAFTA's agriculture objectives into the Scale, Technique and Composition Effects framework, it appears that NAFTA negotiators assumed that the negative Scale effects of trade liberalization, would be offset by positive Technique and Composition effects. Specifically, the negative environmental impacts of larger scale agricultural production (negative Scale effect), would be offset by increased investment in "green technology" (positive Technique effect), plus the positive effect of switching to crops that make a more efficient use of economic and natural resources (positive Composition effect).

Unfortunately, we will see that most of these positive effects did not materialize. Lower export prices resulted in lower than expected income growth. This, coupled with inadequate environmental institutions, eliminated (and

even reverted) the positive impact of the Technique effect. Further, inadequate transition policies and the dismantling of rural credit institutions prevented achievement of the expected Composition effect. Indeed, overall negative environmental outcomes appear to have predominated[3].

2.3.1 The Scale or Production Effect

Trade liberalization generally increases the Scale of economic output, which often places greater stress on the environmental (Copeland and Taylor, 1994). Indeed, in Mexico, Table 2.c shows that during the period of trade liberalization the scale of agricultural production in both the North and the South increased. In Northern industrialized areas, the scale increase was achieved by intensification of production; a 64% increase in total production was possible despite a 10% decline in total planted area versus pre-NAFTA years. While the increase in scale of agricultural production unquestionably brings economic benefits, this seems to have been accompanied by adverse impacts on the environment. Specifically, higher yields where arguably accomplished through increased use of chemicals and scarce water resources (Rodriguez, 2003), and greater reliance upon a narrow band of crop diversity [CEC, 2002 #7]. While no direct data on pesticide and fertilizer usage are available (Rodriguez, 2003), the value of pesticides imports has increased more than 60% since NAFTA implementation (FAO-stat, 2003), suggesting the reasonableness of this hypothesis. Further, although there is no availability of consolidated data on the northern region's water depletion rates (CEC, 2002), we do now that Mexico's water resources are among the most seriously degraded of all OECD countries (OECD, 2000a). Further, water in the northern arid region is 7 times more scarce than in the Southern tropical region, and 17% of the aquifers in the country are now over exploited. (Reforma, 2003). The Northern agricultural expansion has exacerbated water scarcity and concomitantly increased water pollution due to chemical use (CEC, 2000).

[3] Note that agricultural trade between Mexico and the US represents less that 1% of agricultural production in the US (FAO-stat ,2003), so the Scale, Technique and Composition effect of NAFTA in the US are negligible (Porter, 2002).

[5] Mesomerica comprises Mexico and Central American countries.

Table 2.c. Total Agriculture Planted Area, Yield & Production

	Pre- NAFTA (Average 1991-1993)	Post- NAFTA (Average 1999-2001)	% change
TOTAL AGRICULTURAL PRODUCE			
Planted Area (hectars)			
Industrialized (Irrigated)	5,182,533	4,669,768	-10%
Subsistence (Rainfall)	13,034,612	15,432,631	+22%
TOTAL	**18,188,889**	**20,174,211**	**+11%**
Production (tons)			
Industrialized (Irrigated)	68,422,252	112,481,616	+64%
Subsistence (Rainfall)	52,281,216	60,142,665	+15%
TOTAL	**120,703,468**	**172,624,281**	**+43%**

Note: production of flowers and ornament plants is not included

Chart by S. Vilas, Source: (SIACON-database, 2002)

In the South, table 2.c. reveals that subsistence agriculture increased total planted area by 22%, after liberalization, with production rising only 15% versus pre-NAFTA period. The frontier expansion in the subsistence sector, as a means to compensate lower income levels appears to have increased the rate of deforestation and soil erosion. Unfortunately, the lack of data availability on deforestation rates makes it impossible to run correlations. However, to put these issues into perspective, a study conducted by UNEP (2000) in Mesoamerica[5], considers the expansion of agricultural frontier as one of the main causes of deforestation in this area. It also shows that 74% of Mesoamerican cropland is affected by land-degradation, and 82% by soil erosion. Importantly, the Southern Region of Mexico is considered a hotspot of biodiversity (Myers et al, 2000). Further, the fact that planted area has increased proportionally more that production, evidences a decline in yield, possibly due to the use of degraded land and/or by the loss of skilled agricultural workforce to urban migration (Patel and Henriques, 2003; Nadal, 2000). The latter has incentive farmers to rely on less endemic crop varieties, specially corn, risking its genetic diversity[6] (Nadal, 2000; Porter, 2002). Given the above, we can conclude that the Scale effect brought by NAFTA has had negative impacts, both, in the Northern and Southern areas of the country.

[6] México counts with 41 landraces of corn, that as described by Nadal (2000) have such rich genetic diversity that could help cope with adverse environmental conditions. Further, polemic has also been caused by the potential effects of *gene flow* from (imported) genetically modified corn to traditional landraces. See (CEC, 2003) for further reference.

2.3.2 Technique Effect

Economic theory predicts that trade liberalization increases incomes, and wealthier countries tend to be more willing and able to channel resources into environmental protection and higher environmental standards (Copeland and Taylor, 1994).

Based on this, or similar economic assumptions, a number of researchers employed sophisticated economic models to predict that, assuming that Mexican real GDP would increase significantly, trade liberalization in Mexico would decrease both agricultural output and pollution as measured by 13 indicators of water, air and soil effluents (USDA, 2002).

However, agricultural GDP dropped after the 1994 crisis, and has not yet recovered (Nadal, 2000). Despite the production increases referred to above, table 2.d. demonstrates that the total value of agricultural produce[7] in Mexico in 2001 was 16% below 1993 levels. This decrease in production value was evident in both, industrialized and subsistence producers, showing reductions of 22% and 9% respectively during the same period.

Table 2.d. Agriculture Production Value Pre and Post- NAFTA

(billions of dollars)

	1993	2001	% Change
INDUSTRIALIZED			
Corn	2.4	1.0	-58%
All Others (except Corn)	10.2	8.8	-13%
TOTAL IRRIGATED	**12.6**	**9.8**	**-22%**
SUBSISTENCE			
Corn	3.3	2.4	-27%
All Others (except Corn)	6.4	6.4	0%
TOTAL RAINFALL	**9.7**	**8.8**	**-9%**
NATIONAL			
Corn	5.7	3.4	-40%
All Others (except Corn)	16.6	15.2	-8%
TOTAL NATIONAL	**22.3**	**18.7**	**-16%**

Note: All figures expressed in real US dollars (billions) at 2001rates

Chart by S. Vilas, Source: (SIACON-database, 2002)

[7] The total "value of agricultural produce" refers to the monetary quantification of production volume, at the prices paid to the producers [SIACON, 2002 #31]

Lower international crop prices, together with the inflow of heavily subsidized, and thus low priced, grains from the US (Patel and Henriques, 2003), yielded on lower earning levels that expected, for both, industrialized and subsistence producers [CEC, 2002 #7], as well as on less money available to invest in environmental practices. The positive Technique effect has clearly not been achieved, if anything, the effect on the environment has been negative.

In the North, lower prices coupled with lack of regulation enforcement has resulted in few incentives to invest in greener technologies. The industry has therefore made unsustainable use of pesticide, fertilizers and water for irrigation (Rodriguez, 2003) and has increased reliance upon specialization and monoculture (Nadal, 2000).

In the South, lower prices have severely impaired subsistence producers' capacity to adapt to trade liberalization. Poverty incidence among economically active agriculture population has increased from 54% in 1989 to 64% in 1999 (Patel and Henriques, 2003). This has been coupled with, if not partially caused by restricted access to credits and under funded rural development plans (Nadal, 2000; Fitzgerald*, 2003). The overall result seems to be the expansion of the agricultural frontier to marginal lands, further exacerbating the deforestation and soil erosion rates. Further, economic hardship has increased migration to urban areas, resulting in the deterioration of communities, and thereby limiting native crop diversity practices and knowledge, as well as adequate soil conservation structures such as terracing, hedging, and alley cropping (Nadal, 2000).

Net, we can also conclude that despite NAFTA objectives of improved environmental protection, the Technique effect at both, the industrialized and subsistence level, appear to be negative.

2.3.3 The Composition Effect

One of the objectives of the agriculture liberalization in Mexico was to open-up the "inefficient" grains sector to imports, in exchange for guaranteed access to the US market for horticultural products and other labour-intensive crops where Mexico was thought to enjoy competitive advantages (Nadal, 2000). This would bring economic benefits to Mexican farmers who would switch to more efficient and profitable crops. It would also bring, in theory, environmental benefits as farmers would produce more efficiently and thereby reduce pressure on environmental resources.

In the North, the Composition effects have been relatively close to the textbook model. As we can see in table 2.e., although grain production has increased by 13% since pre-NAFTA period, all other crops have grown by 67%, showing a bigger emphasis on production of more profitable, non-grain crops. Additionally, despite limited market access for the Mexican horticultural produce in the US (Porter, 2002; RMALC, 1997), exports of fruits and vegetables have increased 57% since NAFTA (Patel and Henriques, 2003). Unfortunately, although this Composition effect was expected by NAFTA negotiators, it has brought serious environmental problems. As mentioned above, to achieve the NAFTA objective, Northern producers had to switch horticultural crops, thus increasing their reliance on the use of machinery, pesticide, fertilisers and water usage through irrigation. The latter has a particularly severe environmental impact given that Northern producers are located in arid areas. Indeed, horticultural produce are, in general terms, more suitable for tropical weather (Rodriguez, 2003).

Table 2.e. Composition Change of Crop Production

(tons)	Pre-NAFTA 1991-1993	Post-NAFTA 1999-2001	% change
Industrialized (Irrigated) production			
Total Industrialized production	**68,422,252**	**112,481,616**	**+64%**
Production of Grains	14,603,323	16,549,229	+13%
Production of All-other crops	53,818,929	95,932,387	+78%
Subsistence (Rainfall) production			
Total subsistence production	**52,281,216**	**60,142,665**	**+15%**
Production of Grains	16,603,802	21,735,630	+30%
Production of All-other crops	35,677,414	38,407,034	+7%

Note1: grain production include corn, wheat, sorghum and beans
Note2: production of flowers and hornament plants is not included

Chart by: S. Vilas, Source: (SIACON-database, 2002)

In contrast, in the South, scarce access to credit and rural development plans limited farmers ability to switch from grain production to other more efficient and suitable crops for Southern tropical weather. Indeed, grain production has increased. Table 2.e. shows that subsistence production of grains increased 30% versus pre-

NAFTA period, while other crops increased only in 7%. In the specific case of corn, production has remained at historically high levels of over 18 million tons per year (Nadal, 2000). The expected Composition effect has thus not been achieved in the South. On the contrary, the increased reliance on expansive agricultural crops such as corn, seems to have exacerbated deforestation, soil erosion and land degradation in the tropical Southern region.

Given the above, we can say that NAFTA Composition effect has brought negative environmental effects.

2.2 Conclusion

The Scale, Technique and Composition effect analysis has been a useful tool to demonstrate the negative environmental effects of trade in the Mexican agricultural sector, as well as the mismatch between NAFTA environmental objectives and reality. Expected negative Scale effects, evidenced by the unsustainable usage of chemicals and water in the arid Northern areas, as well as deforestation, erosion, land degradation and loss of crop genetic diversity in the already fragmented and delicate Southern forested areas, seemed to have been further exacerbated by mostly negative Technique and Composition effects. Lower than expected production values and incomes seemed to have contributed to reduced investment on greener technologies on the Northern industry, as well as curtailing the subsistence producers from performing environmentally friendly agricultural practices. Finally, a mixed Composition effect, of increased water and input intensive agriculture in the North and expansive agriculture in the South, has further increased environmental pressures on the scarce resources of each of these regions. Although the above effects were fostered by a complex set of elements, such as the low price elasticity of grains, specially corn (Porter, 2002); the extremely fast liberalization of the agricultural sector; and heavily subsidized crop imports from the US (Nadal, 2000), there were also key institutional elements that contributed to this degradation. As we will demonstrate in chapter 3, weak environmental institutional framework, coupled with inadequate rural transition plans contributed to the environmental impacts highlighted above. Further, chapter 4 will stress that high levels of development of the northern industry call for improved environmental measures and institutions, while the Southern peasantry also requires development and financing institutions to help producers afford more sustainable agricultural practices.

Chapter 3

AN INSTITUTIONAL EXPLANATION

"Institutional failure of national, bilateral and international environmental institutions are important contributors to today's environmental problems"

World Resource Institute (2003).

Introduction

The previous chapter noted how conventionally accepted economic theory predicts that NAFTA should have improved environmental quality in Mexico. However, it was demonstrated that the environmental impacts of NAFTA in the agricultural sector were primarily negative, exacerbating the use of chemicals and scarce water in the North, and fostering deforestation, soil erosion and loss of crop genetic diversity in the South. Clearly, an explanation for the divergence between prediction and outcome is required.

In this chapter, we propose an institutional explanation as a partial cause of this divergence. We argue that theoretical results from conventional economics are implicitly reliant upon the presence of an adequate institutional framework. Therefore, section 3.A. begins with a brief review of the literature on the role and importance of national and multilateral institutions in regulating and managing the environmental impacts of international trade. In sections 3.B. and 3.C. we apply these general concepts to the impact of NAFTA in the Mexican agricultural sector. Section 3.B. examines the role played by Mexican environmental institutions in managing the environmental consequences of NAFTA. We demonstrate that the Mexican institutions have no explicit mandate to deal with the environmental effects of international trade nor agriculture, while also lacking the adequate national structure and funding. This section will further analyse the financial institutions and the

government programs in charge of NAFTA's transition plan and rural development incentives. We indicate that these institutions and plans have significant weaknesses in terms of funding and project implementation, and lack the necessary environmental provisions. In section 3.C. we explore the efforts of the multilateral environmental institutions created by NAFTA's side agreements to prevent the environmental degradation resulting from the treaty, concluding that their failure is due largely to a lack of political support, and, concomitantly, a limited funding and scope.

The central conclusion of this chapter, presented in section 3.D, is that the environmental problems resulting from NAFTA could have been prevented by a stronger and more adequately structured institutional framework at a national and Multilateral levels.

CHAPTER 3, SECTION A

Institutional Theory & Practical Examples

"Reaping the gains from openness requires a full complement of institutional reforms"

(Rodrik, 2001).

This section provides an overview of the theory of institutions and their role in building an adequate base to support a sustainable and beneficial international trade system. The discussion will briefly review both national and multilateral institutional concepts, and through this process, reference to theory on environmental institutions will be made. Further, we will also review some examples of national and multilateral environmental institutions, and their approaches to the agriculture and trade arenas.

3.A.1 National Institutions Theory

The neo-liberal economic theory that guided economic and trade liberalization during the 1980s and 1990s in Mexico minimized the role of national institutions, arguing that market forces helped by the "invisible hand" would guide the restructuring of previously inefficient governmental organizations into, mostly, private enterprises (King, 2002). However, following the economic crises in Latin-America over the last two decades, the basis for successful trade liberalization has been reassessed. For Harvard Economist Dani Rodrik (2001), successful integration of a developing country into the global market should include a full range of institutional reforms at a national level. Rodrik argues that national public institutions are "the most important determinant of a country's long term development" (Rodrik, 2001), as well as the prime determinant of the impacts of trade liberalization (Halle*, 2003).

The number of marginal reforms which could improve the effective functioning of national institutions is limitless. A good starting point, however, is the basic theory of organizational capacity. Hauser (2003) highlights three key elements:

a) a clear, focussed and, ideally, quantifiable mission to guide strategy and organizational activities;

b) an adequate structure and staff to achieve the institution's goals; and

c) a financial base that can be sustained through time.

In order to achieve these three elements, particularly a sustainable financial base, the relevant institutions require adequate political support from the national government. UNEP (2000) provides some more detail on what element (b) above should contain for an environmental institutional framework to be effective. The framework needs to have the capacity (through one or several institutions) to undertake the following activities:

i) research and understand national environmental needs;

ii) develop an integral policy and regulatory framework;

iii) enforce compliance with environmental regulation; and

iv) promote and coordinate social participation.

Finally, it is critical that effective institutions are based on local knowledge and experimentation, and tailored to domestic needs and institutional realities (Rodrik, 2001). A "cookie-cutter" approach to institutional design will fail; an effective African institution might be entirely inappropriate for Mexico. To demonstrate the variety of possible approaches, we briefly examine the different institutional frameworks present in Britain, Norway and the US which promote sustainable agricultural development. None of these frameworks are perfect, and it should not be thought that any could be reapplied in Mexico, as each country's needs and realities are unique.

I. United Kingdom (UK)

The UK has among the most developed institutional structures to oversee environmentally sustainable agricultural production. The aptly named Department of Environment, Food and Rural Affairs (DEFRA) regulates both agricultural and environmental matters. It's several objectives include the duty to "*protect and improve the rural, urban, marine and global environment and to lead integration of these with other policies across Government and internationally*", as well as an obligation to "*promote sustainable, diverse, modern and adaptable farming through domestic and international actions*". In order to achieve these objectives, DEFRA's organizational structure is divided into several General Directorates, including Environment; Food, Farming & Fisheries; Land Use & Rural Affairs; and, Animal Health & Welfare. Further, the structure of DEFRA also reflects the importance that the UK government places on sustainable agricultural exports, with a dedicated sub-department overseeing Agri-food Exports and Promotion (DEFRA, 2003).

II. Norway

Norway has a totally different institutional approach to ensure the sustainable management of its agricultural sector. It employs two autonomous national institutes for administration. One is the "Norwegian Centre for Soil and Environmental Research", which oversees environmental issues related to soil, water, waste and landscape resources. Although it is a private foundation, it receives most of its funding from the Ministries of Agriculture and Environment, and is thus firmly anchored in both sectors (Jordforsk, 2003). Separately, the "Norwegian Crop Research Institute", which is the leading institute for applied research on crop production. This institute is mainly funded by the Ministry of Agriculture, and aims to strengthen the research and development of environmentally sound farming and ecological (Planteforsk, 2003).

III, United States (US)

The US has yet a different approach. The U.S. Environmental Protection Agency (EPA) recognizes that "*environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade*", and thus consider all of them when establishing environmental policy. However, neither the EPA, nor the US Department of Agriculture (USDA) have the level of institutionalism that Norway and UK have

built to oversee the environmental impacts of agriculture. Instead, they have a variety of independent programs and Centres to address this issue. These include "The Sustainable Agriculture Research and Education (SARE) Program", the "Sustainable Agriculture Network" (SAN) (SARE, 2003) and the "National Agriculture Compliance Assistance Centre" (EPAa, 2003). All of the above are funded by the USDA, although the latter is actually part of the EPA structure.

As evidenced above, there are multiple potential approaches to managing agricultural sustainability, with different degrees of interconnection between rural and environmental issues. The UK decided to fully integrate the environment and agricultural affairs (among others) into a single department under DEFRA's umbrella. Norway created two independent and private institutions which are funded by the Environment and/or Agricultural ministries. Finally, the US employs several programs and Centres, all of which contribute to the environmental sustainability of the sector. To note, in all three countries, the agriculture sector represents less than 2% of GDP and less than 4% of labour force occupation. However, agricultural land represents a significant percentage of total land, being 26% for UK and 19% for the US[8] (CIA, 2003) This is important as agriculture in Mexico represents a higher percentage in all measures, 5% of the GDP, 20% (CIA, 2003) of the labour force occupation, and 40% of the total land (USDS, 2000), evidencing a more dramatic need for strong environmental and agricultural institutional linkage.

3.A.2. Multilateral Institutions Theory

For certain problems, national institutions alone are insufficient. Governments establish international and multilateral institutions to respond collectively to problems that are insoluble without international support (Haas et al, 1993). Several theories exist to explain when such institutions are necessary, which will prove helpful to understand the creation of multilateral environmental institutions. Keohane's (1989) theory of international institutions holds that the greater the degree of economic interdependence, the greater the demand for institutions to facilitate cooperation. On this premise, institutions can be particularly important to the weaker states in the relationship, providing them with "voice opportunities". In contrast, the theory of Constructivism holds that systemic interaction among countries may, in itself, transform the interests of states as they realize their mutual interests, thus leading them to cooperate in pursuit of common goals (Wendt, 1994).

[8] Although for Norway arable land only represents less than 3% of their total land (CIA, 2003).

Along similar lines, Haas et al (1993) developed the "three C's" model that highlights the key roles of international institutions: increase national governmental concern, enhance the contractual environment and increase the national capacity. In other words, they "set facilitating conditions" to overcome national obstacles that impede coordination on environmental matters. Although it could be argued that cooperation emerges from common interests (and not from the institutions *per se*), multilateral institutions can boost coordination by (a) reducing transaction and information costs; (b) creating a forum and an established set of procedures; and (c) creating standards of behaviour which reduce uncertainty (Haas et al, 1993).

To achieve their coordinating role, multi-country institutions can either provide national governments with information, skills, resources and legitimacy or can establish more "institutionalised" mechanisms to implement joint scientific research, technical assistance teams and financial programs (Haas et al, 1993).

One illustrative example of a multilateral environmental institution is the European Union's Environment Directorate General (DG). Its main role is to *"initiate and define new environmental legislation and to ensure that measures, which have been agreed, are actually put into practice in the Member States"* (EC, 2002). The EU's Environment DG is a multinational insittution that has developed well beyond the coordination objectives that the theory above highligths, and as with other EU institutions, might be critiziced as being overly bureaucratic. Nevertheles, the Environment DG reflects the importance that most European countries place on agriculture and trade. This is evident when we analyze its organizational "units" which include Agriculture and Forests; Biotechnology & Pesticides International Affairs; and Trade & Environment (EU, 2003).

Surprisingly, there has been limited research into the effectiveness of national and multilateral environmental institutions created through the NAFTA negotiations and implementation process (McKinney, 2000). Influential studies, such as Nadal (2000), and reports such as the Environmental Performance Review of the Organization for Economic Co-operation and Development (OECD, 2000a), focus on the barriers preventing Mexican institutions from meeting their objectives, particularly in terms of policy making, research and regulatory enforcement. However, they are lack a higher level of analysis in failing to assess whether the mandates and structures of Mexican institutions are adequate for Mexico's environmental needs. Indeed, none of this research has addressed whether national or multilateral environmental institutions in Mexico consider agriculture to be within their mandate.

CHAPTER 3, SECTION B

The Mexican Institutions

"If the objective is to create and reinforce the institutional framework, you first need to conduct a national inventory of needs"

[Crespo, 2003 #25]*

In this section, the theories discussed above are used to analyse the effectiveness of Mexican environmental institutions. In particular, we evaluate the mandates, as well as national structure and funding of four Mexican institutions relevant in managing the environmental impacts of agricultural trade liberalization[9]. The overwhelming conclusion is that these institutions were, and remain, ill-equipped to deal with NAFTA's effects. Indeed, most of these institutions do not have an explicit mandate to deal with agricultural issues, nor the effects of international trade. To the extent that such a mandate is implied within their stated objectives, we find that they are generally hampered by their organizational structure and a lack of funding. Nevertheless, the combined effect of NAFTA, its environmental agreements, and international pressure appears to have stimulated some beneficial restructuring of the Mexican institutional framework (Nunez*, 2003), and led to major regulatory reforms (OECD, 2000a). The news, therefore, is not all bad.

We proceed with a cursory review of the background and recent history of Mexican environmental institutions, before considering each of the four relevant institutions in their current form[10]. We also briefly examine the

[9] Analysis of regional and local institutional is not included and should be evaluated separately.

[10] Limited information is available on the historic performance of Mexican national environmental institutions, hence our analysis is necessarily restricted to the current state of these institutions, with the exception of brief commentary on their evolution since NAFTA.

financial institutions and rural development plans, given their relevance to development and, therefore, environmental degradation in the South.

3.B.1 Background

In the early 1990s Mexico went through the process of restructuring and renovating its environmental laws, regulations, standards and institutional infrastructure, following the combined pressures of globalisation, liberalization, and NAFTA's environmental side agreements (McKinney, 2000; Nunez*, 2003). A key step in this process was the reorganization of Mexico's disparate environmental agencies into a single, cabinet-level secretariat, to ensure better coordination and management of the environmental state agencies, a smooth decentralization process of environmental authority from the Federal Government, and increased social participation in decision making (USMCOC, 2000). The ministry created as a result of this restructuring was The Secretariat of the Environment & Natural Resources (SEMARNAT).

3.B.2 The Secretariat of the Environment & Natural Resources (SEMARNAT)

SEMARNAT is the government agency in charge of developing environmental protection policy and setting the foundations for sustainable development. Its mandate reads:

> *"SEMARNAT aims to incorporate environmental criteria and instruments in all areas of society and public functions, to ensure the optimal protection, conservation and usage of the country's natural resources, building with this an integral and participatory environmental policy within the sustainable development framework" (SEMARNAT, 2003).*

This mandate is clearly wide enough that almost everything, including the environmental considerations of international trade in agriculture, is implicit within its scope. However, no explicit reference is made to trade or agriculture in the list of detailed objectives shown in Table 3.B.a.

Table 3.B.a. SEMARNAT Detailed Objectives

- To succeed in protecting and conserving the ecosystems, species and genes most threatened within the country.
- To stop and reverse pollution of water, air and soil.

- To stop and reverse the erosion and deforestation processes.
  To guarantee the inclusion of the environmental variable as a State policy within the national life activities (government, companies, society).
- To promote the sustainable use of natural resources (including an efficient use of water and electric power).
- To promote a comprehensive and decentralized environmental management. To encourage the development and adoption of productive processes and clean technologies.
- To increase and strengthen social participation and access to information on environmental and conservation policies and programs.
- To develop and encourage applied research to support the activities of the Sector.
- To promote processes of education, training and communication to preserve the ecological balance, environmental protection and sustainable exploitation of natural resources.
- To facilitate a comprehensive handling of the environmental policy and the natural resources to consolidate a sustainable development.
- To manage and preserve national waters with the participation of society to achieve a sustainable use of water.
- To guarantee strict compliance with, and enforceability of, the regulations on environmental matters.
- To assure accountability to the citizens with efficacy, efficiency and transparency.

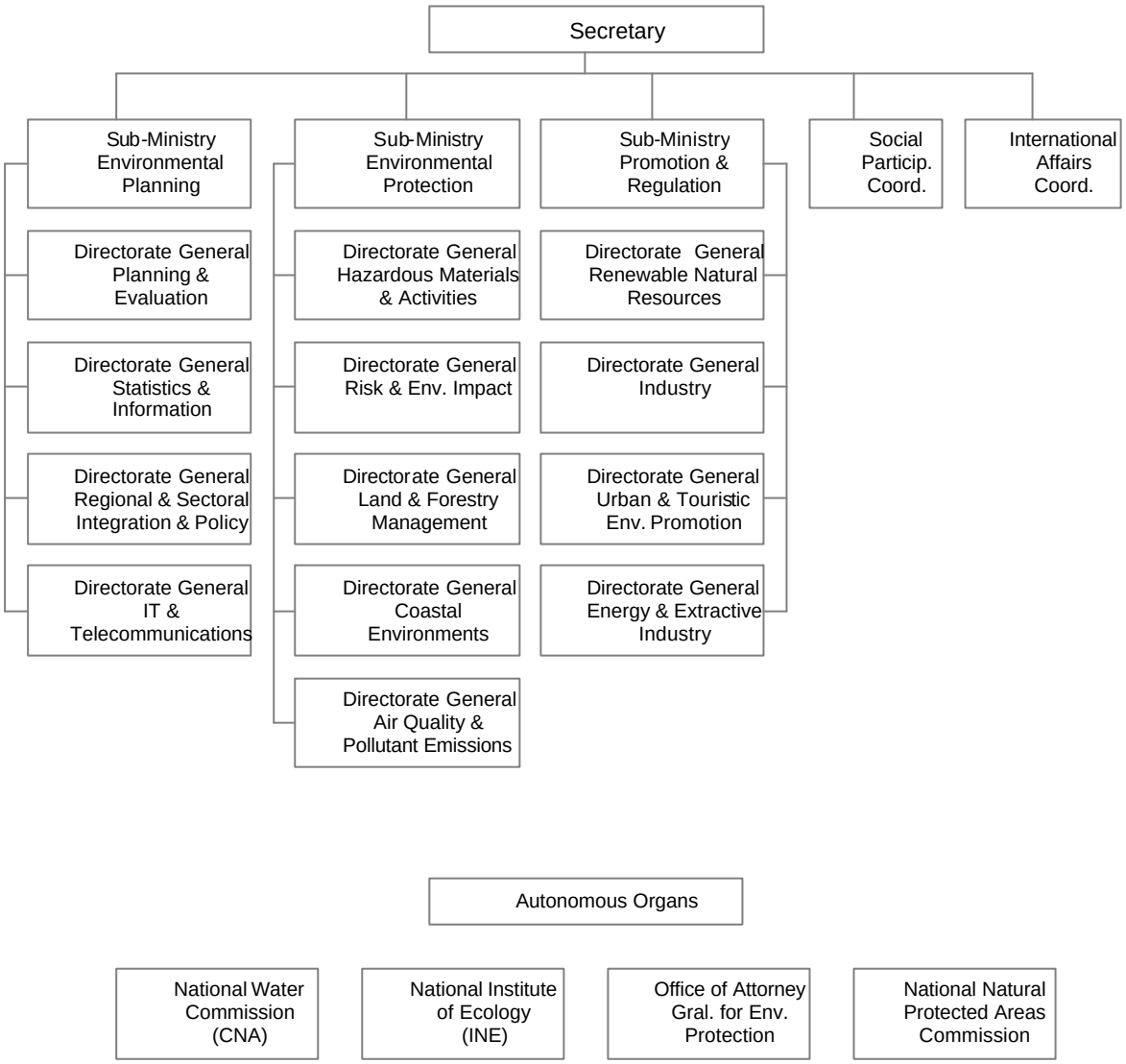
Source: (SEMARNAT, 2003)

Given Mexico's reliance on international trade and agriculture, one might expect SEMARNAT to explicitly include these two areas within its mandate and objectives. This contrasts with the mission, and purposes of other national environmental institutions, such as DEFRA (UK) and EPA (US), which, as highlighted previously, do explicitly include agriculture as part of their aims.

Over the past ten years, SEMARNAT has evolved into a complex structure comprised of 11 sub-ministries and 8 autonomous organs. As we can see in table 3.B.c., sub-ministries are organized by operative tasks, while some are sub-divided into Directorates based on the economic activities they overlook. However, none of these sub-ministries, directorates or organs has a division dedicated to oversee the environmental impacts of international trade, nor the sustainability of the agricultural sector[11].

[11] Except for the National Water Commission (CNA), which will be analysed later on this chapter.

Table 3.B.c. SEMARNAT's Simplified Organizational Structure



Translated from (SEMARNAT, 2003)

The institutional weakness mentioned above is again further highlighted when compared with the institutional frameworks in UK, USA and Norway, all of which have dedicated institutional structures for overseeing environmental impacts of agriculture.

The lack of explicit inclusion of international trade and agricultural environmental issues in SEMARNAT's mandate and organizational structure has undermined its capacity to effectively coordinate and pursue

sustainability objectives jointly with other national ministries. Although SEMARNAT has been involved in rural development plans managed by the Agriculture Ministry (Nunez*, 2003), this contributions have been so marginal, that the benefits have been limited (Gonzalez, 1999). As highlighted by Nunez [*, 2003 #58] "*there is still significant room for improvement in terms of the transversality of the environmental considerations throughout all federal ministries, as well as regional and local government agencies*". Similarly, the OECD (2000a) has urged SEMARNAT to create mechanisms to ensure a better integration at the inter-ministerial level.

On the positive side, and although not included in its mandate, the SEMARNAT does have an "International Affairs Coordination Unit" (seen in table 3.B.c.), which deals with international environmental agreements. This body forms a link with international and multilateral agencies, such as the North American Commission of Environmental Cooperation (CEC)[12], and is involved in the trade agreement negotiations.

The reason why SEMARNAT has not included environmental impacts of agriculture in its mandate and structure appears to be primarily due to international pressure and limited funding. SEMARNAT was created and restructured following external pressures (Nunez*, 2003), and therefore its objectives and structure has been shaped following what have been perceived as international "common practices" regarding environmental institutions (Ezcurra*, 2003) and not necessarily national needs. Crespo [*, 2003 #25] concurs that this is a common practice in developing countries, which leads to institutions and regulations being updated continuously, with the needed functions sometimes not covered.

In terms of funding, in 2003 SEMARNAT received US$1.6 billion, approximately 0.05% of the total Federal budget (SHCP, 2003). This seems low when compared to US spending on Environment and Natural Resources, which accounts for US$27.4 billion (USBudget, 2002) or 3.7% of the Federal budget. Allowing for population, economic and territorial differences, the proportion of the total budget spent in Mexico on the environment remains significantly less than that of the US and most developed countries. Although the OECD (2000a) attributes the continuing under funding of SEMARNAT to the economic hardship suffered by the country during the 1990s, Halle [*, 2003 #66] and Ezcurra [*, 2003 #79] believe that it is not a matter of absolute resources, but a question of governmental priorities.

[12] As we will see in the next section, the CEC is one of the multilateral institutions created by NAFTA's environmental side agreement.

In summary, SEMARNAT was created and has evolved mainly following external pressures brought about by NAFTA (Nunez*, 2003; OECD, 2000a). Surprisingly, however, its contribution to the management of the environmental impacts of agricultural trade is unclear. This is evidenced by SEMARNAT's poorly defined objectives and inappropriate institutional structure, caused by a lack of adequate funding, government priority , and the external pressures upon which it was created.

We now analyse three of SEMARNAT's organs relevant in the context of this dissertation[13]:

a) The National Institute of Ecology (INE);

b) The National Water Commission (CNA); and

c) The Office of the Attorney General for Environmental Protection (PROFEPA).

3.B.3 The National Institute of Ecology (INE)

INE is a decentralized body incorporated into SEMARNAT in 1994, and is in charge of environmental research and understanding. Its aim is:

> *"the generation of scientific and technical information on environmental issues and the training of human resources, in order to inform society, support decision making, encourage the protection of the environment, promote the sustainable use of natural resources, and support the Secretary of the Environment and Natural Resources in reaching its goals" (INE, 2003).*

Clearly, one of INE's main aims is to help SEMARNAT "reach its goals", thus, the vague objectives of the environment ministry in terms of international trade and agriculture permeates to INE. This is evident when analysing INE's "research agendas", summarized in table 3.B.d.

[13] Other relevant autonomous organs such as the National Forestry Commission and the National Protected Areas Commission were not included in the subject dissertation, but independent analysis should draw similar conclusions.

Table 3.B.d. INE's Research Agendas

- The "green ecology agenda" aims to carry out research that leads to the sustainable use of natural resources through the ecological ***land use planning***, biodiversity conservation, ***and the integrated management of basins***.
- The "brown ecology agenda" encompasses the pollution control measures at a local, regional, and global Scale. Its aim is to develop research intended to draw up policies that permit the prevention of pollution and the proper management of hazardous materials
- The "socio-economic agenda" is formed by research projects oriented to design new economic instruments of environmental policy, develop economic assessment methodologies for the ***natural capital and environmental services***, and in general to establish environmental accounting systems.
- The "experimental research and training agenda" includes research activities with mainly an experimental approach to control technologies and monitoring and characterization of pollutants, substances, and waste in all the environmental matrixes. It also includes the specialized development of human resources oriented to the study of environmental issues through theoretical and practical training in top-notch laboratories where studies applied to the solution of specific problems are performed.

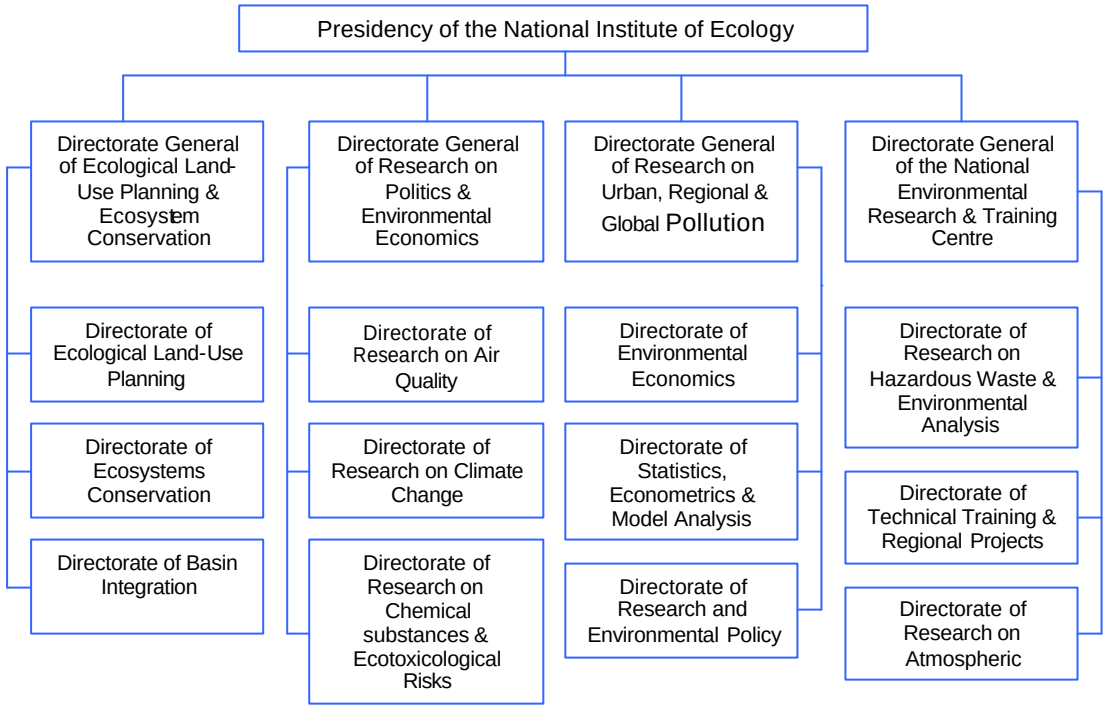
Source: (INE, 2003).

It is obvious that the INE does not explicitly include the study of trade and agriculture effects on the environment as part of its mandate. This is not to say that the INE does not include projects related to agriculture as part of its green and socio-economic agendas. The Institute does have projects such as (Ezcurra*, 2003): a) compliance with the Cartagena Protocol[14] and the understanding of genetically modified influx into local corn varieties; b) economic analysis of payment of environmental services to farmers (although more focused to forestry); and c) the establishment of a much needed monitoring system to assess national deforestation rates. However, these projects seem limited compared to the sustainability needs of the agricultural sector in Mexico, and even more so when assessed versus the UK and Norway's research on the subject. There is truth to Ezcurra's [*, 2003 #79] assertion that the environmental problems in the Mexican agricultural sector are not necessarily rooted in limited research. However, the lack of knowledge of basic data, such as deforestation rates due to agriculture, certainly contributes to the continuation of the status quo.

The above limitations are also reflected on INE's organizational structure (See Table 3.B.e.) which does not have a dedicated directorate focusing on researching trade or agricultural issues.

[14] which seeks to "*protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology*" (CP, 2003).

Table 3.B.e. INE's simplified Organizational Structure



Source: (INE, 2003)

As with SEMARNAT, it seems that INE lacks an agricultural focus due to the international pressures through which it was created, as well as inadequate funding.

To this point, INE's president (Ezcurra*, 2003), considers the Institute's agendas and organizational structure adequate to satisfy the environmental research needs in Mexico. He says so as INE's research agendas and structure resemble those of other environmental research institutes worldwide. Thus, he assess as correct that while INE barely conducts research on sustainable agriculture, it does have a department focusing on Climate Change and another one on hazardous materials (INE, 2003), both which, while internationally relevant, are arguably not national priorities. Further, the contention that INE's structure follows international common practices is in doubt, given the examples highlighted in section (A) of this chapter.

In terms of funding, INE received US$17M from the Federal government in 2003 (SHCP, 2003), only 1% of the total SEMARNAT budget. This seems limited when compared to other national institutes and commissions

budgets. For example the National Commission of Sports and the National Institute of Nuclear Institutions received US$50M and US$40M respectively (SHCP, 2003). Further, US institutes such as the Biological and Environmental Research Institute received US$504M (BERI, 2003) during the same period! In addition, the fact that INE focuses part of its resources on "internationally relevant" environmental projects, detracts resources from national needs.

In summary, although INE has made significant progress since its conception in terms of capacity building and strengthening of research and scientific cooperation in several environmental areas, it is ill-prepared to deal with the environmental stresses caused by trade liberalization in areas such as agriculture. As with SEMARNAT, its objectives and institutional structure were not developed taking into consideration the subject topic, partially due to inadequate Federal funding and support, and partially due to its focus on internationally relevant priorities.

3.B.4 National Water Commission (CNA)

CNA is another decentralized unit of SEMARNAT. It was created in 1989, but was preceded by several institutions, including the Direction of Water, Lands and Colonization established in 1917; and the Ministry of Agriculture and Hydraulic resources created in 1976 (CNA, 2003). This long institutional history makes CNA one of the most developed environmental institutions in existence prior to NAFTA (Nunez*, 2003). CNA's mission is to "*manage and preserve the national waters, with the participation of society, to achieve a sustainable use of the resource*" (CNA, 2003). It is also in charge of enforcing regulation in areas related to inland water basins. CNA addresses its mandate by establishing six specific objectives, highlighted in Table 3.B.f, which explicitly include the efficient use of water in agricultural production and the sustainable management of basins and aquifers.

Table 3.B.f. CNA Objectives:

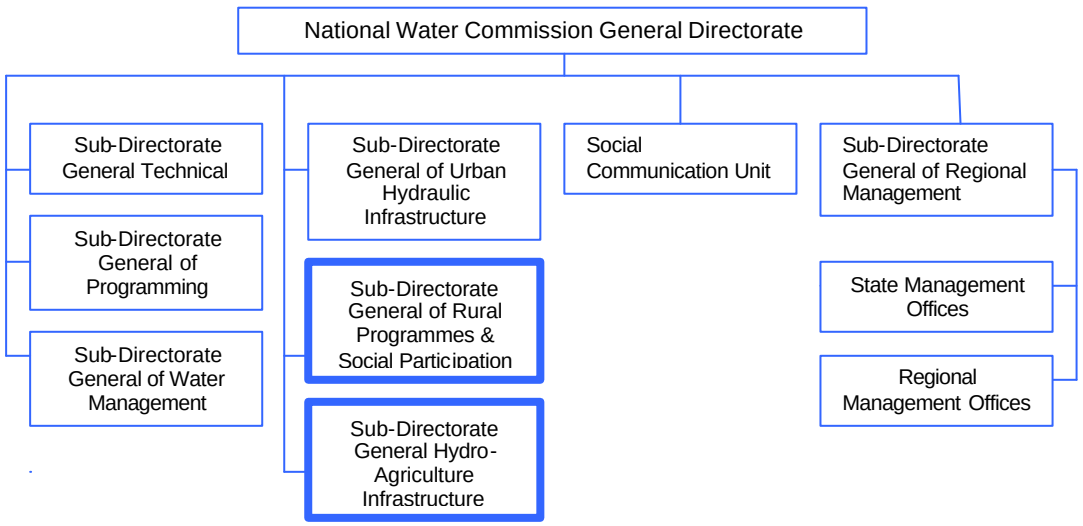
- Promote the efficient use of water in agricultural production.
- Promote the extension of the coverage and quality of the services of potable water, sewer system and cleaning-up.
- Achieve an integral and sustainable management of water basins and aquifers.
- Promote the technical, administrative and financial development of the hydraulic sector.
- Consolidate the participation of users and organized society in water management matters and promotion of a culture of good water usage.
- Prevent the risks and address the effects of flooding and droughts.

Source: Translated from (CNA, 2003)

Indeed, CNA is the only environmental institution in Mexico that explicitly includes the agricultural sector within its mandate. This is partially because CNA acknowledges that 75% of the basin and aquifers water resources in Mexico are used in agriculture (CNA, 2003; Reforma, 2003). It might also trace back to the origins of the institution, which has been historically focused on the agro-industry. In this case, CNA already included the agricultural sustainability objectives, and was positively influenced and strengthened by NAFTA, in other important water issues, such as border water usage and treatment (Nunez*, 2003).

CNA's organizational structure reflects its mandate (see Table 3.B.g.). It is divided into several sub-ministries, two of which are related to the agricultural sector, the General sub direction of Hydro-agriculture Infrastructure, which is in charge of managing, operating, conserving and modernizing the irrigation infrastructure, and the sub direction of Rural Programs and Social Participation. The latter has diverse responsibilities, mainly fostering the adequate use of the resource throughout the rural sector, while promoting public participation.

Table 3.B.g. CNA Organizational Structure



C

Source: Translated from (CNA, 2003)

CNA is SEMARNAT's agency with the largest annual budget, US$1.2 billion for 2003, representing 70% of the total ministry's budget. This reflects a higher level of political support, as the Mexican government actually considers water depletion a "National Security" issue (CIA, 2003).

Unlike other environmental institutions in Mexico, CNA does seem to have a more adequate mandate, organizational structure and funding at a National level to cope with the water problems of the agriculture industry. Nevertheless, CNAs institutional criticisms include: (a) lack of coordination capacity to adequately manage the water resources in Northern areas. Most of the superficial and underground water basins in the northern areas are shared with the US (CEC, 2002; SCERP, 2002) and CNA has been criticized of having a weak coordination with regional and local governments at either side of the border, as well as with bilateral water institutions (such as the IBWC) (CEC, 2002; SCERP, 2002). CNA, as well as the NAFTA multilateral environmental institutions, have an important role to play on improving inter-agency cooperation among all currently "disconnected" institutions (SCERP, 2002); and (b) CNAs institutional weaknesses are mostly evident at a regional and local level, through weak political support and capacity to enforce the relatively recent water management reforms[15], and thus, its inability to collect water usage fees (Liverman et al, 2001; OECD, 2000a). This inefficiencies, translate into unclear water property rights, promoting the excessive water depletion and pollution rates, especially in the Northern agricultural areas (Nunez*, 2003; Rodriguez, 2003)

In summary, CNA is the most developed environmental institution under SEMARNAT umbrella and is the only Mexican environmental agency that includes the environmental impacts of agriculture as part of its mandate and organizational structure, while also receiving most of the Federal environmental budget. Unfortunately, lack of inter-agency coordination with National, Bilateral and US agencies in the border area, and inadequate enforcement capacity at local and regional levels, curtails CAN's ability to promote more sustainable usage of water resources.

3.B.5 The Office of the Attorney General for Environmental Protection (PROFEPA)

The Office of the Attorney General for Environmental Protection (PROFEPA) has been a decentralized administrative organ under SEMARNAT's umbrella since 1994 (PROFEPA, 2003). It is Mexico's primary

[15] The National Water Law modified in 1992 includes reforms on the management, law and pricing of water in Mexico (Liverman et al, 2001).

monitoring, protection and enforcement agency and runs Mexico's environmental audit program (USMCOC, 2000).

Since its conception, PROFEPA has had difficulties complying with its role. It is widely accused of inefficiency and corruption. While changes were made by successive administrations, especially since NAFTA, the results have not always been favourable (PROFEPA, 2003). PROFEPA recognizes that it is inadequately prepared to face the environmental challenges of a rapidly growing country, as it is still facing funding, as well as monitoring and enforcement capacity issues (PROFEPA, 2003).

Given this, PROFEPA has recently highlighted four priority areas to better manage its limited resources (PROFEPA, 2003). None of these priority areas, shown in Table 3.B.h, include compliance with environmental regulation by the agricultural sector. It comes as no surprise, therefore, that PROFEPA does not focus significant efforts on monitoring environmental impacts and enforcing regulation of the agricultural sector.

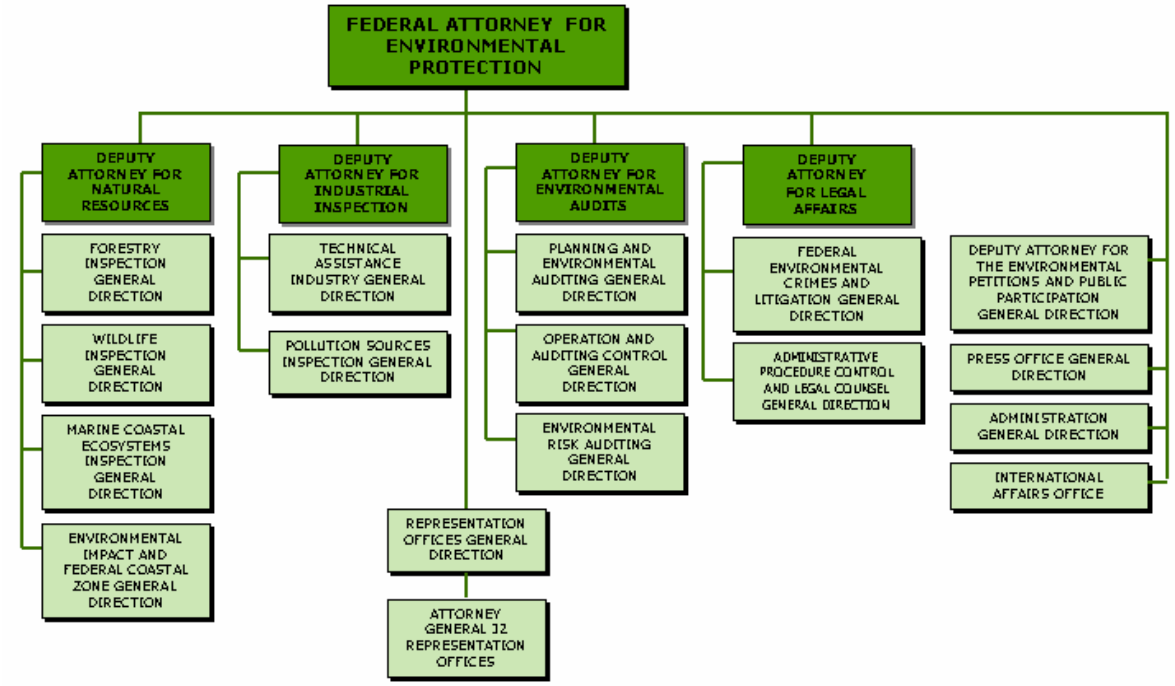
Table 3.h. PROFEPAs Priority Areas

- Protection of natural protected areas and protection of endangered species
- The monitoring and compliance of high risk industries *(i.e. chemical, petroleum, automotive, oil industry, construction)*
- Strict enforcement of the law, through inspection and surveillance,
- The promotion of voluntary plans and mechanisms to comply with environmental regulation

Source: Translated from (PROFEPA, 2003).

Evidently, and not surprisingly PROFEPAs organizational structure does not include any area in charge of overseeing enforcement of trade nor agriculture environmental regulation. See table 3.B.i.

Table 3.B.i. PROFEPA's Organizational Structure



Source: (PROFEPA, 2003)

The limited scope of PROFEPA's organizational objectives and structure, and to some extent corruption and inefficiency, comes mainly from significant human and monetary limitations (PROFEPA, 2003; OECD, 2000a). PROFEPA's annual budget for 2003 is US$64 Million (SHCP, 2003), which scarcity can be annecdotically highlighted by one of its directorates. The Forestry Inspection Directorate, relies to achieve its national mandate only on 321 inspectors, meaning that each is responsible for monitoring a forested surface of 4,000mts2, while earning a monthly salary averaging only US$380 (PROFEPA, 2003).

In summary, PROFEPA's inadequate funding limits its scope of action and hinders its organizational capacity to enforce regulation in all areas, and specially in agriculture.

The above analysis on the Mexican Environmental Institutions highlights that although NAFTA and its environmental side agreements have encouraged positive reforms in terms of environmental regulation and overall institutional capacities, most institutions have blatant weaknesses in coping with the environmental pressures of a liberalized agricultural sector. This is evidenced by the fact that none of them, except CNA,

include trade or agriculture as part of their mandates or institutional structure. This gap is attributable to the lack of adequate funding and political support from the national government, as well as the fact that most institutions were created following international pressures, and not necessarily national needs.

3.B.6 Financial Institutions & Rural Development Plans

Although both Mexico's North and South face particular environmental pressures, the Southern peasantry also suffers from economic underdevelopment. Mexico's agricultural environmental impacts in the South, therefore, are significantly affected by the low level of financing and access to credit available to transition from a closed to a more open economy (Fitzgerald*, 2003; Nadal, 2000; Quintana, 1996).

The fact that the Southern peasantry does not have access to credit from commercial banks[16], makes them rely on government financial redistribution schemes to become productive and sustainable. The Mexican government has historically covered this role through national institutions, such as the Bank of Agricultural Development (Banrural), as well as price support mechanisms such as CONASUPO[17]. However, most of these mechanisms were closed or significantly under funded after the 1994 crisis[18] (Fitzgerald*, 2003; Quintana, 1996; Yunez-Naude, 2003).

Given this, the Ministry of Agriculture, Ranching, Rural Development, Fisheries and Feeding (SAGARPA) set two basic policy instruments aimed to assist producers, especially low income producers, during the transition period to an open economy, the PROCAMPO and the Alliance for the Countryside (Yunez-Naude, 2003; Nadal, 2000).

[16] As they do not have collateral

[17] Conasupo was key to ensure that local producers were paid an adequate price for their produce, and thus indirectly incentive a more sustainable agricultural production (Yunez-Naude, 2003)

[18] During the 1980's and 1990's Mexico was not only going through a process of liberalization, but was also struggling to recover from the debt crisis in 1982 and the peso crisis in 1994. The economic hardship and governmental deficit brought by these crises, together with the perception of international funding institution such as the World Bank and the IMF, that the subject institutions were corrupt and protectionist, caused their closure (Fitzgerald*, 2003).

PROCAMPO was established in 1994 as an income support mechanism to compensate for loss of income expected as a result of lower corn prices after trade liberalization (PROCAMPO, 2003). The Alliance for the Countryside was conceived in 1995 and is intended to promote farming productivity and crop substitution in line with NAFTA objectives. (Yunez-Naude, 2003; SAGARPA, 2003). However the benefits from these programs have been limited due to severe under funding and poor implementation (Nadal, 2000; FAO and SAGARPA, 2002; Patel and Henriques, 2003; Rodriguez, 2003). The budgets for PROCAMPO and Alliance for the Countryside have dropped in 27% and 23% respectively from 1995 to 1998 (Nadal, 2000). Further, the coverage of each programs is still limited (60% and 18% respectively), and concentrated in the hands of fewer, larger private producers (Nadal, 2000; Rodriguez, 2003; FAO and SAGARPA, 2002). Table 3.B.j. provides a brief summary of the Alliance for the Countryside Evaluation conducted by the FAO in 2002.

Table 3.B.j. Alliance for the Countryside Evaluation highlights

The number of beneficiaries was only 18 % of the programs Universe. Further, the number of producers receiving support fell 14% after the first three years of the program.
The program is more successful among the more capitalized producers, as this are the ones that receive more funding, with actions that are more consistent and of greater value. The program has had little impact with poorer producers, as they receive less money in a more dispersed manner. This highlights the fact that the distribution of resources was unequal, Poor and very poor farmers account for 19% of the total population of farmers, but received only 5% of the total budget.
Overall, only 1/3 of the producers saw a change in production, productivity or quality attributable to the Alliance's support, being this proportion only between 10-24% among the poorer producers, highlighting poor results in terms of productivity building.
Among the peasantry, the communities that were well organized among themselves obtained better benefits from the program, highlighting the importance of local social institutions.

Table by: S.Vilas, based on (FAO and SAGARPA, 2002)

This analysis indicate that the Federal government has failed to provide an adequate transition plan to foster the economic integration and sustainability of the Southern producers in light of a liberalized agricultural market (Fitzgerald*, 2003; Quintana, 1996; Nadal, 2000).

Separately, Northern agriculture faces a completely different financial scenario. It receives significant amounts of private investment from national and international investors, while also having access to commercial bank loans and credits (Fitzgerald*, 2003). In addition, they have more than proportionally benefited from government rural

development projects (FAO and SAGARPA, 2002; Nadal, 2000; Rodriguez, 2003). The combination of these sources of funding has contributed to the relatively healthy economic development and expansion of Northern agriculture. Rather, the environmental sustainability problem of the North is driven more by a lack of economic incentives to invest in “green” technologies, as well as weak enforcement of regulation (Fitzgerald*, 2003).

3.B.7 Conclusion

NAFTA has positively influenced the creation and development of environmental institutions in Mexico. However, most of these institutions continue to lack the key characteristics that theory suggests are required of effective organizations. In particular, they do not have adequate mandates and organizational structure to deal with environmental impacts from agricultural liberalization, which could be assessed as one of the main sources of environmental pressure in Mexico. This oversight is partly due to a lack of adequate funding, a lack of political will, and the fact that most institutions were created in response to external pressures rather than national needs. Further, the absence of incentives to fund “greener” technologies in the Northern part of the country, as well as the lack of credit and funding of rural development programmes in the South, have been a key factor fostering unsustainable use and over exploitation of natural resources.

CHAPTER 3, SECTION C:

The Multilateral Institutions and NAFTA Environmental Provisions

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"An amazing thing about NAFTA is that It continues to function without institutions"

(Fitzgerald, 2003)*

This section provides an overview of NAFTA environmental provisions and the institutions created by its side-agreements. It will be argued that these institutions have contributed to open the better communication and information sharing between countries (Torres, 1999; McKinney, 2000). They have not, however, been able to deal with many of the environmental stresses brought about by NAFTA (Fitzgerald*, 2003; Mumme, 1999), especially in the agricultural sector. Their inadequacy stems from their narrow scope, insufficient funding and lack of political support since conception (Fitzgerald*, 2003; McKinney, 2000; Torres, 1999). This is partly because the environmental provisions were included in NAFTA primarily at the behest of US pressure groups concerned with increased pollution from manufacturing companies on the border (Halle*, 2003) and widely ignoring the requests of Mexican environmental groups (Torres, 1999), thus they deal mainly with U.S.-Mexico Border issues.

We argue that the lack of an adequate multi-lateral institutional framework, coupled with a weak national institutional framework in Mexico (as seen in the previous section), has further contributed to environmental degradation and depletion of natural resources in the agricultural sector in Mexico.

3.C.1 The Context: Why were environmental provisions included in NAFTA?

None of the three NAFTA governments initially intended to include environmental provisions as part of the negotiations (Torres, 1999; McKinney, 2000; Lopez-Hoher*, 2003; Halle*, 2003). However, increasing environmental problems at the US-Mexico border nurtured environmental groups pressure, particularly in the US, which began demanding the strengthening of previous bilateral environmental agreements such as La Paz (EPA, 2003b), and eventually pressed the US government to include environmental provisions in NAFTA (Torres, 1999). Subject to US pressure, Mexico & Canada eventually accepted the provisions too. This reluctant acceptance, coupled with the countries' differences in terms of environmental priorities and laws [19], gave early evidence of the limits the environmental agreements would reach (Torres, 1999; Lopez-Hoher*, 2003).

While NAFTA environmental provisions did not satisfy environmental groups in the US, they provided enough political cover for the congress to approve the main NAFTA text in 1992, before the end of the Bush administration (Torres, 1999; McKinney, 2000). The environmental provisions included in this text, while limited, were applauded as it was the first time such provisions were include in a trade agreement (USDS, 2000).

However, environmental concerns from pressure groups in the US persisted after NAFTA text was completed in 1992 (McKinney, 2000). Thus, two supplemental agreements were created under the newly elected Clinton Administration. These were the North American Agreement on Environmental Cooperation (NAAEC) and the US-Mexico Border Environment Cooperation Agreement (BECA). NAAEC addresses party's failure to enforce environmental laws and contains the dispute settlement process, while BECA aims to identify mechanisms for financing border environmental projects and promote clean-up (USDS, 2000).

3.C.2 The Environmental Institutions

Based on NAAEC, the North American Commission for Environmental Cooperation (CEC) was created between Mexico, USA and Canada. Further, based on BECA, two binational institutions, between the USA and Mexico were created, The Border Environmental Cooperation Commission (BECC) and The North American Development Bank (NADBank). These three institutions were intended to support national institutions in

[19] Mexico specially, in its role as a developing country moving towards industrialization, had not considered environmental protection as one of its top priorities (Torres, 1999; Lopez-Hoher*, 2003).

minimizing the negative environmental impacts of trade (USMCOC, 2000)[20]. Table 3.C.a. summarizes the agreements and institutions created by NAFTA.

Table 3.C.a. Summary of NAFTA Environmental Agreements and Institutions

Agreements	Objective	Institutions	Role
North American Agreement on Environmental Cooperation (NAAEC)	Address party's failure to enforce environmental laws and contains the dispute settlement process	Commission for Environmental Cooperation (CEC)	-Broaden environmental cooperation among the parties. -Forum to consider environmental issues -Promote regulation enforcement.
US-Mexico Border Environment Cooperation Agreement (BECA)	Identify mechanisms for financing border environmental projects and promote environmental clean-up.	Border Environment Cooperation Commission (BECC)	-Helps border states and communities coordinate, design and mobilize financing for environmental infrastructure project -Certify projects for financing.
		North American Development Bank (NADBank)	-Evaluates the financial feasibility of projects certified by BECC and provides financing as appropriate.

Table by: S. Vilas, source (USDS, 2000)

3.C.3 North American Commission for Environmental Cooperation (CEC)

The Commission for Environmental Cooperation (CEC) aims to: (a) address regional environmental concerns, by broaden environmental cooperation and providing a forum to discuss environmental issues among the parties; (b) help prevent potential trade and environmental conflicts, acting as a dispute settlement mechanism to resolve government-to-government environmental disputes, and (c) promote the effective enforcement of environmental law in all NAFTA countries (CEC, 2003). CEC is intended to oversee any environmental issue that are relevant to the member parties, including trans-boundary and intranational problems.

[20] Independently from NAFTA side agreements, other bilateral programs have been signed between US and Mexico, including the US-Mexico Border 2012 programme that was created in 2002 (based on the previous La Paz agreement signed in 1983) to deal with environmental problems in the border states (EPA, 2003b). However, although relevant, we will not cover these bilateral programs in the context of this dissertation.

McKinney (2000) highlights, that CEC is the "most well developed, transparent and active of all NAFTA-related institutions". It has proven useful as a forum to express trinational environmental concerns, deploy relevant information, monitor environmental trends and incentive public participation on relevant environmental issues, all which have helped improve cooperation among NAFTA Countries (Mumme, 1999; Torres, 1999). This is reflected in CEC's organizational structure, summarized in table 3.C.b. The council, on which the three environmental ministers are members, the Joint Public Advisory Committee, and the National and Government Advisory committees are all mechanisms that facilitate dialogue among the environmental experts in each country.

Table 3.C.b. – CEC Organizational Structure

Council: The Council is the governing body of the CEC, is composed of the environment ministers (or the equivalent) of each country. It meets at least once a year to discuss CEC programs and activities.

Joint Public Advisory Committee (JPAC): it is composed of fifteen members, five from each of the three countries (Canada, Mexico and the United States), who are appointed by their respective governments, and may include government officials, Scientists, and/or Academics. Its members act independently and their responsibility is to provide the Council, with their advice on all matters within the scope of the NAAEC.

National Advisory Committee (NAC) and the Government Advisory Committee (GAC): The National Advisory Committees, are made up of members of the public, including representatives of nongovernmental organizations, who advise their signatory governments on the implementation and further elaboration of the agreement. Each country has its own NAC and decide the structure and number of members on it. The GAC's consist of representatives of federal and state or provincial governments who offer advice on the implementation and development of the agreements. CEC's interaction with civil society is further fostered by the grants it extend to nongovernmental organizations through its North American Fund for environmental Cooperation programme

Independent Secretariat key responsibilities include preparing reports and serving as a point of inquiry for public concerns about NAFTA's possible environmental impacts. The Secretariat is composed of professional staff who implement initiatives and conduct research in core program areas on topics pertaining to the North American environment, environmental law and standards, and other environment/trade issues, in addition to processing citizen submissions on enforcement matters.

Table by: S. Vilas, Source: based on information from *(USDS, 2000)*

Although, according to institutional theory, incentive "cooperation" is a key element for multilateral institutions, it is still open to question whether the CEC is complying with its coordination role to the extent needed (McKinney, 2000). The CEC has been criticized for having limited coordination and contact with other NAFTA institutions, such as the Free Trade Commission, as well as with other environmental bodies and programs (Mumme, 1999).

Further, CEC performance in terms of its mandates (b) and (c) has been limited. Its objective of performing as a dispute settlement mechanism on environmental matters have clearly not been met, as the rules of procedure to resolve these disputes has not been yet established due to lack of political support from the three countries (Mumme, 1999). Thus, major environmentally based cases, such as the Tuna-dolphin, have been solved through the WTO dispute settlement mechanisms instead (McKinney, 2000). Further, CEC does not have the autonomy, the authority nor the organizational structure needed to initiate reports, gather information or enforce environmental actions (Torres, 1999), limiting its ability to comply with its mandate of promotion of environmental law enforcement (Mumme, 1999). In other words, like all other NAFTA institutions, it "lacks teeth" (Lopez-Hoher*, 2003).

CEC is divided in four main research areas, namely: Environment, Economy and Trade; Conservation of Biodiversity; Pollutants and Health; and Law and Policy, which are intended to oversee all relevant trasnational and intranational environmental issues. However, given the political pressures that gave it birth, it has dedicated most of its resources to increase understanding and cooperation on border pollution related issues. Only on the last couple of years, CEC has broadened its scope from border problems, to other trade related environmental issues, such as the ones faced by the agricultural sector (CEC, 2002; Nunez*, 2003). Further, as of 2002, CEC started covering the environmental effects linked with current and proposed commitments in the World Trade Organization (WTO) as well as consideration of the possible implications of the Free Trade Area of the Americas (CEC, 2002). However, CEC's historic limited scope, has contributed to lack of information on environmental risks of agricultural trade liberalization, and thus to unnecessary environmental damage in this sector. Further, CEC role to influence coordination and action of the NAFTA governments to address the environmental impacts of agricultural trade liberalization is still to be seen.

In terms of funding, it is financed equally by the three countries and has an annual budget of approximately US$9 million, which is below the originally promised budget of US$15 million (Mumme, 1999). The inadequate funding of this institution has resulted in staff shortages, and has contributed to the limited scope and the less-than-efficient performance of mandate functions mentioned above (Mumme, 1999).

In summary, although the CEC has nurtured the cooperation and dialogue among NAFTA countries, it still has room for improvement, specially in areas such as agriculture. Further, given the political unwillingness of the three countries to establish a supranational institution, the autonomy, scope and funding of the CEC is still

limited (Mumme, 1999; Fitzgerald*, 2003; Lopez-Hoher*, 2003). This has impeded the CEC to build the organizational structure and political power to help enforce legislation in both sides of the border and to perform as a dispute settlement mechanism. It has also limited its scope, having a slim impact in issues concerning environmental sustainability of agricultural trade.

3.C.4. The North American Development Bank (NADBank) and the Border Environmental Cooperation Commission (BECC).

The North American Development Bank (NADB) and its sister institution, The Border Environment Cooperation Commission (BECC), were created by Mexico and U.S. under the auspices of the U.S.-Mexico Border Environmental Cooperation Agreement (BECA) (USMCOC, 2000).

The NADBank mission is *"to enhance the affordability, financing, long-term development and effective operation of infrastructure that promotes a clean, healthy environment for the citizens of the border region".* It achieves this by financing environmental infrastructure projects related to potable water supply, wastewater treatment or municipal solid waste management located within the border region[21] (NadBank, 2003a). BECC identifies, supports, evaluates, and certifies affordable environmental infrastructure projects that will then be financed by NADBank (BECC, 2003). Certification is based on a set of environmental, health, technical, financial, community participation and sustainable development criteria, through a process that ensures extensive public and local input.

Both, NADBank and BECC were sorely needed to deal with environmental problems along the US-Mexico border. While both have been slow in getting started, their programs are making a difference to communities along the border (Mumme, 1999; McKinney, 2000). Although the bifurcation of functions between the two institutions have been assessed by some authors as unnecessarily complex and bureaucratic (McKinney, 2000), the increased participation of border inhabitants through public meetings and participatory mechanisms, incentive by BECC, has been assessed as a positive and encouraging step (Torres, 1999; CSIS, 2003).

[21] To note, the US-Mexico border region in which the bank focuses its efforts, is defined as the area within 100 kilometres (approximately 62 miles) North and South of the boundary between the United States and Mexico [NadBank, 2003a].

However, one of the criticisms of NADBank and BECC is that their performance and scope are too limited (CSIS, 2003; Gradisher and Callis, 1997; Filner, 2003). Although in 2000 the NADBank undertook a series of reforms, including (a) the opening of NADBank funding to basically any kind of "environmental infrastructure"; (b) expansion of its regional jurisdiction from 100 to 300km on each side of the border; and (c) increasing the low-interest-rate lending facility; little, if any, progress has been evident to date (CSIS, 2003). Further, funding of irrigation systems were not explicitly included. To this point, all NADBank critics agree that the bank should improve its performance, however there is controversy on whether the bank should expand to cover any type of border environmental issue (CSIS, 2003; Filner, 2003) or if it should only comply with its original mandate (Kourous, 2000). In terms of the subject research, given the relevance of the border water depletion rates for the US and Mexico, and the fact that most of the water in the area is used for irrigation of agricultural land mainly focused on export produce (Rodriguez, 2003; Fitzgerald*, 2003), there is a strong argument to suggest that the NADBank should explicitly include, and moreover, actively promote, funding of efficient irrigation projects as part of its core mandate.

Separately, each country contributes an equal share to the funding of both NADBank and BECC, and they may additionally, receive contributions from other institutions, foundations or government entities (BECC, 2003). The original capital to cover the functioning for the first ten years of NADBank was of US$8 billion[22]. However, the authorized capital of NADBank todate, 9 years after its creation, totals only $3 billion (NadBank, 2003b). Further, up to June 2003, the NADBank has funded 73 projects, of which NADBank participation is estimated at only US$0.7 billion (NadBank, 2003b), less than a tenth of the original budget. The lower than estimated funding of NADBank can be traced to lack of political will of both governments (Gradisher and Callis, 1997; Fitzgerald*, 2003), as well as the principle of "equality of efforts", by which two countries with enormous economic disparities finance the bank by equal disbursements (Torres, 1999). Further, NADBanks difficulty to lend the funding that it does have available comes from the fact that it bases its loans on market (or higher) rates, making the loan packages excessively expensive for the border communities (Mumme, 1999; CSIS, 2003).

Net, the NADBank and BECC have had a slow start. On the positive side, BECC has incentive cooperation and community participation in the border region. However, lack of political will and the "equality of funding" principle

[22] Original Sierra Club estimates indicated the need for at least US$20 billion to pay for border clean-up (Gradisher and Callis, 1997)

have limited the NADBank funding, while its policy of lending credits at market rates or above, has discouraged lenders from applying to the bank's credit. Finally, the unwillingness of the bank to include and actively promote funding of water quality and conservation programs in the agricultural sector, contributes to the current reliance of Northern producers on inefficient irrigation technologies.

3.C.6. Conclusion

NAFTA bilateral institutions have started, though slowly, to increase environmental cooperation between the three countries. Although they have been successful in increasing intergovernmental coordination on the decision making process of environmental problems in the border region, they are still lacking the necessary political support, funding and scope needed to contribute to the better management of environmental impacts from trade liberalization, specially in areas such as agriculture.

3.D. Chapter Conclusion

We can draw several conclusions based on the subject institutional analysis. We can first establish that NAFTA, and the external pressures that accompanied it, positively influenced the creation and development of environmental institutions at a national and multilateral level. However, given the pressures by which these institutions were created, as well as the lack of political will that have accompanied most of them, their capacity to contribute to the better management of environmental impacts brought about by international trade have been impaired, specially in sectors of economy which do not necessarily generate trans-boundary impacts, such as agriculture.

In the specific case of national environmental institutions, most of the institutions do not have the key characteristics that institutional theory recommends in order to build effective organizations. This is evidenced by them not having concise and adequate mandates and structures to deal with important national issues such as the environmental impacts of international trade and agriculture. As demonstrated previously, this seems to be caused by lack of adequate funding, lack of political will, and the fact that most of these institutions were mostly created following external pressures and not necessarily national needs. The weak national environmental framework, coupled with the insufficient supply of financial credit and sustainable rural development plans, has been a key factor fostering unsustainable use and over exploitation of natural resources throughout the country.

In terms of the multilateral institutions created by NAFTA environmental side agreements, we can also conclude that although having positively impacted coordination and communication among NAFTA governments, they are still well underdeveloped. Continuous under funding and lack of political support of all involved governments have not allowed the multilateral institutions, to comply with their respective mandates. In addition, their limited scope of action, which in general terms has not included agricultural issues, has contributed through omission of act, to the environmental stresses highlighted in chapter 2.

However, the above criticisms do not imply that the existent institutional framework is considered negligible. As McKinney (2000) highlights, all these institutions have "laid a foundation on which more robust institutions can develop in the future". So considered, the next chapter will make some recommendations of how to improve the current national and multilateral institutional framework in order to better contribute to the management of the environmental impacts of liberalized agricultural trade.

Chapter 4 - DRAFT

RECOMMENDATIONS:

A Revised National and Multilateral

Institutional Framework

"We know that "good" institutions are important,

even though we have very little idea

about how countries can acquire them".

(Rodrik, 2001)

Designing and building the adequate national and multilateral institutions to address the key environmental needs of Mexico is a task that is easier said that done. There is not a specific formula or model to follow. Although we have several examples of different national institutional frameworks - such as the ones developed by the UK, the US, and Norway – as well as multilateral, such as the Environment DG at the EU, we know little of what institutional framework would be more conducive to sustained environmental development. What is true, is that the institutional framework should be designed to address the local environmental needs, while taking into consideration the economical and institutional realities of each country (Rodrik, 2001).

The National and multilateral institutions analysed in the previous chapter have the potential to improve their management of the environmental impacts of agricultural liberalization, by ensuring that each of them comply with the three key characteristics of sustainable organizations: an adequate mission, institutional structure and funding (Hauser, 2003) to address the key environmental needs of the country.

However, different levels of development, as well as environmental footprints of Northern and Southern producers, demand different institutional solutions. The high levels of economic development of the Northern industry call for improved environmental institutions as well as for incentives to invest on more sustainable technologies. Economic hardship in the South requires, in addition, development and financing institutions to help producers adapt to a liberalized market in a sustainable way.

Based on this premise, we will proceed with brief, but specific recommendations that should help the national and multilateral institutional framework in Mexico better address the environmental needs of the liberalized agricultural sector. In addition, we will also highlight key interventions needed to improve the financial institutions and programs in charge of rural development.

4.1 NATIONAL ENVIRONMENTAL INSTITUTIONS

1. All national environmental institutions, probably with the exception of CNA, should conduct a national inventory of environmental needs. Based on this analysis, which should be inclusive of all relevant stakeholders, each institution should revisit their current objectives to ensure they reflect the country's key environmental requirements. By doing so, sectors such as agriculture and trade, both which have demonstrated economic, social and environmental relevance for Mexico, should be explicitly incorporated as part of the mandate of the relevant institutions.

2. All institutions should reassess their organizational structure in a way that it allows each of them to better comply with their revised objectives. Including agriculture and trade as part of the institutional structures of the different agencies might not necessarily require mayor structural changes. Given the low political support that environment currently faces in Mexico, as well as the limited funding availability, following institutional models such as those in the UK or Norway would be unrealistic. However, a first step to increase the relevance of agriculture and trade within SEMARNAT umbrella could include:

    - The creation of an agriculture sub-directorate as part of each of the relevant agencies. This should help to group the few, currently isolated and disparate, agriculture projects into specific

areas in each institution. This should incentive the development of new ideas, policies and programs, as well as foster and enable increased coordination among the relevant environmental institutions, the Agriculture department, the rural development programs and even the general public. Finally, by creating a department, and not a separate institution, you avoid the political unwillingness of creating a separate bureaucracy and the costs it involves.

- In terms of trade, given that it is a transversal issue touching all areas of economy and environment, it could make sense to create a "trade commission" instead of a directorate. The commission should ideally include members from all relevant areas at each institution, and could potentially be formed by inter-agency members. The commission could also include a representative from the trade ministry to promote environmentally sound trade negotiations. Again, creating a commission within the already existing institution would enhance the relevance of the topic within the institution and increase cooperation, while avoiding the extra costs of a new bureaucracy.

3. Increasing the amount and efficiency of the budget assigned to the National environmental institutions is a priority, if the inclusion of agriculture and trade to each institutions' mandates is bond to be successful. Increasing the Federal funds assigned to the environment might prove difficult, but not impossible. Thus, we recommend:

    - Increase the percentage expenditure on the environment coming from the Federal government. Currently, Mexico spends only 0.5% of the governments Federal budget on their environmental institutions (Ezcurra*, 2003), while other countries, such as the US, spend 3.7% (USBudget, 2002). This reflects the limited priority that the government gives to the environmental conservation. As Ezcurra (2003) highlighted, the low proportion of the budget assigned to the environment raises from an historic mindset, and not to a lack of funds, as environmental institutions are still too young and the government is not used to spending significantly on them.

    - The Mexican government should further incentive the "budgetary reform" started a couple of years ago, which, among other things, aims to link the federal government assignation of budget to institutional performance and results, instead of to administrative costs and

procedures (OECD, 2000b). Countries such as the US and New Zealand are starting such practices (TBS, 2003) but Mexico has lagged behind on its implementation (OECD, 2000b). The main benefit of this type of budget assignation is that it further highlights the need to have clear objectives and to make an evaluation of all projects, thus helping to spend budgets in a more efficient way, as activities that do not contribute to the main goals of the organization are eliminated. See (OECD, 2000b; TBS, 2003; ODI, 2003) for further details.

Finally, better defined objectives, a suitable institutional structure and increased funding will not only contribute to the above points, but will also help improve enforcement capacity, which is one of the key weaknesses of CNA and PROFEPA.

4.2. MULTILATERAL ENVIRONMENTAL INSTITUTIONS

1. As with the National institutions, the CEC, NADBank and BECC should revise their missions and mandates to accommodate the agricultural impacts of trade. Further:

    - The CEC should continue fostering its key role as a multi-government coordination agency, as well as an environmental forum. Additionally, the CEC should continue further expanding its scope to other non-border areas, such as agricultural trade, explicitly including this as part of its mandate. However, it does not seem likely that the CEC would obtain the necessary political and institutional support to comply with its dispute settlement mandate, nor with the objective of promoting enforcement of regulation in the border regions. Given this, we recommend that the CEC focus all its resources, objectives and structure only to comply with its current coordination role.

    - The NADBank and BECC should revise their mission as well, explicitly including irrigation projects as part of its mandate. It should also broaden, in practice not only in theory, their scope of funding to include credits for environmental agriculture projects, specially focusing on funding “green credits” for the Northern agricultural industry.

2. The organizational structure of the multilateral institutions should be reassessed in light of the above suggestions. This should not represent a major structural change for the CEC. However, the NADBank and BECC would need to build the necessary capacity to enter the credit market of the agricultural sector. Further, following criticisms by (McKinney, 2000) it might seem unnecessarily bureaucratic to have both the NADbank and BECC as pararell institutions. Thus, they could potentially be merged into only one institution that certifies and funds projects, while promoting social participation within its processes'. In this way, bureaucracy can be minimized, while releasing funds and human capacity to be invested on the agricultural credit area.

3. In terms of funding, both, CEC and NADbank should receive the full funding they were promised originally. As we mentioned before, the CEC has only received 60% of the originally established annual funding (Mumme, 1999), while the Nadbank available funds is less than 40% the original budget (USDS, 2000). Further, NADBank should lower its credit rates (Mumme, 1999), as a means to incentive Northern producers to invest in "green" technology. Additionally, criticisms to the "equality of funding" principle (Torres, 1999) are still valid, and thus the government might try to renegotiate it so that the U.S. invest proportionally more, although it seems politically unlikely.

4.3 FINANCIAL INSTITUTIONS

As we have seen, the situation of the financial institutions and rural development programs in Mexico is critical and requires the government to take immediate and significant actions. Among the urgent interventions we can highlight three:

- Reestablish and fully fund rural development banks and credits for the poor peasantry (Fitzgerald*, 2003; Quintana, 1996).

- Adequately fund PROCAMPO and Alliance for the Countryside to meet the needs of the subsistence producers. Further, the implementation of both programs needs to be improved in order to comply with its main objective of helping the poor, halting the current bias to fund industrialized producers (Nadal, 2000; FAO and SAGARPA, 2002; Patel and Henriques, 2003;

Rodriguez, 2003). Finally, these programs could also be strengthened from an environmental point of view, giving incentives to producers that enroll in sustainable agricultural practices (Gonzalez, 1999). As suggested previously, the establishment of a agricultural departments in the environmental agencies could help achieve this goal.

- Reestablish the original timeframe of gradual liberalization of the agricultural sector, specially on corn (Nadal, 2000; Oxfam, 2003). This would reduce the level of cheap corn import into Mexico, increasing the revenues of the country in an estimated US$600M (Nadal, 2000), while partially re-establishing the demand for local produce.

In summary, all national and multilateral institutions should integrate trade and agriculture as part of their mandates and structure. Further, current funding limitations could be overcome if the Federal Government increased the proportion of the budget that is directed to the environment, following the example of more developed countries. Further, there is room to make the budget spending more efficient, by moving from the current activity-based allocation, to one focused on performance and results. Finally, the reestablishment of the rural development banks, the adequate funding and implementation of PROCAMPO and Alliance for the Countryside, as well as the compliance with the quota-based system for corn imports should give the Mexican agriculture sector, specially at a subsistence level, the financial breath to start a sustainable development.

Importantly, the above institutional recommendations are not the solution to the environmental and sustainability issues of the Mexican agriculture. However, granted the necessary political support, they should help build the adequate base on which key policy and regulatory measures, as well as national sustainability plans should be built upon. Moreover, these institutional changes could prove to be not only the support, but also one of the motors to promote environmental improvements in the Mexican agricultural sector.

CONCLUSIONS

This research argued that trade liberalization, through NAFTA, exacerbated previously existent environmental degradation trends in the agricultural sector in Mexico. The Scale, Technique and Composition effect analysis has been a useful tool to demonstrate that, despite NAFTA environmental objectives, there was a combined negative effect that exacerbated the environmental trends previously existent in both the Northern and Southern areas of the country. Northern industry intensified production resulting in the unsustainable use of chemicals, water and monoculture in the arid areas. Southern producers expanded their agricultural land while abandoning environmentally friendly practices thus, further exacerbating deforestation, erosion and loss of crop genetic diversity in the already fragmented and delicate forested areas.

Although we acknowledge that these environmental impacts were fostered by a complex set of economic policies, it is evident that there were also significant institutional weaknesses that contributed to this degradation. Despite NAFTA and the external environmental pressures that came with it fostered the strengthening and creation of national and multilateral environmental institutions, it is concluded that the performance of these institutions has been far from ideal. This study has established that the weak environmental institutional framework which complemented NAFTA, both at the national and the multinational level, was not equipped to cope with the environmental stresses brought on by agricultural trade liberalization. It was demonstrated that none of the national or multilateral environmental institutions has the adequate institutional objectives, structure and funding to address the environmental pressures of a liberalized agricultural sector.

We recognize that solving the environmental and sustainability issues of the Mexican agricultural sector will require strong political will and governmental interventions in many fields not related to the institutional framework. Nevertheless, an improved environmental institutional framework should prove useful as a base to support future sustainable development of the Mexican agricultural sector. In this regard, we recommend that

the reassessment of the objectives, structures and funding of all the related environmental institutions accommodate the areas of agriculture and trade. Finally, we also argue that given economic and development disparities between North and South, institutional requirements also vary among regions. Thus, although environmental sustainability in the North may be promoted through stronger enforcement and “green” investment incentives, the South also needs increased access to credit, adequately funded rural development plans, and ideally, the compliance of the import corn quotas.

Without the implementation of the above recommendations, the possibility of moving forward to environmental sustainability of the agricultural sector in Mexico is slim.

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