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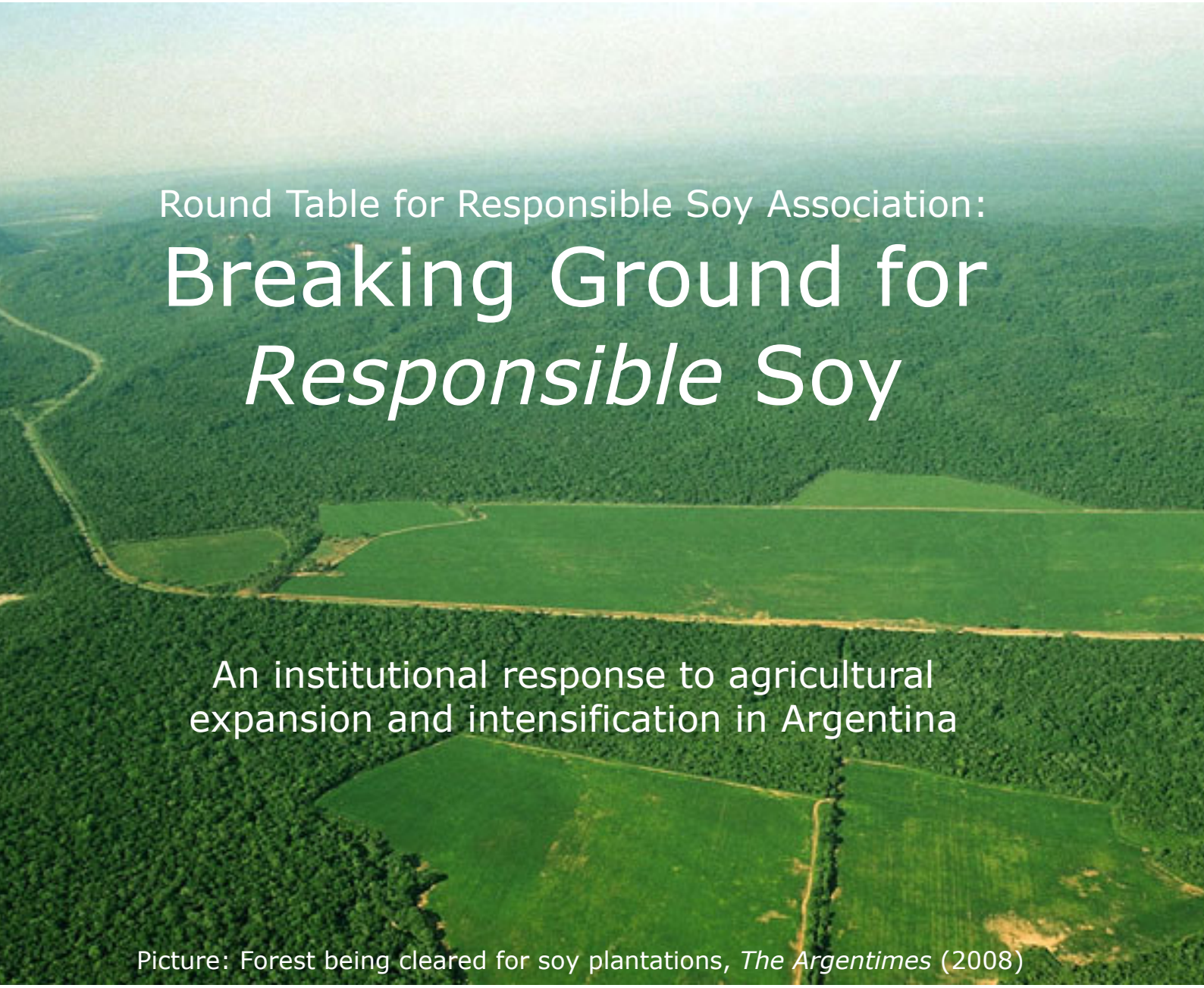

Round Table for Responsible Soy Association:

Breaking Ground for *Responsible* Soy

An institutional response to agricultural expansion and intensification in Argentina

Picture: Forest being cleared for soy plantations, *The Argentimes* (2008)

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Content

Preface

From the start of this research I was looking forward to the challenges of working in the field, in a foreign country, as a student-researcher. My personal ambition was to realize a thesis on this topic of research in Argentina. However, I was very well aware that a first foot on the ground was a prerequisite to start. Thanks to Dr. Ben Zeehandelaar, my supervisor at the Round Table of Responsible Soy Association, I got the opportunity to carry out my plans accordingly.

At the office, during my internship, and in the field, during my research, I greatly appreciated the supportive environment I found myself in. Colleagues as well as participants in this research were willing and enthusiastic to contribute and help me achieve my aims. It was a pleasure working together with Miguel Hernández, Ben Zeehandelaar, Cecilia Gabutti, Verónica Estrade and Delfina O'Grady, who patiently continued to help me practice my Spanish conversation skills as well.

In Salta, where I spent most of my time for the actual research in the field, Pablo Frère, associated to the NGO Fundapaz, provided for a warm welcome and a practical introduction to his insights, network and activities in the region. Also Javier Martín, an agronomist in one of the key soy production areas in Salta, opened doors for me by taking me along on his field and farm visits in Las Lajitas.

At Utrecht University, Prof. Dr. Annelies Zoomers guided me from a distance throughout this process, from the beginnings of a research proposal to the final version of this thesis. Her valuable remarks on content combined with encouraging support on planning, contributed a great deal to this writing.

Lastly, I take this opportunity to thank my parents for their support and for trusting me to successfully complete this thesis.

The interdisciplinary character of this thesis, based on my educational background in history as well as social sciences, brings together a variety of sources and information. I hope that the topic of soy expansion – presented in this form - will appeal to a varied audience with a general interest in agricultural development, the sustainability debate and the wellbeing of people and environment around the world.

Summary

This thesis covers the historical development of intensification and expansion of soy production in Argentina. The availability of rich agricultural lands and the apparent abundance of natural resource endowments in Argentina provided for seemingly unlimited opportunities in agricultural development. Technological advancement and advantages of scale stimulated a practice of monoculture production, primarily carried out by agri-businesses.

Negative side effects accompany these agricultural practices and have an impact on society, economy as well as environment. The existing tension between the earnings of soy production and the – indirect – costs for the surrounding environment, make for an interesting subject of research. Three research questions are posed in order to shed light on the history and present reality of the situation in Argentina. First, which factors contributed to the expansion and intensification of soy production in Argentina? Second, what are the consequences of the expansion and intensification of soy production for society, environment and economy? And third, does consensus on Good Agricultural Practice, complemented with the implementation of a certification mechanism as initiated by the RTRS, contribute to a sustainable practice in soy production?

The last question makes an important part of this writing, because recent institutional initiatives respond to the present situation of agricultural intensification and expansion. Their sphere of influence reaches beyond country borders as they operate on a global scale. Producers, business, industry as well as civil society are incorporated in the process of establishing consensus on sustainability and the implementation of necessary improvements in the sector. The Round Table on Responsible Soy Association (RTRS) is an example of a multi-stakeholder platform which aims to bring together all stakeholders associated to soy production and trade, in order to develop quality standards for the production process.

Attention for factors that contributed to the specific agricultural development in soy production over time provides for the historical context in this study. The review of the case-study area of Salta Province in the northeast of Argentina complements this background knowledge with insights in the status quo of the scale and the impact of soy intensification and expansion in this specific region today. Analysis of the institutional initiatives, that respond to the situation at present, but, most importantly, influence the outlook on sustainable development in the future, deals with the potential of this type of organization.

Land use and land use change - spurred by soy production - are the subject of this writing. Taking into account policy, planning, research and technology, as well as consideration of different stakeholder perspectives provide for a comprehensive approach towards this topic. The concept of sustainability is guiding in the assessment of agricultural practices in soy production, in past, present and future.

Introduction

Deforestation of pristine sub-tropical forests, displacement of indigenous people, deterioration of soil and water quality and growing crop dependence are the consequences of increased soy production in Salta Province, Argentina. Despite these negative side effects, soy production is rapidly expanding and pressuring the agricultural frontier to move further into natural lands, impacting local environment and people in Salta Province. This particular case is striking, but does not stand alone. Nationwide Argentina's agricultural development exemplifies the growing importance of soy. Local and regional land use change presently taking place in Salta Province is better understood with knowledge of national decision making and global trade flows. Government induced trade policy made Argentina the worlds' leading exporter in soy, however, without taking into account a long term perspective on the sustainability of such agricultural development.

Today's bulk production of soy in Argentina, of which 90% is destined for export, is partly enabled by rising yields from existing agricultural land, due to intensification of land use. The practice of soy production evolved over time into a dominant agro-industrial model of monoculture production with support from the technological package of genetically modified (GM) soy. For the other part growth in production has been achieved through conversion of natural lands - such as grassland and forests (Grau & Gasparri, 2009). In this research both intensification and expansion are under discussion considering the sustainability of these developments in agriculture (Holm and Tiessen, 2009).

Society, environment and economy are inevitably affected by intensification as well as expansion of agricultural practices. Therefore continuation of research is necessary in order to qualitatively improve the strongly polarized debate. Opposing interests from producers versus civil society hinder the outsider to see the forest for the trees and factually understand the issues faced today. This context is prerequisite for appreciation of most recent (institutional) initiatives, such as the Round Table for Responsible Soy Association, which aims for standards of sustainability and – ultimately – certification of soy. This particular response to identified soy issues, promising change for the practice and effects of soy production, invites for critical observation. For that reason, three research questions are posed for this research.

1. Which factors contributed to the expansion and intensification of soy production in Argentina?
2. What are the consequences of the expansion and intensification of soy production for society, environment and economy?
3. Does consensus on Good Agricultural Practice, complemented with the implementation of a certification mechanism as initiated by the RTRS, contribute to a sustainable practice in soy production?

The Round Table on Responsible Soy Association is a private, multi-stakeholder initiative that aims to realize certification of soy on a global scale. The initiative started in 2004 and has grown to represent 127 members in 20 countries today. Principles and Criteria were set up in order to come to a general accepted standard for soy production, which is now in the phase of field trials and testing, with the long term outlook of reaching as many soy producers as possible in the future. The RTRS initiative has received support as well as criticism in the already heated debate on soy. The accusation of certification being merely *green washing* - favoring producers and consoling consumers without actual improvement for the surrounding environment and people - is the most heard critique. The pro and cons of this institutional response to agricultural intensification and expansion in soy production need careful analysis in order to value the contribution of certification to a sustainable future.

The subject of soy production and sustainability is interlinked with a wide range of crosscutting themes which touch upon environment and socio-economic development. The relevance of this discussion is emphasized by pressing global issues such as climate change, food security and nature conservation which demands for an interdisciplinary theoretical approach. The theoretical foundation of this writing lies with the sustainability discourse, which covers the interconnectedness of environment, economy and society in the ideal notion of sustainable development. The definition of 'sustainability' and the critique posed in the discourse need to be addressed to secure the viability of the concept in the discussion on 'sustainable' soy.

Subsequently, theory on land use change brings focus to the different approaches in land modeling and enables understanding of how environment and society affect land resources. Also institutional structures affect land use outcomes (Riebsame, Meyer & Turner, 1994). The role of institutions in relation with natural resource management is further elaborated in theory on institutions, stakeholders and governance. Stakeholders who are affected by or responsible for decision making on land use change need to be identified and analyzed with regard to their attributes, power and legitimacy (Mitchel, Agle et al. 1997). Relatively new in this respect is the concept of multi-level or network governance conducted by *green alliances*, which is of specific relevance to recent institutional initiatives that aim for 'sustainable' soy production.

The content of this writing consists of, first, a theoretical chapter. The theory on sustainable development (Keil, Bell, Penz & Fawcett, 1998) (Ostrom, 1993), land use change (Riebsame, Meyer & Turner, 1994) (Goldewijk & Ramankutty, 2004) and the role of stakeholders and institutions (Arts, 2002) will be discussed. Secondly, a quick scan from a global and economic perspective, characterizing soy production and related social and environmental issues, forms an introduction to the soy production chain and its global trade developments. Big players dominate soy

production and trade, with China and EU on the demand side and the US, Brazil and Argentina on the supply side. In response to the international market these players determine to a large extent drivers and projections of (future) trade flows (Van Berkum, 2008). The same chapter continues with country specific information on Argentina, providing an historical overview of its agricultural development and the growing importance of soy over time. Government policy, the rise of powerful agribusiness and the advancement of agricultural practices, such as the introduction of GM soy, prove to be determining factors in the history of Argentine soy production.

Chapter three takes this analysis from a national to a regional level, presenting the case study of Salta province in the northwest of Argentina. Geographical features and natural resource endowments show the agricultural potential of the region as well as the need for the environmental protection of fragile ecosystems. Previous studies on land use change in this particular region provide data - by means of GIS mapping - and different perspectives on the expanding soy frontier (Grau & Gasparri, 2009) (Delgado, 2007) (Volante et al, 2005). This information, together with personal data gathered from interviews with local stakeholders, allows for understanding of the process of land use change in Salta province.

The extent to which land use change and its effects on environment and society can directly be ascribed to the production of soy remains in dispute. The complex relation between land use change and the expansion of soy appears in the discussion on stakeholders' position and responsibilities. Chapter Five takes these stakeholders and, more specifically, the recent initiatives of relevant institutions that strive for the sustainable practice of soy production into account. Awareness of strengths and weaknesses of green alliances such as the Round Table on Responsible Soy (RTRS) are of great importance in forming an opinion about the potential of such initiatives. Findings in this context provide input for the final conclusions in Chapter 6 on the opportunities and risks involved in present and future soy production.

The central research question aims to understand how soy expansion could take place in time and space. In addition, the question of sustainability in soy production and the role of stakeholders and institutions in natural resource management are addressed within the context of land use change. Key to this topic is the assumption that institutions with attention for sustainability criteria are a potential driver of land use change by own means. Institutions not only respond to land use change but actually affect future developments. The goal set for this thesis is to estimate the potential of such initiatives and how institutions like RTRS provide input for a more sustainable future for soy production.

Map 1.1 Country map of Argentina

Methodology

An internship position at the Round Table on Responsible Soy (RTRS) Secretariat office in Buenos Aires was a first prerequisite to conduct this research. The RTRS is a multi-stakeholder initiative which strives for a certification mechanism for the production of soy. The development of Principles and Criteria, which determine a sustainable practice for soy production, is central to achieving this goal. As the organization, together with the associated stakeholders, is in the middle of the process of testing the Principles and Criteria, an internship position within this setting was an opportunity to benefit from the knowledge and contacts available in this working environment. The internship period of three months consisted of two parts. The first part entailed a literature desk study, studying relevant sources and getting to know the host organization, and making preparations for field work. The second part was the actual travel and presence in the research area of Salta Province. Scheduled meetings and observatory travel were the core activity at this stage. Cooperation with the LIEY Research group (Laboratorio de Investigaciones Ecológicas de las Yungas) in Tucumán was of great value both during and after the gathering of data.

Literature desk study

Literature study is the point of departure in this research. I conducted historical and geographical research by means of the available literature on Argentina in general and the province of Salta in particular. The theoretical framework of this research is based on literature related to sustainable development and natural resource management, taking into account different viewpoints from ecological and institutional perspectives. Online sources as well as library access provided sufficient material, primarily the Utrecht University library collection, Centre for Latin American Research and Documentation (CEDLA, Amsterdam) and the Royal Tropical Institute (KIT, Amsterdam) in The Netherlands. In Argentina, additional material was available in the (online) libraries of Universidad de Buenos Aires and Universidad Nacional de Salta.

Observation of the environment

On location, observation has been of great importance throughout my research. At first, exploratory travel through the research area helped me to get acquainted with the surrounding environment. In a later stage of research it enabled me to gain a holistic understanding of the landscape in its present form. Spatial organisation and active land users are recognized as factors of influence shaping the environment and therefore had to be taken into account during the process of mapping the research area. By means of observation it was my aim to learn and understand the practices and activities that determine the use of natural resources. Structured visits into the

countryside were part of this exploratory study in an attempt to assess activities undertaken and learn about the incentives of actors that shape the environment. Unstructured visits provided an informal way of gaining experience and getting to know the living and working environment at a local level.

Stakeholder analysis

An analysis of stakeholders proved an appropriate measure in defining the stakeholders in the soy economy. The expansion of soy is considered to be an important driver in the process of land use change in northwest Argentina. Therefore, analysis of the different stakeholders involved provided an overview of the actors involved in the value chain. Getting into contact and starting a dialogue with the stakeholders, who varied from individuals, agro-industrial businesses, farmers associations, and (government) institutions, enabled a greater understanding of their position in the soy economy and their direct or indirect relation to land use change.

Interviews

Interviewing was the main research tool for gathering qualitative data. This involved (semi-structured) interviews with identified stakeholders. Parties of influence in the institutional sphere, for example, employees of the provincial government and active members of producer organisations or farmers associations, provided for different perspectives on policy and land use practice. In total, I conducted twenty seven interviews with key-persons, which are listed by name and function in Appendix I.

Participatory research

Besides one-to-one interviews with key persons, participatory gatherings created practical opportunities, in time and content. The NGO Fundapaz works with small-scale farmers in the Chaco region and aims to empower small-scale farmers organizations. Working together with Fundapaz meant taking part in workshop discussions with representatives of these farmers' organizations. The setting allowed people to express their opinion and share experiences in a group of 15 people. Short assignments were part of the program and enabled interactive brainstorming about a variety of topics, including, for example, the history of farmer's organizations in Argentina. The participatory method is an approach which aims to empower and educate, while at the same time involve local communities in the policy debate and validate their knowledge.[1]

[1] http://www.iisd.org/casl/caslguide/participatoryapproach.htm (15/12/2009, 12.33 hrs)

LIEY Research group (Laboratorio de Investigaciones Ecológicas de las Yungas)

Within the University of Tucumán the research group LIEY is a centre of expertise for research on the particular conditions of the Yungas ecosystem. Their work is focussed on the provinces of Tucumán, Salta, Jujuy, Formosa, Santiago del Estero and Catamarca. Key-persons within this research group, who study the expansion of soy production, are Ignacio Gasparri and Ricardo Grau.

Throughout my research, the work of LIEY has guided both theory and practice. Their literature on the topic introduced me to the specific situation and problems that are experienced in the Northwest of Argentina, particularly Salta, as the result of soy expansion. Interviews and discussion in person provided valuable input before as well as after the time I spent in the field. Taking part in a working group of fellow researchers and students helped increase my awareness and understanding of their working method and, especially on the potential influence of academic research.

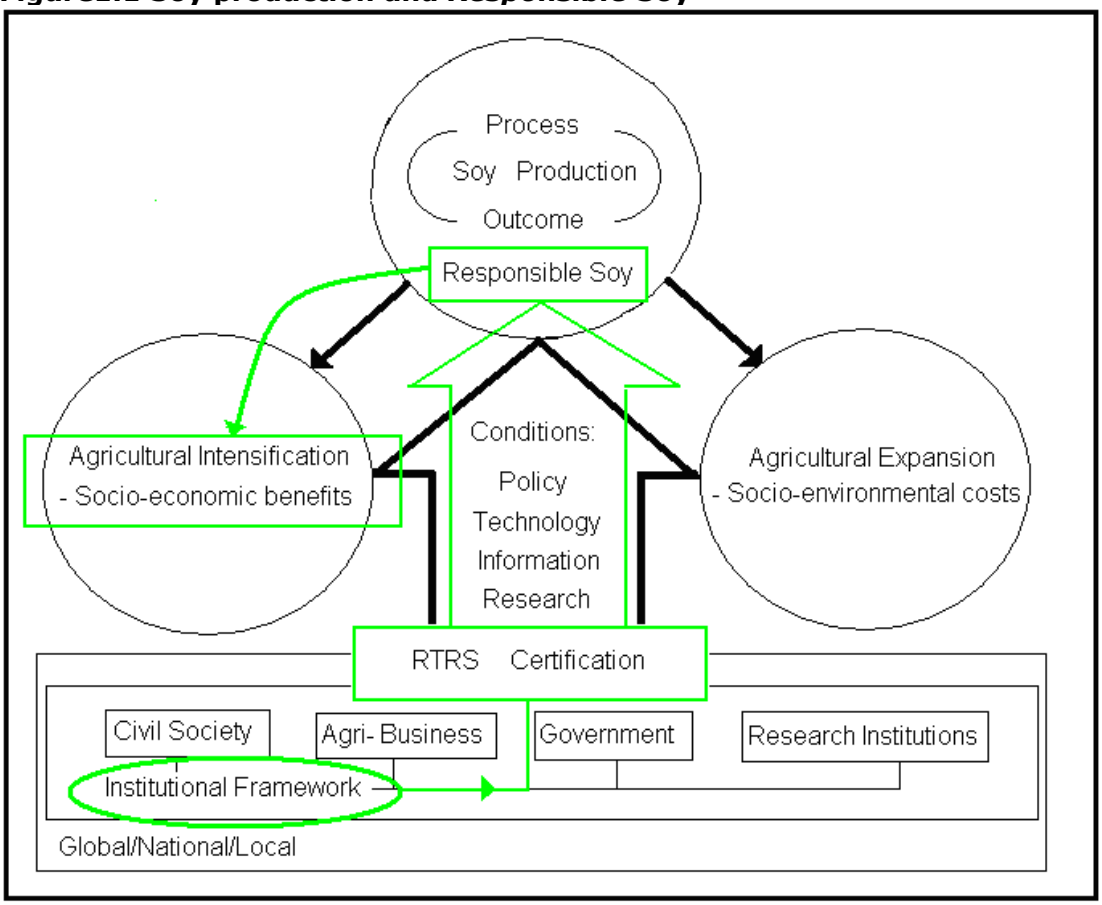
FSA Research group

At the same time as I was conducting my research, two Dutch students from the University of Amsterdam were carrying out a research project for the Dutch NGOs BothEnds and Milieudefensie. This research was initiated by the Financial Study Association Amsterdam (UvA). Their task was to discover the actors in Argentina's civil society who are at present working on issues related to soy production and its effects on society and environment. They managed to visit a list of key persons in relevant NGO's. Their research findings were presented in a report, which formed an additional source of information to this writing.

Conceptual model

The institutional framework in this conceptual model reflects the diversity of institutions that play an active role in the process of land use change. An institution is not easily defined. The concept *institution* is *a custom, practice, relationship or behavioral pattern of importance in the life of a community or society* as well as *an established organization or foundation, often dedicated to education, public service or culture* (Merriam Webster Dictionary). North (1989) defines institutions as 'the rules of the game', rules and norms that constrain behavior by power of legislation and enforcement. Granovetter (1992) speaks of the enabling rather than the constraining function of institutions - connecting people through networks and the existing social cohesion in society.[2] These definitions show the vastness of the concept and to what extent institutions are inextricably bound to all forms of organization in our society.

Figure1.1 Soy production and *Responsible* Soy



Institutions operate at global, national and local levels, as well as at community, household and personal levels. The institutional framework in *this* conceptual model embodies the variety of stakeholders involved in the soy value chain. These stakeholders, each in their own position, are in control of respectively: policy, technology, information and research. The process and outcome of soy production is

[2] Dr. Guus van Westen, Lecture on *Institutions and the role of social cohesion* (Development Theories - IDS, Utrecht) Date: 22-09-2008

shaped and affected by rules and regulation in policy, opportunities and investments in technology, access to information and focus in research.

The effects of increased soy production, considering the growing demand for soy worldwide, result from intensification in land use as well as expansion of arable land. The consequences of intensification and expansion demand for careful consideration of costs and benefits with respect to economy, society and the environment. In a simplified setting intensification is proposed to allow for socio-economic advantages at minimal environmental costs, while expansion into natural lands harms the environment and lacks the benefits of land use efficiency. However, intensification brings about socio-economic as well as environmental disadvantages, considering the minimal labor force required for soy and the abundant use of pesticide for example.

This conceptual model introduces the initial concepts as a point of departure, but the complexity of the matter needs further elaboration. In addition to analysis of the status quo, this conceptual model assumes that the institutional framework has the power to develop and implement standards for certification. Embodied by the RTRS, principles and criteria are guiding for policy, technology, information and research. To what extent institutions such as RTRS are in the position to spread and implement certification and the actual contribution of certification to a more sustainable future is questioned throughout this research.

Research questions

The three central research questions posed for this research are the following:

1. Which factors contributed to the expansion and intensification of soy production in Argentina?

This question is a point of departure which enables to determine the significance of soy for Argentina. It requires understanding of Argentina's economy, which is characterized by agriculture and export, and opportunities in world trade. Argentina's comparative advantage in natural resource endowments combined with decision making in policy and planning, make for a combination variable factors of influence, direct or indirect stimuli for soy production.

2. What are the consequences of the expansion and intensification of soy production for society, environment and economy?

The second research question brings focus to the consequences of the identified increase in soy production. Besides financial return for producers and the government, by means of tax collection, soy production causes harmful side effects

for surrounding society and environment. Displacement of indigenous people for agricultural exploitation of natural lands and production practices without a long term vision on resource management are leading examples. Also from an economic point of view crop dependence due to the scale and importance of soy in Argentina is questionable considering its long term sustainability.

3. Does consensus on Good Agricultural Practice, complemented with the implementation of a certification mechanism as initiated by the RTRS, contribute to a sustainable practice in soy production?

Recent non-governmental and privately held institutional initiatives, in which civil society and business efforts merge, aim to improve sector growth as well as a the quality of product and process. In the agricultural sector these initiatives entail certification schemes for crops, incorporating the entire production process including all actors in the chain. Consensus on Good Agricultural Practice throughout all steps of the production chain provides a basis which is necessary to set standards for – ultimately – certification. The Round Table on Responsible Soy Association (RTRS) has started this process for certification of *responsible* soy over five years ago. Achievements so far in the development of Principles and Criteria, as well as critical response towards the initiative, are guiding in an analysis of the strengths and weaknesses of RTRS, estimating the potential contribution to improving the status quo of soy production in Argentina.

1. Theoretical framework

"***Sustainability -*** *as it is commonly used - has a particular political and historical context. Rather than simply a discourse of the environment movement or the competing tension between environment and development, sustainability is primarily a discourse of modernity. In simple terms, modernity can be seen as the social relations created by institutions and cultural values. The key institutions that can be associated with modernity are democracy, capitalism and science. Modern values include progress, consumption, human rights and individual freedom.* ***As a discourse of modernity, sustainability reflects and creates ideological contradictions and has material consequences when it is defined and acted upon. People's relationship with nature, the environment and the place in which they live is critical, however, this relationship is essentially social and dependent on power relations in local, regional, and global contexts."***
(Cheney, Nheu & Vecellio, 2004)

1.1 Sustainability discourse

Human presence has an effect on our natural surroundings; natural resource management is the intervention of humans in the environment. Human intervention is a strategy to accomplish a specific goal using natural resources, striving for efficiency, productivity, sustainability and/or control. At the same time, human intervention is a manipulation of the ecological system. Either consciously, by means of rules, agreements, monitoring and enforcement, or unconsciously, based on peoples shared beliefs, myths and taboos. The interaction of humans with nature or the environment are described and analyzed from various perspectives. Differences and similarities between concepts and approach provide a theoretical background in the sustainability discourse.

Human ecology is where social sciences and natural sciences meet. Focusing on the interplay of processes, human ecology brings together history, culture and political science with biology, ecology and environmental studies. Between the 1950s and 1970s the cultural approach in human ecology, with distinctive roots in social sciences, dominated the discourse on environment. *Cultural ecology* took it one step further, considering the environment as a significant factor in shaping human behavior. Research had a clear focus on indigenous groups, isolated from external forces in society, in an attempt to understand the way small communities adapted to their environment on a micro scale.[3] Berkes (1999) defined cultural ecology as an ethnological approach, explaining the distinction between exploitative management and conservation management as the result of adaptation to the environment.

[3] Dr. Fabio de Castro, Lecture on *Natural resources and Environmental management in Latin America* (CEDLA, Amsterdam) Date: 29-10-2008

> "*Traditional systems* inspire a new resource management science open to the *participation of resource users in management*, one that uses locally grounded alternatives to top-down centralized resource management. The point is important not only for humanizing resource management, but also for making sure that local needs are addressed and that *relevant local knowledge, practice, and values are part of management decision making*." (Berkes, 1999) (Emphasis mine).

In the 1980s *political economy* introduced new view points into the ecology debate, as the study of economic and political behavior shifted its focus towards power relations in society. Institutions were considered to be a significant factor in shaping human behavior in relation to the environment (Cypher and Dietz, 2009). Research focused on settlers and their surroundings, particularly in unfamiliar environmental settings, where they experienced difficulty in adapting due to a lack of societal organization. The ecological effects of economic activity inspired research into changing market economy incentives. Whether or not the adaptations of settlers proved sustainable, depended on the degree to which they were able to respond to external factors in the environment and society.[4]

Recent theoretical approaches which further diversify the discourse on the environment include *historical ecology* and *environmental history*, where historical analysis of social change is related to the environment. *Landscape ecology* uses spatial analysis to connect changes in space to social processes. The social perspective is concerned with institutional arrangements while the ecological approach is concerned with sustaining biodiversity. In economics, *ecological economics* and *environmental economics* both deal with the limits of growth in relation to natural resources and the value of nature in economic measures.

Political ecology combines political, economic and social factors studying their affect on environmental issues. Acknowledging the complex interaction between local, national and global levels, political ecology emphasizes the dynamics of systems through time and space. Considering multiple factors of influence, this approach aims to understand links free of preceding assumptions. Defining humans as actors instead of victims brings forward the issue of agency. Within political ecology people are actors with the ability to cause change. Analyzing the human environmental system using this approach provides an opportunity to conceptualize natural resource use patterns. Human behavior becomes an empirical question instead of an assumption. Motivation and incentives influencing human behavior towards natural resource management are points of departure in political ecology (Keil *et al*. (eds), 1998).

Escobar (2004) offers a reaction to the contemporary discussion on environment within development and aims to expose the notion of *sustainability*. The

[4] Dr. Fabio de Castro, Lecture on *Natural resources and Environmental management in Latin America* (CEDLA, Amsterdam) Date: 29-10-2008

Brundtland report (1987) launched by the World Commission on Environment and Development of the United Nations (WCED) deals with sustainable development and defines it as "(...) development that meets the needs of the present without comprising the ability of future generations to meet their own needs". This report, titled *Our Common Future*, established the idea of sustainable development as a mainstream notion, drawing a connection between accepted models of development and the deterioration of the environment (Cheney, Nheu & Vecellio, 2004). According to Escobar, the approach of managing nature entails its capitalization.

> "The sustainable development discourse purports to reconcile two old enemies - economic growth and the preservation of the environment - without any significant adjustments in the market system. (...) Nature is reinvented as environment so that capital, not nature and culture, may be sustained. (...) In sum by rationalizing the defense of nature in economic terms, advocates of sustainable development contribute to extending the economization of life and history" (Escobar, 2004).

A return to cultural practices of indigenous groups as the principle of productivity for sustainable use of natural resources is possible with 'ecological culture'. Social relations and forces of production are viewed in an alternative ecologically sustainable productive rationality (Leff, 1993). This entails redefining basic constructs such as production, away from market mechanisms; rationality, away from utilitarian views, and management; away from bureaucratized practice towards a participatory approach (Escobar, 2004, p.225; Leff, 1993).

The concept of sustainability is biased in its use within the development discourse, suggesting it favors economy above environment. The discourse has a continued emphasis on growth and economics. Macgregor (2002) mentions that sustainable development remains basically an economic concept that is not as critical as it might be of old, neo-classical economic principals such as progress and utility maximization. Shiva (1988) noted in an earlier critique the discrepancy between south and north, when it comes to what sustainability should look like. According to Shiva, development has led to environmental devastation and impoverishment in the south; 'sustainable' has become a mode of regulating southern economies when the north began to experience the effect of its own un-sustainable colonial practice of resource extraction.

From this point of view, global justice is embedded in colonial and neo-colonial histories. Justice, equity, diversity and ecology are culturally interlinked in sustainability studies. The definition of the WCED has linked sustainability to development, but the following question is critical:

> "If the concept of sustainability is to orient a process of finding enduring responses to the worlds intricate problems of ecological degradation and social justice, is "development" still part of this equator?" (CRC in Sustainability and Culture, York)

In defense it might be said that the difference between growth and development could shed new light on how development is meant to be perceived. When something grows, it gets quantitatively bigger and when something develops, it gets qualitatively better - or at least different. Quantitative growth and qualitative development follow different laws. According to Meadows (1992) there should be limits to growth, but there need be no limit to development. Quantitative relates to material and qualitative to non-material as they are two different dimensions. Socio-ecological transformation or an ecological crisis in essence, is a crisis in societal relationships with nature. A solution means intervention in their dynamics, a qualitative improvement and therefore development is still part of the solution.

Other questions, leading to a critical use and practice of the concept of sustainability, stress the importance of knowing who and what are being sustained and how sustainability is enacted in a particular situation. Fundamental to an answer is clarifying what sustainability means, "in particular times and places, as a set of embodied ideas and practices that locate human groups in natural environments and orient their inter-relations" (CRC in Sustainability and Culture, York). Agarwal (1998, p.198) adds that sustainability involves "struggles over resources and meanings". Understanding the politics of sustainability as a negotiation of cultures of nature suggests a far more inclusive approach and greater applicability compared to the concept as it was proposed at first by WCED.

Endless variations leave room for an expanding array of interpretations on sustainability, to which preceding insights form an introduction. Bindraban (2008) for example brings the institutional setting to the fore, stating that "sustainability is a comprehensive concept under continuous construction to be approved by the consent of multiple stakeholders" (Bindraban, 2008).

Is trade sustainable or a trade-off?

With trade as a necessary engine for economic growth, sustainability must address and incorporate the issue of international trade. How does trade affect the local and national economy? How can trade related pressure to overexploit resources be counterbalanced? How does trade contribute to the transformation of local environmental problems into international ones? (Keil et al. 2002). Interlinking environment and economy raises awareness towards environmental externalities that are the result of economic activity and insufficient domestic environmental policy. International trade acts as a magnifier of these externalities, inherent to the domestic economy (Perkins, 2002, p.53). From a positive point of view, trade has the potential to make environmental care possible. On the other hand, trade in itself is a cause of environmental degradation.

Perkins (2002) states that trade liberalization and environmental regulation have similar goals. They reinforce each other, both striving for an increase in

economic efficiency. This becomes apparent in agreements such as the United Nations program of Agenda 21 where trade and environmental policies are mutually supportive.[5] Markets are based on open competition and stimulate lower costs and more efficient technologies. However, sustainable trade will not be achieved by trade liberalization alone. The government has a role in making private institutions aware of environmental regulation. Still, trade can create social conditions for sustainability. Perkins suggests that trade with economic benefits for the countries involved generates an increase in standards of living and will help raise levels of environmental protection. In this context there are advocates of sustainable development who support the idea of trade, trusting to the policies of each trading nation to curb any excess and bring about sustainability.

Theoretical views on how trade affects sustainability range between absolute rejection and marginal approval. Perkins (2002) identifies *deep ecology* - rejecting industrial society as a whole and wishing to return to absolute wilderness; *bioregionalism* - generally in favor of economic and political systems within the region and critical towards the global consumer lifestyle; and *social ecology* – which promotes the belief of life within the boundaries of the bioregion and local communities that counter the harmful social and environmental effects of trade. Basic arguments opposing trade are that trade damages the community by making people dependent on goods and services outside their bioregion. It devalues what is local and instability generated externally harms the local area. Trade makes it difficult to see the limits of the local ecosystem. Its dominance over the non-human environment denies mans position as part of a complex global ecosystem. Trade can exacerbate forms of social domination and injustice, opposing social transformation towards community self sufficiency. These arguments combined, stress that sustainability means living without any form of trade that reaches outside the bioregion.

Unlike bioregionalism and deep ecology, ecological economics considers humans controllers of what happens in the environment and calls for responsible interaction and management of the global environment (Daly, 1992, in: Keil et al. 2002). Ecological economics speaks in favor of unregulated international trade, roaming the globe in search for the lowest cost in production. Trade has its merits and targeted protectionism can foster economic self sufficiency without lowering labor and environmental standards or worsening the international income distribution and unsustainable growth of the world economy. From this perspective sustainability is rather "the relationship between dynamic human *economic* systems and larger dynamic, but normally slower-changing *ecological* systems, in which human life can

[5] A UN program related to sustainable development. Agenda 21 is a blueprint of action, globally, nationally and locally, for UN bodies, governments, and major groups in which humans impact on the environment. http://www.un.org/esa/dsd/agenda21/

continue indefinitely, human individuals can flourish, and human cultures can develop, but in which effects of human activities remain within bounds, so as not to destroy the diversity, complexity and function of the ecological life support system" (Costanza, 1991, p.8-9, in: Keil et al. 2002).

However, a form of self-critique is posed and trade is criticized from an economic, not ecological point of view. Difficulties that need to be addressed are the allocation of efficiency, internalizing external costs, distributive justice and the widening disparity between labor and capital. Furthermore, by neglecting communities, ownership and control are separated in the process of trade at the local level. Macroeconomic instability and the criterion of sustainable scale have an impact on the vulnerable position of the community (Perkins, 2002) (Costanza, 1991). Meadows (1992) underwrites these points of critique from his *system viewpoint*. A sustainable society can persist over generations, when it does not undermine its system of support; "free trade enhances the likelihood that parts included in the free trade zone will reach limits simultaneously". Therefore, "further globalization should be treated as a bad idea" (Meadows, 1992).

The negative effects of trade on economic sustainability are that free trade hampers environmental quality for those countries that do not internalize environmental costs. Furthermore, trade contributes to uncertainty and the uncontrolled growth in scale of the global economy. As a result, trade hinders societies in providing for their members. Nonetheless, from the viewpoint of environmental economics, according to the Coase theorem, polluters can compensate pollution sufferers or vice versa in order to attain an economically efficient level of pollution control. Prevention of transboundary environmental conflict, triggered by transboundary pollution resulting from increased trade, is desirable (McRobert, 1991). Trade facilitates bargaining at the international level, making possible environmental quality improvements based on property rights. The property rights perspective entails that individual freedom is the most important aspect of sustainability and governments only need to protect physical property, leaving markets alone. Environmental economics rejects sustainable development because it would require political control and government regulation of the economy.

In summary, it is possible to categorize perspectives concerning the relationship between trade and sustainability on the basis of their definition of sustainability and their view on trade. "What is it about trade that seems to lead to overexploitation of the trading relationship, to sprawling inequality?" (Keil et al. 2002). Perkins expressed his opinion posing the theoretical possibility that limited trade - among sustainable, self-sufficient trading partners - could contribute to sharing diversity and world understanding without threatening sustainability.

Criteria are needed to measure the harmful and beneficial effects of trade. The definition of sustainability is critical, whether natural resources are infinitively

replaceable or in need of nature conservation. Either way, given the above, a proper definition should include 1) attention to the protection of the long-term stability of ecosystems, 2) preservation of non-human nature and ecological diversity, 3) ensuring inter-generational equity for humans and other species, 4) maintaining stocks of renewable and non-renewable resources, 5) protecting the Earth's waste assimilation capacities, 6) fostering human diversity and equity among individuals and cultures, regions, countries, communities and social groups, 7) allowing for human mistakes - to understand earth processes, 8) taking into account irreversibility, risks and uncertainty (Keil et al. 2002, p.56-57).

Indicators of sustainable trade can be defined, as did Jacobs (1991) with 'green economy' on a national level. After operationalizing the goal of sustainability each of the economic functions of the environment is taken in consideration, such as supplying renewable and non-renewable resources, assimilating waste and furnishing environmental services. Renewable resources are identified by means of the rates of resource harvest and habitat quality. Non-renewable resources are relatively scarce and need sustainable use rates. These can be achieved by means of the development of new economic reserves, re-use and recycling, or demand reduction. With respect to environmental services, targets could be set for emission rates and vegetation cover. These indicators are not pre-fixed criteria, but always context specific and function as a guideline to operationalize sustainable trade.

Moving beyond the national level, global sustainability lies in the political and institutional context where policies for sustainability can be adopted, examples being fora to hear international disputes and the imposition of effective sanctions. Other factors that should be taken into account are human rights, national debt and the position of communities. Human rights matter on both sides of the trading relationship and resources need to be justifiably allocated. "Environmental protection frequently requires challenging market-based ownership rights over natural resources (…). Sustainable management of these resources has been shown in many cases to be best achieved by giving control over them to local, poor communities, who's livelihoods depend on them, and who therefore have a long-term interest in their conservation." (Jacobs, 1993, p. 184, in Keil et al. 2002). Debt plays a part, because as long as countries are pressured to pay international debts, this will hamper the implementation of sustainable trade policies. Sustainability implies a 'restructuring of international financial obligations and relations'. Lastly, the community is considered vital for social, institutional and ecological sustainability.

The reasoning on the comparative advantage of trade is revisited. True, comparative advantage would take into account the existence of non- and renewable resources, waste assimilation and environmental services. A prerequisite is the equal distribution of benefits among all people and sensitivity to the distortions of transboundary pollution, human rights, debt and community sustainability. If one

country has a surplus, is there a sustainable trading advantage? This will depend on the current physical endowment per region, country and population. Indicators imply government action, to set sustainability targets and agree internationally on standards for global justice and transboundary environmental issues. Harris (1993) suggests that strategic trade planning could reconcile governance interference with the mentality of free trade. "Finding the opportunities which are available - the institutional changes which are needed at the local, national, regional, and inter-regional level to bring sustainable trade closer - is the challenge the world faces" (Harris, 1993).

1.2 Land use change; human intervention shaping environment

Land use and land cover change are important drivers of global change. Historically a wide variety of datasets filed land use change and with recent initiatives efforts are made to characterize patterns of present day global land use and land cover (Goldewijk & Ramankutty, 2004). Research on land use change is of specific relevance today because of its impact on climate change. However, it takes a long time before comprehensive data on historical land use and land cover change becomes consistent in a classification scheme. Delivering a consistent global product that provides knowledge on how to deal with present issues such as climate change is a difficult task. Global remote sensing based land cover products are a technological breakthrough in this respect. GIS offers opportunities for explicit identification of land use patterns (Goldewijk & Ramankutty, 2004).

Land use patterns result in land cover changes that cumulatively affect the global biosphere and climate. Discovering driving forces behind land transformation and creating land use models provide an approach and a method that help to understand how land use and environmental effects are interlinked. Land use and land cover change are complex phenomena reflecting a wide range of social and natural processes. Economic, ecological and social factors should be integrated in analysis and land use models (Riebsame, Meyer & Turner, 1994).

In respect of land use change, a distinction should be made between modification and conversion. Modification is the change of condition within cover type, while conversion is the change from one cover type to another. In studies on land transformation in general, despite data problems, the dramatic expansion of cropland over the past three centuries is very clear: a global anthropogenic transformation of land use conversion as well as modification. The role of the land use historian is to find long-term global trends towards greater intensity of particular uses and the replacement of less intensive by more intensive users. Broad land use trends are the result of trends in increasing global development. However, land use is not simply associated with broad trends in society and the economy such as the growth of population, production and consumption. Rather, land use is related to national and international markets and policies as well as to local and regional socio-economic change. That is the complexity of land use and cover change.

The practice of land use modeling consists of four different phases. At first, a description entails a detailed or simplified inventory and assessment of land use and cover. Secondly, the explanation connects patterns of land use and cover to their social and physical causes. Thirdly, the projection and prediction forecasts future conditions based on theories of processes in their corresponding social and ecological contexts. Fourth and last, prescription, planning and policy, based on normative criteria and social goals, ensure preservation, economic efficiency and social equity (Riebsame, Meyer & Turner, 1994). In direct relation to the situation in Argentina,

and more specifically in Salta Province, these are the steps taken in this research. An assessment of the situation is described in a case study on the geographical setting and the recent expansion of soy in this area. These are connected to drivers of land use change which enabled the process of expansion into primarily natural lands (land use conversion). The consequences of the expansion of soy predict high environmental and social costs to the surroundings and these issues need to be addressed with an adequate policy response, either in the governmental or non governmental sphere (business or civil society initiatives).

A dominant approach in predicting and explaining land use is socio-economic modeling by means of social driving forces. An example of a macro scale model is Impact equals Population, Affluence, and Technology; a formula which is not widely accepted and has been criticized for being an *ecological fallacy*, ascribing characteristics of the whole to the parts. Environmental degradation is supposed to be due to population growth or actions of the political and economic elite. Moreover, poverty is ignored as a driver in unsustainable resource use and affluence is neglected in its potential to aid environmental protection. To overcome these constraints in modeling, there is a need for social science knowledge on variables such as the political, economic and geographical patterns of human activity and influence on environmental change. Five different categories are mentioned in this connection: population change, technological change, affluence or poverty, political-economic structure, and in the cultural sphere: beliefs and attitudes. Macro-scale models do not capture this complexity at present. Argentina, on a national level, and Salta Province, on a regional level, function as a case study to connect political, economic and geographical patterns to land use change and its effect on environment.

Meso-scale models incorporate the richness of multiple social causes. A favored starting point is the theory of land rent, which emphasizes how economic forces control land value. According to this theory, any parcel will be used in ways that lead to the highest rent. However, such an econometric model does not suffice, when social and institutional factors impact on the power of individuals and affect their ability to optimize returns. Theoretical viewpoints from political ecology as well as land use change acknowledge the importance of the institutional structure on land use outcomes. Humans are the actors with the ability to cause change, but multiple factors – beyond economic logic alone - influence their incentives and motivation. Therefore, social causes need to be addressed.

For a more integrated analysis, social and ecological models need to be linked. Are there better - more holistic - approaches to land modeling, offering better insights and projections in search of answers? Different scales of analysis are necessary to better deal with complexity. Patterns and interactions, with forces influencing each set of actors, must somehow be considered in modeling landscape

changes, landscape ecology and the social ecology of land tenure. In this way environmental and social driving forces that play out on a parcel of land or over regional landscape can be assessed with respect to the contextuality of land use and cover processes in regional and local variations. Science of the earth's surface needs a holistic and integrative approach. So far, too many social processes have been neglected (Riebsame, Meyer & Turner, 1994).

Globalization and land use change

Land use change is associated with globalization. According to Grau and Aide (2008), increasing global demand for food and bio fuels triggers two trends in land use change, deforestation and ecosystem recovery. At the global level modern agriculture spurs the rate of deforestation in its quest for arable, productive lands. The counter trend is ecosystem recovery, due to land abandonment resulting from higher yields in modern agriculture and the flow of rural-urban migration and remittances (Grau & Aide, 2008).

Deforestation is the largest threat to Latin American ecosystems such as tropical and subtropical dry forests and temperate grasslands and savannas. Agricultural activity, subsistence agriculture as well as export-oriented agriculture, is the main cause of deforestation. The soy boom serves as the core example threatening regional ecosystems and biodiversity on the one hand, but offering large economic benefits to economy on the other, serving cheap calories and rich protein raising nutritional levels in Asia.

The main point derived from this analysis of globalization and its effects on natural resources is the potential of intensive modern agriculture to increase food production while sparing land for nature conservation. The combination of threats and opportunities requires a change in approach to conservation. Grau and Aide (2008) argue that land use *efficiency* should be analyzed beyond local based paradigms in order to focus on a larger geographical scale, taking into account long distance fluxes of products, information and people. It should be possible to prioritize maximization of agricultural production and the conservation of environmental services simultaneously, bringing deforestation under control.

Land use change in a globalised world responds to developments in demography and economy. Rising population and the increase in living standards in certain parts of the world, result in a growing demand for food. A solution could be found in agricultural intensification and agricultural adjustment, striving for efficiency, modernization and land concentration; a trend which has the potential to simultaneously favor ecosystem recovery elsewhere.

Population in Latin America is expected to double by 2050 with a corresponding increase in per capita consumption. Although Latin America is rich in natural resources and fertile plains, it has a generally low agricultural production.

This potential needs to be utilized, especially with additional and increasing demand from abroad, for example Asia; Latin America is in a position to produce for the rest of the world. "*The fate of Latin American ecosystems will depend on how economic and social forces influence where and how the growing Latin American population lives in the coming decades and how the region responds to global changes in population, trade, consumption and technology*." (Grau & Aide, 2008, p.2).

Latin America is a large continent which is highly urbanized, a situation which permits inefficient land use in the far less densely and low populated rural areas. To accommodate growth and maintain biodiversity, landscapes and regions must be used in a more efficient way. Grau (2009) poses a controversial solution for efficiency by shifting from traditional to modern agriculture and locate high yield crops on the most productive soil, concentrating land for soy bean production. The trend of rural-urban migration strengthens the argument in favor of land use efficiency on these terms. People who move to urban centres consume agricultural products that have been produced in more efficient systems such as mechanized agriculture, planted pastures and feed lots. Moreover, Grau (2009) states an improved quality of life and reduced population growth in urbanized areas as beneficial side effects for society and environment as a whole.

Land use from a global or local perspective?

Perspectives differ on the threats as well as opportunities that are faced while moving forward in today's globalized setting. Threats, brought to the fore in the debate on GM-based modern agriculture, and opportunities as the result of migration and ecological transition, make up the present reality. The complexity and contextuality of land use change and land use efficiency are stressed in every approach dealing with the topic. However, viewpoints and argumentation differ greatly. Two contrasting contributions in academic writing are Grau and Aide (2008), who see a clear potential in modern industrial agricultural practice and Altieri (2009), who poses counter arguments in the discussion on global versus local and large-scale versus small-scale farming.[6]

From the perspective of peasant agricultural practice, Altieri favors enhancing the productivity of traditional Latin American peasant farming systems. Peasant systems rely on local resources and complex cropping patterns which produce reasonable yields. Agro ecological initiatives provide opportunities to substantially increase food production while preserving the natural resource base and empowering rural communities. Farmers who work the land traditionally are considered intelligent land users. The agro ecological approach is an alternate path to agricultural intensification and reverses anti-peasant biases.

Alternative production has lower crop yields compared to high input

[6] http://www.monthlyreview.org/090810altieri.php

conventional systems. However, yield is not the only measure. Area productivity, environmental services and crop variety are defining factors for successful and sustainable agricultural practice. They include environmental and economic benefits for farmers and the community. Scaling up this practice means gains in food security and environmental conservation. Features of a traditional farming system are an increase in plant diversity and minimizing risks. Agricultural development and resource management strategies should be based on local participation, skills and resources (Altieri, 2009).

From this point of view, soy bean monoculture is considered inappropriate land development, considering the negative side effects on soil conservation, use of water resources and soil fertility. Peasant agriculture and agro ecological systems supply more stable levels of total production per unit area than high input systems. Altieri (2009) proves these economically favorable rates of return. The return to labor and other inputs suffice for a livelihood acceptable to small farmers. Soil conservation and protection as well as enhancement of biodiversity are sought after. The agro ecological approach could double yields of the existing 16 million peasant units, which safely increases the output of peasant agriculture for domestic consumption well into the future. The agro ecological approach aims to deal with hunger and malnutrition by producing more food and have it available for those who need it the most (Altieri, 2009).

Discussing the best approach for agriculture and resource management in order to deal with changes spurred by globalization offers an introduction to two possibilities that stand wide apart; modern mechanized industrial agricultural versus small-scale subsistence agriculture. How to judge the viability of one or the other? Which is the best response to globalization? What are the effects on society and environment?

1.3 Institutions and environment

Natural resource management is the intervention of humans in the environment. Human intervention is a strategy to accomplish a specific goal using natural resources and striving for efficiency, productivity, sustainability and control. Human intervention at the same time is a manipulation of the ecological system. Resource use systems are dependent on ecosystems. Either consciously, by means of rules, agreements, monitoring and enforcement, or unconsciously, based on peoples shared beliefs, myths and taboos. Three main forms of management systems can be distinguished in organized human intervention at the level of the individual, the collective and the state. These forms differ in scale which is an essential characteristic in discussing natural resources and human intervention in terms of management. Social capital and resource governance play a vital part in natural resource management.

In the 1990s, the concept governance came increasingly to the fore. "The discussion is part of a shift away from state-led development, towards the strengthening of civil society (...). Citizenship, participation and mobilization are important elements in the governance discussion" (Nuijten, 2004, pp.104). This does not imply a diminished role for the state, since the state is considered a central actor. Governance is related to government and management, to issues of order, rule and power, and refers to institutional diversity. In this respect Rhodes (2000) mentions the complexity of local organizations, consisting of public, private and voluntary representatives, as well as the processes of governing these organizations.

Furthermore, "the literature on governance rejects the rigid polarization between the anarchy of the market and the hierarchy of imperative coordination, in favor of the concept of heterarchy, i.e. horizontal self organization among mutually interdependent actors" (Jessop, 2000, pp.15). Van Kersbergen and van Waarden (2006) relate governance in the development debate to decentralization. They notice vertical shifts, from national to local or international bodies, and horizontal shifts, from public to semi-public or private. Common terms in this context are 'local governance', 'public-private partnerships' and 'collective action' (Nuijten, 2004, pp.106).

The emphasis on participation is closely related to the increased importance of governance in the development debate. Participatory governance is about transparency and information access leading to joint decision making with all parties involved. However, prerequisite to forms of decentralization and participation is a strong state that can institutionalize and support these processes and guarantee the rights of the actors involved (Nuijten, 2004, pp.114). "Governance influences the distribution and reshuffling of people, means and resources" (Nuijten, 2004, p.124).

Power relations are a fundamental part of governance, continuously shaping society as well as its institutions. It is helpful to understand the complexity of human

interaction in a social system, from the perspective of governance, in order to position the role of institutions in the development debate. Research on participation and governance related to sustainable development shows the need to understand how the norms and values of sustainability can be concretized in each specific situation. Governance in this sense refers to (...) the way of managing collective relations through spatio-temporally specific articulations of the rules of behavior regarding the principle for allocating resources among the individual and collective members of society" (Rist, *et al.*, 2007).

Institutions at multiple levels are essential for the long term protection of ecosystems. Interlinkages that need to be addressed are global market chains competing for resources, overlap of government jurisdiction and regional or local use rights, interregional migratory flows, trade blocks and multilateral infrastructure and changes in global climate (Brondizio & Ostrom, 2008).

Institutional interaction has consequences for socio-environmental systems by facilitating cross level environmental governance, an important form of social capital. Key challenges for institutions are to work with boundaries, have authority and the ability to sanction and be up to date with knowledge and information. The goal is to identify requirements for success in governing complex and dynamic systems and discuss various ways to meet requirements in situations featuring high levels of functioning interdependence.

Thinking about integrating economic development, conservation, indigenous rights and national export goals should follow these lines. There is a need for multiple levels of analysis and organization as there is no fixed spatial or temporal level appropriate for governing ecosystems and their services sustainably, effectively, efficiently and equitably. Resources have horizontal impacts on resources of a similar spatial scale and vertical relationships upward and downward to systems that are larger or smaller. Social capital needs to be built accordingly to enhance the long-term sustainability of natural capital at multiple levels of scale, relevant to particular ecological resources (Brondizio & Ostrom, 2008). In this context, connectivity is introduced as a decisive factor spreading disturbing forces (negative linkages) as well as positive learning processes.

With rising levels of functional interdependence, local management authority becomes untenable and the linkages to larger systems become increasingly important (Brondizio & Ostrom, 2008). For example considering the extent to which ecosystems are affected by land cover change and socio-economic factors such as land tenure, global markets, infrastructure, and policy initiatives. Human dominated ecosystems need to focus on the dynamics of socio-ecological systems rather than biophysical or socio-economic systems. The higher levels of public authority in government and policy and lower levels in community sphere are the limits in mainstream responses to managing human environment interactions. Neither one is

adequate; there is need for management to be place based and in contact with local users (Brondizio & Ostrom, 2008).

Stakeholder's theory and analysis

A stakeholder is a person or organization that is impacted positively or negatively by the actions of a company or organization or in turn creates an impact on the institution concerned. For example, within the soy value chain, stakeholders include input and services suppliers, producers, processors, soy users, traders, financers, retailers and consumers. A distinction within the production chain can be made between primary stakeholders, secondary stakeholders and key stakeholders, depending on their direct or indirect involvement in the production chain. A stakeholder analysis is useful when there is a need to clarify the consequences of envisaged change. The goal is to identify all stakeholders for the purpose of discovering their role and position in the production chain in order to successfully intervene when necessary.

The topic of soy production and the heated discussion on the (non-) sustainability of the production process adds to the complexity of stakeholder identification. The stakeholders are not limited to the soy production chain, because science, civil society and organized critical opponents of soy production in its present form, have become a factor of influence to take into account. These are outside forces that can be characterized similarly to the stakeholders within the production chain, considering their direct or indirect involvement affecting the process of soy production, striving to halt or at least improve the practice of unsustainable mono-cropping.

Stakeholder theory includes the normative theory of stakeholder identification, meaning to explain who should be considered and to determine certain classes or entities as stakeholders. The theory is a tool or method to reliably separate stakeholders from non-stakeholders. Stakeholders are identified as primary or secondary stakeholders, rights holders or moral claimants, owners or non-owners, owners of capital or less tangible assets or be actors or those acted upon. They may have voluntary or involuntary relationship with the institution of subject or be resource providers to or dependents of the institution. In case of this research the stakeholders related to soy production are under discussion, with attention for their own position and more specifically focused on their relation to the RTRS as an institution.

Classes of stakeholders can be identified by their possession or attributed possession of the following: power of influence, legitimacy of relationship with the institution and the urgency of a claim against the institution. To explain these classes the relationship in terms of status of power dependence has to be determined between claimants versus influencers, actual versus potential relationship, and the

relationship between the institution and stakeholder involved. (Mitchell, Agle and Wood, 1997).

An interesting method for stakeholder mapping is to classify stakeholders according to potential for threat and potential for cooperation (Savage, Nix et al, 1991). In the process of stakeholder identification another method of classification is the assessment of awareness support and influence that can lead to strategies for communication and the evaluation of stakeholder's satisfaction. Which groups of stakeholders are aware or unaware and whether their attitude can be considered supportive or confrontational. This classification is of particular importance with reference to the Outreach Program of the RTRS, a strategy which aims to inform and attract more stakeholders to become a member of the organization (Chapter 5).

Resource dependence theory suggests that power accrues to those who control the resources needed by an organization, creating power differentials among parties. The possession of resource power makes a stakeholder particularly important to managers. Land owners and producers – varying from private family enterprises to multinational agribusiness – are examples of stakeholders that control the natural resource of land. However, other relevant resources, such as the availability of financial means, knowledge and technology, or agricultural input for production (fertilizers, pesticides or machinery) all make part of the production chain and create a position of power. From an institutional perspective there is a preference for those stakeholders that make part of the soy production chain, as they possess resource power and are in the position to envisage change in how to use the resources sustainably.

In defining stakeholder's attributes (*power*, *legitimacy* and *urgency*), power is considered the ability to bring about a desired outcome. Coercive *power* functions by means of physical resources, force, violence and restraint. Utilitarian *power* concerns material and financial resources, while normative *power* is derived from symbolic resources. Power is transitory and can be acquired as well as lost. When combined with legitimacy power becomes authority. *Legitimacy* is the general perception or assumption that the actions of an entity are desirable, proper or appropriate within a socially constructed system of norms, values, beliefs and definitions. Legitimacy is present at multiple levels, from the individual to the organizational and societal level. *Urgency* captures the dynamics between stakeholder and manager, shaping a time sensitive relationship or claim which is important and critical to the stakeholder.

These stakeholder characteristics have a variable status, perceptual quality and variable consciousness. They form the groundwork for the future analysis of the dynamic nature of stakeholder relations (Mitchell, Agle and Wood, 1997). Stakeholder theory as a tool in the analysis of the situation in Salta, Argentina, enables an approach to natural resource management and land-use decision making. The identification of stakeholders provides guidance in determining who plays a role

in decision making and determining land use. Ascribing attributes such as power, legitimacy and urgency to the stakeholders involved helps to clarify their responsibilities, motives and action.

The complexity of the topic in the context of multilevel institutional governance, characterized as "horizontal self organization among mutually interdependent actors" (Jessop, 2000), with interaction between private initiatives and government, society and the market emphasizes the need for a stakeholder approach. Arts (2002) has further elaborated the role and position of stakeholders when exploring the coming into being of *green alliances,* their function and their strength and weaknesses.

Green alliances

Green alliances are collaborative partnerships between agencies whose relationship used to be antagonistic (Eden, 1996). They have the potential to embody the various stakeholders involved as well as to become stakeholders in themselves. Stafford (2000) refers to partnerships between environmental NGO's and businesses that pursue mutually beneficial ecological goals. The reason for a rise in the popularity of green alliances is the shared disappointment of both businesses and NGO's in government policy (Arts, 2002). Green alliances stem from two interrelated developments, of which the first is the growing emphasis on self- governance in industrial environmental policy, both by state as well as market and civil society parties. The second development is the growing prominence of the sustainability discourse as a result of professionalization within the environmental movement and the development of a proactive environmental approach by businesses.

Businesses see new opportunities, want to improve their environmental performance and enhance their reputation. NGO's have a different point of view, aiming for environmental gains by means of cooperation with businesses. RTRS is an example of a multi-stakeholder initiative providing for a platform where both business as NGO viewpoints are represented, enabling cooperation in ways that are more effective and efficient than current government intervention. Green alliances offer an alternative to the government, especially considering issues that reach beyond borders and require an international and integrative approach. Green alliances are equally capable of designing policy, they guarantee efficiency and effectiveness, and are granted legitimacy and credibility by NGO's. Arts (2002) questions how effective these initiatives are in contributing to environmental policy making and regulation. Can they successfully contribute to or replace state-led environmental policy making?

Theories on political modernization and policy arrangements can help provide insights into the strengths and weaknesses of green alliances. Political modernization spurred the renewal of environmental politics from the 1970s onwards. A transition

took place from state centric regulation to interactive regulation and self-regulation. Innovations occurred in policy arrangements within organizations and specific policy domains. Policy arrangements in this context are the temporary stabilization of the content (policy programmes) and organization (actors involved, mutual power relationships, rules of the policy game) of a policy domain (UNPOP) (Arts & Van Tatenhove, 2000).

Political modernization brought about a transformation in the political domain of society with new views on governance and new relations between state, market and civil society. Historiography documents the stages in this process. The early phase - from the 1950s to the 1980s - was characterized by the nation state, a regulatory state and a manageable society. The boundaries of the nation state fenced off the state as a supreme regulatory body which exercised political domination over both market and civil society. The later phase - from the 1980s to the present day has been influenced by post-modernity and reflexive modernity - a reaction to the governance problems associated with early modernity. The nation state could not secure ecological security and prosperity for all and state power was gradually replaced by a system of multilevel governance: regions, nations, international organizations who through participation and decision making determine political outcome (Table 1.3.1) (Arts, 2002).

Table 1.3.1 Historical phases of political modernization

Early Phase (1950s-1980s)	Late Phase (1980s-present)
Nation state	Multilevel governance
Regulatory state	Network governance
Manageable society	Self governance

Top down policy proved unable to deliver the required effectiveness and efficiency, therefore multi-layered, multi-actor, interactive governance based on policy networks came to the fore. NGO and business participation increased at all levels of policy making. Society was becoming increasingly complex and as a result less manageable. Trends such as public responsibility and the ability to 'govern themselves' through corporate responsibilities emerged in response to these developments.

Political modernization is a macro societal process with specific effects on certain policy domains at the meso level. This implies a change in policy arrangements influenced by new views on governance and a new relationship

between state, market and civil society. In the early phase policy arrangements were static, state based, and corporatist with closed networks. In the later phase they became more pluralistic and open with private governance interacting with the market and civil society.

Theory on *green alliances* again emphasizes the complexity of natural resource management in the context of today's multi-level institutional governance. With regard to the functioning of the Round Table on Responsible Soy (RTRS), a private, multi-stakeholder initiative operating on a global scale, the background and analysis of green alliances in general provides an insight into how the functionality and effect of such a multi-stakeholder initiative can be understood.

Map 2.1 Regions of Argentina

2. Soy and land use change in Argentina

2.1 Soy production and trade development

Soy is a versatile, edible crop with a high protein and oil content. The raw product is a bean, which can be processed to either soy meal or soy oil. It serves many purposes both in terms of human consumption and animal feed. Soy is a major source for the chemical industry in the production of bio-based products. For example, soy oil is an important ingredient in many processed food items and has grown in popularity for the production of bio diesel (Bindraban et al, 2009). Consumption of soy around the world has increased dramatically in the past decennium, from 100 million ton in 1990 up to 200 million ton in 2005 (Soja Doorgelicht, 2006). Recent figures estimate the global production of soy at approximately 240 million ton (Data USDA, 2009). A world wide increase in meat consumption and the demand for soy as animal feed is held responsible for this increase.

Soy is an annual crop. Modern varieties reach up to one meter in height and have a growth cycle of 90 to 120 days. Yields vary between 1.5 and 3 tons per hectare. Soybeans are generally cultivated in (sub) tropical and humid climatic zones in (the south of) the United States of America (USA), Latin America (mainly Brazil and Argentina, but also Bolivia and Paraguay) and Asia (India and China) (Van Berkum, 2008, p.21). Soybean production takes place at different levels of scale and small- and medium-scale farmers as well as large scale, mechanized agro-businesses are involved in its cultivation. After harvesting, soybeans are stored in large silos, different varieties are mixed and information on identity of type is lost early in the chain which makes soy a bulk product (Soja Doorgelicht, 2006, p.10).

Today the production of soy is characterized by monoculture cultivation of genetically modified (GM) soy, except for example Brazil, who is the leading country in non-GM soy production. The use of the pesticide glyphosate – to which GM soy has been made resistant – and zero till practice make the production process labour extensive. The GM soy crop requires no more than 2 people per 200 hectares for production. This practice allows for large plots of land to be cultivated with soy, with concentration of land holdings and an environmentally unsustainable situation as result.

Trade flows and prospects

United States of America (USA), Brazil and Argentina are the world's three largest producers of soy, with a market share of respectively 36%, 25% and 21% (USDA, 2009). Simultaneously, they are the three dominant exporters, with the USA leading in the export of soybeans and Argentina in export of soy meal and soy oil. According to Pengue (2008) Argentina achieved this lead position in the early 1990s with a

22% world market share in soy meal and a 30% world market share in soy oil. Although Argentina produces less than for example Brazil, it is more export orientated because of limited domestic consumption, clearly apparent in Table 2.1 (Data USDA, 2009). A small and stable population, a relatively small poultry and pork industry and a cattle industry which is predominately grass-fed explain this limited domestic demand (Pengue, 2008) (Data USDA, 2009).

Table 2.1 Domestic consumption of soy

	Oil	**Meal**
USA	90%	75%
Brazil	75%	30%
Argentina	6%	3%

Source: Data USDA (2009)

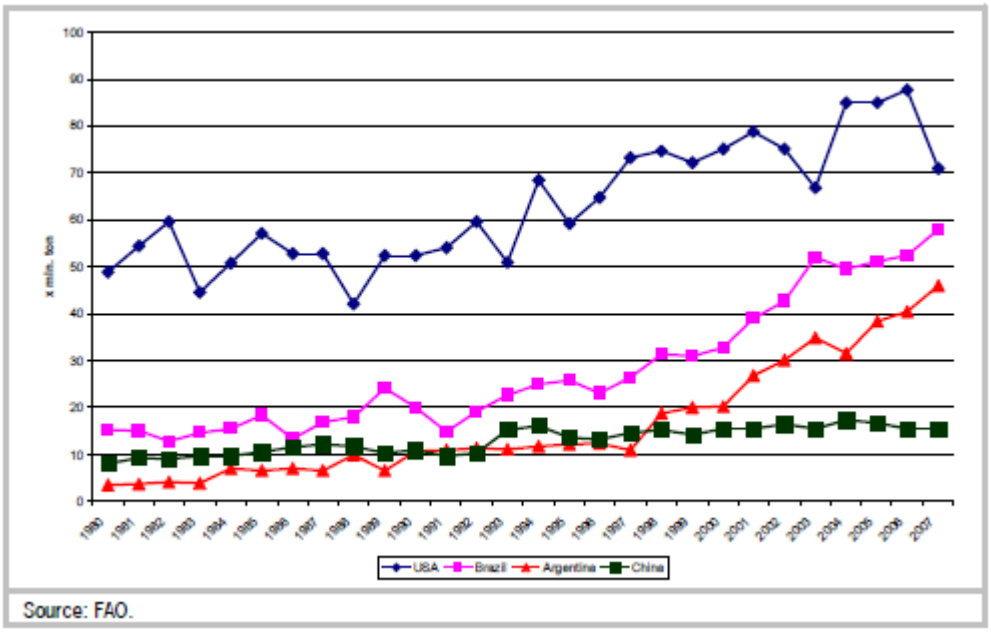
Other soy bean producing countries are China (6.5%), India (4.1%), Paraguay (2.4%) and Canada (1.4%), all produce over 1 million ton. All soy producing countries benefit from the export opportunities for soybean, meal and oil except for China and India. Although China and India belong to the producer group, they need to import soy in order to fulfil domestic demand.

China (51,2%) and the European Union (EU) (17,3%) take the lead within a large group of importers, leaving Japan, Mexico, Thailand, Indonesia, Turkey, Egypt and Korea far behind (USDA, 2009). China's soybean import in particular has increased significantly within the last five years, from 5 up to 30 million ton in 2006. The EU remained relatively constant around 16 million ton. The EU is the most influential soy meal partner worldwide importing around 23 million ton, - 50% of the world market share (Van Berkum & Bindraban, 2008).

In 2005 the price for soy was considered fairly stable at around US$200 per ton, but this price has shown fluctuations with a record high of over US$500 per ton at the end of 2007. Throughout 2008 there was a decline in price with a drop to US$350 per ton. Early in 2009 prices began to rise again reaching US$450 per ton in June of that year (Data USDA, 2009). Despite fluctuation, production of soy remains profitable at the best and very lucrative as world prices and demand rise. Price increases spur production in Latin America and the rise in demand spurs the price, a vicious circle which continuously boosts the production of soy.

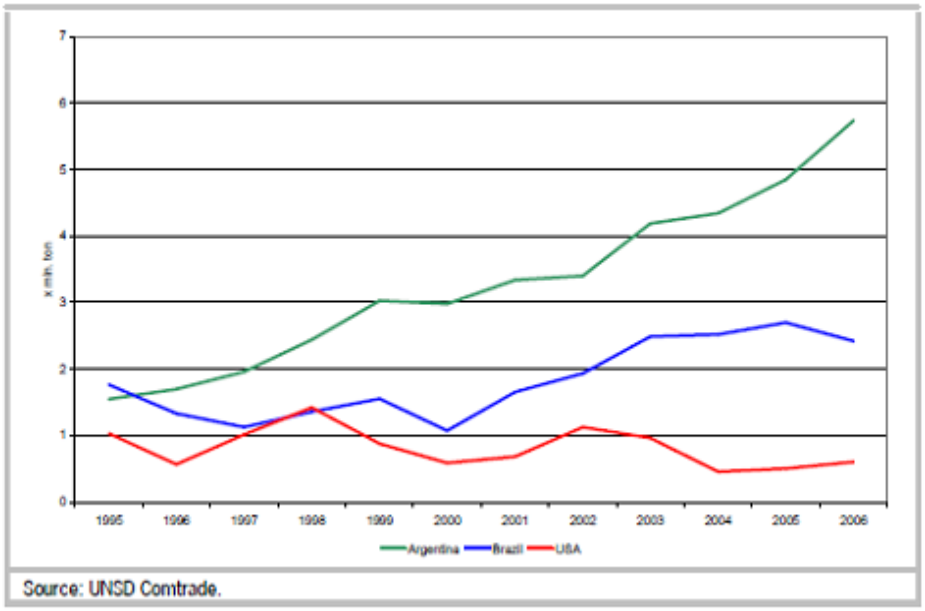
The rise in soybean production is apparent in Graph 2.1.1 for the three leading producer countries; USA, Brazil and Argentina. However, since 1999 the growth in soybean production has increased at a higher rate in Latin America than in the USA because of the expansion that has taken place in Brazil and Argentina.

Graph 2.1.1 – Production of soybeans in the largest producer countries (Van Berkum, 2008)

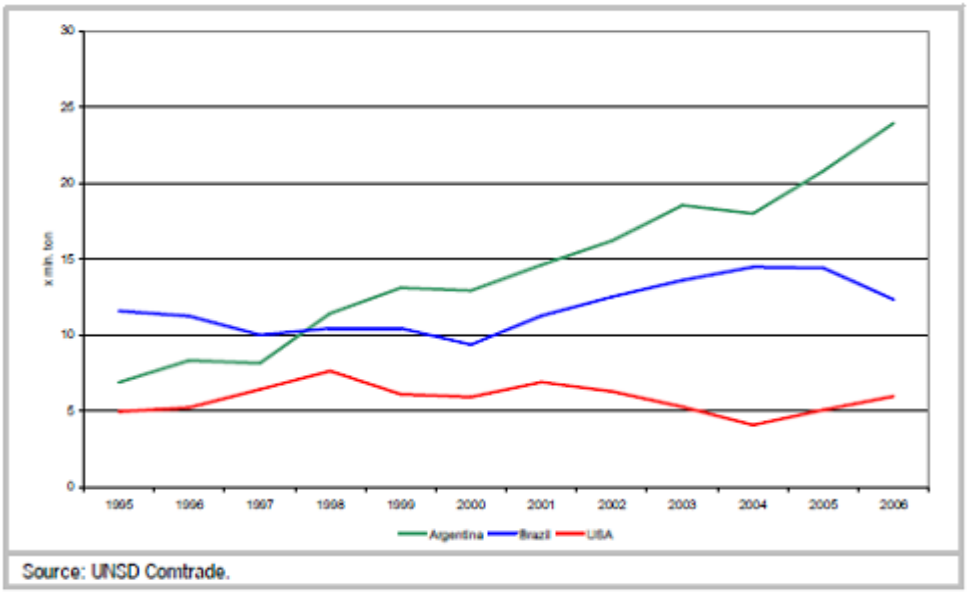


In the past 15 years the USA lost much of its trade position, while Brazil and Argentina strengthened their position significantly (Van Berkum & Bindraban, 2008). Increased production allowed Argentina to capture a significant share of a growing global market, as the rising exports in soy oil and soy meal show in Graphs 2.1.2 and 2.1.3 (Data USDA, 2009).

Graph 2.1.2 – Exports of soy oil by Argentina, Brazil and USA (Van Berkum, 2008)

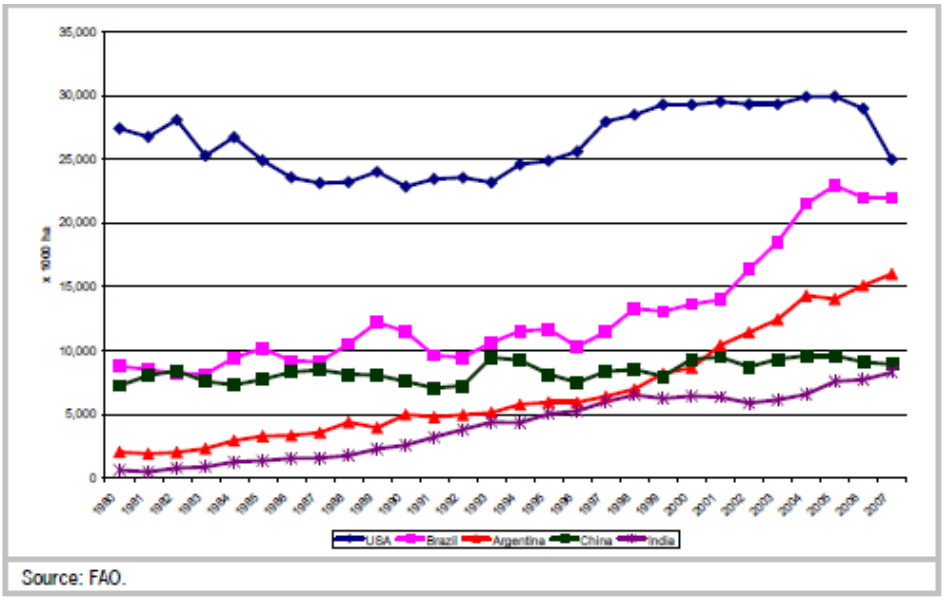


Graph 2.1.3 – Exports of soy meal by Argentina, Brazil and USA (Van Berkum, 2008)



Expansion of the area dedicated to the cultivation of soy, evident in Graph 2.1.4, facilitated this rise in production. Brazil, with 11 million hectares of soy in the early 1990s, had over 20 million hectares of soy cultivation in 2007. Argentina experienced a growth rate of 6.8% annually in soybean expansion, from 5.4 million hectares in 1993 to 10 million hectares in 2000 and over 16 million hectares in 2009 (Data USDA, 2009, p.22).

Graph 2.1.4 – Area development in the most important producing countries (Van Berkum, 2008)



These trends in production, area development and trade positions are put in perspective with a projection for the coming 10-15 years (Van Berkum, 2008). Expectations on where and to what extent the production of soybean will expand, forecasts a continuing process of land use change. The international market reflects a shift from cereals to meat consumption, spurred by economic growth in transitional and developing countries that will lead towards the consumption of more luxury goods (Pollan, 2006). Trade flows will shift to the advantage of developing countries. In the feed and energy sector there will continue to be an increased demand for soy (FAPRI, 2008). Price increases boosted growth in Latin American production, and as demand is on the rise, prices can be expected to increase further. China embodies this demand and with their steady home production will become more dependent on import. The demand from the EU will be stimulated by the bio-fuel industry.

Van Berkum (2008) concludes that the supply response has to come from Latin American countries, such as Argentina, Brazil and Paraguay. New land will be opened up for agricultural purposes, there will be a shift between crops and more intensive use will be made of existing agricultural land. This forecast is of considerable relevance to Argentina, taking into account the previous development patterns and their current impact on society and the environment. There is a need for research into the impact of the expansion of soy at country as well as regional level.

2.2 Argentina's economy: a geographical perspective

Historically, Argentina's wealth stems from the agricultural productivity of the Pampeana regions farms and ranches (Map 2.1, p.41). Primary production and trade dominated the economy. The countries natural resources, a well-educated population and diverse industries together with an export-oriented agricultural sector made Argentina the tenth wealthiest country in the world at the beginning of the 20th century. Despite an era of decline between 1930 and 1980, Argentina held a position of relative wealth in Latin America until – between 1981 and 2002 - a series of economic crises hit the country hard.

During the 1960s and 1970s regional development policies aimed to spread out economic development geographically as well as stimulate the secondary and tertiary sector. The focus shifted away from production in the Pampa's towards the interior regions. Minerals, rice and cotton in the Northeast, sugar in Tucumán and wines and fruits in the Cuyo region helped reshape the geographical pattern of production and the interior regions became increasingly important (Keeling, 1997). However, globalization strategies of the 1990s refocused development processes on Buenos Aires and the Pampas in response to a drop in Argentina's share of global trade in the 1980s, changing its role in the global economy considerably.

Three key processes were responsible for changing patterns of production. First, despite government neglect of the sector, agriculture made a substantial comeback and contributed significantly to export performance. Second, urban centers were appointed as growth poles, to spread the benefits of regional integration and stimulate regional development with extensive linkages. Thirdly, industrial activities were clustered in and around the Pampa's despite government's efforts to decentralize (Keeling, 1997).

The resurgence of the primary sector was the result of the economic crisis in the 1980s and the growth of externally-oriented development strategies which promoted agricultural exports. Agribusiness became more integrated with the industrial sector, with land controlled by industrial companies such as Bunge, Cargill and Dreyfus.[7] In the early nineties this resurgence in agricultural production made Argentina tenth in the world commodity exporters of cereals, third in vegetable oilseeds and oil and ninth in tobacco. Long-term economic instability is the inherent downside to Argentina's export driven agricultural sector. Farm profits depend on global commodity prices and the individual farmer has no control or influence over commodity price manipulation (Keeling, 1997).

[7] Bunge & Born (internationally known today as Bunge Limited) was founded in 1884. They achieved a near monopoly on cereal and flour export until Populist President Juan Péron established a state agricultural purchasing and export agent in 1946. During the presidency of Carlos Menem the succesfull agribusiness company, also active in textile, paint, chemical, fertilizer and food processing industry, received partial control over the national economic policy. Bunge & Born provided the Menem government with its first two economy ministers, and the combination of large rate increases on public services (around 500%), a simplified exchange rate and a massive, mandatory wage hike led to a sharp economic turnaround between July and November 1989.

In the 1990s, 50% of Argentina's farms comprised of less than 50 hectares and the large number of medium sized and small farmers had less than 2% of the total land surface in agricultural use. On the other hand, fifty percent of the country's total land surface was controlled by less than 2% of all farmers in Argentina. These owners have over 5000 hectares of land on the Pampas or in Patagonia. Half of this group is located in the Pampas and 40% of the land in this area is used for agricultural purpose (Keeling, 1997). These numbers show to what extent landownership created disparity in society and agricultural activity, not only between farmers (small, medium to large landholdings) but also regionally across the country, with a concentration of large landholdings and intensive land use in the Pampa's.

In his discussion on land use change in Argentina, Keeling (1997) specifically mentions the core of agricultural activity based in the Pampas, which reflects a geographically uneven pattern of development. Meanwhile, the interior regions (Map 3.1) were subject to an increase in agro-industrial activity in the natural environment. These regions that lay to the north, west and south of the Pampeana region suffered from the negative affects of expanding agricultural lands, which coincided with the use of poor technology, under capitalization, environmental degradation, marginal product quality and inferior transportation links.

Global and regional trade patterns

Patterns of trade are strongly influenced by transportation and communication. Under Spanish law regional trade was restricted from the mid 1800 to the mid 1900 as Europe absorbed Argentine exports. In the 1930s, import substitution industrialization (ISI) lead to the creation of a protected economy. Isolation from global trade networks and the generally low quality of industrial products were direct results of this ISI policy. Between the 1950s and the 1990s the approach changed and the economic situation in Argentina was improved, an improvement that was directly related to the countries position on the global export market. In 1991, under the rule of Carlos Menem, president of Argentina between 1989-1995 and 1995-1999, economic liberalization and globalization policies were introduced after which cheap manufactured goods started to flood the country. The restructuring policies seemed to result in an export performance that became increasingly strong after 1995.

Privatization and deregulation spurred the rapid growth of foreign corporate and multinational activities in Argentina and opened up the national economy to regional and global capital circulation. At present global trade is primarily with the USA, Europe and Asia. Not only global, also regional trade patterns experienced a shift. After decades of isolation trade relations with neighbors have become more important. In 1975 only 11% of Argentina's world trade was with MERCOSUR – *Southern Common Market* - countries, but from 1985 onwards the realignment of

trading links included MERCOSUR, encouraging rapid growth after 1990. After Menem – from a macroeconomic point of view - Argentina was heading in the right direction.

Nonetheless major problems remained embedded in Argentina's socio-economic structure. Particularly within the agricultural sector problems include debt, inadequate technology and an unbalanced distribution of farm size and landownership. Under-capitalized industry, largely concentrated in the Pampeana region, is hampered by an inflexible labor market. Furthermore, transport and communication are insufficient to support integrated regional development strategies. Poverty, underemployment, deterioration of social services and lacking infrastructure crippled the regional economies of the interior (Keeling, 1997). Disparities are evident between prosperous agro-industrial provinces and those rural areas that are considered to be "left behind".

Economic development in the Northwest

The Northwest of Argentina makes part of the rural, regional area left behind in its overall development when compared to the Pampas. Salta Province, the case study in this research, is located in this region; a bird's eye view on the history of economic development provides for relevant background information. In the Spanish period the colonial economy of the Northwest was based on silver mining. Indigenous societies produced and supplied maize, potatoes, beans, squash and quinoa. They also produced fruits, melon, grapes, cotton, dyestuffs, and honey and herded sheep and cattle, which originally came from the Pampas. The economy of the Northwest was stimulated by silver production and the 'Pan Andean socio economic space' was characterized by inter-regional market networks. Conflict and repression from the Spanish crown disrupted the exchange of mules and silver in the 1870s. Rural communities fell back on their traditional source of income practicing subsistence agriculture. Large landholdings were in the hands of a few elite families and local manufacturers and artisans were replaced by landless, nomadic people. It was only in the provincial capitals that the transition from traditional to commercial and industrial activity continued to take place (Keeling, 1997).

In the Northwest, sugar and tobacco are amongst the agricultural products that have dominated the regional economy since the late nineteenth century and have lead to a culture of poverty. Today, workers in the sugar and tobacco industry suffer from poor living and labor conditions, limited prospects for employment and declining demand due to laws and legislation on production. The northwest was surpassed by the economies of the Northeast and the Pampeana region and suffered from a deteriorating relationship with Bolivia. The introduction of the sugar plantations boosted the economy, which were located in the lowlands and required all the temporary labor available from the haciendas for harvesting.

Throughout Salta and Jujuy minifundios are scattered along north south valleys. The land tenure structure in Latin America consists of latifundio's – large commercial estates (over 500 hectares) - and small properties known as minifundio's (less than 5 hecares), which are subsistence oriented smallholdings farmed by indigenous and peasant households. The products they cultivate are diverse and they deliver for example tomatoes, beans, citrus and cotton to the local market. Soy, kidney and black beans are cultivated on a narrow strip (Umbral al Chaco) (Map 3.2 Salta). Natural resource extraction - logging, oil and gas production and mining - also takes place in the region and contributes to an increased deforestation rate with little possibility for reforestation (Delgado, 2009).

Agricultural based poverty was induced by the regional development strategies drawn up in the late 1960s. In 1975, the benefits of promoting industry spread to Jujuy, Salta and Santiago, but the increase in industrial employment was short lived because of global industrial restructuring in the early 1980s. Regional companies could no longer compete in the national and global market. Amongst the problems they faced were the cost of shipping to Buenos Aires and the absence of all weather passes to the Pacific ports. Railroad development in the Northwest was in private hands and there was a lack of public infrastructure. This reflected the dominance of the landowning elite and although these developments favored large producers in the interior regions they lead to the further geographical isolation of these regions. While the landowners' world of cities, industry, imports and exports thrived, the rural population of the Northwest remained backward and exploited.

In addition to the problems caused by lack of infrastructure, structural ecological problems influence economic opportunities in agriculture. The soils of the region have been steadily deteriorating since the 1950s with a corresponding negative impact on agricultural production and the environment in general. Factors responsible for erosion and top-soil loss include logging, over-pasturing of animals and the flooding of the Rio Parana basin. After the period of Menem reforms, there was a reduction of funds in the direction of the Northwest and other interior regions. Bankrupt provincial governments did not have the financial resources to deal with the problems of environmental degradation or the restructuring of agriculture (Keeling, 1997).

History of land use in the Northwest

The history of land use and tenure explains the background of the situation today. In pre-Hispanic time, before the 16th century, the lowland area was inhabited by two ethic groups; a Chaco indigenous group of hunters and gatherers and later, a group of Guarani origin who subsisted of migratory agriculture. The Andean groups performed agriculture with terracing and an irrigation system. Between the groups there was exchange, although predominantly the groups kept to their own region. In

1531 the invasion of the Spanish crown brought along a land leasing system. The objective was to obtain rent and labor of the aborigine population. This later evolved into a land tenure system of *terratenientes* or large landowners in charge of *latifundios*, their large properties. Today they are known as haciendas or fincas. Leading family clans and creole descendants who managed to acquire independence created the countries structure and the concentration of land that evolved from it (Delgado, 2009).

The incentive for control by landowners was primarily social rather than economical. The objective was to control the aboriginal people rather than exploit the lands. By 1900 the practice of leasing land to campesinos introduced minifundios, which were basically small properties and formed a measure of economic control. Between the 1850s and the 1920s the northwest started loosing economic importance and from then on the leasing system was a measure of social and political control. It also had a cultural function, conserving the traditional cultural practice which was rapidly disappearing in the rest of the country due to modernization.

The Spanish had brought two major modifications of land management of the area. They replaced local species such as Llamas and Vicuñas for European commercial species such as cows, sheep and horses, which needed more pasture than the local species. Secondly, the terracing and irrigation systems were replaced by migratory agriculture practices on the slopes of the mountain range. The lifestyle of the campesinos now incorporated the whole altitudinal range by moving the animals each season for pasture. They did not negatively impact the ecosystem or conflict with interests of landholders and sugar exploitation. Landholders were more concerned with their political control and sugar exploitation took lace in the lowlands and utilized labor provided by campesinos, parties were interdependent but had different interests (Pacheco, Gonzalez & Meitner, 2005).

In the 1950s, after small scale forestry activities had started in the region of Oran, landowners became aware of the economic potential of the Yungas forests. This led to a conflict of interests with the campesinos, whose livelihood strategies depended on access to the entire hacienda. To ensure this access people moved out of the highlands into the forests. Dependence on land increased when the labor demand in the sugar industry decreased. The landowners lost their control over the local people which makes for an unclear situation of ownership of resources. The situation at present is a social and political problem instead of an economic one.

The Yungas forests face several threats. Between 1986 and 2002 more than 15 thousand hectares of the Yungas have been deforested (Montenegro et al, 2003). Sugar cane plantations, development of oil and gas extraction and agriculture, driven by the soybean frontier are held responsible for this process of deforestation (Grau et al, 2005). In detail human activities are highlighted as a threat to the area; grazing,

timber, oil and gas extraction, hydroelectric projects and agricultural development.

Grazing and trampling remain the most extensive degradation factors in the region, especially at the higher altitudinal level (Grau & Brown, 2000). In the 1950s and 60s forestry activities were carried out in an aggressive manner, without any attention for long term management of the resources. Both grazing and forestry have lead to ecological changes causing increased erosion. This is worsened by land cover alterations, degradations and reductions, intense summer precipitation, and thin soils (Braun, Wilke et al, 2000). Furthermore, the Yungas reserves contain one of the most important gas and oil resources of the country. Not the extraction itself is the threat to the environment, rather the construction of infrastructure which makes the area accessible for other activities detrimental to the eco system (logging, hunting etc.). Plans for hydroelectric projects are another potential threat that could seriously reduce the connectivity of the Yungas region between Argentina and Bolivia.

The climatic trend (increased levels of regional rainfall) and favorable international prices for the soy bean have lead to the dramatic expansion of agriculture in the area. It is predicted that no more forested lowlands will remain because of this (Grau & Brown, 2000). What was once a diverse landscape, producing different crops, fruits and vegetables, has turned into a "green desert" (Economist, 2004). Conversion and structural degradation of its forests and biodiversity define the crisis of this region.

2.3 The expansion of soy in a historical perspective

Agriculture in Argentina has seen unprecedented change in the last 15 years. An intensive technological approach, shift in social players in land and agro-industry, a favorable international setting, and a state that facilitated this process or did not intervene to check developments (Pengue, 2008). The adoption of the economically successful industrial agricultural model brought about deep social, economic, environmental and logistic changes. The practice of *pooles de siembra*[8], literally the pooling of resources with a business mindset, exemplifies the opportunities for maximization of agricultural production and increased financial gains. On the downside, this resulted in the displacement of small- and medium-sized farmers, the disappearance of crop varieties and environmental destruction. The continual demand for new land has led to deforestation, overexploitation and – as erosion becomes increasingly pronounced – the quality of the land available for agricultural use has steadily deteriorated. The developments over time leading up to these issues that need to be faced today form the content of this chapter.

Economy

Historically, the agricultural sector in Argentina received little government support. Cropping patterns were determined by returns, rotation and the degree of long-term investment. In the 1950s the Government of Argentina adopted an import substitution strategy in order to promote economic growth, limit foreign dept and limit the use of foreign exchange. Agricultural producers were forced to rely on inefficient, overpriced domestic input industries and were limited in their access to agricultural markets. Three policy instruments supported this import substitution strategy. First, tariffs and quantity restrictions were set for imported agricultural inputs to encourage the sale of domestic produce. Second, export taxes were levied on grain and oilseeds, to help out the budget for the Malvinas – Falkland's war (1982) and secure a cheap supply for domestic industry. Thirdly, a manipulation of the exchange rate created a distortion with high interest rates, real exchange rate appreciation and overvalued currency. As domestic producers were paid in domestic currency, the overvalued currency burdened the agricultural sector by reducing demand and lowering the farm value of exported products (Data USDA, 2009).

Throughout the 1960s, 1970s and 1980s seven different government programs were put in place to try and stabilize the inflation that undermined the economy, creating economic instability and leading to public sector deficits, low rates

[8] *Pool de siembra* describes the specific agricultural practice in Argentina in which financial capital and the organization of a transitory business system play a determinant role. Agribusiness has complete control over production, by means of leasing large extensions of land and contracting the sowing, fumigation, harvest and transportation, in order to generate economies of scale. At the end of the production cycle the profits are distributed. The English word "pool" signifies a fund that gathers money of various investors. These financial resources enable the goods and necessary services to carry out the production of the crop, and then to distribute the profit among the members of the pool. The system plays a dominant role in the production of soy in which Argentina holds the position of third world producer in the market of beans and first in the market of soy oil.

of savings and investments, an unstable exchange rate and variable inflation. In the 1960s annual inflation was around 30%, in the 1980s -1990s it exceeded 1000% (Data USDA, 2009). In the 1980s there was a slump in international commodity prices, global recession and world debt crisis. The specific situation for Argentina entailed hyperinflation and external debts amounting up to 60 billion US dollars, 39% of national GDP, with an interest rate demanding 50% of export earnings. Taxes on agricultural exports generated 20% of government revenues in 1986. In 1988, 50% of the actual value of agricultural export prices consisted of taxes and currency controls.

The export taxes posed on products and the import taxes levied on inputs are an obstacle for agriculture, as they distort production incentives and strangle growth. Despite these circumstances agricultural output continues to contribute to half of the export earnings and 8-10% of GDP. Yield gains over the period of time between 1970 and 1990 showed a 3% annual growth, reflecting gains in productivity. Resources and know-how were accumulated, resulting into yields that approached, at times even surpasses, those of the USA. Considering the relatively low input from (government) investments, these results reflect the agro-climatic advantage that Argentina has in field crops such as soy.

The unstable macroeconomic environment influenced decision making in export oriented agriculture. Other factors of influence were the trade restrictions on agricultural inputs and outputs and government policies favoring industrial development and controlling cheap domestic food prices for wheat and beef. These factors together muted price transmission from global commodity markets and discouraged investments. Economic and policy reforms of the 1990s served to stabilize the economy and initiate a liberal policy regime on agricultural investments, production and export. The aim was to take advantage of Argentina's natural comparative advantage where major field crops such as soy, corn, wheat and sunflower were concerned. Macroeconomic and agricultural policy focused on transportation and marketing infrastructure, which spurred the race for the same resources between competing field crops and livestock.

Throughout the 1950s and 1960s Argentina was a major producer of corn and wheat. In the 1970s the soybean sector emerged taking up about 36000 hectares. Brazil, which had started soy production earlier, was already producing about 1.7 million hectares and in the United States 17 million hectares were under soy production and yields were 50% higher than in Argentina. Despite the competition at the global level, conditions for the production of soy in the 1970s were favorable because of high international soy bean prices. Increase in demand, as a result of the drop in fishmeal production, a growth in EU soy consumption and an US oilseed embargo in 1993, lay behind these price increases and created an incentive for Argentine producers. Between 1970 and 1974 plantings increased tenfold. In

addition, natural comparative advantage over cereal production continued to boost plantings. The profitability of oilseeds relative to grains continued the transition from corn, sorghum, barley into soy and sunflower (Data USDA, 2009).

In 1979, Argentina's soybean plantings surpassed the 2 million hectare mark. Corn production had fallen from 4.1 million to 2.5 million between 1970 and 1979. Early in the 1980s, cereal prices recovered and this slowed down the transition to soybean production. However, from the mid-1980s onwards there were record plantings and in 1989 some 5 million hectares were under soy cultivation. The rapid rise of soybean in Argentina is remarkable, considering the unstable macroeconomic environment in the postwar period with high inflation, an overvalued exchange rate and the burden of heavy external debt.

In 1989, 5 million hectares were dedicated to soy production, generating 11 million ton. Expansion in production involved new land entering soy bean production and a shift of existing farmland from grains and pasture. In the 1990s, Argentina became the worlds leading exporter in soy oil, with a 30% market share, a mayor exporter in soy meal, with a 22% of market share, and a 13.4% share of the world market in soybean. This leading position in the world market was achieved not by the highest number in production, but rather due to specific orientation on export and the limited domestic use of soy products.

Menem government

In 1989, the Peronist Carlos Menem introduced substantial reforms by means of currency realignment (the c*onvertability plan*) and economic deregulation measures. Menem came into power in the midst of a major economic crisis with severe hyperinflation and recession. After a failed stabilization program, sponsored by Bunge y Born (one of the country's leading agribusiness firms, p.37), and the conversion of time deposits into government bonds, newly-appointed Finance Minister Domingo Cavallo introduced a series of reforms in 1991 and pegged the value of the Argentine peso to the U.S. dollar.

This *Convertibility Plan* was followed by massive privatization of utilities (including the oil company Yacimientos Petrolíferos Fiscales (YPF), the post office, telephone, gas, electricity and water utilities). A massive influx of foreign direct investment funds helped tame inflation (from 5,000% a year in 1989 to few percent by 1993) and improved long-stagnant productivity, though at the cost of considerable unemployment (Pastor & Wise, 1999). Menem's policy reforms reduced export taxes on agricultural commodities and tariffs on import. In 1991 there was an elimination of all export taxes on grains and oilseeds, except 3.5% on unprocessed oilseed export. This was followed by elimination of all quantitative restrictions on imported agricultural products, a reduction on import tariffs for agricultural products and an exemption from tariffs and taxes of agricultural products and capital goods

that extended beyond one production cycle. Furthermore, elimination of government commerce agencies (grain board, meat board) and large scale privatization in marketing and infrastructure were established (Data USDA, 2009). Overall the climate for investment and growth improved in Argentina. Participation in the global commodity market increased the adoption of innovative technology and agricultural inputs. Menem's successful turnaround of the economy made the country one of the top performers of the developing countries in the world.

The use of agricultural inputs under reform and opening up Argentina's economy increased imports and agricultural inputs. New technologies improved yields, planting, harvesting and delivery. The high soil fertility, limited availability of agricultural credit and low domestic production of inputs limited the use of fertilizers, pesticides and machinery. Argentina's use of pesticide is relatively small compared to the USA, depending on the international market and variability in price, and higher fertilizer use could allow for more intense cultivation.

The production of soy bean accelerated under reform. In 1990 an annual growth of 8% was registered as a result of substantial yield improvement and a soybean expansion of 6.8%. In 1993 there were 5.4 million hectares under production and in 2000 this had doubled to 10 million hectares. Initially the Pampas were the central production zone, but in recent years the northern and northwestern states have become more important in the production of soy after infrastructure improvements providing access to ocean ports in Rosario and Buenos Aires.

Under reform there was a stable investment climate. Government dealt with inflation, restored confidence in peso as currency, reduction in taxes, tariffs and quotas, and more agricultural surplus was moved into the export market. There had been four crises; the Mexican (1995), the Asian (1997), the Russian (1998) and the Brazilian (1999). Meanwhile, Argentina managed to maintain its currency peg to the US dollar. Problems that remained unresolved after 4 years recession were an economy excessively regulated, labor market rigidity, little flexibility for employers; firing, lowering wages and part time labor. This hindered international competitiveness. Privatization did not necessarily bring gain in efficiency and competition (Pastor & Wise, 1999).

Agricultural scene

In Argentina a major technological revolution has occurred. A network of landowners, companies carrying out farm work, and industrial manufacturing are interconnected by contracts facing strong domestic and export demands. Direct sowing and use of transgenic seeds doubled production; a new agricultural system is relocating across the country, which can be seen as "the fine-tuning of an organizational system that incorporates and generates new companies, improves collective efficiency in the use of resources and changes existing mechanisms for sharing out revenue" (Bisang,

2008). In the 1990s the production of soy and wheat – oleaginous plants – experienced an annual growth of 5.7%. Production doubled but the amount of land use expanded far less, from 20 to 24 million hectares in 20 years.

Drivers of the increase in production are the organization of the system and a model of generating, adapting and spreading innovations with production networks as the new trend. In the earlier production model the situation was about possessing land and the renting of land, including high risks bound to weather and commercial factors. The trend of production networks shows a separation between landowners and companies that farm. The role of contractors as dynamic forces and suppliers of services and agricultural inputs are now part of the production network. The agricultural sector is no longer vertically oriented but, similar to industry, works with subcontractors. Another trend is increased sophistication to boost yields; the industrial system has become a supplier of technology. And thirdly, a separation between production and territorial base of those responsible for production has occurred.

In the 1960s and 1970s a green revolution took place. Farmers and livestock producers incorporated mechanization, fertilizers, and hybrid seeds. For soy production, adopting these future technologies entailed the introduction of direct sowing. In the 1990s transgenic seeds (genetically modified varieties) were introduced and advances in biotechnology made local seeds compatible with weather and soil. The combination of local availability of machinery, the practice of direct sowing, and the supply of biocides and fertilizers made for a new starting point for the next period of technological change.

Previously, knowledge and technological decisions of this sort centered on the producer. In the 'new model' many players are involved, such as seed suppliers and multinationals who form alliances with breeders and local producers. Other important players are the suppliers of farm machinery, introducing new equipment and new technology, and coinciding developments in education and research institutions (such as INTA)[9] in order to keep up to date with the new technology on the market. Furthermore, input suppliers, with their customer service centers, operate as economic forces by selling and advising. Private, non-profit making institutions encourage innovation in the sector (AAPRESID and AACREA)[10] and new associations, organized as production chains, address technological challenges (ACSOJA)[11]. Indirectly the quality control rules imposed by industrial customers and experts, government intervention, standardization of products and processes, environmental

9 INTA (Instituto Nacional de Tecnologia Agropecuaria). INTA is Argentina's national research institute on agriculture and technological advancement in production.
10 AAPRESID (Argentine Association of Regional Consortiums for Agricultural Experimentation) and AACREA (Asociación Argentina de Productores de Siembra Directa - Argentine No-till Farmers Association)
11 ACSOJA (La Asociación de la Cadena de la Soja Argentina). ACSOJA is composed of many institutions that represent the stakeholders in the soy production chain: 1) Science and Technology, 2) Producers, 3) Inputs Suppliers, 4) Traders, 5) Industry 6) Services.

and other complementary regulation, shape the innovative development of farming (Bisang, 2008). Today, the RTRS initiative builds on these developments with the introduction of Codes of Conduct for the agricultural practice in soy production.

Farm production rose in response to strong external demand for food, bio fuels and biomass. Prices on the international market increased, creating more income for the agricultural sector. Higher demand and rising exports at the same time negatively affect Argentine society with higher domestic food prices and lacking distribution of income. The generation of income through agricultural exports is a source of financing for development and debt repayment, which forces a review of the distribution of wealth as for example for the price of land. The government has used a one size fits all tool for the whole industry instead levying taxes, instead of targeting the flow of resources and level of wealth specific to each segment of the network. These variable export restrictions jeopardize the Argentine organizational farm sector model (Bisang, 2008).

Other crops, next to soy, show the vital prospects for agricultural production, namely corn, wheat, rice, cotton and livestock. For the production of corn there are excellent land resources present and, with a production cycle in the southern hemisphere, corn makes for a seasonal competitive crop. Furthermore, serving only a small domestic market enables export orientation, with gains in production immediately increasing exports and enabling a greater market share. Production is highly sensitive and responsive to price relationships between crops and inputs that govern profitability, which easily leads to a higher abandonment rate. However, overall there is a declining trend of field crop abandonment, as opposed to the period before 1980, when 20% of the total field crop was abandoned for livestock pasture and winter grazing. A declining abandonment is related to Argentina's increased integration into world markets after policy reforms. Improved transmission of international prices and higher yields create incentives to harvest and alter the previous mix of crop-livestock activities. Cattle compete with field crops for grazing land in production areas and at times it is considered complementary rotating crops with sown pasture to maintain soil fertility. On western edges of the agricultural zone there is a trade off between crop and cattle, which hinges on market condition.

Transport and infrastructure improvement

Transport and communication are crucial for socio economic restructuring and development as they influence growth and change over time. Both facilitate the interaction between people, institutions, labor, capital and the regional environment. The situation at present in Argentina shows transport routes which are dendritic in nature, carrying export products from the interior to the ports. Public transportation services suffered under the immediate impact of privatization. Maritime connectivity depends on ports that can accommodate large ocean-going vessels, taking

advantage of economies of scale. Sufficient storage and loading space are therefore a primary requirement and the ports themselves are of great importance for connectivity with the global economy.

Since 1945 transport policies are driven by two major factors, first, the aim of *de*-concentrating industry and manufacturing by means of regional planning strategies and second, the trend of nationalization and privatization. Future transport and communication strategies should consider potential cost saving from transportation improvement. Examples are improvements in navigation, for oceangoing vessels in the lower portion of Parana-Paraguay waterway, increased efficiency of barge transportation and the development of privatized railway, giving Northwest Argentina access to barge loading facilities in Resistencia, Formosa. (Fuller et al, 2000). These infrastructure developments would spur competitiveness, as for now the area of production is limited to a maximum of 300 km distance from a port due to the reliance on trucks. Road transport with trucks is relatively expensive compared to train or barge, however, the Parana-Paraguay inland waterway opens up opportunities for barge transport and serves all 4 MERCOSUR nations, Argentina, Brazil, Paraguay and Uruguay.

Government and private investors started projects to improve and modernize road conditions, rail networks, waterways and export terminals. Since in 1997 the Parana- Paraguay was dredged, raising the depth from 25 to 36 feet, oceangoing cargo ships now reach Rosario (Data USDA, 2009). Private road development expanded paved road services, but at the same time created higher toll levels. The removal of border charges improved market infrastructure. Under privatization Argentina's post costs declined per unit production average to the USA.

GM development in production

GM soy was adopted during the 1990s and in 2001 already 90% of the total soy production consisted of biotech varieties. Labor and time savings were drivers for this transition, as costs for *non*-GM crops (40$ per ton) were too high considering the received benefit of 8$ per ton for the non GM status. GM soy improved weed control and generated higher yields, equal to those in the USA. The potential of rotational crops and early maturing varieties provided opportunities for double cropping, which meant an increase in annual yields as the result from producing two crops on the same land within the same year.

Coinciding trends with the introduction of GM soy are the growing presence of major international agribusiness firms, which contributed to the acceptance of GM crop by Argentine producers. The production climate in Argentina enabled a rapid transfer of technology and supplies that was already grounded in the USA. Further advantages for GM in Argentina was the absence of patenting Roundup-Ready soy (RR Soy, the GM variety by USA multinational Monsanto). There were no technology

fees and farmers were allowed to save seeds which made seed costs for biotech lower in Argentina compared to the USA.

High international commodity prices in 1996 boosted producer incentives, with record high prices for wheat, corn and sorghum, and in 1997 for soy the highest price in nine years with $328 per ton. The reason for this is found in the sagging production in grains, which caused a decrease in size of the world grain stock (1992-1995). In 1996 and 1997 the lowest level in global stocks on grain and wheat was registered since the 1970s. Global grain producers responded to high prices, expanding plantings and record production in 1996 and 1997.

Growth in soy in Argentina coincided with a stable and expanding planted area of other crops, equally driven by high international commodity prices. Gains in total crop area resulted from either new land being added, permanent pasture being converted to field crop production or shifts in the traditional crop-livestock rotation pattern, with a growing emphasis on crop. The expansion into new land entails serious consequences for society as well as the environment.

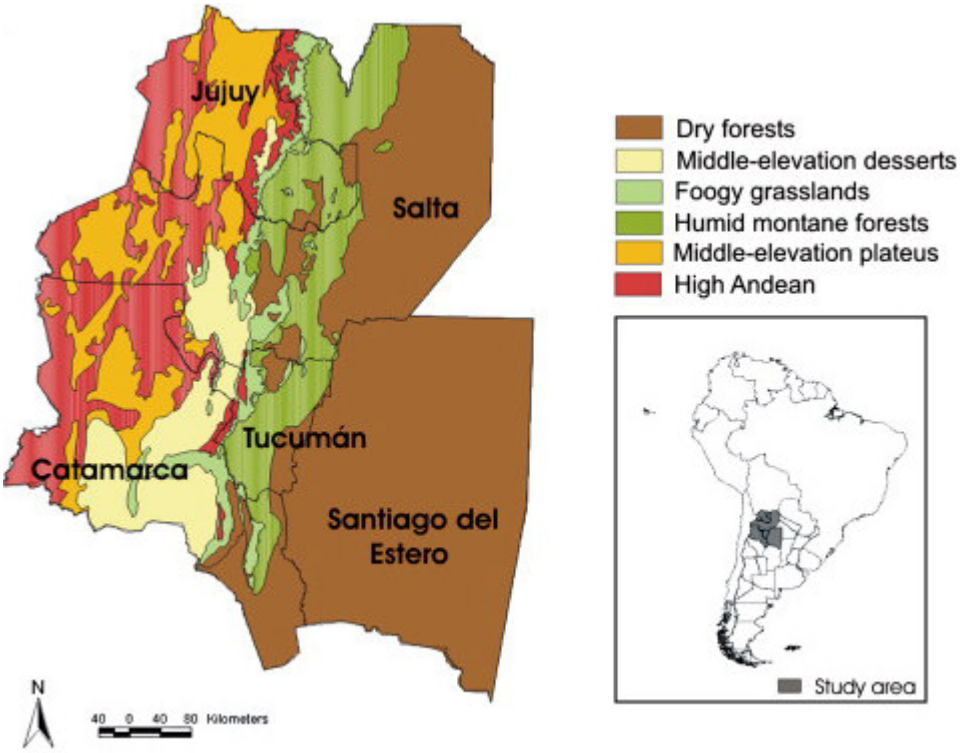
3. *The Soy Frontier* - Land use change in the Province of Salta

3.1 Geographical features

The province of Salta is located in north western Argentina (*Noroeste*, NOA). The province borders to Bolivia, Paraguay and the Province of Jujuy in the north; to the provinces of Tucumán, Catamarca and Santiago del Estero in the south; to the Provinces Chaco and Formosa in the east and Chile to the west. The land cover stretches over an area of 155.488 km², which is 5.6% of the countries total surface (INDEC 2002a). The province of Salta consists of 23 departments, which are each subdivided in different municipalities. The total population of Salta Province counts 1,079,052 people, of which the larger part (900.171 people) reside in urban areas and 178.880 people live in rural areas (INDEC, 2001). The capital city Salta in the *Valle de Lerma*, counts almost 500.000 inhabitants.

From east to west the Province of Salta can be divided in six geographical zones (Map 3.1). In the west there are the high mountains of the Andes (*Altiplano*) and the high elevation plateaus of the *Puna*. Eastwards, the mountain range is interrupted by middle-elevation desserts, large canyons and fertile valleys, such as *Quebrada del Toro*, *Valles Calchaquíes* and the *Valle de Lerma*. Further east the humid subtropical forests (*Yungas*) are dominated by semi-evergreen forests on slopes and foothills. In the east they transform to the dry forests of the *Chaco Salteño*.

Map 3.1 Eco regions Salta Province



Source: Izquierdo and Grau (2009)

Agricultural activities in the Province of Salta vary to the same extent as the existing eco regions. The agricultural potential depends on topography and climatic features, as for example altitude alone ranges between 300 meters up to 7000 meters causing extreme differences in levels of temperature and rainfall. In short, the key features and core agricultural activities are mentioned. The High Andean (red) extends above 4000 meter, has marginal vegetation and human land use is limited to extensive grazing. The Puna (yellow) ranges between 3000 and 4000 meters, has shrubby vegetation which grows in a cold and dry climate. Land use is characterized by extensive grazing and small family managed agricultural fields.

The middle elevation deserts are located between 1000 and 3000 meters with intermediate temperatures and little rainfall. Land use includes extensive grazing and irrigated modern agriculture, for example vineyards and fruit orchards. Foggy grasslands are situated on humid slopes, between 2000 and 4000 meters, where land use is dominated by extensive grazing and some horticulture in the valleys. The Yungas, a stretch of semi evergreen forests on humid slopes along the east of the Andes mountains, are a transitional zone to the eastern forests, below an altitude of 3000 meters who receive more than 900 mm of rain annually. In the forests agricultural activity is limited to extensive grazing and logging, but the foothills provide favorable circumstances for main agricultural development of the area. Produce is focused on citrus, sugarcane, tobacco, horticulture, and the expansion of soybean. In the dry forests of the Chaco core activity of land use includes grazing, some irrigated agriculture and expanding rain fed agriculture.

Izquierdo and Grau (2009) analyzed information on agricultural development and land use change since the 1970s for this specific region. In their study there is a focus on the environmental effects of these land use trends in order to highlight areas that are in need of ecosystem protection. Their findings stress the imbalance that persists between the areas that are protected, by means of natural parks or managed areas according to IUCN criteria[12], and areas that are exposed to the threat of agricultural expansion. The data shows that there has been an increase in the number and area of reserves during the last decades, however, the majority has been established in areas that do not undergo an intensification of land use, such as mountainous and high elevation ecosystems. This leaves the most seriously threatened eco-regions, such as the Dry Forests, unprotected from land use change.

[12] IUCN supports the High Conservation Value (HCV) concept which was originally devised in the context of forest certification (High Conservation Value Forests of HCVF), but is also applicable to all kinds of ecosystems and habitats. The HCV concept has proven to be a flexible concept promoting sustainable use of natural resources. High Conservation Value Areas (HCVA) can be identified on the site-level and landscape level, it can assist in land-use planning and in identifying conservation priorities, in a multi-stakeholder setting (www.nciucn.nl). HCVA's are critical areas in a landscape which need to be appropriately managed in order to maintain or enhance High Concervation Values (HCVs). (RTRS Principles and Criteria Field Testing Version 28th of May 2009, p.25)

There is an ongoing discussion on land use planning which took of after the issuing of the national law *Ley de Bosques* on the 28th of November 2007. This law provides a baseline for environmental regulation throughout the whole of Argentina. Within a year each province had to create an *Ordenamiento Territorial* (a territorial code) on their native forests in line with the technical criteria identified in the national law. Until this would have been achieved, all deforestation was prohibited. The territorial code is based on a classification in three categories (I, II and III) of which only category III allows for land use change, after an environmental impact study on the proposed activity has been carried out.

In 2007, during parliamentary discussion on the *Ley de Bosques*, the Provincial Government of Salta acted in counter to this law. They gave their approval to the deforestation of half a million hectares. In order to protect the indigenous population and local farmers, the National High Court of Justice suspended this permission for deforestation in the departments Oran, San Martin, Rivadavia and Santa Victoria until the Provincial Government would conduct an environmental impact study and the Ordenamiento Territorial would be in place.

On the 7th of July 2009, the Government of Salta Province announced the finalization of the *Ordenamiento Territorial para el areá boscosa de la Provincia de Salta* (Annex III; Map). The three categories of conservation are; I (red) high conservation value where deforestation is prohibited as well as any other use of the forest, II (yellow) medium conservation value where deforestation is prohibited but use of the forest is allowed for example tourism, research or cattle grazing, III (green) low conservation value where partial or total deforestation is allowed for large scale agricultural activity.

Deforestation and politics

Until 2002 almost half of the total 15 400 000 hectares in Salta maintained its natural vegetation cover, counting 6 931 705 hectares of forest. With soy expansion at its highest rate, in 2006 and 2007 the cultivated area of agricultural land increased up to 569 810 hectares, while over four thousand of hectares forest disappeared between 2002 and 2006. Deforestation had already increased with 113.45% between 1998 and 2002 and continues rapidly. Focus points are the transition area towards the Chaco and the sub-humid Chaco area in the East, where thousands of hectares at a time are cleared (Delgado, 2009). The world market for soybean, technology changes (GM soy and zero-till practice) and the rainfall increase have been identified as key drivers for deforestation in the Chaco area (Grau et al, 2005; Zak et al, IN PRESS). The research on deforestation and fragmentation of Chaco dry forest in NW Argentina (1972-2007) by Gasparri and Grau (2009) explores the relations between deforestation rates and the country's economy related to the agricultural sector, taking into account land property structures and ecological

restrictions for agriculture. Interpretation of the figures on deforestation shows a total deforestation of 1 451 959 hectares during the last 35 years. In 1972 all sites showed more than 75% forest cover, by 2007 only Oran is still above this percentage (Gasparri & Grau, 2009). After 2002 deforestation accelerated in all sites.

In line with the research of Grau and Gasparri (2009), Delgado (2009) shows that the departments of Anta, San Martin and Oran are the areas most affected by deforestation. Between 2002 and 2004, a total number of 66 838 hectares were deforested in Anta, 11 358 hectares in Oran and 14 747 hectares in San Martin. Between 1984 and 2001, almost a hundred thousand (94 087) hectares of Yungas forest was cut down, 10.84% of the total Yungas land cover. Between 1984 and 2004, 396 943 hectares of Chaco were cleared in San Martin, Oran and Anta. "In the northeast of Salta 51% of the area planted with soya crops (15 700 hectares) corresponded to what would still have been natural areas in 1988/1989." (Paruelo, 2005).

Political power in Salta, in control of land use planning, is distinct power inherited from the time of the dictatorship.[13] The present Governor Juan Carlos Romero is from the influential Romero family of whom it is suggested that they increased their wealth during the dictatorship. With arrival of democracy they acquired regional political power through their richness and powerful business and allies in circles of big landowners. Also they have significant control over the regional newspaper *El Tribuno* (Delgado, 2009).

Agricultural businessmen, strongly in favor of promoting the soy model, collaborate and support the exterminating function of armed forces in the present political system. At the end of the 1970s the state was dominantly military and favorable of large businesses which resulted in the appearance of new landowners in the public lands of northern and eastern Salta. Land agreements were awarded to high ranking members of local military as well as from Buenos Aires. Companies who took the position of large landowners started undertaking forest clearances and focused on the potential of GM soy in the second half of the 1990s (Delgado, 2009).

SEMADES (Secretaría de Medio Ambiente y Desarrollo Sustentable) issued deforestation permits and set up public hearings. Theoretically these public hearings were consultation rounds, but they did not enable participation of the public because access was not assured due to the choice of location and manner of organization. In 2007 the provincial government authorized deforestation of almost 200 thousand hectares in response to the national legislation which was supposed to ensure the protection of forest and the development of the O*rdenamiento Territorial*.

The position of the provincial government appears ambivalent, with on the one hand continued deforestation, granting land and economic opportunities to the benefit of the vested elite, while on the other hand efforts are made working towards

[13] Dictatorship; military rule in Argentina after the coup in 1976 which lasted until 1983.

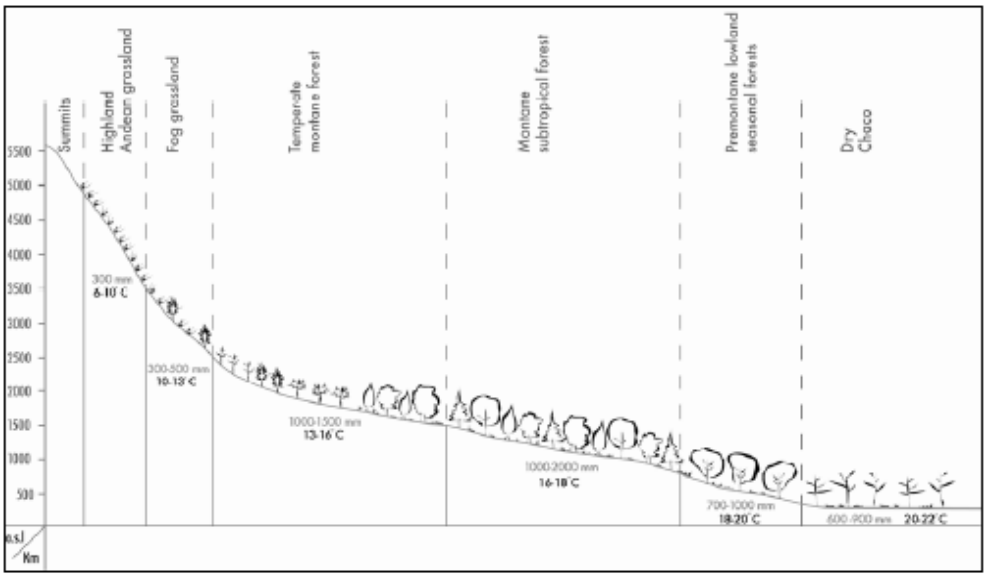
legislation for protection of the environment. An additional complicating factor is the relation between the provincial and the federal government, representing different interests. Political dynamics play an important role in the power struggle that takes place over the land and natural environment of Salta Province.

Yungas and Chaco forests

The situation of deforestation in Salta Province is particularly alarming because of the direct threat posed to the Yungas and Chaco forests, known for their rich biodiversity and wide variety of ecological services. The Yungas is one of the most diverse eco-regions of Argentina and they are considered a high priority conservation area. For this reason the UNESCO biosphere reserve is located in the Yungas area and has as main priority to establish a land-use plan that takes into consideration social, economic and ecological dynamics. Yungas is the term used for tropical and subtropical forests that can be found on the eastern slopes of the Andes Mountains in South America. The Yungas region has a varied typography, including humid forest ecosystems and sub-tropical seasonal forest to misty pastures (Figure 3.1). From the north in Venezuela down to Catamarca in Argentina, this narrow ecological band stretches over 4000 km from north to south (Brown et al, 2001). On average the region has a subtropical climate with distinct wet and dry seasons. The majority of precipitation (90%) occurs in the summer period from November until March. Annual precipitation varies between 350 and 2300 mm across strong altitudinal gradients, with the highest rainfall occurring between 1000m and 1500m (Grau & Brown, 2000).

Key features that make this Yungas area unique and reasons for locating the UNESCO biosphere reserve accordingly, are the fact that it is the largest continuous Yungas surface in Argentina, which continuous into Bolivia, a total of 3 million hectares of forested area. It contains 30% more plant and animal species than any other Yungas region, due to its surface area and a good degree of conservation, a history of stability and isolation and its geographic location. It is a safe haven for threatened animals, such as the jaguar and tapir, as well as an important watershed area which sustains the economic development of the lower situated region. There is also a high concentration of aboriginal and campesino communities who are habituated in this region. They live in close contact with the mountain forest and have a high level of traditional knowledge of local biodiversity (Pacheco, 2005).

Figure 3.1 Altitudinal distribution of vegetation in the Yungas



The 5 million hectares Chaco forests encompass the second largest forest mass in the world, after the Amazon. It crosses the borders of Bolivia, Paraguay and Argentina. Gasparri and Grau focused on deforestation and fragmentation of the Chaco dry forest in Northwest Argentina between 1972 and 2007 (Gasparri & Grau, 2009 IN PRESS). The importance of research on this trend is emphasized because of the negative consequences of deforestation. Deforestation is a main driver of species extinction, carbon emissions and climate change at regional and global scale. It changes landscape configuration which triggers habitat degradation and has consequences for species, energy and matter. Tropical dry forests are one of the most threatened ecosystems worldwide (Hoekstra et al, 2005).

Recent agricultural expansion in the Chaco is largely driven by modern agribusiness companies oriented to the global market of grains; mainly soybean. These modern agribusinesses follow a different line of decision making when it comes to investments in clearing new land compared to traditional agents of deforestation (i.e. cattle ranchers). The Chaco forests of Northwest Argentina are a clear example of deforestation driven by agribusiness expansion. In subtropical Argentina, the Chaco region has the highest absolute deforestation rates (Gasparri & Grau, 2006; Gasparri et al., 2008).

Previous studies identified the soybean global market, technology changes and the rainfall increase in this region as key drivers for deforestation in the Chaco but relations with the national economy were not clear. Political changes took place and had effects in shorter periods of time compared to the long period of analysis. However, in addition to recommendations for research, this research brought focus to fragmentation of nature in relation to land property structure and ecological restrictions for agriculture (Gasparri & Grau, 2009 IN PRESS).

3.2 Soy nuclei and land use change

Salta province counts 15 400 000 hectares of land of which half was natural vegetation cover until 2002. 6 931705 hectares are forest, of which 5 000 000 hectares is Chaco, dry subtropical forest. The other 2 000 000 is Yungas mountainous subtropical forest, which stretches through the provinces of Jujuy, Salta and Tucumán. The foothill forests (Figure 3.3.1) have a high level of biodiversity and are densely populated by indigenous communities. At the same time, this area is favored for agricultural expansion, in particular mechanized agriculture.

Izquierdo and Grau (2009), who work within the LIEY research group (Laboratorio de Investigaciones Ecológicas de las Yungas) at the University of Tucumán, carried out research on agricultural adjustment, land use-transition and protected areas in Northwestern Argentina. They combined an analysis of trends in land use and human demography with trends in the creation of protected areas in the last three decades (1970-2002) in this specific region. Four ecological groups were distinguished; dry valleys, highlands, humid ecosystems and dry forests. Demographic trends were related to each of these groups with respect to the impact of land-use transition. Their key findings are guiding for the coming into existence of soy nuclei as the result of land use change, transforming natural lands for agricultural purpose.

Between 1970 and 2001, population increased with 83%, with an additional number of 1 899 277 inhabitants. This population increase primarily took place in the cities; urban population increased by 142% while rural population decreased by 3% (Izquierdo & Grau, 2009, p.862). These demographic trends were apparent in all ecological groups. The changes in agricultural practice, however, differed among the ecological groups. In the dry valleys there was an increase in agricultural area, with minimal effect, as the eco region represents less than 1% of the region. In the highlands the agricultural area decreased, in the humid ecosystems the agricultural areas remained relatively stable, but in the dry forests agricultural expansion accelerated significantly with a sharp rise in available agricultural area. The area of pastures doubled as well in the dry forests, while it decreased in all the other areas.

The different eco-regions in the Northwest of Argentina differ in the percentage of protected area. There is a total increase of the number of hectares protected area since the early 1970s, with an expansion in the highlands and humid ecosystems. In contrast, the levels of protection remained minimal in the dry forests. There is a generally negative relationship between the degree of protection of the eco-regions and the level of threat due to changes in land use intensity. "Highlands have the lowest level of threat; since they have decreasing agriculture and livestock numbers and it has the highest percentage of managed protected areas. (…) Dry forests, which experienced the largest threat due to increasing agriculture and constant livestock numbers are the ecological group with the lowest level of

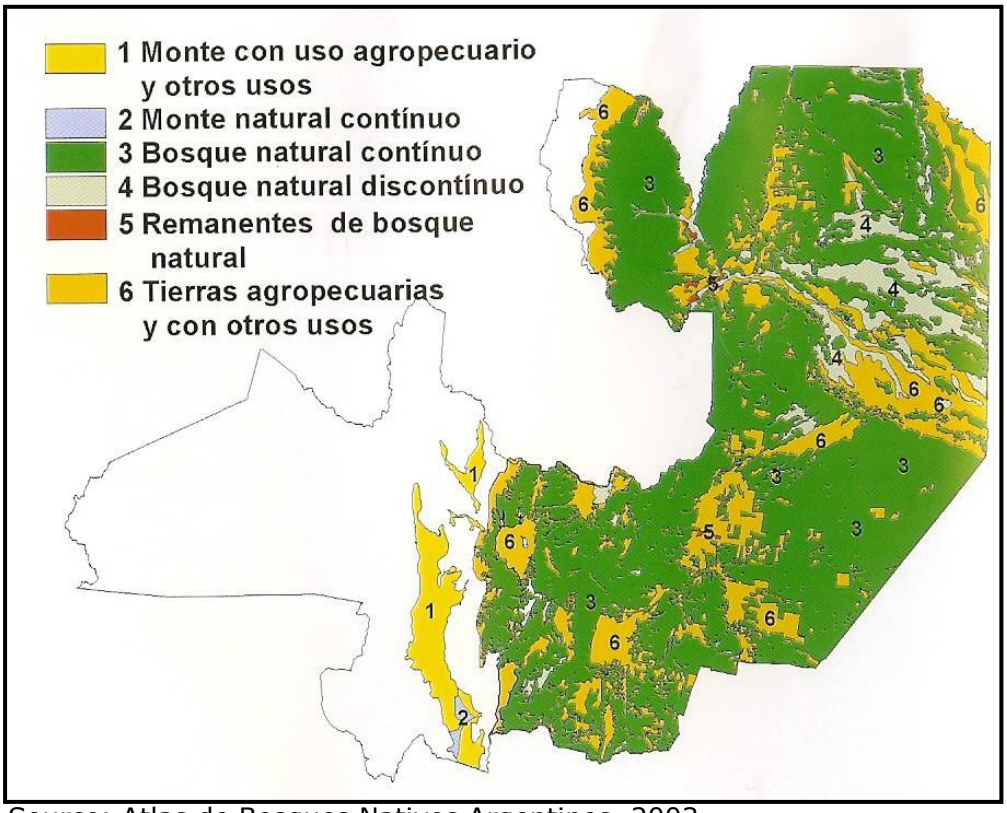
protection" (Izquierdo & Grau, 2009, p.863).

Land use dis-intensification and the expansion of the modern agriculture frontier are contrasting trends in land use and related to the environmental heterogeneity of the region. Expansion of agriculture in the dry forest (Chaco) is the main cause of deforestation; a process similar to patterns in dry forests throughout South America, making dry forests the most threatened mayor neotropical biome according to Janzen (1988). In the humid ecosystems (Yungas) agriculture expanded almost exclusively in the lowland pre-montane sector, associated to modern agriculture technologies for the production of sugar cane, citrus fruits and at present, soybean. Higher situated areas show this trend in the lower parts of the valleys. In both cases numbers of domestic animals, which had been the dominant type of marginal land use, is decreasing. The process of agricultural adjustment is accompanied by a reduced human impact on montane forests, foggy grasslands and non-irrigated deserts. Agriculture becomes concentrated in flat areas with productive soils, suitable for modern technology.

Protected areas are typically located in remote places and areas which are not suitable for agriculture and commercial activities (Margules & Pressey, 2000). Eco-regions with the highest level of conversion to agriculture have the lowest level of protection (Hoekstra et al, 2005). This situation occurs in Northwest Argentina. Conservation efforts have been made in order to protect landscape with high scenic value and preserve biodiversity and watershed quality, but part of the success might be due to the decreasing land uses in these particular eco-regions (highlands and humid ecosystems). Creation of protected areas has occurred mostly in montane forests and foggy grasslands, while in the flat foothills, where agriculture has expanded there is almost no area under protection (Brown et al, 2002; Izquierdo & Grau, 2009). "The patterns of land use change in Northwestern Argentina show a process of agricultural adjustment, characterized by concentration and expansion of agriculture in fertile flat areas suitable for modern agriculture, while marginal areas are undergoing a reduction in land use intensity associated to decreasing rural population. (..) these trends should be used to prioritize conservation efforts" (Izquierdo & Grau, 2009, p.864).

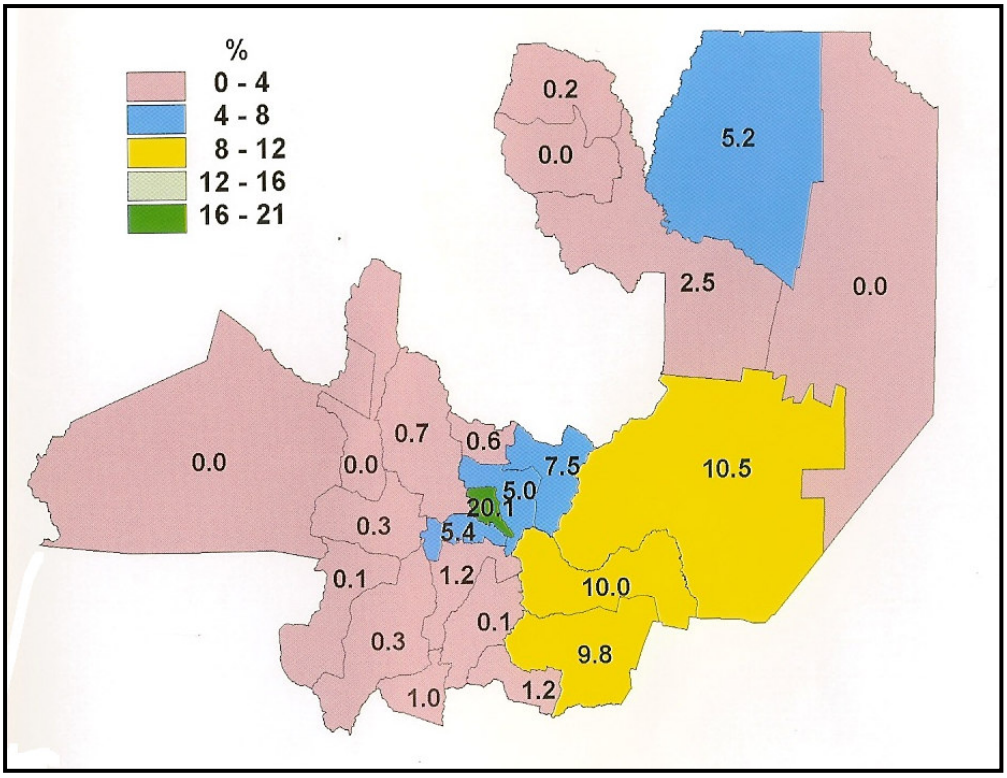
Map 3.2.1 shows the spread of agricultural activity throughout Salta province, marking agricultural land in yellow and forest in green. Map 3.2.2 gives insight in the concentration of agricultural activity in the different departments, with Anta, Metan and Rosario de la Frontera representing the highest percentage of land dedicated to agriculture, being primarily mono-crop soy.

Map 3.2.1 Forest cover in Salta



Source: Atlas de Bosques Nativos Argentinos, 2003.
Proyecto de Bosques Nativos y Areas Protegidas

Map 3.2.2 Agricultural land per department in %



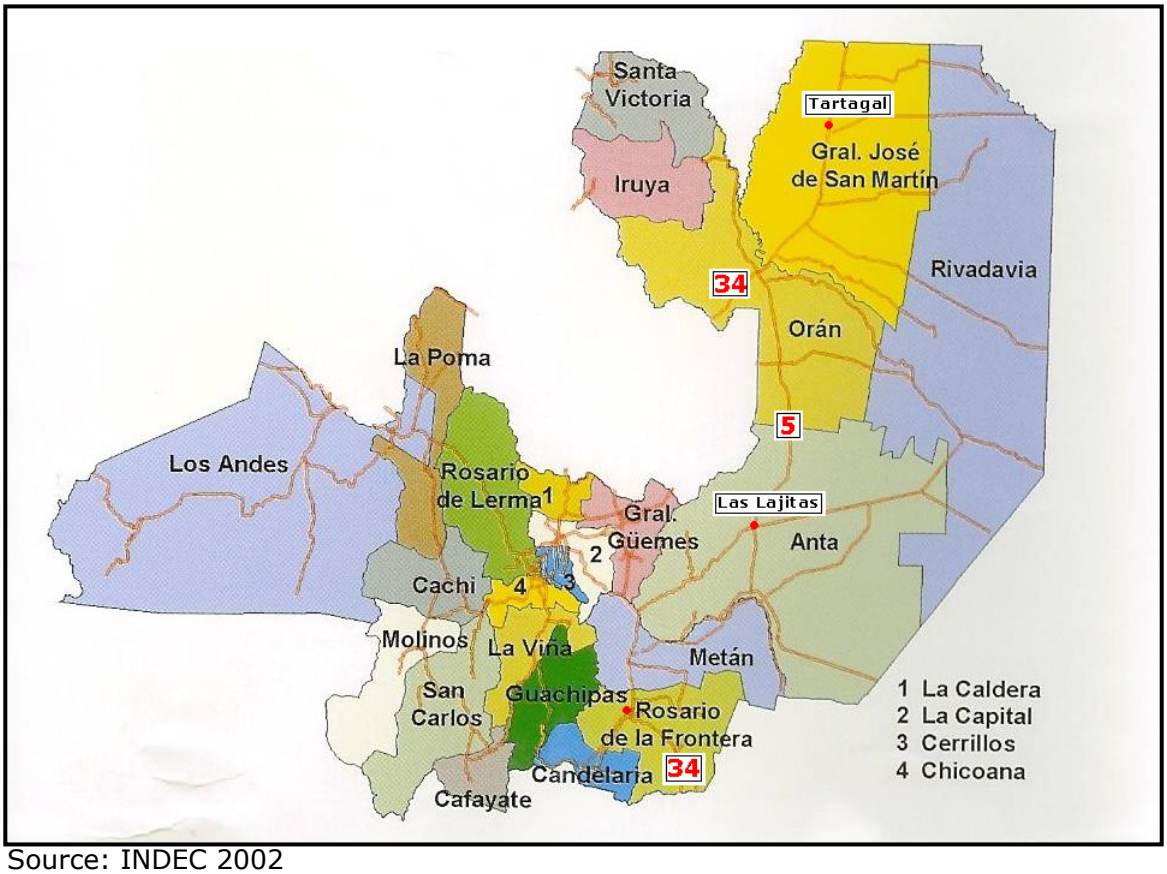
Source: CAN 2002 INDEC

Soy nuclei

Salta has known the highest rate of soy expansion, which is apparent in an actual *soy route*. This route runs from south to north of the Andean foothills along route 34 and links with route 5, connecting southern Salta to the borders of the Chaco (Map 3.2.4). From the 1960s, mechanization and intensively farmed large scale monocultures marked the take off in production of several bean varieties. In search of land to plant soy, production moved beyond the Pampas into more environmentally fragile areas in the North. Landownership became more concentrated, as small farmers were driven of their lands due to low prices they received for their products – rice, maize, lentils and potatoes – and herbicide contamination (Branford, 2004). Agricultural activity grew dramatically from the 1990s onwards with the expansion of soy. After 2006-2007, soy extended into another 527 650 hectares within the transition area of the Chaco. The urban centers, well connected by road routes, became providers of key agricultural services.

There are three urban centers in Salta province from which agricultural frontiers are being planned. In the south Rosario de la Frontera, in the east Las Lajitas, which forms the entrance to the Chaco, and in the north Tartagal, consisting of large plots arranged on a north-south axis east of route 34 (Map 3.2.4).

Map 3.2.4 Political division of Salta Province in departments



Source: INDEC 2002

The departments of Rosario de la Frontera and Metan were the first location for large scale mechanized agriculture in the 1960s. The agricultural exploitation meant an intensive extraction of all resources. The monoculture production of beans was an incentive for deforestation, carried out by families descendant or immigrated from Spain in the 1940s. Their practice was comparable to land use in the pampas, while having to deal with different climate and soil conditions. After a couple of years their approach led to reduced yields, poor soil quality and erosion. In the 1970s these were the factors of influence that made bean farmers decide to move up further north. In the north there was an abundance of public land, which was inhabited by Creole farmers and indigenous communities, but never obtained legitimacy over their ancestral lands.

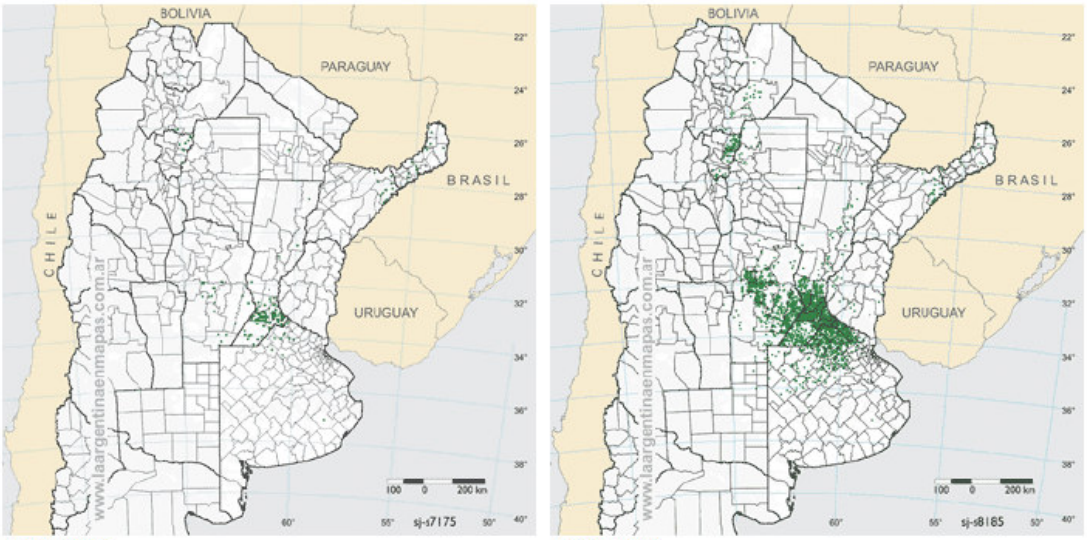
These developments led up to the soy nuclei of today. Las Lajitas, situated at the centre of the province in the department Anta, functions as a centre for agricultural services and a focal point for the expansion of soy, growing exponentially since the 1990s. Tartagal is the provincial capital of the department San Martin, boarding on a tropical climate, which offers wide humid plains at the base of the jungle highlands to the North of the river Bermejo (Delgado, 2009). These forests are still inhabited by gaucho families that practice extensive ranching and medium sized plantations with for example pepper and tomatoes, providing a diversity of products for the regional economy.

These are the regions where, in the 1970s, new entrepreneurs arrived and large corporate identities bought or received land from the provincial government. The traditional size of the farm saw a tenfold increase, from 100 up to 1000 hectares. In 1989, 70% of the land belonged to companies or people outside the region. In the 1990s mechanized agriculture grew exponentially coinciding with tactics of physical and legalized violence in the interest of the political and economical business circle of soy (Delgado, 2009, p. 140). The second half of the 1990s Las Lajitas, Metan and Tartagal where subject to the building of offices, warehouses and agricultural silo's, activities that were carried out by corporations responsible for the soy expansion such as Monsanto, Bunge and Dreyfus.[14]

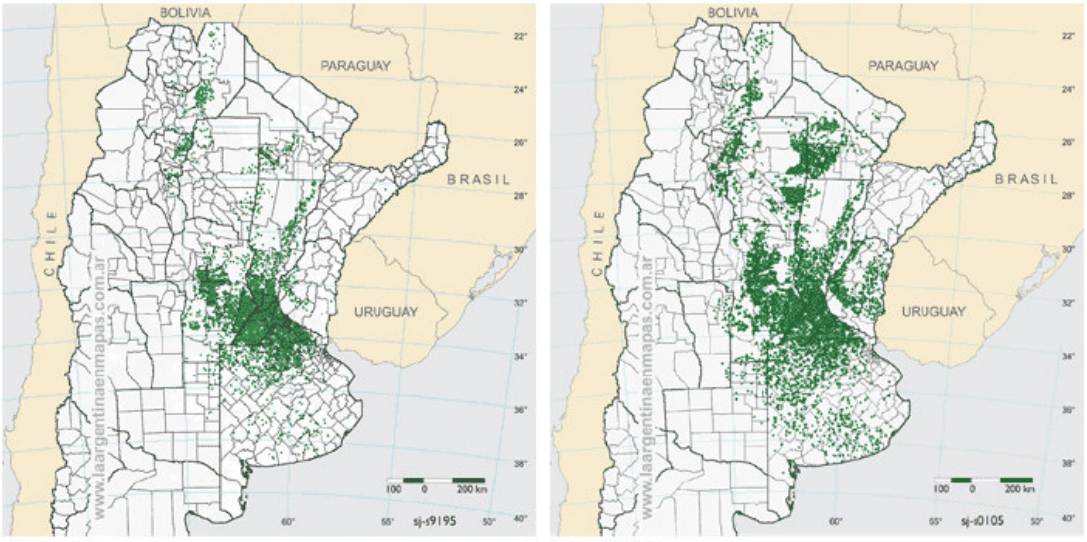
Map 3.2.5 shows how the expansion of soy production took place in the various agricultural regions in Argentina, showing tremendous growth in and around the Pampas as well as the exploitation of relatively new agricultural lands in the north. These maps portrait the process of soy expansion over a period of 35 years, stressing the increased importance of soy, playing the upper hand in agricultural development.

[14] Explanation on ABCD, multinationals that have a monopoly on facilities and services related to GM and glyphosate.

Map 3.2.5 Evolution of the area cultivated with soy in Northern Argentina from 1971-1975 to 2001-2005, one dot represents 1000ha



1971-1975 1981-1985



1991-1995 2001-2005

Source: Argentina on maps, 2009 (Plant Research International, Report 259, p.13)

4. The impact of soy on society, economy and the environment

4.1 Negative effects

The production of soy poses threats as well as opportunities. The direct and indirect negative effects of soy production that impact the surrounding society, economy and the environment are the primary reason for heated debate on the further expansion and intensification of soy. Therefore, these negative effects are explicitly mentioned in this chapter. Table 4.1 recapitulates the identified threats and opportunities related to society, economy and environment (Van Berkum & Bindraban, 2008).

Society

Social problems directly related to soy production are, first, the displacement of people from their land. The expansion of soy moves into the traditional lands of indigenous people who have lived there for many years but do not have ownership documents to prove it. Vulnerable groups of whom the livelihoods are disturbed are Kolla and Guarani communities in Salta and Jujuy, and the Wichi and Toba communities in the Chaco (www.iwgia.org).

Secondly, the increased scale of production has led to further replacement of labor by machinery. Rising numbers of unemployment in rural areas is partly to blame on the low demand for labor in the soybean production process. Advanced technology, increased scale of production and the use of machinery make a labor force in agriculture redundant. Moreover, soy forces out the variety of products that used to be produced before the introduction of the monoculture of soy.

A trend related to unemployment in rural areas is the migration to urban centers. Rural-urban migration is explained as the result of mechanization and large scale agriculture practice, with consequently an increase in unemployment and a rising poverty rate under urban dwellers. In 2006, the northwest of Argentina, together with the northeast, was one of the regions defined with the highest rates of poverty and Unmet Basic Needs (UNDP, 2006). For those that do make a living as an employee in the soy sector, the lack of respect and enforcement concerning the labor rights of employees is, thirdly, a social unjust practice taking place.

Technological advancement in the agricultural sector has further increased the disparity between large scale producers and smallholders, who practice self-subsistence farming. There is a knowledge gap and smallholders lack the financial means to introduce new technologies in daily practice. Genetic modification of crops, application of pesticides and fertilizer and the practice of zero-tillage, demands for education and knowledge transfer. Only farmers with access to information and means for investment are able to keep up with these changes in the agricultural sector. The result of this disparity benefits the relative few farmers operating on a large scale, with access to information and financial resources, opposed to a larger number of smallholders that miss out and get in trouble because of increased

competition. Especially considering soy, which has become more specialized in its shift from a traditional, small scale production model to an agro-industrial, large scale production model. Education and information services are lacking in response to this social dilemma of increasing disparity the agricultural sector.

Furthermore, technological advancement and increased scale of production for crops has led to a scarcity of land for cattle grazing. Feedlots for cattle are the direct result with the harmful side effect of methane release, one of the greenhouse gasses contributing to climate change on a global scale.

More health related social issues in this realm are the supposed negative impact of glyphosate, which is the most frequently used pesticide for genetically modified varieties of soy, on human beings, animals and the environment. There are cases known of increased rate of cancer at early age, birth defects, kidney problems, respiratory ailments and irritation of the skin.

Economy

In economic terms, Argentina is highly dependant on the income of soy exports. A situation best described as crop dependence, in which Argentina relies more and more on the production of soy, to the detriment of other crops and products. As most of soy produce is stemmed for export, provision of domestic demand could be at risk which brings the issue of food security forward.

Threats from an economic point of view, considering this position of crop dependence, are a decrease in demand due to reduced economic growth in importing countries. Other identified risks from economic perspective are all related to a potential increase in costs, namely the relative high costs for intensified use of grasslands compared to expansion of grasslands. These land use considerations show the discrepancy between economic versus environmental interests, favouring the best alternative of land use cost-wise.

A decreasing demand for soy or meat in importing countries - as soy is destined for cattle feed in the meat industry abroad - is another risk for Argentina. Also the limited outlet for meat products due to trade barriers shows the relative vulnerable and dependant position on the world market. Lastly transportation costs, directly related to internal production costs and relevant for price competition internationally, form a risk when the comparative advantage of production is outweighed by a rise in transportation costs. This risk is exemplified by the case of further expansion of soy into natural lands in the northwest of Argentina, located far away from the seaports (Van Berkum & Bindraban, 2008).

Environment

Environmental problems are resulting directly from soy production, of which deforestation is at the top of the list. Expansion of soy plays an important role in the

transformation of forests into arable land. The loss of forests and the coinciding loss of biodiversity are a worrying trend. On a larger scale the relation is brought forward with climate change, as soy production increases greenhouse gasses (GHG) with a concerning amount. The cutting down of forests preceding the production of soy destroys existing carbon pools.

Soil erosion is another negative side effect of soy production. When rotation of crops, zero-tillage and pesticide use are not sufficiently taken into account, soil degradation is the result. Also water pollution is closely related to intensive land use. The extremes of water shortage on the one hand and flooding on the other are both side effects related to insufficient water management. The situation also depends on rainfall and the capacity of the soil to retain the precipitation. Despite the fact that soy does not need much water, in dry periods it still needs irrigation which leads to shortages due to increased concentrated demand for water. Changed patterns of rainfall, due to climate change, has opened up a larger region suitable for soy production, certainly in combination with irrigation facilities. Still, the popularity of the crop spurs production even in those regions with unsuitable climatic features (Delgado, 2009).

Contamination of glyphosate is a severe environmental effect. It kills micro organisms in the soil and natural processes are disturbed. Toxic particles contaminate groundwater as well as the ground. Spraying from airplanes creates the risk of drifting in the air with wind and rain. Transport of soy and storage in silos brings glyphosate, after the production process as field crop, in proximity of people in villages. Another risk of frequent use of glyphosate is the application of higher doses to maximize effect. This will create glyphosate resistant weed crops in the long run, which could have a harmful effect on surrounding environment as well as agricultural practice itself.

Table 4.1 Opportunities and threats related to soy expansion

	Opportunities	Threats
Economic	- Increasing demand for soybean food and feed - Increasing demand for soybean fuel - Increasing demand for meat	- Costs of intensification of grassland higher than costs of expansion of grasslands - Decreasing demand due to reduced economic growth in importing countries - Limited outlet for meat products due to trade barriers - High transportation costs
Social	- Labour conditions complying with international standards (incl. erase of child labour) - Fair remuneration of labour - Securing land rights by land re-registration programmes	- With increased scale of production, labour is replaced by machinery - Livelihoods of indigenous population disturbed by moving up soy production - Infringements on labour rights due to lack of enforcement
Environmental	- Zero-tillage production method - Soy-based rotation system - Ecological Economic Zoning	- Loss of biodiversity if cultivation expands as monoculture - Soil degradation, water pollution and loss of biodiversity as existing land is used more intensive - Local government is incapable to enforce spatial planning measures aimed at controlling soy area expansion

Source: Van Berkum & Bindraban, 2008

4.2 Stakeholder's response

A variety of stakeholders were approached for this research in order to get their response on the situation of soy production today in Argentina and, more specifically, in Salta Province. By conducting a semi-structured interview, which focused on the position and opinion of the individual as well as the aims and means of the organization, respondents were enabled to express their view on issues of concern that result from today's practice in soy production.

In Table 4.2.1 the stakeholders are categorized in five different groups, namely Research Institutions, Civil Society, Farmers Organizations, Agribusiness and Government. The abbreviations by which the stakeholders are mentioned are clarified in Table 4.2.2, which provides for an introduction to the organization, stating in short its activities and ambition.

Table 4.2.1 Stakeholder categorization

Research Institutions	Civil Society (NGOs)	Farmers Organizations	Agribusiness (farmers/producers)	Government (Federal/ Provincial)
LEIY	**FARN**	**AACREA**	**El Tejar**	**SEMADES**
UNSA	**Fundapaz**	**AAPRESID**	**Los Grobo**	**SEPA**
UCASAL	**FoE**	**FAA**	**Las Lajitas**	**INTA**
-	**Solidaridad**	**CRA**	**-**	**-**

This chapter brings forward the issues of concern identified by stakeholder respondents and will further complement the overview of direct effects for society, economy and environment as the result of soy production. Partly the respondents identified with the issues raised, partly the respondents have specific concerns related to their own interest and perspective as an actor or stakeholder in (the debate on) soy production. In order to structure the discussion of the research findings extracted from the interviews, this chapter consists of two parts. Part one treats the situation in Argentina on a national level, while part two allows for a more detailed analysis considering the situation in Salta Province, adding focus to the specific environmental impact on a local scale and difficulties with respect to policy of land use. The following topics are covered in part one and part two:

1. Soy Production in Argentina

1.1 Highlighting Soy Issues
Society and environment
1.2 Good Agricultural Practices
1.3 The role of the Government
Conflicto del Campo
1.4 The Potential of RTRS

2. Soy Production in Salta Province

2.1 Highlighting Soy Issues
Conserving biodiversity
2.2 Good Agricultural Practices
2.3 The Provincial Government
Ordenamiento Territorial
2.4 The Potential of RTRS

Part 1. Soy production in Argentina

1. Highlighting Soy Issues; Society and Environment

Civil Society

The Civil Society stakeholders express a shared concern with regard to social and environmental issues. The Chaco and the Yungas forests in the northwest of Argentina are mentioned as the most threatened ecosystems, because these regions have become lucrative for exploitation after the introduction of GM soy and changes in climate and precipitation. Leslie MacColman, coordinator at FARN, states her viewpoint on the present situation of soy production: "Problems with soy include risks such as the loss of biodiversity, negative environmental impacts and the impact on the indigenous people as well as the workers. There are multiple indigenous people suffering from the soy production in Argentina. A few of the tribes are called Atopa, Wichi, Cojas and Wasanihas. In total approximately 30.000 to 40.000 indigenous people are harmed by the soy production." (FSA Interview, FARN). Their life style as hunters and gatherers requires a large piece of natural land, which is now under threat due to deforestation.

Josephine Eisele, program assistant with Solidaridad Cono Sur, shares these concerns and emphasizes that the social and environmental problems resulting from soy production in Argentina are centered in a small area: the Chaco. Here deforestation and the displacement of the indigenous community, primarily Wichis, cause for serious problems. Solidaridad chose to support the NGO Fundapaz on their work with the indigenous community and small farmers in the Chaco region. The activities on the ground undertaken by Fundapaz are for example workshop-series on empowerment and participation for representatives of farmers and rural communities in the Chaco forests.

Roque Pedace, representative of Friends of the Earth (FoE) Argentina, explains that the reason for the aforementioned problems in the Northwest region is climate change. Increased rainfall has lowered the risk of production and allowed for an expansion of the practice of soy production further into the northwest of Argentina. In the Yungas and the Chaco people see the advantage of adopting new methods and techniques in cultivation as the result from climate change, which Pedace explains as a process of 'spontaneous adaptation', reeking the benefits of agricultural opportunities. However, the situation today is not sustainable; the soil will not remain productive if the practice of soy production will continue over the years to come. Acknowledging the relation between climate change and the challenges met in agricultural development and deforestation, resulted in a particular focus on these topics for FoE.

Agribusiness

The stakeholders representing the category in Agribusiness hold a different position considering soy related issues, as they are producers and more concerned with the production process, yields and profit. A spokesman of El Tejar, for example, denies the negative socio-economic effect of expanding soy production causing poverty in the rural areas due to reduced job opportunities or even displacement. "In reality, the opposite occurs in the rural areas. Through soy expansion there has been an indirect job creation, which has increased the income of rural inhabitants. Moreover, on average farmers in Argentina are young people interested in new technologies to apply. Their land has an emotional value since it has been passed on since generations; therefore the outlook is long term." (FSA Interview, El Tejar)

Gustavo Grobocopatel, general manager at Los Grobo, holds a different opinion and aligns himself with the issues raised so far. He expresses his concern about the expansion of soy in the northern areas. In this region of the Chaco and the Yungas, native forests accommodate unique species and biodiversity worth protecting. Small farmers in these regions are not in the position to cultivate crops and conserve the forest at the same time. That is why they should be paid for ecological services. Grobocopatel emphasizes the responsibility of the government to educate the farmers and the population in order to address these problems.

Academic Research

From an academic point of view, Ricardo Grau, researcher at LIEY, underwrites the variety in existing viewpoints with his work; on the one hand stressing the negative environmental effects of the soy production and the deforestation taking place. On the other hand, he speaks highly of the increased efficiency of land use and intensification of agricultural practice, which, according to him, improved standards of living in the rural areas and at the same time offers opportunities for conservation and better protection of nature.

Grau states that the quality of life for the small-sized subsistence farmers in the Chaco – who live scattered in the forest in puestos – is very low. They are cut of from basic services such as water supply, sewage, education and modern society as a whole. Furthermore, a complicating factor is the tenure scheme in place in the Chaco region. Landlords officially own large plots of land, while the indigenous population does not have land titles and practice a communal type of land management. Today, increasing demand for their lands spurred by advancement of the agricultural frontier stresses the importance of land and property rights. Although the Chaco province initiated a land titling scheme for puestos, in Grau's opinion this type of settlement is undesirable and should not be stimulated by government efforts. The way forward is land use efficiency and agricultural intensification combined with the trend of rural-urban migration and nature conservation.

1.2 Good Agricultural Practices

Farmers Organizations

The practice of soy production is under discussion considering the sustainability of the situation at present and options for improvement such as zero-tillage, crop rotation and responsible use of pesticide. The question is whether an agreement on Good Agricultural Practice could enhance the promotion of such measures in order to make soy production more sustainable, with respect to the resources such as soil, water and surrounding environment. The stakeholders, Agribusiness as well as Farmers Organizations and Civil Society share their thoughts on the meaning and opportunity of Good Agricultural Practice from their point of view.

As representatives of farmers' interests, AACREA as well AAPRESID approach the agricultural practice from the perspective of the producer. Although AACREA acknowledges the balance between society, environment and economy in development, it is their core mission to support their members with activities that support production. Members of AACREA for example turn to them for legal advice when they own native forest lands and whish to clear it for agricultural production.

Agustin Bianchini, technical agronomist at AAPRESID, starts of with a similar recognition of the sustainability principle. AAPRESID, as opposed to AACREA, does contribute to sustainability in practice by promoting no-till farming, considering that the practice of no-till is environmentally sustainable. No-till is more sufficient with water and can produce higher yields despite water shortage.

AAPRESID represents approximately 10-15% of the agricultural land in Argentina. This is a rough calculation because of the practice of renting land, which causes for a fluctuating amount of hectares in annual cultivation. At present, around 70% of Argentina's soy cultivation is no-till, which requires a substantial investment in equipment and therefore guarantees a long term commitment to no-till practice. The equipment for no-till can also be rented, as opposed to tillage machinery, making the transfer to the no-till production technique readily accessible.

The use of pesticides, according to AAPRESID, needs to be carried out in a professional way, with attention for the amount and frequency of application. The danger is to create a weed that is resistant to the pesticide. Rotation of crops automatically leads to the rotation of pesticides, which would be a more responsible practice (FSA Interview, AAPRESID).

Agribusiness

For El Tejar environmental sustainability entails no-till farming and the renting of land that has already been cultivated, avoiding the issue of deforestation. Water shortage has raised awareness towards the dependence on irrigation, favoring rainfall as natural precipitation.

On farming techniques, El Tejar acknowledges the advantages of no-till

farming, such as lower production costs and the need for less fertilizer and water. Activities that need to be carried out on the land are reduced and soil preservation is a positive result, which stabilizes yields and revenues, avoiding the issue of soil erosion. El Tejar applies the concept of rotation between soy, corn, wheat and barley. Also double cropping and intercropping practice allows for an increasingly efficient land use. The use of glyphosate combined with no-till farming is supposed to have limited negative effects on the environment. Moreover, El Tejar works with glyphosate, considering it to be one of the least toxic agrochemicals available (FSA Interview, El Tejar).

Argentina has 17 million hectares of land devoted to soy production and 80% of all the soy is produced with the no-till practice, which is beneficial both economically as well as environmentally, according to Los Grobo. There is a general consensus among agribusinesses on balancing the environment with economy and society in order to achieve a sustainable situation. Soybean production is sustainable when taking into account the following: the nutrients in the soy, rotation of crops, control on pests and insects affecting the crop, and insurance for hail and drought. However, a critical note is made on behalf of monoculture production, which is unsustainable itself, because it allows weed to become resistant to pesticides.

Although large scale monoculture entails risks such as crop dependence and weed resistance, small scale producers deal with difficulties of a different sort. Small producers lack the financial resources to invest in their land nor do they possess the technical know-how on efficient land use, says Alex Ehrenhaus, agronomist at Los Grobo. The 200.000 small scale producers in Argentina make up for a large part in the supply chain. In order to realize a sustainable production of soy, education for farmers is necessary. Contracting an external consultant would be a good way to check whether the agricultural practice is good for the soil. Furthermore, responsible use of bio chemicals is equally important to ensure a sustainable practice.

Government

Mrs. Caballaro, at the INTA office in Buenos Aires, explains how rainfall increase caused an expansion of agricultural areas. Wheat, sunflower and soy compete for this agricultural land as they require a similar amount of precipitation. Maize needs more water and does not thrive on these lands in dryer periods. Caballaro states that soy production is a sustainable practice as long as there is crop rotation, which will prevent the soil from degradation. Rotation has been practiced sufficiently until the last 3-5 years, for which external factors such as the weather and the government are to blame. Soy production is the crop that is the most profitable, considering the production costs and taxation, which heavily burdens the farmers. The effects of not rotating have not become apparent yet and therefore farmers continue short sighted practices to make budgetary ends meet.

Civil Society

Solidaridad is convinced supporter of measures for Good Agricultural Practice and makes a stand for training and education on farming and technology for small holders in order to support them with for example implementation of no-till farming, rotation schemes and responsible use of pesticides. The aim is to help these farmers and prevent them from renting out land to large agribusinesses. Together with the RTRS, Solidaridad initiated the SOYPSI project in 2009, which is a support program for small holders in the soy sector preparing them for certification. Awareness on the importance of crop rotation as a sustainable agricultural practice and the damaging effect of deforestation is little among smallholders, which fuels the work of Solidaridad in their support to RTRS and SOYPSI and their lobby to convince more NGOs for their cause: communicating the need for sustainability. (FSA Interview, Solidaridad).

1.3 The role of the Government; *Conflicto del Campo*

Civil Society

FARN blames the government for the lack of control in the soy situation, as there is neither policy for agriculture nor an environmental policy in place. "There is a need for macro vision, which includes land management and spatial planning" (FSA Interview, MacColman). The government does not provide any guidance for Good Agricultural Practice, for example by means of stimulating crop rotation.

Weak government performance on the national level worsens the already fragmented provincial approach in natural resource management throughout Argentina. The provinces are in charge of the natural resources, meaning that the Pampas, a historically rich and highly developed agricultural zone with suitable soil, has the practice of rotation in place, while in the northwest of Argentina, where soy replaced the production of sugar, cotton and sunflower, rotation is absent. The traditional landowners, who live in Buenos Aires, administer the land of the Pampas with all necessary capital and equipment, while small holders live and work on the land themselves and combine farming with other economic activities. Also transport and infrastructure is lacking in the interior regions, without adequate highways and railways in place for transportation to the ports. Access to information and power of influence are ultimately centered in Buenos Aires.

This disparity in power and means between provinces is further apparent in the 'Conflicto del Campo', in which the major issues is the unfair practice of taxation towards small, medium and large producers. All producers are burdened with similar taxation of agricultural produce, disregarding their ability to cope. Farmers, especially the small and medium size farmers, demand for a fair distribution of taxation in which the large producers, with higher profits, pay a higher price.

Solidaridad brings forwards an additional point with regard to the institutional sphere in Argentina, being the lack of power in the hands of NGOs and Civil Society. Compared to other countries, NGOs in Argentina do not have the power to change policies. With a government changing every four years and the power to decree laws according to their liking, makes for a setting in which NGOs do not try to influence policymaking and rather focus on education and charity. FARN is the only NGO that tries to influence the government and change policies, as well as recent successes from the NGO Fundapaz, with respect to their work protecting the Wichi people from displacement in Salta province. Still, legislation does not guarantee for a correct treatment or practice according to the law. For example in Salta, the law against deforestation coincided with a government allowing several appeals for deforestation.

The combination of a stronger government, providing support to NGOs, and a change in society are both a prerequisite for improvement towards sustainability. Also, NGOs need to focus on sustainability in a total picture, including the debate on GM products and deforestation, not just focusing on one or the other. Characteristics of soy production in the specific case of Argentina make it a difficult challenge, considering the economic importance and dependence on soy. The best long term solution would be a government that supports crop rotation laws and encourage other agricultures outside of soy (FSA Interview, Solidaridad).

On the role of the government, in relation to the 'Conflict del Campo', Pedace with Friends of the Earth Argentina explains the situation from both the government as the farmer's point of view. Considering the high prices on the world market and the price of production, the government has the right to ask for a substantial tax. Historically, taxation of agricultural exports has been an important source of income for the government since the 1930s. However, the lack of dialogue and negotiation with the farmers has lead to a reluctance to pay these taxes. Moreover, there should have been a distinction between small, medium and large scale farmers, instead of considering them all the same. There are no policies in place to empower small farmers or peasants and corruption is a heavy burden on the tax politics.

Farmers Organizations

From the farmers' perspective, AACREA acknowledges that unclear rules on environmental and agricultural practice impede investments in land and environment. Farming is an instable and insecure business in Argentina, accompanied by a short term vision due to ever changing laws with each term of rule. Government retentions and taxation further encourage the intensification of soy production, as farmers turn under pressure to a secure crop that is cheap and easy to produce. Farmers should be in the position to produce whatever crop they choose, then crop rotation would be encouraged because of diversified production (FSA Interview, AACREA).

AAPRESID is less explicit in commenting on government performance, but

critical towards the governments position in the 'Conflicto del Campo'. A distant relationship with the government is preferred, according to Bianchini, because of the amount of corruption and bureaucracy in Argentina. Ongoing difficulties in the agricultural scene are based on discontents regarding taxation and typify the conflict of interests between farmers and government. Taxation is an important source of income for the government, while for the farmers this price is too high to pay as they get nothing in return. Investments in infrastructure or health care are not visible to the people and what happens with the money is unclear.

Agribusiness

El Tejar shares the opinion with the Farmers Organizations that the current monoculture of soy is government induced. In order to survive, farmers have had to produce predominantly soy. Especially due to the high production costs involved with corn and wheat production, the only profitable crop has been soy. The drought has contributed to the monoculture production since soy has been the only crop that grows and the investment costs are relatively low. Economically, the dependence of the country on agriculture is very big. When the dairy industry and the meat production are taken into account, dependency of the economy is more than 30%. Employment related to agriculture is over 40% of the total workforce." (FSA Interview, El Tejar). These numbers show the importance of agricultural production as a source of revenue to the government.

Los Grobo underwrites the statement that farming is an insecure business in Argentina. After farmer's investments in the crop, just before harvest, the government announces to levy a 40% tax on the yields. There is a financial chain in place between banks, producers and small producers, but the supply chain itself is complex. In reality the practice of rotation results in soy producers being wheat and maize producers as well, of which the soybean supply chain is only a simplified version.

1.4 The potential of RTRS

Civil Society

FOE is against the principles of the RTRS, as they consider it to be a support to increased intensification in land use and capital. RTRS is not engaging small farmers or considering the position of landless people, the principles of RTRS are rather a form of micromanagement which enables a weak system of certification and supposed sustainability. Certification is only a good solution if you can certify everything, while today instead of certification it is just *greenwashing* taking place. Pedace argues furthermore that GM crops in general require one type of farming for high yields, including the intensive use of only one herbicide (glyphosate) risking weed resistance. His point being that GM soy can never be considered sustainable.

Fundapaz has its own motivation to draw away from the RTRS initiative as Pablo Frère, regional coordinator of the Fundapaz activities in the Chaco forests in the northeast of Salta province, explains. Frère used to be the representative of Fundapaz and contact person for cooperation with RTRS. Fundapaz was a member of RTRS, but decided to withdraw in May 2009, because the aims of the institutions stood too far apart, especially since Fundapaz has a clearly defined target group of poor rural communities in the Chaco that have little in common with the multi-stakeholder and business interest of RTRS.[15] In the long run, Frère confirms, Fundapaz is still in favor of a positive development towards the certification of soy. However, he holds a critical position towards the implementation and the effects of certification, because his primary concern is with the environment and community and not with the production of soy.

Agribusiness

Conclusively, a fierce statement is made by Grobocopatel concerning the responsibility for sustainable practice. In his opinion not the producers are to envisage change, but the consumers; "the demand size has to be conscious, not the production side. The demand side has to stop complaining and stop pointing at South America for deforestation." In this sense Grobocopatel considers RTRS a main part of the problem, as they demand all the compromises to come from the producers.

[15] http://www.corporateeurope.org/agrofuels/blog/nina/2009/05/30/soy-round-table-fails-all-fronts Soy Round Table allows further deforestation. Brazilian Soy Farmers walk out. (30 May 2009)

Part 2. Soy Production in Salta Province

2.1 Highlighting Soy Issues; *Conserving biodiversity*

Government/Research

In addition to the aforementioned social and environmental issues resulting from soy expansion in Salta Province, such as displacement of indigenous people and deforestation, José Volante of the regional INTA office in Cerillos provides specific insight on regional issues with his research on land use change. Volante is an expert on land cover and land dynamics, who has been gathering data by means of GIS. Volante generates regional maps of spatial patterns and quantified the expansion of soy by means of land use modeling. Based on the results generated so far, it shows that attention should be paid to, first, definition of topics for future research, second, the creation of new environmental legislation, and third, the implementation and enforcement by means of political power in the management of environmental resources and agriculture. Immediate objectives for social actors, according to Volante, are land use planning for the Ordenamiento Territorial, the introduction of alternative practices to stimulate rotation of crops and further research on the benefits of sustainable agriculture.

2.2 Good Agricultural Practices

Agribusiness

Las Lajitas is one of the most important soy nuclei areas in Salta Province, where Javier Martin works as an agronomist for Grupo Las Lajitas. This region forms a good example for soy production in Salta. Martin is of the opinion that Grupo Lajitas operates in a responsible way, taking responsibility for improvement in their agricultural practice according to the most recent technology and information on no-till practice, rotation and the use of pesticides.

However, politics are going in the wrong direction, demanding tax levels reaching up to 35% or 40%. Taxes are too high and result in the negative trend of withdrawing profits from agricultural areas without reinvesting into the community (in for example infrastructure, education and healthcare). Martin is positive about the advances in cooperation between farmers, as cooperation leads to benefits in information supply and technical practices for all parties involved. Grupo Lajitas is an example of how knowledge and experience are brought together for the benefit of the group. Science and technology where utilized to improve the entire production process and increase yields.

Martin expresses his concern on the future, although it is neither a clear

positive nor negative opinion, rather a middle way of moving forward. The Ordenamiento Territorial (Annex V) shows too much yellow, which is land where only small scale agriculture is allowed. However, if more were green (all agricultural practice allowed) that would not be desirable either. Martin acknowledges the importance of nature protection and ecological services, but stresses the development that comes with the production of soy and profitable yields. In comparison with cattle farming for example, which is far less efficient but has an equal deteriorating effect on the environment. In this respect, Martin is in favor of efficient land use such as the intensive production of soy, as long as technology and legislation allow for the right set of conditions that secure a responsible practice.

2.3 The Provincial Government; *Ordenamiento Territorial*

The process of decision making on the Ordenamiento Territorial, which is supposed to be the implementation of Argentina's national policy, deals with appointing an official function to the land, with either a destination for intensive agriculture or conservation and protection (Map Ordenamiento Territorial, June 2009). The Ley de Ordenamiento Territorial Area Boscosas (LOTB) took of by a law passed in November 2007 prohibiting further deforestation. The aim of the LOTB is to bring forward clear land use planning, ascribing terms of use to land in each province, including the Province of Salta. However, interests of conservationists as well as producers clash in particular, which leads to an ongoing debate on the hectares and resources that are in need of protection or should be available for agricultural production.

Civil Society

FARN is critical towards the Ley de Ordenamiento Territorial Area Boscosas (LOTB). MacColman blames the lack of cooperation between the national and the provincial government for causing confusion on which deforestation permits could be adhered and which had to be denied. Institutional failures lead to rapid deforestation in Salta province during this process which was supposed to increase environmental protection. "Therefore, having passed an important law did not ensure rapid effectiveness." (FSA Interview, FARN). The lack of control and lack of a plan for the future creates a lot of problems in Argentina. A combination of a more systemized and responsible way of farming for the cultivation of soy as well as a comprehensive law to protect the forests is necessary.

Agribusiness

From the producer's perspective, Martin from Las Lajitas stressed several topics that imply the need for government intervention. First of all lowering tax levels, which entirely depend on the government's agenda. Secondly, investments in transport are important, considering Salta as a relative remote area for production far off from the

ports in Rosario, Santa Fé. Also legislation on land use should develop further incorporating different classification for private property, renting and contract farming. Furthermore, on land use and planning, legislation should be guiding in the provincial arrangement of land use (referring to the LOTB) in order to discern land for agriculture and land which is protected for nature conservation.

Javier Martin is dedicated to his work in the field of research and facilitates cooperation of farmers in Grupo Lajitas. Not only locally, also regionally and even on a national level, Grupo Lajitas is a regional representative of Salta province in the Confederaciones Rurales Argentinas (CRA), the national agricultural federation responsible for negotiation with the government. Martin's personal focus is mainly technical, considering his background in agronomy, but on request he organizes gatherings, makes farm visits for his clients and publishes an annual report with all his findings on production and land use. As an agricultural extension officer he finds himself on the interface of practitioner in the field and participant in the dialogue on the future of soy, aware of the tangible issues at present.

Research Institutions

Adriana Ortin, chair of the Natural Resource Management department of UNSA, explained her understanding of the power relations between the different parties involved with environmental issues in Salta, relevant to the political process of the LOTB. According to her, the debate is strongly polarized, which hampers communication and cooperation between environmentalist parties and the producers. Furthermore, the consultation process with local communities, which should have been guiding for the land use decision making in the political arena of the provincial government, has been criticized to be merely protocol instead of taking into account the opinion of the people. Ortin mentions the difficulty of bringing across vital information provided through the academic channels in UNSA, as the government attracts research groups that are more in favor of their opinion and deliver the information accordingly, neglecting more objective academic work.

Aligned to UCASAL, Dr. Daniel Alberto Sabsay expressed his opinion on the Ordenamiento Territorial and sustainable development. He states that the development of a territorial code is a rational and participatory process, which – at least in theory - entails taking into account society and its relation with the environment. A change in perception has occurred over time, as concern with the environment used to be limited to the private property and management of the environment was a static, technocratic process taking place outside of society's sphere of influence. Today, natural resource management is a dynamic, participatory process, integrated with environmental politics.

In this respect strategy is very important, according to Sabsay, taking into account population, migration, contamination and pressure on natural resources, and protecting environment as well as cultural practices. There is a conflict of interest

between cultivation and conservation, conservation and tourist development, conservation and development of infrastructure, urbanization and preserving cultural heritage.

The importance of citizen participation is emphasized strongly in working towards resolving such conflicting interests. The Ordenamiento Territorial, which dictates where development of agriculture, infrastructure and other activities are allowed, is an example of such a process where political, social, technological, cultural, juridical and economical aspects have to come together. Dr. Néstor Caferratta and Dr. Julio Nasser are critical towards the participatory process, in their discussion on the involvement of the public in the political process. Access to information and consultation are perceived to be an essential prerequisite to reach all sectors in society and optimize the results of a law coming into existence.

Government/Research

As researcher at INTA's regional station in Cerillos, Salta Province, Corrizo is limited by the financial means provided and the top down decision making on research topics. Momentarily he takes part in various networks which develop and research opportunities for bio-fuels, as INTA aims to play a role in this development. However, for research on mainstream soy production, for example on seed testing or improvements in technology and production, there is no funding available.

According to Corrizo, the debate on the expansion of soy is very polarized, between on the one hand neo-liberal parties and on the other hand conservationists. The producers, such as Grupo Lajitas and on a larger scale Prograno (Asociación de Productores de Granos del Norte), are in this case the neo-liberals, striving for increased production, yields and profit maximization as opposed to the conservationists such as ProYungas and Fundapaz, the NGOs striving for conservation, nature protection and rights for the indigenous communities. Corrizo's overview stresses that these particular players are important in the debate and that they are positioned opposite of each other, fighting for their own interests.

Government

SEPA Secretario de Politico Ambiental is the secretariat on environmental politics and part of the Ministry of Environment and Sustainable Development. Here a working group is active on the Ordenamiento Territorial. Maria Gil, Florencia Luñis, Marcela Palma and Adriana Morales explain how citizens in the departments of Rivadavia, San Martin, Oran and Santa Victoria in the Chaco organized themselves and made a case against the continuation of deforestation. They made it all the way the High Court in Buenos Aires. The case brought forward information mapping the deforestation of the passed 5 years and recorded the social impact in this region.

The process working towards an Ordenamiento Territorial is supposed to be a

participatory process. The working group at the secretariat is brought into existence to follow up on the process and verify to what extent there has been participation, representing for example the interests of the same groups in the affected people in Rivadavia, San Martin, Oran and Santa Victoria. Their project covers 300 hectares and is focused on consultation by means of public hearings to which citizens are invited.

Elizabeth Prudencio is the coordinator of the Ministry of Environment and Sustainable Development (SEMADES), which is part of the Provincial Government of Salta. She has an insider's perspective on the political process of land use planning with regard to sustainable development. The Ministry works together on a national level with the federal government and with INTA, UNSA (university) and the ANP (Argentinean National Parks). Research working towards the Ordenamiento Territorial has been going on for several years, generating map after map which define the areas in red, yellow and green and determine the activities allowed. The general opinion reflected by the government is the continuation of a similar growth curve compared to the passed years. However, this would mean further expansion of the agricultural frontier into fragile ecosystems. Prudencio explains the difficulty of the political process, in which the Camera Alta (High Chamber), representing senators, and the Camera Baja (Low Chamber), representing deputies, are divided in accepting the legislation and continue to make a stand for there own interests. For example, three of the senators are so called 'productivistas', highly in favor of producers, increased production and agricultural expansion.

2.4 The potential of RTRS

Agribusiness

The producer group Grupo Lajitas, with Martin as the direct representative, is familiar with the RTRS because of a meeting and a field visit initiated by the Outreach Programme coordinator at RTRS, Ben Zeehandelaar. The goal of this visit was to explore the region of Las Lajitas and meet the local soy producers and simultaneously promote the initiative of RTRS and brainstorm on the draft Principles and Criteria. There was no follow through by means of a membership, because Grupo Lajitas is of the opinion that it is not in their interest to get involved at this stage in time. Improvements in production techniques, seed quality and safeguarding the soil are topics with which they are already directly concerned themselves for their own benefit and future. This point of view stresses the position of these middle scale family enterprises, which are committed to invest in their land and their future. These farmers are prepared to reconsider their practices by means of research and technological improvements, but rather for their own interest and their children's future than for an institutional initiative getting certification of the ground.

This position and approach differs to that of large agribusinesses, as they exploit rented land for maximum yields and have a short term commitment to the land. According to Martin, this short term perspective is induced by the high level of taxes, which makes soy one of the relative easy and low cost crops with a high guarantee for profitable yields; in that sense the government should be held responsible for the "soy situation" of resource exploitation at present.

Martin expressed his concern towards the value of a certification mechanism in general terms, as the practice of soy production depends on the context of each region and country. In his opinion the concept of responsible soy entails the danger of putting a far too general label on a product of which responsible practice is much more context specific. The practice of national interpretation, which is part of the RTRS working method, meets these objections. The national context is taken into account by interpreting the RTRS principles and criteria before they are put into practice, to secure an adequate and context specific approach.

Interpretation of table 4.2.3

In table 4.2.3 the findings of the stakeholders' response are brought together in a scheme. Eight statements were extracted out of the information received from the stakeholders. For each statement the stakeholder group is placed in the position *affirmative*, *critical* or *rejective*. As a whole, this scheme shows on which topics the groups of stakeholders share their opinion and on which topics they stand apart. In short, particularities are highlighted below.

The consensus on the first statement, the serious negative impact of soy production on the environment and society, stands out. Although each stakeholder group holds a different perspective, they have all acknowledged the negative side effects of soy production in this respect. On the second statement, concerning the socio-economic opportunities soy production has to offer, it is Civil Society that stands alone in rejecting this assumption. The underlying motivation for this critical opinion is the experiences NGOs have with affected indigenous people and vulnerable small holders. Civil Society makes a stand for the interests of these groups in society. From the Agribusiness and Farmers perspective it is understandable that they see a socio-economic benefit in soy production, as they are the ones making a living out of it, including the government by means of taxation.

The third statement shows a similar division of positions as the previous statement, with Civil Society again standing out with critique opposing the positive effect of Good Agricultural Practices. Although there is common understanding on the positive effects of no-till and rotation for example, still the damaging effect of monoculture production and pesticide use for natural resources and the surrounding environment remain worrying aspects of soy production. Results for the fourth statement are deducted similarly, because the same reasons make for Civil Society

to be of the opinion that a sustainable practice for soy production does not exist.

Regarding the statements 5 and 6, which express a critical note on government performance, it is apparent that Civil Society and the Producer groups (Farmers Organizations and Agribusiness) find each other in this critique and share the same opinion. Often mentioned in the stakeholder response were the lack of clear government vision and management. Also the levels of taxation cause for problems, which has escalated in the Conflicto del Campo, and directly influences farmers land use practices.

Lastly, the statements posed on certification and the functioning of the RTRS unite all the groups in doubt and critical reflection when it comes to their opinion on this institutional initiative of a multi-stakeholder organization. The dominating response among producers is the fact that the benefits are not clear. In whose interest is it to cooperate with this initiative that is still under construction? Civil Society criticizes the intention, except for direct partners as in this case for example Solidaridad, and the accusation of *greenwashing* is expressed, questioning the actual value of the label of certification.

This table functions as a quick scan, bringing forward the most important issues identified during this research and using these to make for an overview on where the different stakeholder groups stand in relation to each other in the debate on soy. The discussion on certification and RTRS will further continue in Chapter 5.

5. Sustainable initiatives and *Responsible Soy*

5.1 Sustainable agricultural practice for soy?

As the results of the stakeholder perspectives on soy production, expansion and certification showed, it remains in the eyes of the beholder whether or not sustainable soy or responsible soy (in line with for example the RTRS criteria) exists. Despite critical opinions the sustainability aspect of resource use in soybean cultivation is a reoccurring topic. It is to the concern of the international community how Latin American countries manage their natural resources, with particular emphasis on the importance of the sustainable exploitation of these natural resources. In Europe, initiatives towards sustainability principals have been presented in agreements such as Good Agricultural Practice within the Global Partnership for Safe and Sustainable Agriculture (EurepGAP, 2007). Farmers are obliged to implement these principals and conditions are posed on actors and activities along the supply chain.

Complexity to assess the sustainability of soybean production is high because of the international dimension, with producing and consuming countries around the world. Desires and objectives differ greatly in these countries because of different stages in development, resource base and education, leading to different perceptions of sustainability (Bindraban & Greco, 2008). "Despite different views, the necessity to sustainably manage world's natural resources is key to provide the ever growing population with sufficient, safe and healthy food, while maintaining and even improving socio-economic prosperity" (Bindraban & Greco, 2008). Efforts made in the 1990s towards sustainable agriculture focused on conservation of land, water, plant and animal genetic resources and biodiversity in general. Agricultural practice should be economically viable, environmentally non-degrading, socially acceptable and technologically appropriate.

Progress is slow and discouraging developments demand for adjustment along the way. Climate change, food security, over-fishing, degrading land quality, pollution and overuse of water, poorly managed animal production, are examples of how exploitation of natural resources has proven effective but unsustainable in the past and present. In the past decades a different approach is leading towards more sustainable practice. The agri-food chain is internationally connected, which limits actors by means of requirements on food security in order to potentially influence the environment in developing countries. "The magnitude of current demand urges for complete transformation of production systems in their local context to comply with sustainability demand" and "Global platforms are needed to negotiate their desires" (Bindraban & Greco, 2008, p.39). The Round Table for Responsible Soy is an example, developing a sustainable framework for the future expansion of soy of which the key features are highlighted below.

Table 5.1 List of the 5 principles of the RTRS (P&C Field testing version, 28th of May, Appendix II)

1. Legal compliance and Good Business Practice
2. Responsible labor conditions
3. Responsible community relations
4. Environmental responsibility
5. Good Agricultural Practice

Principles and Criteria

Bindraban and Greco (2008), from Plant Research International at the University of Wageningen, discussed the viability of these principles of RTRS for sustainability criteria. The relevant issues highlighted below shed light on potential improvement by means of these principles, towards a more sustainable soy production.

Labor problems are related to irregular work, bad working conditions, child labor and forced labor. Nowadays, soybean production does not demand many employees due to the technical input and mechanization in production over the years. This has resulted in a reduced number of incidents in the realm of violating labor rights. The RTRS principles are in line with the International Labor Organization (ILO).

Land rights are considered the root to all problems related to agricultural development, environmental conservation and social conflict. The primary question is: Who are the owners of land? In each context, depending on the situation per country and region, information on landownership and claims for land, should be managed by institutions that take responsibility for control and legislation on rural properties.

Small scale and traditional land use is threatened by the trend of a growing size in land holdings and a corresponding decline in number of landowners. The relation between farm size, production area and yield show that larger land holdings produce higher yields, which will lead to continuous striving for efficiency benefiting from the advantage of scale. Furthermore, the relative large difference in number of employees between small and large properties, show a dependence on labor in the small scale landholdings, with relatively more employees. Small scale landholdings contribute to employment opportunities on a local level. The potential of small scale landholdings, in competition with large landholdings with scale advantages, is found in diversification and niche markets, such as organic production.

Responsible community relations take into account how the soybean sector affects community development, by means of creating jobs, affecting rural production and characteristics of soy production affecting the surroundings. With regard to employment distinction is made between direct employment; required by the sector due to increased production, indirect employment; which entails the creation of jobs in sectors linked to the soy production chain, and wealth-effect

employment; wealth stimulating consumption. Soy does not employ the same amount of jobs as other rural activities because of the input from machinery and technology (Sachs, 2004). Per 100 hectares only 2 jobs are generated, compared to the average of 12 jobs per 100 hectare, considering employment rates of 36 other crop types (Bindraban & Greco, 2008, p.57). The soybean sector is more efficient in creating new indirect jobs and wealth effects than direct jobs.

Environmental responsibility is mostly concerned with the deforestation that occurs. In the specific case study of Salta the example is made clear with the percentage of land cleared in the Yungas and Chaco forests, where land is now dedicated to soy. The provincial government has taken up responsibility to control and manage land use, carrying out the *Ley de Ordenamiento Territorial de Bosques Salteños* (LOTB), which ascribes zones to land use, intensity of land use and protection of the environment. Such legislation, once it is implemented, would allow for government control on environmental responsible action.

However, there is an inconsistency between those areas considered in need for protection and those that actually face threats of deforestation and agricultural use (Grau, 2009). To what extent does the LOTB comply with the accurate data on land that is exposed to irresponsible use of natural resources? Chapter 4 deals with this particular case study in more detail.

Responsible soil and water management are mentioned under the same header, as soy production demands little irrigation and yields largely depend on rainfall. For example, the expansion of soy was possible further east into the Chaco because of an increase in precipitation. Water issues are largely related to soil management, which is concerned with the soil structure and – dependent on the location - very context specific. Nutrient application, the amount of soil organic matter and the quality, timing and placing of organic matter are contributing factors that make up for soil quality. Continuous soy bean cultivation has a detrimental effect, while crop rotation combined with the application of nitrogen fertilizer has a positive effect building up soil organic matter. Also the practice of zero tillage has ecological and economic benefits, because less energy is needed, residues on the soil lead to a carbon build up and erosion is reduced.

Protection of biodiversity is a core necessity to maintain environmental functions such as preserving water resources, the landscape, geological stability, the gene flow of flora and fauna, soil protection and at large, the welfare of people. Rivers are protected with a boundary varying between 10 up to 600 meters, depending on the water course. Nature reserves contribute to sustainable use of natural resources by means of conservation and restoration of ecological processes.

On *Crop protection and responsible use of chemicals* there is a lack in academic background information, which leaves the incidents and accidents in case study examples on use of chemicals and health related problems as the primary

source of information to form an opinion.

Responsible establishment of infrastructure and new areas of cultivation are a prerequisite for sustainable soy in the future, as infrastructural investments will promote the advance of soy. In Argentina, this is closely related to the waterways that allow access to the ports and railway access to Chile for export. Investments in this realm would spur soybean expansion in the northwest of Argentina, making it a more attractive location for production. At the same time it can also increase efficiency of production, and combined with land use regulation measures, control and manage the expansion.

An assessment of sustainability for soybean production reveals the complexity of the soybean chain. The lack of factual information leaves room for different interpretations of the situation at present, for example with regard to the hazardous effects of pesticide use on health. Definite conclusions are the rapid expansion of acreage resulting from the increased production of soybean, pressuring forests and grassland ecosystems. The speed with which Argentina is living up to global demand and market competition has undesired ecological, economic and social effects. The laws are in place to regulate this process, but enforcement is difficult because of insufficient institutional capacity and the sensitive issue of landownership.

There is a need for verifiable scientific information to support all stakeholders in contributing to sustainable cultivation, as it is difficult to ascribe specific responsibilities to certain actors. An assessment of components of sustainability, as discussed in the above, is necessary on a national level in order to comply with international and national laws in each setting and context of soy production.

There is no quick fix according to Van Berkum and Bindraban (2008) in achieving a sustainable production system for soy, which should integrate rotational land use combined with cattle grazing. Agronomic practices have the potential to improve taking into account soil conditions, water use and zero tillage practice. Crop rotation and the application of nitrogen fertilizer to non-soybean crop (for example maize or sorghum) appear ecologically feasible. However, the economic incentive for these practices is lacking. Relating the production of soy, cattle feed and meet could bring about an overall increase in productivity and results in a closed nutrient cycle (Bindraban & Van Berkum, 2008. p.78). Investments in current grasslands could then relieve the pressure on forests and savannah, findings which complement the work of Grau (2009) (Chapter 3).

A sustainable exploitation of natural resources in Latin America needs to be stimulated, governed by national as well as international forces. Argentina and Brazil are mentioned as the most competitive suppliers of soy bean in the world, with an abundance of land and an agricultural infrastructure of research and development in place. National policy and institutional strengthening should secure implementation and seek for solutions to deal with conflicting interests between increasing soy bean

production and responsible natural resource management. There is willingness to join forces, visible in national and international initiatives and attention for the topic. Van Berkum and Bindraban (2008) recommend improvement at the level of local government and local agribusinesses and farms, as the responsibility for action is based locally, while the pressure to improve sustainability is formulated internationally.

5.2 Opportunities for institutions; RTRS

Green alliances are collaborative partnerships of agencies whose relationship used to be antagonistic (Eden, 1996). Stafford (2000) speaks of partnerships between environmental NGO's and businesses that pursue mutually beneficial ecological goals. The reason for a rise in popularity of green alliances is the shared disappointment of businesses and NGO's in government policy (UNPOP) (Arts & Van Talenhove, 2000). Businesses see new opportunities, want to improve their environmental performance and enhance their reputation. NGO's have a different point of view, aiming for environmental gains by means of cooperation with businesses, but more effectively and efficiently compared to government intervention. Green alliances offer an alternative to the government, as they can design policy themselves, guarantee efficiency and effectiveness, and are granted legitimacy and credibility by NGO's. Arts and Van Talenhove (2000) question how effective these initiatives are in contributing to environmental policymaking and regulation. Do they successfully contribute or replace state-led environmental policymaking?

RTRS

The Round Table on Responsible Soy is a relatively new initiative and fits with the characteristics presented in the theory on Green Alliances. In order to understand the position and function of the RTRS, with respect to their approach towards improving the soy production practices, the history of the institution is taken into account.

In 2004 a group of producers, NGOs and companies gathered in London, United Kingdom, to start a multi-stakeholder dialogue with the intention to promote the use of a responsible standard of soy production, processing and trade. The World Wildlife Fund (WWF) together with Unilever and several other representatives of corporate enterprises initiated this meeting on the topic of corporate responsibility. Inspired by the existing practice of the Round Table on Sustainable Palm Oil (RSPO) and the certification system for wood by the Forestry Stewardship Council (FSC), the format for developing a responsible standard of soy production was sought in a multi-stakeholder approach.[16]

On the 17th and 18th of March 2005 representatives of the soy supply chain, consumers, investors, governments, scientists and civil society came together at the First International Round Table on Responsible Soy Conference in Foz de Iguaçu, Brasil. The organization committee consisted of Coop (CH), Cordaid (NL), Fetraf-Sul (BR), Grupo André Maggi (BR), Unilever (NL) and WWF (BR/CH). This conference was organized with the support and assistance of the Swiss State Secretariat for Economic Affairs. Over 220 people participated in the discussions and a wide variety of interest groups were represented, varying from smallholders in family subsistence

[16] Interview Jeroen Douglas, Annex II Logbook interviews

agriculture to large scale producers, social, environmental and indigenous community organizations as well as trade and industry.[17]

One year later, in April 2006, a technical workshop was held in Sao Paulo Brasil, where fifty experts gathered in order to identify the key impacts of soy production and processing. Lacking data or topics that caused disagreement among participants were highlighted. In August 2006 the Second International Round Table on Responsible Soy Conference was held in Asunción, Paraguay. The challenge was to transform the earlier identified issues into working principles, "From problems to solutions", on the basis of the results of the preceding Technical Workshop. The content of the meeting consisted of presentations of case studies from soy producing countries and consumer nations and, in addition, a Working Group agreed on the need to consolidate the RTRS by generating the "Asunción Declaration", which further elaborates on the principles of the organization.

To follow up on the gains achieved in Asunción, in November 2006 the RTRS Organizing Committee (OC) held a meeting in Rolle, Switzerland. Now the RTRS could consolidate the initiative started in 2004 with the constitution of a legal entity domiciled in Switzerland. Switzerland is considered a neutral location offering solid statutes and a stabile and secure financial banking system. With this step RTRS had become a "*non-profit Civil Association, based upon membership according to different stakeholder constituencies (Producers, Business, Industry & Finance) and with an international projection as a global organization with presence in the key soy producing and consuming regions of the world.*"[18]

Subsequently in May 2007 the first general assembly was held in Sao Paulo, Brasil, with the financial support of the Swiss and Dutch government. In total 115 participants were present, representing NGO's, producers and trade organizations in order to discuss relevant issues such as the Principles and Criteria, and Verification Development Group, outreach to stakeholders and other projects. The main priority was given to the development of globally applicable criteria and indicators for the production, processing and trade of soy in a responsible manner within a period of around 18 months. The RTRS Board selected the UK consultancy ProForest to carry out this task. The General Assembly participants agreed that the draft principles discussed at the second roundtable conference in Asunción in August 2006 would constitute a starting point for this work. These principles include issues such as protecting biodiversity from conversing natural habitats to agriculture, better agricultural practices, and full compliance with labor laws.[19]

To continue and advance the debate on the definition of responsible soy, on April 23rd and 24th the Third International Conference on Responsible Soy took place in Buenos Aires. In a participatory way, workshops were organized to work with the

[17] www.responsiblesoy.org
[18] www.responsiblesoy.org/ Events; Constitution
[19] www.responsiblesoy.org/ Events; 1st General Assembly May 2007

proposed principles and criteria's and the first ideas on a verification system. The format was part of a public consultation process which took place from March until May in 2008. In 2008, after the Second General Assembly, held directly after the conference on the 25th of April, the focus was on a series of six public consultation workshops and seminars. Five were held in Argentina, in Buenos Aires, Resistencia, Salta and Tucumán, and one in Asunción, Paraguay.

The Fourth International Round Table on Responsible Soy Conference which was held from May 26th until 28th 2009 in Campinas, Brasil, proved the result of efforts made during the lasts 18 months of meetings and the public consultation process. In Campinas the Principals and Criteria document of the Round Table on Responsible Soy was approved unanimously. This document now functions as an official baseline for a global standard on responsible soy (Annex IV Principles and Criteria).

Table 5.2 RTRS Activities

	RTRS Milestones
Date	**Event**
May 2004	Beginning of Responsible Soy Forum in London, United Kingdom
March 2005	I International Responsible Soy Conference, Foz de Iguaçu, Brazil
April 2006	Technical Worshop, Sao Pablo, Brazil
September 2006	II International Responsible Soy Conference, Asunción, Paraguay
November 2006	Creation of RTRS Association in Rolle, Switzerland
May 2007	I General Assembly, San Pablo, Brazil
October 2007	I Development Group Meeting, Cuiaba, Mato Grosso, Brazil
February 2008	II Development Group Meeting, Rosario, Santa Fe, Argentina
April 2008	III International Responsible Soy Conference, Buenos Aires, Argentina
April 2008	II General Assembly, Buenos Aires, Argentina
August 2008	III Development Group Meeting, Puerto Iguazú, Misiones, Argentina
October 2008	IV Development Group Meeting, San Pablo, Brazil
March 2009	V Development Group Meeting, Buenos Aires, Argentina
May 2009	IV International Responsible Soy Conference, Campinas, Brazil
May 2009	III General Assembly, Campinas, Brazil

Source: www.responsiblesoy.org

Organization

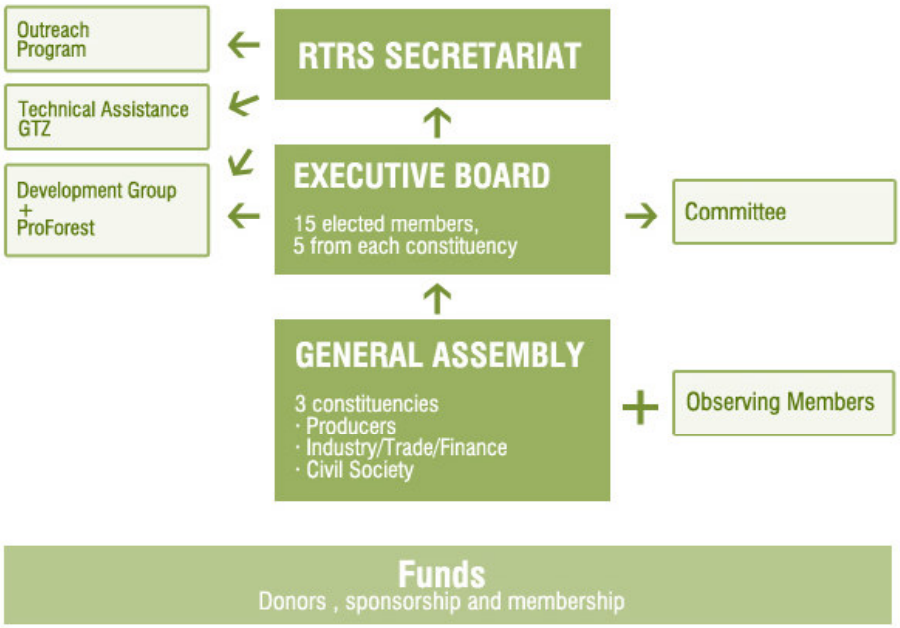
The Round Table on Responsible Soy Association is a multi stakeholder organization with 107 members in 17 countries. The structure of the organization consists of the General Assembly, an Executive Board and a Secretariat. The General Assembly is the highest body where three different constituencies are represented; 1. Soy producers, 2. Industry, trade and banking representatives, 3. Civil society organizations. Each member of RTRS has a seat in the General Assembly and belongs to one of the constituencies. There is an exception in the case of observing member, for example representatives of national governments or academics. Observing members do not belong to a constituency nor do they have the right to vote, however, they can attend at meetings and contribute with respect to content.

The General Assembly is the highest decision making body. An ordinary General Assembly is held annually. An extraordinary meeting may be called based on a decision by the Executive Board, at the request of at least one fifth of the participating members or at the request of the auditor. The General Assembly meeting has the power to elect the members of the Executive Board, elect the independent auditor of RTRS, establish the principle guidelines for the policy of RTRS, decide on proposals of the Executive Board, approve or reject the annual accounts and budget of RTRS, approve or reject membership fees proposed by the Executive board, amend the statutes and decide on dissolution of RTRS.

Within the General Assembly each participating member has the right to one vote within its constituency. Each constituency takes its decisions by a simple majority vote. Each constituency represented at the General Assembly also has the right to veto power, when a majority within the constituency wishes to exercise a veto vote it can prevent a resolution from being passed.

The Executive Board has fifteen members, five from each constituency. The members of the Executive Board are elected by the General Assembly for a period of one to two years to secure continuum. The voting functions similarly to the General Assembly, each constituency has one vote and within the constituency decisions are made by a majority vote. The Executive Board constitutes itself and elects a President, vice-President and a Treasurer. The operational management is entrusted to the Secretariat. Figure 5.2 gives an overview of the organizational structure.

Figure 5.2 Organizational structure RTRS



Source: www.responsiblesoy.org

Institutional strengths and weaknesses

Criticism towards RTRS was expressed on behalf of the Dutch Soya Coalition, an initiative of Dutch civil society organizations that combine their expertise to address global problems regarding the large scale production of commodities. In February 2009 the Soya Coalition formulated their critique in a letter addressed to the Dutch minister of Agriculture, the minister of Development Cooperation and the minister of Housing, Spatial Planning and the Environment. In this letter the Soya Coalition questions the financial support provided by the Dutch government to the RTRS and asks the ministers to reconsider this support (Annex III).

According to the Soya Coalition, the RTRS in its present form does not sufficiently contribute to reaching the long term goals of poverty eradication, sustainable development and protection of biodiversity. The five points of concern that were stated to clarify the shortcomings of the RTRS in its present form allow for a critical assessment of the functioning of RTRS. The strengths and weaknesses of the initiative are brought to the fore.

First of all, a large part of interested parties remain outside the RTRS. Especially the United States and China, as heavyweight actors in the soy economy, are underrepresented in the member group of RTRS, in all three constituencies. Also social-, environmental-, and developmental organizations in producing and consumer countries need stronger representation. According to the Dutch Soya Coalition, the RTRS has put too little effort in including social and environmental NGO's, trade unions, small peasant farmers and landless, and producer organizations.

Second point of critique is focused on the content of the RTRS Principles and Criteria (P&C), as they were at the time of writing in February 2009. The P&C are considered incomplete as they fail to take into account international human rights

treaties and the convention on biological diversity (Rio de Janeiro, 1992). Furthermore, means for monitoring and reporting on social and environmental effects related to the soy value chain are lacking. Deforestation before 2008 is no longer under discussion and it is permitted to continue cutting down natural vegetation for responsible soy. Limiting the use of pesticides is hardly addressed and the fundamental differences between traditional soy varieties and genetically modified (GM) soy are overlooked. Parties that are directly involved, but at the same time the least powerful stakeholders, such as small farmers and indigenous people, are left outside of the negotiation process. Procedures that would secure dispute settlement and compensation are not in place, which is partly due to the lacking representation of social NGO's and local environmental organizations.

Third point of critique is the unclear use of criteria and indicators. These criteria and indicators are badly defined and difficult to measure. The question is whether their use can actually improve the reality of soy production rather than legitimizing the present practice in the soy value chain. Overall, the meaning of the international standard *responsible soy* represented by the RTRS is questionable in itself, since it is unclear how this standard is met by the individual members. National interpretation allows for different application of principles and criteria and weakens the potential of establishing a fixed, global standard for *responsible soy*.

Fourth point of critique is the functioning of the RTRS in its present form. It does not have the right means and mechanisms to effectively function as a voluntary governance system. Procedural arrangements for complaints are not in place, there is no legislation with regard to the use of the RTRS name and logo nor are there clear guidelines for the duties and responsibilities of the RTRS members. The fifth and last comment is complementary to the aforementioned, stating that the means and manpower of the current organization is insufficient to realize the goals and objectives in line with responsible production of mainstream soy as a world commodity.[20]

The critique on RTRS helps to assess the functioning of the RTRS as an institution. Eye for the weaknesses and the bottlenecks in the functioning of a multi-stakeholder organization clarifies the difficulties the RTRS has to face. How they deal with these difficulties in order to realize the long term goal of responsible production of mainstream soy will shed light on the strengths and potential for future development of this initiative. The critique posed by the Dutch Soya Coalition demands for an argumentation in response.

The first point of critique is mainly on the lacking representation of members in US and China. In order to improve this situation and increase the number of members the RTRS has an Outreach Program in place. The aim of the Outreach

[20] Letter drawn up by the Dutch Soya Coalition and Oxfam Novib on the subject RTRS, addressed to the Dutch minister of Agriculture, the minister of Development Cooperation and the minister of Housing, Spatial Planning and the Environment. (20th of February 2009) Appendix III

Program is to spread the word on the objective and activities of RTRS and to strengthen and expand the basis of the member pool. Target countries are Argentina, Bolivia, Brazil, China, European Union, India, Paraguay, Uruguay and the United States. Establishing contacts with relevant stakeholders takes place in close cooperation with existing members in these countries by means of local knowledge, facilities, relations and networks. Once the first representatives of RTRS are in place, the spread of knowledge and information on RTRS within a country can accelerate as a domino effect. Active members continue with the work of the outreach program and reach potential stakeholders themselves.

With respect to the type of stakeholders - producers, industry, NGO's or civil society - the supposed lacking representation of NGO's and civil society can be put in different perspective by explaining the structure of the organization. The General Assembly and the Executive Board both consist of three constituencies that allow for the equal participation of each constituency in the round table talks, voting and decision making process. Therefore, the actual number of NGO's and civil society within this constituency does not determine the significance of their contribution. It is the content of their contribution that should be assessed in order to argue which topics are in need of more attention and to what extent indigenous population, small farmers or landless, or at large the call for nature conservation, needs to be heard.

Eyes should be set on this content, rather than asking for an increase in numbers, in order to improve contribution of NGO's and civil society. Moreover, an increase in numbers is far more important among the members of the constituencies producers and industry. These are the stakeholders that form an active part of the value chain and each one can actually make a difference in changing the practice towards the objective of responsible production of soy. In this sense there should be a common understanding of the safeguard offered by the organizational structure of the RTRS, by means of constituencies, which justifies unequal numbers of stakeholder representation when absolute numbers of members per constituency are compared.

The second point of critique was on the content of the Principles and Criteria's, which were considered incomplete for leaving out certain international treaties and conventions. However, laws stated by the International Labour Organisation (ILO), the World Health Organisation (WHO), the Basel, Rotterdam and Stockholm Conventions and the Pesticide Action Network (PAN) are examples that show how international treaties and conventions have been incorporated to back up the content of Principles and Criteria. In addition, the National Interpretation process is considered to play an important role in further including relevant international treaties and agreements in considering how to interpret the criteria for national use.[21] After comparing the third draft version of the Principles and Criteria with the

[21] Annex IV; Principles and Criteria, Preamble

present Field testing version, the loss in content is to be found in the section on Environmental Responsibilities. This section shrunk considerably after loosing paragraphs on the importance of maintaining and safeguarding habitats of rare and endangered species and on defining a correct way for land use transition towards soy production.

Comments on weak methods of monitoring and reporting have to be put in perspective considering the time frame and the developments that are in process at this phase. The period of field testing will bring forward a certification tool for soy. The Development Group as well as working groups per country (National Technical Group) are in place to work on this task. The critique that follows subsequently is the validity of a global standard for responsible soy, after this national interpretation is carried out. It can possibly result in a variety of applications of the Principles and Criteria's. This asks for an in depth discussion on the quality of the discourse on sustainable practice and *responsible soy*, to understand different perspectives of stakeholders and their use of terminology. Admitting that a global standard has to be put in to practice in the local context of regions and countries allows room for flexibility. In the long run experience and results are necessary to conclude how to measure and value a global standard on *responsible soy*.

Finally, the last point of critique focuses on the capacity of the RTRS as an institution. This relates partly to the issue of representation, which concerns the member pool, and partly to the organizational setting that drives the RTRS. The secretariat only counts the small number of six people in charge of organizing the events and the member administration, as well as the outreach program, communications and information services. Content wise there are working groups in place, developing the certification tool and working on the national interpretation per country. The round table meetings take place at the General Assembly, which generates actual content and outcome of the RTRS framework. The functioning of the RTRS allows to see how this organization can grow and reach the objective of responsible soy production. The outreach program needs to further expand the horizon of RTRS and the spread of information as well as the gathering of up to date information needs to be professionalized. There are opportunities for cooperation with local contacts or reliable research institutions.

Rules of the game should be further elaborated, in line with the points of critique, for example mechanisms for dispute settlement and procedural arrangements for complaints. Legislation with regard to the use of the RTRS name and logo should provide guidelines and is part of the process of developing the certification tool. This will also clarify the duties and responsibilities of the RTRS members. However, up till this stage, the duties and responsibilities have been made clear in the statutes and bylaws.

6. Conclusions

6.1 Reconsidering soy production and land use

On a global scale the demand for animal feed, food and fuel continues to increase. Argentina, with a dominant position in agricultural exports, has to respond to this demand. Soy production in Argentina serves the world market as well as the government's national budget. However, if environmental and societal costs continue to be neglected, the price in the long run will severely outweigh the profits at present. Therefore, sustainability is not only an ideal notion to harmonize interests of society, economy and the environment. It is a serious investment to safeguard natural resources and secure means for production in the future.

Agricultural practice has become more intensified and efficient, which at the same time increased the pressure on natural resources and the environment. Expansion into natural areas is a coinciding trend, posing a direct threat to biodiversity and nature conservation. The Chaco and Yungas forests exemplify the particular importance of these natural habitats and emphasize the need for protection of these areas. The challenge is to combine agricultural development, by means of intensification, with nature conservation, bringing deforestation to a halt or at least providing for clear land use planning and management.

Land use policy and planning need to be in place on the federal as well as provincial level. Policy making has to focus on increased efficiency in the agricultural sector as well as protection of the environment, bringing unregulated expansion to a halt. In Salta Province well defined zones for agricultural practice and protected environment, demarcated in the Ordenamiento Territorial, should from now on provide for a clear guideline. Monitoring is the next prerequisite to make sure all actors adhere to these legal boundaries.

Agricultural practice in soy production is in the hands of producers. Sustainable practice entails consideration of soil quality, water availability, rotation practices and use of pesticide and fertilizers. Spreading the knowledge and practice of how to best safeguard natural resources with Good Agricultural Practice will benefit the future quality of products as well as that of the environment. However, the government's role considering taxation and price regulation makes the situation more complex. Indirectly farmers are pressured to make unsustainable decisions. Politics in Argentina demand for reconsideration on a federal level to finally bring the conflict with the agricultural scene to an end.

Academic research and research institutions should continue to address these problems. Although actual change is difficult to realize where it is needed the most, part of the solution is defining problems and bringing it to the attention of the public. This should also contribute to the efforts that are already being made by organizations such as Solidaridad and Fundapaz in strengthening the position of the

local community by means of empowerment and capacity building. The perspective of local people on how their living environment is affected by agricultural practice and land use should become part of the decision making process on land use change. Acknowledgement of the community as an actor in this process is prerequisite to help dissolve the threats they face today, such as displacement from their land or contamination of their living environment.

The potential of RTRS

The criticism towards the RTRS is valid to a certain extent. In the phase of field testing a lot more issues shall have to become clear and well defined in order to come to a workable practice of certifying soy. Therefore, it is too early to jump to conclusions on the success of the initiative. Theory on *green alliances* provides for the theoretical background on the roots of the multi-stakeholder organization and characterizes the features of such an organization. The critique posed by the Dutch Soya Coalition can be interpreted as helpful recommendations for improvement.

Conclusions derived from the stakeholders' response show their perception on a variety of topics regarding land use change and soy production, as well as their opinion on RTRS. Respondents were reserved and critical, except for those already aligned to the initiative, as for example Solidaridad. However, this offers merely a first hand impression of how, at this moment in time, RTRS is perceived by specific groups of stakeholders, partly on a national level, partly on a local level, limited to the boundaries of Argentina. The assessment of the critique posed by the Dutch Soya Coalition sheds light on the actual functioning of the organization as well as its position on a global scale in the ongoing debate on the future of soy production.

The strength - the potential - of the RTRS is the combination of forces in the framework of a multi-stakeholder organization. Interests of business and civil society, finance and industry are brought together and for consensus they are willing to bundle their means. Especially in the case of Argentina, where the state lacks to provide clear land use policy and planning, this initiative is a welcome development. The RTRS has taken up the responsibility to look into issues that need to be addressed, starting today and working towards *responsible* soy in the future.

6.2 Research recommendations; Reconciling environment and development

In Salta Province, the competition over natural resources – land, forests, soil and water - shows how tension is built up over time due to the opposing interests of agricultural development and nature conservation. In this final paragraph, recommendations for research are given with emphasis on the importance of a holistic approach in the science of land use. The aim to create sustainable landscapes and practice sustainable land use is grounded on the assumption that environment and development can go hand in hand. Environmental change depends on the size and type of local disturbances in ecosystems, complicated due to interconnectivity among ecosystems, which makes linkages and the level of impact difficult to understand. Ecosystem services are fundamental to the development of sustainable landscapes but up till now they have been largely ignored in land management strategies (Castellanos et al, in: Tiessen & Stewart, 2009).

Knowledge of ecosystem functions, services and processes should influence land use decision making and ecosystem conservation is a vital aspect in working towards sustainable land use. While conservation traditionally entailed the threat of human beings towards particular species, today it encompasses the conservation of an entire ecosystem (Tiessen & Stewart, 2009). Quiroz (1993) stresses the importance of local knowledge in traditional production systems, as an example of a dynamic equilibrium between society and nature. However, local practices of subsistence farmers are disappearing because of the emergence of modern market-oriented agriculture, a trend illustrated by the intensification and expansion of soy production. Direct results are the degradation of natural resources and declining standards of nutrition and welfare.

Human capital is critical to counter this type of land use change and should be used to secure land management intervention, safeguarding ecosystem functioning as well as meeting the needs of stakeholder communities. Conservation needs to be combined with rural development, taking into account ecological knowledge, food self-sufficiency and local resource use. Posey (in: Quiroz, 1993) suggests that indigenous people are the main source for information on how to manage natural resources sustainably, for example in areas such as Salta where these communities still exist. Instead of the conservation ethic, more specific adaptive strategies are required for resource management. Social differences, such as age, gender, origins, descent, position and socio-economic status provide the context for natural resource management and will determine how a natural resource strategy should be developed on farm, community and landscape levels.

Raising awareness of local knowledge systems could provide a basis for developing a strategy for conservation and ensuring community involvement. With reference to the situation in Latin America, Quiroz (1993) stresses the need to incorporate the insights of local knowledge systems into the educational system.

Support programs could combine the preservation of resources and development efforts, in which community members become active actors and the farmer an active strategizer in analyzing situations, processing information and bringing together elements for operating the farm. At the same time, there should be a continuous flow of knowledge between farmer, researcher and extension workers. All together, this would provide an alternative approach to current management systems.

In the context of this holistic approach, communicating the science of land use is an important element in the decision-making processes. In practice this implies that available data should be reproduced and distributed as manageable and accessible information. Ecological knowledge must be validated by a larger circle of peers and discussed within broad circles of stakeholders - in the light of their own perceptions and experiences - before decisions are made that impact the environment. The importance of relevant and systematic studies brings the role of academic research into focus. "Science and policymaking are both complex and non-linear iterative processes that deal with multiple, interlinked and changing questions" (Quiroz, 1993). Establishing a working dialogue with land use decision makers from farmers to governments, through intermediaries, is often needed, for example, through an agricultural extension specialist. Also NGOs and key community members need to be involved in such dialogues.

Stakeholders are in a position to decide how to incorporate ecological knowledge into their specific decision-making processes, which is shows why discussion among them is of great value. They decide which indicators are relevant in the context and meaning of sustainable practice. Furthermore, an understanding of decision-making processes is also required. Science must feed these processes with high quality information that is designed to inform non-specialists rapidly and effectively. This can only be achieved by a multidisciplinary approach to land use change. The choice of topics for research could even receive direct input from stakeholders, in which case it is demand driven instead of supply driven. Demand driven research is more likely to generate results that can be communicated back to stakeholders. Supply driven research is more focused on the generation of independent, objective information. Generally, scientific tools and models can help effective communication if they are constructed using participatory methodologies, involving stakeholders and decision makers (Figure 6.1).

The identification of stakeholders is relevant for a participatory approach. Individuals, groups or institutions (local, governmental, land-user groups, indirectly affected groups, NGOs, civil society and private sector) are all considered potential stakeholders. Participation is critical for the effectiveness of research projects and the usefulness of findings and policy implications. Information sharing, consultation methods, collaboration and empowerment are aspects of the participatory approach in practice. A sense of ownership and responsibility is a prerequisite for any research

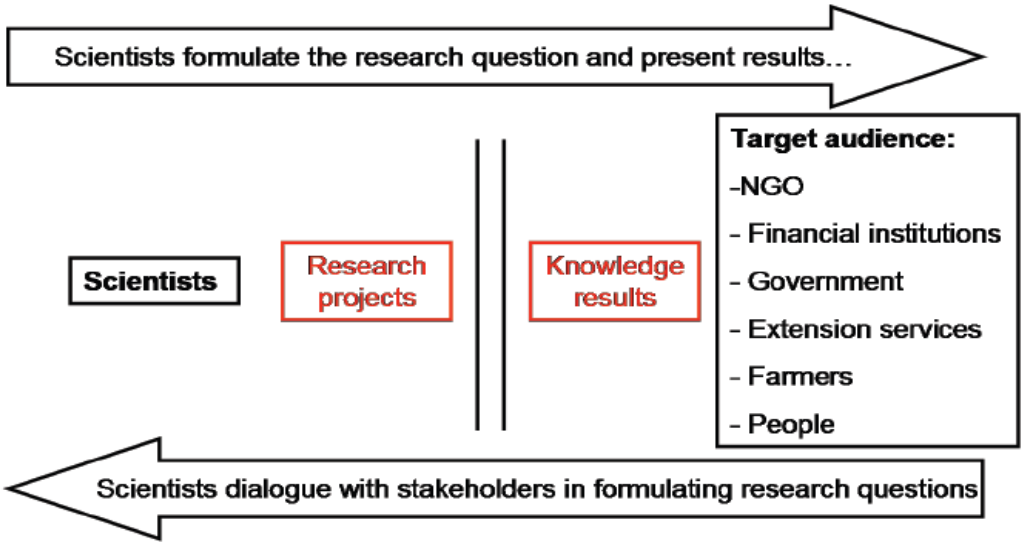


Figure 6.1 Two extremes in research project design. The upper arrow represents supply-driven research and the lower arrow, demand-driven research (Quétier et al, in: Tiessen & Stewart, 2009)

initiative to be successful. Credibility and the legitimacy of research are recognized issues in *earth system science.* The connection with social science and non-scientists, for example policy and media specialists, needs to be developed further to bridge the gap between data and decision making.

It can be concluded that the demand of growing populations and the greater need for basic services - clean water, food and energy - are pressuring most ecosystems on our planet. Land managers face the complicated question of optimizing the different components of human modified landscapes to optimize the production and sustainability of services and goods. Longer time scales and larger geographical areas need to be taken into account by those making decisions on land use change. Not only food and water need to be considered, but also soil nutrient regulation and recycling, surface and ground water flow and climate regulation. Ecological discussion should permeate discussion on all levels, from farmer to bureaucrat. An understanding of individual and local decisions that add up to larger, global impacts, enable the development of more resilient land use systems that include the right combination of production and conservation.

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Maps and illustrations:

Front page: http://www.theargentimes.com/socialissues/environment/beyond-the-amazon-deforestation-in-argentina-/

Websites:

RTRS
www.responsiblesoy.org

CRC in Sustainability and Culture, University of York;
Http://www.yorku.ca/ecocult/pages/naturematters.html

Appendices

I List of Stakeholders

II Interview Logbook

III Letter correspondence Dutch Soya Coalition

IV RTRS Principles and Criteria

V Map *Ordenamiento Territorial, Salta Province*

I List of Stakeholders

Identified stakeholders on national level

	Organization	Representative	Explanation
1	**RTRS** *Multistakeholder organization*	Ben Zeehandelaar Miguel Hernandez Veronica Estradé Jeroen Douglas	Round Table on Responsible Soy; working towards the certification of soy production.
2	**The Netherlands Embassy** *Government*	Freek Vossenaar	LNV; Dutch Ministry of Agriculture, Nature and Food quality
3	**FARN** *NGO*	Leslie MacColman Bernardo Voloj	Fundacion Ambiente y Recurso Naturales
4	**AACREA** *NGO*	Hernan E. Satorre	Argentine Association of Regional Consortiums for Agricultural Experimentation
5	**AAPRESID** *NGO*	Agustin Bianchini	Asociación Argentina de Productores de Siembra Directa, Argentine No-till Farmers Association
6	**Solidaridad** *NGO*	Jeroen Douglas Josefina Eisele	Driving force Fair Trade; active in organic agriculture; striving for certification mechanisms.
7	**FOE** *NGO*	Roque Pedace	Friends of the Earth International; grassroot environmental network
8	**El Tejar** *Producer*	Alfredo Kasdorf Rodrigo Mugaburo	Agri-business in meat and grain production systems.
9	**Los Grobo** *Producer*	Gustavo Grobocopatel Alex Ehrenhaus	One of Argentina's primary grain producer, nat&int food chain coordinator
10	**INTA** *Government/Research*	Mrs. Caballaro	National Institute for Agricultural Technology

Identified stakeholders in the Salta region

	Organization	Representative	Explanation
1	**Fundapaz** *NGO*	Pablo Frére	RED Gran Chaco Network
2	**LEIY** *Academic/Research*	Ricardo Grau Ignacio Gasparri	Laboratorio de Investigaciones Ecológicas de las Yungas (Tucumán)
3	**Las Lajitas** *Producer group*	Javier Martin	Producer group in one of the soy nuclei in Salta.
4	**Universidad Nacional de Salta** *Academic/Research*	Adriana Ortín	Conference: *Jornada Internacional de Cambio Climaticos*, Faculdad de Ciencias, UNSA
5	**Universidad Catolica de Salta** *Academic/Research*	Dr. Daniel A. Sabsay Dr. Néstor Cafferatta Dr. Julio Nasser	*Jornada Latinoamericanas sobre Medio Ambiente* Ordenimiento Ambiental del Territorio
6	**INTA** *Government/Research*	Adolfo Corrizo Jose Volante	El Instituto Nacional de Tecnología Agropecuaria
7	**Secretario de Politica Ambiental** *Government*	Maria Gil Florencia Luñis Marcela Palma Adriana Morales Carlos Peralta	
8	**Ministerio de Ambiente y Desarollo Sustentable** *Government*	Rubén Nieva Elizabeth Prudencio	

II Logbook

Date	Activity	Contact	Organisation
01-06-2009 Mon	Travel and settle in		
04-06-2009 Thu	Introduction Host Organisation	Supervisor Ben Zeehandelaar - *Outreach manager*	Round Table on Responsible Soy (RTRS), Buenos Aires
05-06-2009 Fri	Exploratory travel Misiones		
08-06-2009 Mon	Exploratory travel Chaco		
09-06-2009 Tue	Exploratory travel Corrientes		
10-06-2009 Wed	Exploratory travel Córdoba		
15-06-2009 Mon	Feriado *National Holiday*		
16-06-2009 Tue	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 -Read material RTRS -Meeting Ben Zeehandelaar -Decide on Stakeholder Analysis -Revise methodology		Gic Language School RTRS
17-06-2009 Wed	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 -Arrange meetings -Read on stakeholders RTRS -Internet search		Gic Language School RTRS
18-06-2009 Thu	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 -Meeting Ben Zeehandelaar -Discussed possibility stakeholder analysis		Gic Language School RTRS
19-06-2009 Fri	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Meeting Javier Bartoli Piñero - Assignment to research political and economic situation in relation to outreach - Contact NL embassy; LNV	Javier Bartoli Piñero - *Public Affairs and Communication Director* Freek Vossenaar - *Board LNV*	Gic Language School RTRS The Neth. Embassy
22-06-2009 Mon	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Research assignment - Prepare questions for interview - Literature on multi-stakeholder process - Plan travel fieldwork		Gic Language School RTRS
23-06-2009 Tue	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Interview	Jeroen Douglas - *President Executive Board RTRS*	Gic Language School RTRS Solidaridad

24-06-2009 Wed	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Arrange meetings - Documenting interview material - Meeting Verónica Estrade	Verónica Estrade - *Public Affairs and Communication*	Gic Language School RTRS RTRS
25-06-2009 Thu	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Interview Miguel Hernandez	Miguel Hernandez - *Executive Secretary*	Gic Language School RTRS RTRS
26-06-2009 Fri	Spanish Class 09.30-13.30 RTRS Office 14.00-19.00 - Documenting interview material - Meeting Verónica Estrade	Verónica Estrade - *Public Affairs and Communication*	Gic Language School RTRS RTRS
29-06-2009 Mon	RTRS Office 09.30-19.00 - Statutes and bylaws - Email contacts Salta - Plan travel fieldwork		RTRS
30-06-2009 Tue	Interview Freek Vossenaar RTRS Office 14.00-19.00 - Meeting Ben Zeehandelaar - Discussion Outreach Program - Studied material Outreach Program Language course 18.30-20.30 - Preparation interview material	Freek Vossenaar - *Board LNV* Ben Zeehandelaar - *Outreach Manager* Florencia Chimieti	The Neth. Embassy RTRS LvStudio Palermo
01-07-2009 Wed	RTRS Office 09.30-19.00 - Write Traiectum report		RTRS
02-07-2009 Thu	RTRS Office 09.30-19.00 - Plan travel fieldwork - Search contacts University - Finish assignment Javier Language course 18.30-20.30 - Preparation interview material	Florencia Chimienti	LvStudio Palermo
03-07-2009 Fri	RTRS Office 09.30-19.00 - Finish Assignment Javier		RTRS
06-07-2009 Mon	RTRS Office 09.30-19.00 - Phone contact FAA - Meeting about use of RTRS contacts - Send final version document Javier		RTRS
07-07-2009 Tue	RTRS Office 09.30-19.00 - Meeting about preparation fieldwork; region Salta - Prepare draft text to contact key persons Salta Language course 18.30-20.30 - Preparation interview material	Verónica Estrade - *Public Affairs and Communication* Florencia Chimienti	RTRS LvStudio Palermo
08-07-2009 Wed	RTRS Office 09.30-19.00 - Overview list of appointments/contact details - Review proposal		RTRS
09-07-2009 Thu	Feriado *National Holiday* Language course 18.30-20.30 - Preparation interview material	Florencia Chimienti	LvStudio Palermo

10-07-2009 Fri	Interview FAA Córdoba	Mario Cicioli - *Director de Relaciones Institucionales*	Federacion Agraria Argentina (FAA)
13-07-2009 Mon	Travel Mendoza-Tucumán		
14-07-2009 Tue	Interview Ricardo Grau	Prof. Ricardo Grau	Laboratorio de Investigaciones Ecológicas de las Yungas (LIEY)
15-07-2009 Wed	Meeting FAA office Tucumán Exploratory travel - Tour Yungas	Miguel Peres	FAA Tucumán
16-07-2009 Thu	Exploratory travel - Tour Yungas		
17-07-2009 Fri	Travel to Salta Meeting Fundapaz, Salta	Pablo Frére - *Coordinator Gran Chaco Region*	NGO Fundapaz
20-07-2009 Mon	Exploratory travel - Jujuy		
21-07-2009 Tue	Exploratory travel - Jujuy		
22-07-2009 Wed	Return Salta Preparations excursion Embarcación		
23-07-2009 Thu	Meeting office Fundapaz Contact INTA - office Tartagal Phonecalls Visit Provincial Library		Fundapaz Instituto Nacional de Tecnología Agropecuaria (INTA)
24-07-2009 Fri	Travel Embarcación Visit office Fundapaz Preparation meeting		Fundapaz - RED Gran Chaco
25-07-2009 Sat	Workshop - Focus group discussion Representatives of farmer's organizations in Chaco Region, Province of Salta.		
27-07-2009 Mon	Arrange meetings + excursions		
28-07-2009 Tue	Visit Land Register, Salta Meeting UNSA	Adriana Ortin - Directora Escuela de Recursos Naturales	Universidad Nacional de Salta (UNSA)
29-07-2009 Wed	Visit Land Register, Salta Follow up contacts UNSA - Fundacion OIKOS - Phd student Loretta Baker (USA) - Ley Ordenamiento - APN		Fundacion OIKOS Parques Nacionales de Argentina (APN)
30-07-2009 Thu	Excursion Las Yungas Interview cattle farmers		SAYTA - Chicoana
31-07-2009 Fri	Excursion Las Yungas Interview cattle farmers		SAYTA - Chicoana
03-08-2009 Mon	Excursion Parque Nacional El Rey		
04-08-2009 Tue	Conference: *Jornada Internacional de Cambio Climaticos*, Faculdad de Ciencias, UNSA		Universidad Nacional de Salta (UNSA)

05-08-2009 Wed	Fieldtrip Las Lejitas	Javier Martin - Consultant Agronomist	Gruppo Las Lejitas
06-08-2009 Thu	Fieldtrip Las Lejitas - farm visits/consults	Javier Martin - Consultant Agronomist	Gruppo Las Lejitas
07-08-2009 Fri	Meeting INTA, Salta - Interview Adolfo Corrizo - Interview José Volante - Meeting Daniela Chaves (Economia EEA Salta)	Adolfo Corrizo - Manejo de Cultivos Oleaginosos José Volante - Lab. Teledeteccion INTA	Instituto Nacional de Tecnología Agropecuaria (INTA
10-08-2009 Mon	Preparation presentation meeting Tucumán		
11-09-2009 Tue	Meeting Secretario de Politica Ambiental Discussion on Programma Ordenimiento Territorial	Maria Gil Florencia Luñis Marcela Palma Adriana Morales Carlos Peralta	Secretario de Politica Ambiental
12-09-2009 Wed	Meeting Ministerio de Ambiente y Desarollo Sustentable	Rubén Nieva Elizabeth Prudencio - Coordinator	Ministerio de Ambiente y Desarollo Sustentable
13-09-2009 Thu	*Jornada Latinoamericanas sobre Medio Ambiente* Ordenimiento Ambiental del Territorio Travel to Tucumán	Dr. Daniel A. Sabsay Dr. Néstor Cafferatta Dr. Julio Nasser	Universidad Catolica de Salta (UCASAL) - Instituto de Derecho Ambiental y de la Sustentabilidad
14-09-2009 Fri	Meeting Tucumán, Yerba Buena - Presentation of master and Phd students on reserach - Presentation on own research		Laboratorio de Investigaciones Ecológicas de las Yungas (LIEY)
17-09-2009 Mon	Feriado *National Holiday*		
18-09-2009 Tue	Return office RTRS - Send emails to contacts - Start writing final report		
19-09-2009 Wed	Organizing data Writing report		
20-09-2009 Thu	Organizing data Writing report		
21-09-2009 Fri	Organizing data Writing report		
24-09-2009 Mon	Organizing data Writing report		
25-09-2009 Tue	Reading on UNPOP Organizing data Writing report		
26-09-2009 Wed	Reading documentation Events - Members Organizing data Writing report		
27-09-2009 Thu	Send email to contacts Discussion on planning and utility of work **Last day at the office**		

III Letter of the Dutch Soya Coalition to the Minister of Agriculture, Environment and Food Quality of the Dutch Government

Date: 20th of February 2009

Letter of the Minister in response to the writing of the Dutch Soya Coalition

Date: 12th of June 2009

IV RTRS Principles and Criteria for Responsible Soy, Field Testing Version Date: 28th of May 2009

V Map: Ordenamiento Territorial

(Areá Boscosas de la Provincia de Salta)