

# Land and water accumulation in times of agrarian change

*A case study on changing production and livelihood  
patterns in an ejido in North-East Guanajuato,  
Mexico*



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Master thesis submitted in partial fulfilment of the degree:

Master of Science in International Development Studies (MID)

MSc Thesis Development Economics – DEC 80433

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June, 2018

## Acknowledgments

I want to thank my supervisors, Dr. Nico Heerink and Dr. Jaime Hoogesteger, for their support, constructive feedback and guidance since the early discussions we had regarding the research and then throughout the whole research process.

I owe a debt of gratitude to many people met during my research fieldwork. Thank you to all the people I interacted with in the *ejido of Jesús María la Petaca* and *Los Rodriguez* for welcoming me in your communities, fields and homes and giving me the chance to conduct the research. To those who hosted me, connected me with others, shared perspectives and anecdotes, and helped me getting my Chevy Monza out of the mud, *muchas gracias*.

Among the people I met during my stay in Mexico, I would like to mention: Martha, my “spy” in the *ejido*, for the true friendship we made and for supporting me in the difficult research moments; Dorio for helping me to get introduced in the *ejido*, facilitating the acquisition and sale of my unforgettable Chevy Monza, welcoming me in your family, carrying me around the surroundings of *San Miguel de Allende* to deepen my research interest and supporting me with many words but also with a couple of *tequila* to ease my Spanish fluency; Blanca, Chino, Yesi and Toño for providing me with an endless supply of *elotes*, *pozole*, *pambazo* and *tacos*, a warm hospitality and much more; Veneranda, for helping me in improving the quality of the maps inserted in the thesis and for being a good guide in the *selva de cemento* of Mexico City.

To all my friends met in Wageningen and beyond: thank you for the friendships and fruitful discussions that have helped to overcome the challenges encountered along the path and to shape this thesis. A warm thank you to Chris, Filippo, Lars, Lotte, Lisanne, Merel, Maria and Pietro. To Elena, the greatest thank you for your constant support.

Last but obviously not least, a special thanks to my parents and my sister Marta for your guidance and support without which this thesis would not have been possible.

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## Glossary and abbreviations

ASERCA	<i>Agencia de Servicios a la Comercialización de Mercados Agropecuario</i> (Support Services for Agricultural Marketing)
<i>Avecindado</i>	A person living within the <i>ejido</i> not entitled to a land plot. He/she can rent and buy land.
BANRURAL	<i>Banco Rural</i> (the National Rural Credit Bank)
CFE	<i>Comisión Federal de Electricidad</i> (Federal Electricity Commission)
CONASUPO	<i>Compañía Nacional de Subsistencias Populares</i> (National Company of Popular Subsistences)
CONAGUA	<i>Comisión Nacional de Agua</i> (National Water Commission)
COTAS	<i>Consejos Técnicos de Aguas Subterráneas</i> (Aquifer Management Council)
CPANG	<i>Comité Pro-Mejoramiento del Agro Nacional Guanajuatense</i> A national committee that groups many smallholders who refuse to pay electricity bills and claim for a reduction of energy costs.
<i>Ejido</i>	A communal land management tenure system
<i>Ejidatario</i>	A person entitled to a land parcel in the <i>ejido</i>
FERTIMEX	<i>Fertilizantes de México</i> (Mexican Fertilizer Company)
GATT	General Agreement on Tariffs and Trade
IFM	International Monetary Fund
INEGI	<i>Instituto Nacional de Estadística y Geografía</i> (National Institute of Statistics and Geography)
ISI	Import Substitutions Industrialisation
LAN	<i>Ley de Aguas Nacionales</i> (National Water Law)
NAFTA	North America Free Trade Agreement
NTC	Non-traditional crop, crop traditionally not produced in a specific region and usually produced to be exported
<i>Pocero</i>	Leader of the users' group of a well. The person is in charge of the collection and payment of the electricity fares. He/she represents the group in front of the institutions.
<i>Posesionario</i>	A person who bought a land parcel right within the <i>ejido</i> . Formally, he/she does not belong to the <i>ejido</i> so he/she cannot participate to the assembly.
PROCAMPO	<i>Programa de Apoyos Directos al Campo</i> (Programme for the Direct Support to the Rural Area – now <i>Proagro Productivo</i> )
PROCEDE	<i>Programa de Certificación de Derecho Ejidales y Titulación de Solares</i> (Programme for the Certification of <i>Ejido</i> Land Rights and the Titling of Urban Plots)
RAN	<i>Registro Agrario Nacional</i> (National Agrarian Registry)
REPDA	<i>Registro Público de Derechos de Agua</i> (Public Registry of Water Rights)
SAGARPA	<i>Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación</i> (Federal Secretary of Agriculture)
SAM	<i>Sistema Alimentario Mexicano</i> (Mexican Food System)
SAP	Structural Adjustment Policies
SLA	Sustainable Livelihood Approach
SLF	Sustainable Livelihood Framework
STE	Parastatal and State Trading Enterprise
WB	World Bank



## Abstract

Since the 1980s, Mexico enforced neoliberal agrarian reforms that highly affected the agricultural structure of the country. This research analyses the impacts that such reforms had in terms of land and water accumulation and its impact on rural livelihoods in the *ejido* of *Jesús María la Petaca* in North-East Guanajuato, Mexico. Theory of access is used together with a sustainable livelihood framework and a political economy approach to explore how the social reproduction of the population studied is evolving. The study shows that the reforms led to different development dynamics in the *ejido*. On one hand, external investors bought and rented land with access to groundwater in the *ejido* starting a small cooperative for the production of asparagus. With time various local ejidatarios have joined the production of asparagus as a means to make agriculture economically more profitable. While the cooperative has grown in number of members and cultivated hectares the external investors have been able to gain and maintained access to more and more land and water. In parallel, the majority of the households witnessed the loss of access to groundwater and other means of production. Consequently, livelihood diversification and migration became a necessary pathway for the majority of the population that could not enter into global market chains. The study shows how after the liberalization of the Mexican Agrarian policies and the land and water markets, new processes of agrarian change have unfolded in the *ejido*. These processes have favoured the production of cash crops for the global markets by the few with the capital, resources and know how; while at the same time enlarging the group of landless labourers who have to search for alternative livelihood strategies.

**Key words:** land and groundwater accumulation, theory of access, sustainable livelihood framework, political economy approach, production practices, Mexico, *ejido*

## Resumen

Desde la década de 1980 México ha adoptado reformas agrarias neoliberales que han afectado decisivamente la estructura agraria del país. Esta investigación analiza los impactos de dichas reformas desde el punto de vista de acumulación de recursos hídricos y de tierra y quiere subrayar su impacto sobre los sustentos rurales en el *ejido* de Jesús María la Petaca, ubicado en el noreste de Guanajuato, México. Para entender cómo está evolucionándose la reproducción social de la población de muestra, se ha usado la teoría de acceso junta a un marco teórico de medios de vida sustentables y un enfoque de economía política. El estudio demuestra que las reformas han dado cabida a diferentes dinámicas de desarrollo en el *ejido*. Por un lado, inversores externos adquirieron y rentaron tierra con acceso a agua subterránea en el *ejido* dando vida a una pequeña cooperativa orientada a la producción de espárragos. Con un poco de tiempo, varios ejidatarios locales se unieron a la producción de espárragos para que las prácticas agrícolas fueran más rentables. La cooperativa creció en número de socios y hectáreas cultivadas y a la vez los inversores externos fueron capaces de acumular y mantener el acceso a cada vez más agua y tierra. Por otro lado, la mayoría de los hogares experimentaron la pérdida de acceso a los recursos hídricos y otros medios de producción. Consiguientemente, la diversificación de medios de vida sustentables y la migración se convirtieron en una trayectoria necesaria para la mayoría de la población que no pudo entrar en el mercado internacional. El estudio saca a la luz cómo nuevos procesos de cambio agrario se han desplegado en el *ejido* después de la liberalización de las políticas agrarias mexicanas y de los mercados de agua y tierra. Estos procesos han favorecido la producción de cultivos comerciales para los mercados globales por parte de los que detenían un capital, unos recursos y cierto conocimiento; al mismo tiempo han ampliado el grupo de trabajadores sin tierras que tienen que buscar estrategias de vida alternativas.

**Palabras clave:** acumulación de tierra y agua subterránea, teoría de acceso, medios de vida sustentables, enfoque de economía política, prácticas de producción, México, *ejido*

## 1. Introduction

Since the 1980s, agriculture has been highly entangled with globalisation dynamics worldwide. This interaction led to a global *neoregulation* (Pechlaner and Otero, 2010) of the agriculture sector in which the state boosted the transfer of the regulation mechanisms from the state itself to the international markets (Ascani et al., 2012). Consequently, governments of Africa, Asia and Latin America countries started to emphasise the importance of promoting an agro-export strategy to strengthen rural accumulation, moving from the rhetoric of the 1960s and 70s based on the importance of reinforcing the national market, at that time perceived both as the natural outcome for domestic products and the means to reduce poverty and achieve income distribution (Akram-Lodhi and Kay, 2010). The reinforcement of agriculture into global chains mutated production dynamics globally. An important role is now played by transnational capital of which allocation can vertically control food production. Potentially, each farmer can now produce for an international consumer. Yet, those who cannot benefit from the interaction with financial capital and transnational companies or lack access to fundamental socio-natural inputs such as technical knowledge or groundwater resources face major barriers to enter the globally broadened and highly competitive market chains.

This thesis engages with the relation of these agents and resources through a rural perspective in order to show, by presenting a Mexican case study, how globalisation networks and forces coupled with national political and economic reforms affected social differentiation processes at community level. These mechanisms entailed two different outcomes for two different groups within the context analysed. On the one hand, the majority of the population studied witnessed how the development paradigm shift meant the need for livelihood diversification as agriculture production conditions became adverse. On the other hand, a small group of smallholders managed to enter the global markets through the production of a non-traditional crop (NTCs), the asparagus. NTCs are products grown through the exploitation of favourable conditions such as low production costs, are usually grown not to satisfy domestic demand but to be exported to enter a new market and it regards a product traditionally not grown in a specific region (Barham et al., 1992). Worldwide trade of non-traditional fruits and vegetables increased by 68% between 1992 and 2001 with the Latin America and Caribbean countries playing a major role in this growth (Carletto et al., 2011). Mexico does not escape this trend (Orozco-Ramirez et al., 2017), confirming a general production turn in the area as response to the so-called “lost decade”, the 1980s, in which the Latin America area suffered high economic instability. Between the 1980s and 90s Mexico moved away from an import-substitution industrialisation (ISI) strategy to espouse the neoliberal paradigm.

Within this change, NTCs represent the *trait d’union* between transnational companies, local producers and other intermediary actors. Transnational companies benefit from comparative advantage, the production at lower costs due to, for instance, cheap (family) labour. Through contract farming, defined as “any oral or written agreement reached between direct producers and any of a wide range of agents (wholesalers, processors, retailers, packers, producer organizations, and public-sector enterprises) through which various aspects of the production and marketing of agricultural produce are regulated” (Roy, 1972 in Huacuja, 2006:83), transnational companies highly control the production process influencing land use. Furthermore, they satisfy market demand strengthening the link between the consumers and the producers highly limiting direct production risk associated with, for instance, weather shocks. Simultaneously, multiple agreements

with several producers ensure the provision of various products throughout the whole year. On the other side, rural smallholders see the possibility to enter global chains with the hope of ensuring a steady source of income thanks to the possibility of entering markets previously open only to large private and commercial farms. This apparently win-win situation can lead to exclusionary processes due to lack of financial capital, experience, assets and production standards (Beune, 2016) or situations in which the expected economic premises are not fully realised (Huacuja, 2006). Fostered by the World Bank (WB) and the International Monetary Fund (IMF), in fact, neoliberal policies have cut out of the markets uncompetitive smallholders (*campesinos*) who enter into the migration paths or agrarian wages dynamics instead of the export-oriented chains (Chollett, 2009).

A nuanced reality has been met in the case study proposed. This finds its *raison d'être* in the Mexican neoliberal embrace that enhanced the profit-oriented production of high value crops, limiting the smallholders' production of basic grains to self-consumption purposes (Marsh and Runsten, 1996). This highly shaped Mexican agrarian change processes, based on an agro-export oriented primary sector (Nuijten, 2003; Assies, 2008; Perramond, 2008; Massink, 2016). The thesis focuses on the smallholding agriculture sector which has been highly affected by this political phase, especially due to the centrality of how access to land and water resources, crucial to pursue any production strategy, has been renegotiated within this process. In such agrarian change context, the *ejido* *Jesús María la Petaca*, located in central Mexico, shows the different consequences of the reforms on the smallholding sector. The *ejido* is a Mexican communal land tenure institution, established after the Mexican revolution (1910-17) in order to provide the landless peasants with land. Within the *ejido* selected, its population witnessed the neoliberal shift in a dual way. On one hand, a group of farmers managed to organise themselves to form a cooperative able of exporting asparagus to the U.S.A. allowing to a group of farmers to keep agriculture as their main activity and primary source of income. At the same time, the majority of the smallholders started to make their living out of diversified livelihood strategies in which agriculture does not play a central role in terms of income source. The goal of the study is to describe how these processes occurred shaping the social differentiation within and between the two groups of people.

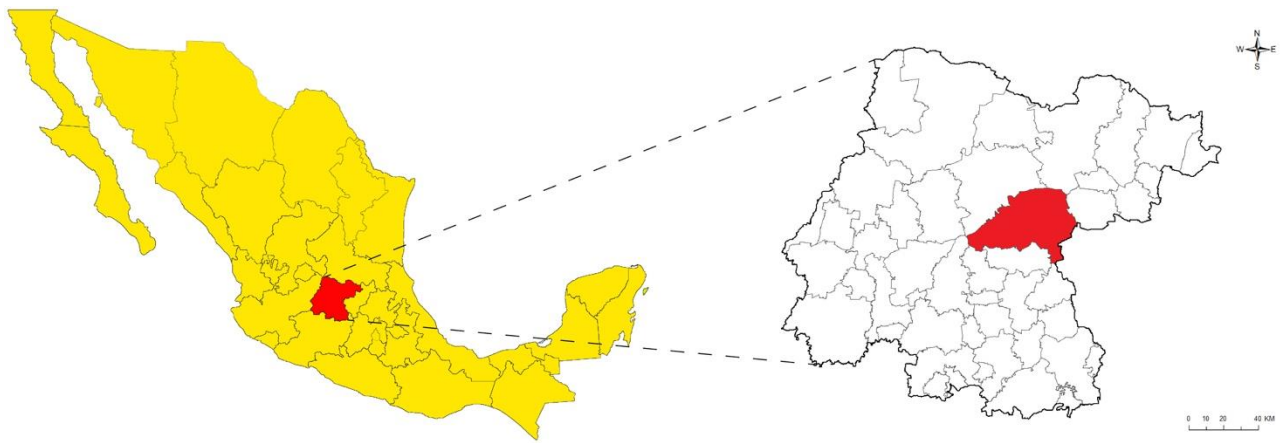
This study wants to contribute to the understanding of the development of rural livelihoods in times of agrarian change in Mexico, drawing from Ribot and Peluso's (2003) theory of access, Scoones' Sustainable Rural Livelihood Approach (1998) and Bernstein's (2017) political economy question. Discussed in chapter 2 together with a livelihood strategies analytical framework, the theory of access is useful to comprehend which mechanisms and socio-natural resources enable (constrain) the pursuit of livelihood strategies that entail the joint production of cash crops instead of subsistence products. Yet, these dichotomous developments need a historical contextualisation that demonstrates how political economy matters (Schmitz and Scoones, 2015). The thesis shows how the process that either places or not agriculture at the centre of rural livelihood is socially differentiated and influenced by both internal and external processes. The former ones occur at the microscale (the *ejido*) and influence the local relations and roles. Attention is given to the distribution of groundwater and land resources in the *ejido*, the consequent change in production practices and thus in the livelihood strategies for those who stopped to place agriculture at the core of them. With respect to land and groundwater resources, I focus on the 1980s and 90s in order to tackle this topic together with the national level policies that have highly affected the form of accessing these resources in this period, finding a direct relation between the external and internal processes. I argue that social differentiation, meant as the social reproduction of a collectivity over

time, occurs at community level because of the connection between external and internal forces that result in two different paths, one based on occupation stability through agriculture-based activities and another based on necessarily unstable livelihood diversification.

While keeping the people-centred livelihood perspective (Scoones, 2009) at the root of this work, this thesis wants to contribute to the studies that enhance the linkage between a micro-level point of view and its broader context (Scoones and Wolmer, 2003) by placing centrally knowledge, politics, scale and dynamics (Scoones 2009; Diniz, 2013). By doing so, implications for rural development policies can be drawn in a way that takes into account rural livelihoods as well as the globalisation forces that drive those livelihoods. Next section will introduce the research context showing how it is an emblematic case of Mexican agrarian change.

## **1.2 Presenting the case study: the *ejido* of Jesús María la Petaca**

Located in the central area of Mexico and with a relatively small size (30,768 km<sup>2</sup>) (Hoogesteger, 2004), the State of Guanajuato (figure 1.1) presents high population density (160 per km<sup>2</sup>) (King, Adler and Grieves, 2013) with a population of 5,853,677 inhabitants (INEGI, 2015) expected to grow reaching a total population of 6,033,559 Guanajuatans by 2020 (CONAPO, 2014). Approximately 10% of the whole population is estimated to be employed in the dynamic agricultural sector of which main products are corn, sorghum, alfalfa, broccoli and wheat (SAGARPA, 2016). In recent years, many farmers have started to produce more vegetables such as broccoli, asparagus and spinach, which are more profitable since they are produced for the agro-exports market. Guanajuato is the fourth Mexican state in terms of agro-exports, mainly directed to the U.S.A. Canada but also Japan and the European Union. (Hoogesteger, 2004). With respect to asparagus, the crops of interest, Guanajuato is the second largest producer out of 32 Mexican federal states. However, not all the producers can afford the shift to export-oriented crops. In particular, the *ejido* sector and the smallholders have fewer chances to move to more profitable crops compared to larger scale producers who own larger plots of privatised land. Despite the difficulties to pursue a profit-oriented agriculture for smallholders of the *ejido* sector, there are exceptions.



**Figure 1.1 The state of Guanajuato; The municipality of San Miguel de Allende, Guanajuato. Self-elaboration**

The *ejido* of *Jesús María la Petaca* is located in the north-east of the municipality of San Miguel de Allende, Guanajuato. Its surface is equal to 3,187 hectares. Its land used to belong to the *hacienda La Petaca* until its closure, probably occurred in the 1930s after a violent process that saw as protagonists the labourers of the estate and the large holdings. As shown in figure 1.2, four sub-communities belong to the *ejido*: *Jesús María*, *Pozo de Balderas*, *Loma de Cocina* and *El Ocote*. *Jesús María* is the largest one with an estimated number of 250 households. However, part of them belong – from an *ejido* perspective – to the nearby *ejido Jesús María el Chiquito*. *Pozo the Balderas* is estimated to have about 140 households and it is the sub-community I have spent more time given the presence of the majority of asparagus producers. *Loma de Cocina* has 110 households belonging to the municipality of San Miguel de Allende, while the rest belongs to the municipality of *Dolores Hidalgo*. Finally, *El Ocote* is the smallest one with only 12 households<sup>1</sup>.

<sup>1</sup> Unfortunately, precise population numbers could not be found and the estimates are done according to the data provided to me from the health centres located in *Los Rodriguez* and *La Palmilla*, south-west of *El Ocote*, and from the talks I had with the delegates of each community. According to both them and many other people I talked throughout my fieldwork, some 50% of the population is involved in migration flows to the United States.





**Figure 1.2. Map of the Ejido. Self-elaboration**

People started to organise themselves as *ejido* already in 1939 (informant no. 19) but the official recognition occurred only in 1955<sup>2</sup>. Originally, 125 *ejidatarios* received 11 hectares of arable land each. Besides arable land, common grazing land accounts for approximately 968 hectares. This has been used communally without any privatisation of it until the beginning of the 2000s (informant no. 4). Now, each *ejidatario* is entitled to 6.5 enclosed hectares of it. Throughout the 1970s and 1980s, part of common grazing land was cleared from natural vegetation to be apt for agriculture. Consequently, *ejidatarios* got the chance to be entitled to 4 more arable hectares each. At that time all the land was rainfed, though. Thus, many *ejidatarios* preferred not to receive more hectares. Instead, they preferred the government to concede in the forms of gift the new plots to landless young people who became *ejidatarios*. This costume explains why land entitlement surfaces and the number of *ejidatarios* in *Jesús María la Petaca* started to vary already before that land parcels could be traded, an issue discussed in chapter 4.

This *ejido* selected presents interesting features that well show how agrarian reforms affected rural livelihoods. The initial justification of the study was represented by the awareness of the existence of a group of farmer involved in asparagus production. The general idea that people in the *ejido* tend to work individually, the difficulties that smallholders face in trying to enter international food chains, the lack of access to sufficient groundwater resources to enter such chains and the increasing (youth) migration rates that impoverish the social cohesion within the communities increased the curiosity regarding this area. The starting point of this study has been, therefore, understanding how a group of farmers has managed to organise themselves to produce asparagus export-oriented. The creation and organisation of a smallholders' cooperative aimed at entering the international markets can be identified as a partial achievement of what the reforms undertaken in Mexico between the

<sup>2</sup> According to the internal regulation, received from informant no.7.

1980s and 1990s were meant to. This thesis wants to tackle how this process can have implications in terms of social differentiation within the cooperative as well as between the group of asparagus producers and those not involved in it.

The study of the asparagus producers gives many insights regarding the link between globalised agriculture chains and nowadays rurality. On the other side, an analysis of the livelihood strategies pursued by non-profit oriented crops producers shows why and how smallholders are excluded by such chains as result of the new global agriculture order. Part of the smallholders' households are thus pushed into the vortex of other globalisation consequences such rural migration flows and livelihood diversification, often carried out by entering the labour market of large export-oriented farms. Finally, the attention given to the story of land and water distribution within the *ejido* demonstrates how the creation of a dual path within the same scale of analysis is the result of a development paradigm change that favours the allocation of capital to agents who already possess financial means together with the possibility to access networks that ease the entry into international chains. Different access opportunity to these resources is one of the causes of the social differentiation evolution in *Jesús María la Petaca* as forms of land concentration can emerge while agriculture is not anymore the main source of income for many people.

Having presented the site the research took place in, the following section presents the research question and the methodology used to answer it.

### 1.3 Research question and methodology

This research has been set up within the broader project of dr. Jaime Hoogesteger van Dijk “Re-patterning water control: Vegetable agro-export chains, water rights and rural livelihoods in the Bajío, Mexico”<sup>3</sup>. As part of a broader investigation that works at regional scale (the Bajío is a major vegetable producer area of Mexico), this study contributes to it by analysing a case study that shows how rural livelihoods and agro-export chains are changing simultaneously at community level, providing an image of local dynamics inserted in larger scale processes. The research question the thesis addresses is:

*What effects have been brought about by the liberalisation of agrarian policies, land and water markets in terms of access to land and groundwater, production practices and livelihoods strategies in the ejido of Jesús María la Petaca, Guanajuato, Mexico?*

In order to operationalise the research question, this is divided into three sub-research questions that place centrally three embedded concepts: access to land and groundwater, production practices and livelihood strategies.

- SQ<sub>1</sub>: How, and triggered by which policy and socio-economic changes have access to land and groundwater resources changed in the researched *ejido* between the 1980s and 1990s?
- SQ<sub>2</sub>: How are these changes in access to land and groundwater interrelated with the transformation of agricultural production practices in the researched *ejido* since the mid-1990s?
- SQ<sub>3</sub>: How are these changes in access to land and groundwater and agricultural production practices related to shifts in the livelihood strategies of the population of the *ejido*?

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<sup>3</sup> <https://www.nwo.nl/onderzoek-en-resultaten/onderzoeksprojecten/i/95/12095.html>

Sub-research questions refer to the domains of interests that have been identified to understand the social differentiation evolution over time. How access to groundwater and land resources is changed between the 1980s and 90s is the initial starting point to be tackled in order to understand how agricultural production practices have been affected by a different availability of these resources within the population of the *ejido*. Thirdly, it is investigated how the (im)possibility to pursue profit-oriented agricultural production practices has implied drastic livelihood strategies changes for a part of the population.

Initially, literature review helped to understand the context and shape the study. Fieldwork took place between July and November 2017. Each domain of investigation has been studied during the fieldwork period in which both qualitative and quantitative data have been collected. During this period, I filled in 58 questionnaires (presented in Spanish to the informants, see annex 1 for the English version) combined with semi-structured interviews to farmers, I also made participant observations in the communities studied, and talked with representatives of Mexican organizations and institutions related to agricultural matters. I have been introduced to the *ejido* through an officer of the local Aquifer Management Council (COTAS). Successively, snowball techniques have turned out to be useful to get acquainted with new informants introduced from already interviewed subjects.

The 58 questionnaires have been chronologically numbered easing the referencing throughout the thesis (see annex 2). I have filled in the surveys with farmers who either own or rent the land. Only three of them do not work own land anymore as they sold or stopped to work it. Out of 58 questionnaires, 21 were taken in *Pozo de Balderas*, 23 in *Jesús María*, 7 in *Loma de Cocina*, 3 in *El Ocote* and 4 in the nearby village of *Los Rodriguez*, which does not belong to the *ejido* but where some people live who own land within the *ejido* borders. The surveys are meant to get a clear picture of several components regarding the informants' household like the number of people belonging to the household, their occupations, education level, migration flows to the U.S.A., land ownership, current and past production uses, livestock ownership and purposes of it, input application, possible water concession and irrigation rules, access to credit and subsidies and ownership of agriculture assets. This information is particularly helpful to answer the third sub-research question as they provide with many information regarding several types of assets and capitals, explanatory factors of livelihood strategies. Moreover, they give information about current and past (in particular about the 1980s and 1990s in which more households had access to groundwater for irrigation purposes) production practices, partly answering sub-research question 2. Overall, they have provided me with a good overview of the *ejido* with respect to above listed topics. Given the high illiteracy rates among the informants, I filled in the questionnaires while reading them to the interviewed people. All of the surveys have been digitalised.

Alongside the questionnaires, I carried out 14 in-depth semi-structured interviews to deepen the knowledge of important aspects. Table 1.1 summarises the main information about the informants I interacted more with and the topics we discussed.



**Table 1.1 Semi-structured interviews basic information**

/	When	Gender	Who	Where	What
1	13/08/2017	M	Packaging company production chief	<i>San Luis de la Paz</i>	Asparagus chain; asparagus market.
2	16/08/2017	M	<i>Ejidatario</i> , non-asparagus grower	<i>Jesús María</i>	History of access to and management of groundwater in the <i>ejido</i> .
3	21/08/2017	M	Son of <i>Ejidatario</i> , asparagus grower	<i>Pozo de Balderas</i>	Cooperative dynamics, wells management.
4	28/08/2017	M	<i>Avecindado</i> , non-asparagus grower	<i>Jesús María</i>	Land transactions in the <i>ejido</i> .
5	14/09/2017	M	<i>Ejidatario</i> , non-asparagus grower	<i>Jesús María</i>	Past production practices.
6	22/09/2017	M	RAN officer	<i>San Miguel de Allende</i>	RAN- <i>Ejido Jesús María la Petaca</i> relationship.
7	23/09/2017	M	<i>Ejidatario</i> , non-asparagus grower	<i>Pozo de Balderas</i>	History of the <i>ejido</i> , milk producers group.
8	25/09/2017	M	Packaging company director	<i>San Luis de la Paz</i>	Producers-packaging company-buyer relationships.
9	26/09/2017	M	Asparagus grower	<i>Pozo de Balderas</i>	Irrigation practices, institutions-communities relationships.
10	3/10/2017	M	RAN officer	<i>San Miguel de Allende</i>	Land and groundwater regulation.
11	10/10/2017	M	<i>Ejidatario</i> , non-asparagus grower	<i>Loma de Cocina</i>	<i>Ejidatarios</i> ' duties and rights, assembly's role.
12	12/10/2017	M	<i>Posesionario</i> - asparagus grower	<i>Pozo de Balderas</i>	Asparagus cooperative history, current dynamics.
13	15/10/2017	M	<i>Ejidatario</i> , non-asparagus grower	<i>Loma de Cocina</i>	Migration flows, labour conditions in the U.S.A.
14	27/10/2017	M	Posesionario, he rents out land to produce asparagus	Los Rodriguez	Migration flows, power relations asparagus cooperative.

I highly value this method has it turned out to be insightful with respect to all the sub-research questions. The nuanced reality can be reported differently according to the different interpretations people give to facts and situations. To overcome the contradictions, I got back to several informants asking again questions they possibly misunderstood or about contradictory information in their answers. With respect to this issue, languages also play an important role. Spanish is not my first (Italian) nor second (English) language. In this thesis, I report only information I am sure I have correctly understood. However, despite my intermediate knowledge of Spanish, some relevant information might have been neglected.

Participant observation has been also used especially in the communities of *Jesús María* and *Pozo de Balderas*, the villages I spent more time in. Here, I got many insights through informal conversation during local ceremonies, parties and events such as the delivery of subsidies to the woman of the communities. Informal moments have turned out to be very fruitful situations to gather information. I decided not to audio-tape the interviews due to the suspicion many people showed about the research, in particular about the questionnaires and the fear I would transmit the data to Mexican institutions. Yet, I took notes during the interviews and the talks.

Moreover, I attended the annual meeting regarding the practices developed by the COTAS. Finally, officers of the Federal Electricity Commission (CFE), the National Water Commission (CONAGUA) and the Federal Secretary of Agriculture (SAGARPA) provided me with information about subsidies and support policies with respect to their domains of work.

## 1.4 Thesis outline

This work is structured as follows. Next chapter presents the theory of access (Ribot and Peluso, 2003) and a livelihood strategies framework (Scoones, 1998) showing how a combination of the two within a specific political economy context can help explain the evolution of social differentiation in the case study analysed. Chapter 3 describes the Mexican agrarian change that occurred in the 20<sup>th</sup> century with a focus on land and water reforms. Chapter 4 to chapter 6 pay attention to the case study. Chapter 4 aims to answer sub-research question 1 analysing how access to land and water has changed within the *ejido* and what these changes have meant in terms of agricultural activities. Chapter 5 and 6 address sub-research questions 2 and 3. In particular, chapter 5 will present how the association of asparagus producers emerged, highly modifying traditional production practices in the *ejido*, and how it is currently organised. Chapter 6 discusses another major facet of the *ejido*: the livelihood diversification of those who lost their access to water resources and were forced to modify their agricultural activity. Based on this case study, the conclusive chapter 7 discusses policy implications regarding food production and livelihood strategies in rural areas in times of agrarian change and pays attention to what this *ejido* can say about the Mexican smallholding sector.

## 2. Theoretical framework

In order to analyse both the macro processes that shape access to socio-natural resources and consequent micro-level production and livelihood strategies, the theory of access as developed by Ribot and Peluso (2003) and the Sustainable Livelihood Framework (SLF) (Scoones, 1998) extended with four political economy questions (Bernstein, 2017), will be the lenses to understand the agrarian structure observed.

Theory of access is used in chapter 4 to answer SQ<sub>1</sub> to describe how access to land and groundwater resources is changed in the *ejido*, focusing especially on the 1980s and 1990s. Moreover, it is used in chapter 5 in order to show which components, and how access to them occurred, made possible the creation of the asparagus producers cooperative. As such, it wants to contribute to answer SQ<sub>2</sub> with respect to non-traditional production practices. Finally, the SLF is the analytical tool to study the livelihood strategies of both asparagus producers and non-growers farmers. It is used to answer SQ<sub>3</sub> in chapters 5 and 6.

### 2.1 Theory of access

Ribot and Peluso (2003: 155) define access as “the *ability* to derive benefit from things” broadening the property theory debate usually most focused on legal and illegal *rights* on resources. Consequently, they focus their attention on a bundle of powers rather than on a bundle of rights. Following the authors, “right-based access” (ibid.:161) mechanisms refer to access through law, custom and convention and occur because of a claim made by an institution. Yet, access to resources is also influenced also by the “structural and relational access mechanisms” (ibid.:162), that are the political-economic and cultural frames that enable or not a person’s ability to benefit from the resource. These are *technology, capital, markets, labour, knowledge, authority, identities*, and access via the negotiations of *social relations*.

In this study, it is strengthened the importance of analysing how access to some of these elements is obtained and how political circumstances facilitate this access. This is necessary to understand how people manage to access natural resources such as land and water and eventually take advantage of them. Following the framework of a theory of access analysis, three steps are identified by Ribot and Peluso (2003:160-161):

- 1) identifying and mapping the flow of the particular benefit of interest;
- 2) identifying the mechanisms (of access) by which different actors involved gain, control, and maintain the benefit flow and its distribution;
- 3) an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived.

Firstly, a benefit flow from access to groundwater will be identified given the importance of this resource for agricultural practices in the *ejido*; the second point refers to understanding which elements have entailed the possibility to gain, control, and maintain the benefit flow through a specific crop production; finally, once that benefit is derived from production, the analysis of the power and organisation relations between those who actually obtain the benefits completes the access analysis.

Going back to the structural and relational access mechanisms that shape access, I will focus on access mechanisms to financial *capital*, *technology*, *labour*, *knowledge*, *authority*, *output market* and access *via the negotiation of social relations* as I have observed they are the main factors that affected social differentiation within this case study.

“*Capital* is generally thought of as access to wealth in the form of finances and equipment (Ibid.:165)”. Besides, it can be used to gain resource access *control* by purchasing rights but also to *maintain* access to resources through the payment of a rent, for instance. Here, attention is given to the channels the population of the *ejido* uses to get access to capital in the form of credit. It will be shown how each asparagus producer managed to obtain sufficient financial capital to initially join the asparagus business and, later on, maintain the activity, despite the dismantlement of government credit providers that highly affected the livelihoods of smallholders.

Controlling access to *labour* is fundamental to benefit from a resource at a specific moment throughout the life of such a resource. In this case, attention is given to the asparagus crop. In times of agrarian change, what labour markets dynamics present give important insights regarding rural livelihoods. This is due to the fact of labour centrality in each livelihood. Thus, understanding which labour sources are present in the study region, and under which conditions, helps to understand the decision of pursuing specific livelihood strategies. Insights into how labour supply and demand match within the *ejido*, from which sources (household, close communities) asparagus producers find workers, and the relationships between producers and workers will provide a better understanding of how the benefits from asparagus production spread over other members belonging to the same community.

The possibility to group membership is among the many benefits that access to *knowledge* can give. The more people get access to specific privileged information, the more they are likely to exploit it together. I will explain how some reforms undertaken by the Mexican government made possible the entry of new *knowledge* within the *ejido*, creating the conditions to set up the cooperative. Yet, it will be shown how unequal knowledge distribution among members of the same group highly influences the power relations within the group. In this case, asymmetrical information distribution takes different shapes.

Ribot and Peluso “think of market access as the ability of individuals or groups to gain, control, or maintain entry into exchange relations” (Ibid.:166). Access to *market* is crucial as it justifies the decision of investing in a specific resource. Thus, I will explain how the farmers started to enter the asparagus market and how they manage their relations with markets agents such as the packaging company and the buyer of their products. On the contrary, access to markets for non-asparagus producers has become less stable for those producers who did not enter international chains and produce mostly for self-consumption.

Access to *authority* has a double face. The theory of access stresses the attention on access to authority through government institutions. In this study, access to authority also comprises access to the internal authorities of the cooperative. Moreover, access to actors in the trade chains increases the unequal knowledge distribution discussed before as some cooperative members have access and control some information before than other members, increasing their authority within the group.

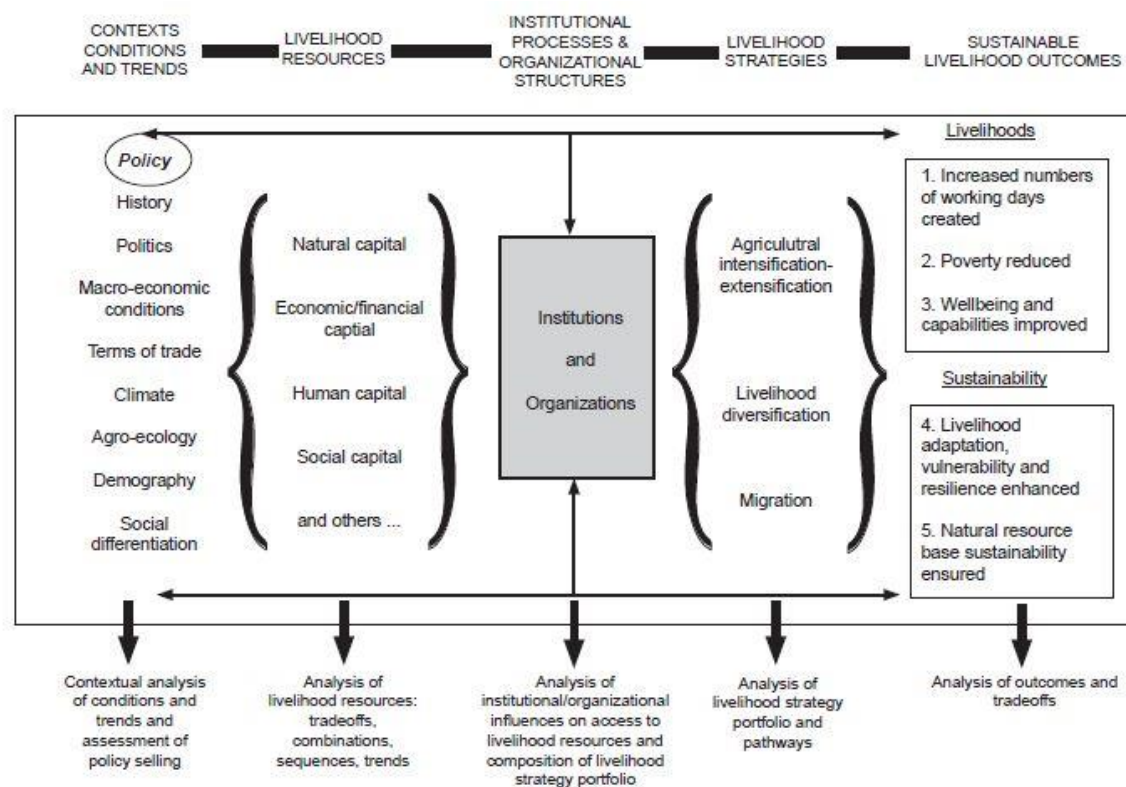
Finally, as pointed out by Ribot and Peluso (2003:172), access to the elements discussed so far and to natural resources can be the result of new forms of *social relations* that can constantly be re-negotiated in response to political economy changes that regard gaining, control and maintain access to resources.

I will make clear in following chapters how the agriculture production practices within the selected community have changed in the last two decades creating a strong differentiation between the asparagus growers and others. This is the result of an alteration in access to resources, both natural and social. However, this comparison would limit the study to a comparison between growers of asparagus and non-growers. Instead, attention is given also to the alteration in access to socio-natural resources within the growers group. Therefore, a second step is needed to explain how and why access is differentiated also within the group of asparagus producers.

## **2.2 Sustainable rural livelihood approach and political economy questions**

Livelihood strategies and perspectives have been central to rural development studies and policy implementation of the last decades (Scoones, 2009). A highly influential paper has been written by Chambers and Conway (1992) in which the authors define livelihood as the “capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhances its capabilities and assets, and provide sustainable livelihood opportunities for the next generation”(Chambers and Conway, 1991:6).

This definition is based normatively on the ideas of capabilities, equity and sustainability. Capability, drawn from Amartya Sen’s work, refers to “what a person is able of doing and being” (ibid.: 4). Equity refers to the distribution of assets, capabilities and opportunities among the population. Sustainability is a concept that refers both to environmental and social aspects. Socially, sustainability is “the ability to maintain and improve livelihoods while maintaining or enhancing the local and global assets and capabilities on which livelihoods depend” (ibid.:5). Among many authors who contributed to rural livelihood studies, Scoones (1998) places at the core of the sustainable livelihood approach (SLA) the concept of sustainability and livelihood, drawing from the definitions given by Chambers and Conway. Figure 2.1 shows schematically the sustainable rural livelihood framework which aims to represent how specific contexts and livelihood resources affect the ability to pursue different livelihood strategies through the intermediation of the institutional and organisational structures. This study makes use of the framework in order to identify factors that affect the current livelihoods outcomes in the context studied.



**Figure 2.1 Sustainable Livelihood Framework (Scoones, 1998)**

The focus in this respect is on the columns within the framework that represent the *livelihood resources* distribution, the *organisational structure* of specific groups in the community observed, and the different *livelihood outcomes* that resulted from different *livelihood strategies*. In particular, the surveys conducted will allow an analysis of the *livelihood resources* distribution (chapter 5 and 6). Livelihood resources refer to several types of capital or asset. Among them, natural, economic, social and human livelihood capitals are depicted. Yet, these assets do not represent only material and non-material aspects of the wellbeing (de Haan and Zoomers, 2005). Nor they are the mere resources that people use to build livelihood but they are assets that enact the way of being and acting (Bebbington, 1999). “They [the assets] are also the basis of agents’ power to act and to reproduce, challenge or change the rules that govern the control, use and transformation of resources” (Ibid.: 2022). Yet, the power to act results also from how access to such resources is driven by macro conditions, namely the agrarian reforms carried out in Mexico and discussed. The distribution of the different types of capital, combined with *institutional processes* (chapter 3) that influence Mexican rurality will provide insights into how *livelihood strategies* took different patterns within the *ejido*. The framework depicts *agricultural intensification – extensification*, *livelihood diversification* and *migration* as possible livelihood strategies to be analysed. All of them fit with this case study as they cover options to rural people and represent those regularities mentioned above. While *agricultural intensification* refers to higher productivity rates, *extensification* refers to process of accumulation (more land under cultivation, for instance). Finally, Instead of focusing on *sustainable livelihood outcomes* through material indicators such as *poverty reduction* and *improved wellbeing*, the sustainability of the final outcomes is assessed by (in)stability of different livelihoods.

Some important limits of this analytical framework have been pointed out by further studies on livelihood perspectives. Four shortcomings are pointed out by Scoones (2009). Firstly, this

approach does not sufficiently address processes of economic globalisation, lacking a focus on the global market as pivotal driver of rural livelihoods. Macro-economic conditions and Terms of trade are just “dumped in a box labelled contexts” (Scoones, 2009: 181), suggesting that they might be part of a livelihood analysis. This position appears to be marginal compared to the centrality of micro-level negotiations and dynamics placed in other sections of the framework. So, the framework would not be able to adequately address the “contexts” when these override the “micro-negotiations around access to assets and they finely-tuned strategies of differentiated actors” (Ibid.: 181). Secondly, he invokes the study of the engagement between politics, power and rural livelihoods. So, it fails as it does not link local-level livelihood studies carried out by academics, NGOs and consultants with broader state politics and governance regime debates regarding rural development. Thirdly, climate is only mentioned as component of one of the contextual factors influencing livelihood. As such, it does not identify the importance of climate change, possibly the biggest issue of the 21<sup>st</sup> century. Lastly, Scoones recognises that livelihood studies are not able to deal with wider questions about agrarian change. He argues that the approach is rooted into a present analysis, without being apt to think of future livelihood scenarios. In order to further livelihood studies and address these four defects, Scoones (2009) suggests four concepts to dedicate more attention to: knowledge, politics, scale and dynamics.

With respect to knowledge, Scoones reckons livelihoods thinking is based on normative assumptions that can help the creation of methods and frameworks. However, explicit assumptions can be adopted by the WB as well as by a radical social movement without any empirical evidence. Therefore, the analysis needs to be rational and objective, making the knowledge implicit rather than explicit (Nunan, 2015). This study does not make use of *a priori* livelihood assumption. Instead, the SLA is used to describe the realities and the pathways observed. Pathways refer to some regularities observed among a population while trajectories are used to describe individual patterns (de Haan and Zoomers, 2005). The context-based SLA coupled with a deep explanation of the macro-level factors that influence micro-level negotiation aims to make think of possible future changes.

Politics refers to the importance of taking into account how political economy, throughout history, shapes the development of wider agrarian changes and, specifically, the context studied. Thus, I pay attention to the drivers that affect the local practices such as the state and its policies and the role of private capital.

Scale is a crucial concept to link the micro with the macro level. Yet, the analysis of such connection has to describe the links between the micro and macro level components but it must remain “firmly rooted in context and place” (Scoones, 2009: 188) in order to understand the consequences of globalisation forces on rural livelihoods in terms of social and political processes of exchange, extraction, empowerment and exploitation.

Dynamics gives the idea that livelihood pathways are not steady and stable but, instead, they change over time. Thus, which drivers affect future livelihood patterns? A historical description of the context studied can be very insightful with respect to long-term changes in livelihood strategies.

Eventually, the use of these four concepts helps to tackle the four major limitations of livelihood studies discussed before. Firstly, the reason that initially motivated the study, an analysis of how a smallholders’ cooperative managed to become part of global economic chains, is the tool to cover



the first limit of the livelihood studies. I reckon that the analysis of the asparagus production within the *ejido* addresses this lack as it regards global markets dynamics and it gives insights regarding food production in rural settings. Micro-level negotiations can be understood through a proper presentation of macro-level and pivotal policies.

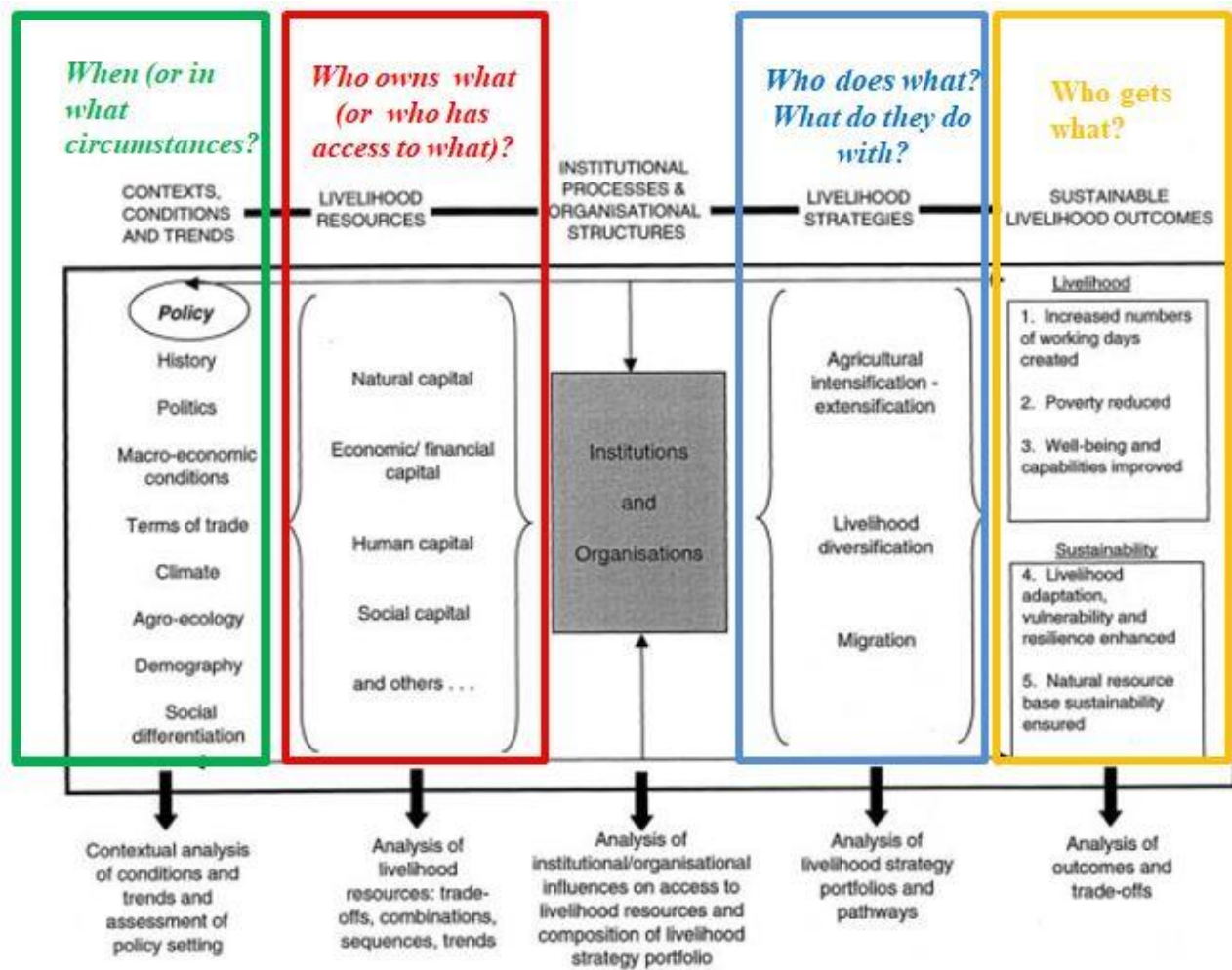
Secondly, the linkage between governance and rural development is presented here both through the presentation of the agrarian change politically led in the XX century in Mexico and by reporting the effects on the *ejido* of the political reforms discussed in chapter 3. This helps to give a clear face to the *contexts, conditions and trends*, the *policy setting*, inserted in the framework. Yet, following Nuijten's arguments (Nuijten, 1998) and aware of the influence that the state apparatus has on local realities and practices, this study does not intend to address the state – peasantry relations as these would limit the study of the local organising practices dynamics that, as shown in chapter 5, override the mere connection between the state and the rural population.

While this study does not directly deal with environmental sustainability and climate change impacts nor makes use of environmental indicators, it does address this third drawback by explicitly considering the environmental challenges that the population has faced and that keep being a menace to the population of the *ejido*.

Lastly, aware of some speculation risk, this study will try to specify possible future trajectories for the two groups studied. Further research would be needed to discuss and answer wider agrarian changes questions. Yet, a comparison between the asparagus growers and semi-subsistence farmers is insightful to understand which factors can drive the (non-)engagement between smallholders and transnational actors.

Thus, a livelihood analysis should be situated within a broader context. “This is the context of long-term, historical patterns of structurally defined relations of power between social groups, of processes of economic and political control by the state and other powerful actors, and of differential patterns of production, accumulation, investment and reproduction across society. In other words, the political economy of livelihoods” (Scoones: 2015, 74). Advocating the combination of a livelihood analysis with broader political economy dimensions, Scoones (2015) invites to extend the analytical framework making use of the four political economy questions suggested by Bernsteins (2017). These are: *Who owns what (or who has access to what)?* introducing questions of property of livelihood assets and resources. *Who does what?* inviting to consider the social labour division, distinguishing those employing and those employed, specifying also the divisions based on gender. *Who gets what?* helping to trace patterns of accumulation and by then social and economic differentiation over time. *What do they do with it?* addressing which livelihood strategies are undertaken by the population studied. To these questions, I also add the temporal “when (that is, in what circumstance)” (Neale, 1998 in Ribot and Peluso, 2003: 154). This intends to place alongside the history line the moments in which socio-political conditions changed favouring, on the one hand, the creation of an asparagus producers cooperative while supporting livelihood diversification strategies by the people excluded from the possibility to enter agricultural global chains. Thus, I draw from Scoones (2015) the SLF extended with the five political economy questions as shown in figure 2.2.





**Figure 2.2 Extended Sustainable Livelihood Framework (Adapted from Scoones, 2015)**

This study intends to link the livelihood strategies debate to broader discussions. Firstly, the simultaneous observation of two different trajectories within the same community shows two sides of the same coin: agrarian change and its facets of land control, food production and access to resources. Secondly, the political economy questions give centrality to politics and power relations at both micro and macro levels, as they both define opportunities and constraints and affect social differentiation dynamics. The “new rurality” studies have mainly highlighted the importance of rural non-farm activities (Kay, 2008) advocating the importance of livelihood diversification (Ellis, 2000). This study presents how favourable conditions can re-install agriculture at the centre of livelihood strategies (World Bank, 2008), with its challenges and limits, diminishing the precariousness that the multiple dimensions of livelihoods imply. Such precariousness is a consequence of the harsh and unstable social and working conditions that alternative-to-agriculture livelihood strategies entail and that involve the sale of peasants’ labour power (Akram Lodhi, 2008). In particular, wage labour and migration (emphasized as possible pathways out of poverty by the World Bank’s 2008 World Development Report) lead to precarious livelihood outcomes in the case study analysed, suggesting both the area of interest for further studies and policy measures to provide smallholders with equal chance to place agriculture at the core of their livelihood strategies.

### 3. Mexican agrarian change throughout the 20<sup>th</sup> century

This chapter gives attention to 1) the evolution of the land reforms in Mexico from 1917 to the 1990s with a specific focus on the *ejido* tenure system 2) the policy reforms carried out during the XX century in Mexico with respect to agriculture production 3) the legal and market water-related framework developed in Mexico throughout the XX century. All these three aspects have been central and interlinked within the Mexican smallholding agriculture sector throughout the last century. A historical explanation is intended to gain a better understanding of how Mexican policy arrived at the reforms undergone in the 80s and the 90s, fundamental events to fully grasp the dynamics occurring in the case study reported. Before starting this historical overview, table 3.1 summarises the main Mexican agrarian reforms discussed in detail throughout the chapter.

**Table 3.1 Main Mexican agrarian reforms of the XX<sup>th</sup> Century**

Year(s)	Reform(s)	Reforms objectives and consequences
1917	<ul style="list-style-type: none"> <li>Promulgation of the national constitution</li> </ul>	Land and water resources belong to the nation. Establishment of the <i>ejido</i> land tenure to redistribute land to landless peasants. This land is communal and cannot be sold.
1930s	<ul style="list-style-type: none"> <li>Land redistribution plan</li> </ul>	Especially under Cárdenas administration (1934-1940), large land re-distribution plan. About 20 million ha's redistributed among some 800.000 peasants.
1940s-70s	<ul style="list-style-type: none"> <li>ISI strategy</li> </ul>	Large state involvement in the domestic economy through an import substitution industrialisation strategy. Agriculture <i>functional dualism</i> between a commercial agriculture and a large and highly subsidised semi-subsistence sector.
1980s-90s	<ul style="list-style-type: none"> <li>Standards Adjustment Policies (SAP)</li> </ul>	Reduction of state involvement in the national economy. Privatisation of FERTIMEX (1992), liquidation of CONASUPO (1999), re-structuration plan of BANRURAL (dismantled in 2003).
1986	<ul style="list-style-type: none"> <li>Mexico joins GATT</li> </ul>	Mexico opens its economy to market liberalisation and free trade. Maximum tariff rate is reduced from 100% in 1982 to 20% in 1988.
1992	<ul style="list-style-type: none"> <li>Constitutional modification</li> <li>PROCEDE</li> <li><i>Dominio Pleno</i></li> <li>New Federal Water Law</li> <li>Reform of the electricity sector</li> </ul>	<p>Reform of the <i>ejido</i> structure. <i>Ejido</i> land plots are certified in the land registry PROCEDE. The <i>ejido</i>'s assembly can allow the privatization of <i>ejidatarios</i>' parcels (<i>dominio pleno</i>) that can now be sold;</p> <p>Decentralisation of water management, registration of land concessions and creation of a water concessions market;</p> <p>Private capital can enter the electricity production sector. Only the state-owned CFE can buy and distribute electricity.</p>

1993	<ul style="list-style-type: none"> <li>• Launch of PROCAMPO</li> </ul>	A direct income transfer to staple producers, granted by the agriculture agency ASERCA, established in 1991. Supposed to be eliminated in 2008, it is still granted as PROAGRO PRODUCTIVO.
1994	<ul style="list-style-type: none"> <li>• Canada, U.S.A. and Mexico start NAFTA implementation</li> </ul>	Signed in 1992, NAFTA aims to liberalise the trade between the signatory countries. Transition period 1994-2008 to remove agriculture tariffs. Millions of family farmers are displaced, migration from Mexico to the U.S.A. increase.

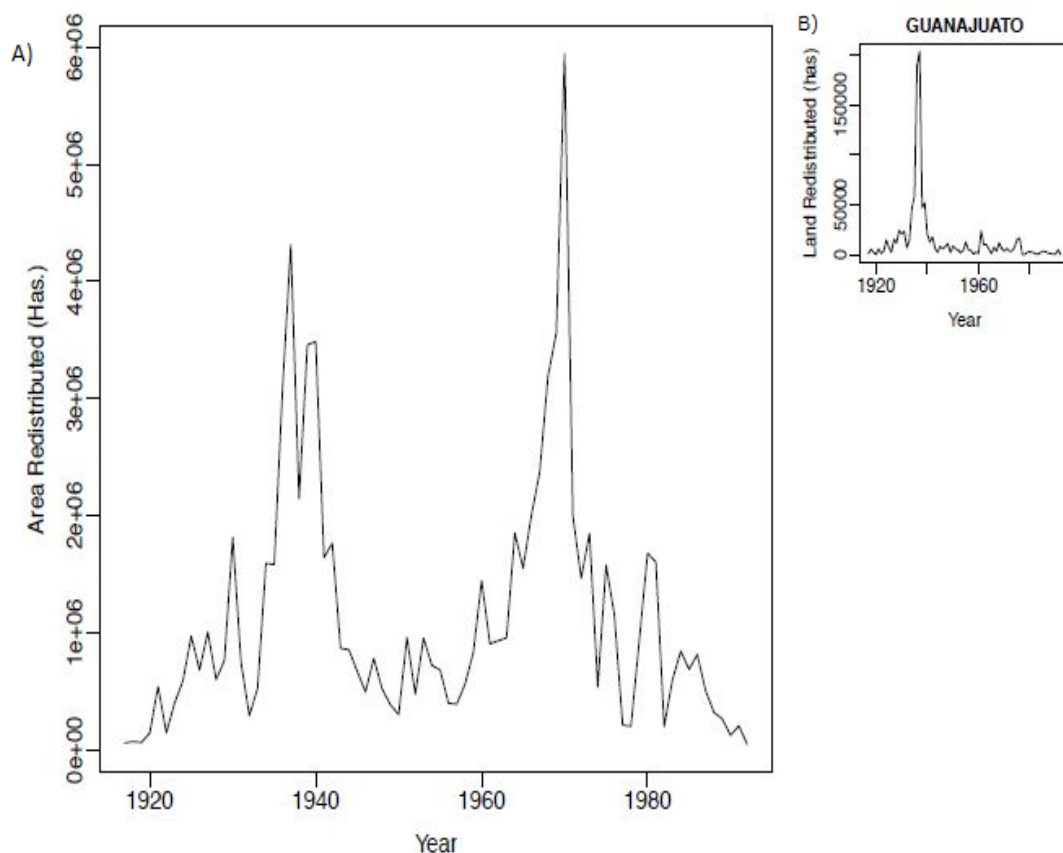
### 3.1 Land reforms and the *ejido* tenure system

Since the Spanish conquest, access to land in Mexico has been a matter of inequality. In fact, land ownership concentrated in the hands of few large landowners (*hacendados*) and only during the XX century land has been subject of re-distribution plans. Thus, before, during and after the Mexican revolution (1910-1917) that overturned the dictatorship of Porfirio Diaz, land redistribution from large-holdings owners to landless peasants played a compelling role in the political landscape of the country (Assies, 2008; Perramond, 2008; Rodriguez, 2011). On the eve of the revolution, in fact, the *hacendados* represented only 0.2% of the landowners while owning 86.9% of the land. At the same time, smallholders and *comuneros* (smallholders owning communal land) had in their hands 5.7% of Mexican lands representing the 7.2% of the rural population (Assies, 2008). Hence, the majority of the rural population consisted of sharecroppers and indentured labourers within the *haciendas* (Ibid., Rodriguez, 2011).

In the aftermath of the revolution, article 27 of the new Mexican constitution promulgated in 1917 stipulated that the state is the owner of all land resources and, consequently, becomes the authority in charge of conceding land use rights to private parties, communities who had no access to land resources, and *hacienda* workers who requested the land (Assies, 2008). Providing land to the last group attempted to achieve several goals. By redistributing the land, it would have ended – or at least limit - an agriculture system based on capital accumulation of agro-exports oriented large estates characterised by exploitation of workers with increasing debts and often forced to live on credit within the *hacienda* tenures (Rodriguez, 2011). Moreover, it wanted to establish and strengthen rural communities, named *ejido*, based on communal, inalienable, usufruct and inheritance rights. Since that time, the *ejido*, “[...]viewed as a permanent institution that was considered genuinely Mexican and neither socialist nor capitalist” (Assies, 2008: 42), started to be a very important component of the Mexican smallholding land tenure system. An inhabitant of an *ejido* can either be entitled to a parcel (*ejidatario*), entitled to use a plot through the acquisition of the right on it (*posesionario*) or can simply live within the borders of the *ejido* (*avecindado*). An *avecindado* could, however, be involved in agriculture activities by informal agreements to rent land and/or by owning livestock.

Despite these premises, redistribution processes were not really enforced in the first years, as shown in figure 3.1. The possibility of demanding land to form a community was introduced only in 1930 through the implementation of article 27 (Rodriguez, 2011). Therefore, until the presidency of

Lázaro Cárdenas (1934-1940), no large land redistribution plan took place. During his *sexenio*, about 800,000 landless farmers benefitted from the reallocation of more than 20 million hectares (Ibid). A second boom of re-distribution occurred in the 1970s.



**Figure 3.1. A) Land redistribution in Mexico 1917 - 1992. B) Land redistribution in the state of Guanajuato 1917 - 1992. Source: Albertus et al. (2015)**

Today, there are 28,058 *ejido* in Mexico (Key et al., 1998) corresponding to about half of Mexico arable land (Massink, 2016). In 27,049 of the *ejido* land is parcelled for agriculture purposes (INEGI, 2007).<sup>4</sup>

A constitutional reform led in 1992 formalised the nationally accepted idea that the communal *ejido* sector was economically inefficient (Rodriguez, 2011). President Salinas (1988-1994), in fact, seized the opportunity to introduce a privatization-based smallholding system based on market principles perfectly in line with the neoliberal turn of the country (see next sub-section). The preamble of the new Agrarian Law that produced a modification of article 27, in fact, states “the limits of small properties shall be maintained, but the productive limitations shall be overcome through partnerships that create economies of scale. Therefore, impediments to the creation of commercial companies shall be removed to grant producers the ability to join together in response to market conditions” (1992 Agrarian Law, in Robles, 2012: 535). The new law promulgated by Salinas’ administration started the *Programa de Certificación de Derecho Ejidales y Titulación de Solares* (PROCEDE), a land rights certification process aimed at creating a public registry of the land concessions within the *ejido* sector. Moreover, the implementation of PROCEDE intended to

<sup>4</sup>[http://www.inegi.org.mx/est/contenidos/espanol/proyectos/metadatos/censos/CE\\_152.asp?s=est&c=17544&e=24](http://www.inegi.org.mx/est/contenidos/espanol/proyectos/metadatos/censos/CE_152.asp?s=est&c=17544&e=24) (accessed on 13.12.2017)

guarantee on paper the right of working the land to its users. By adopting PROCEDURE, each land parcel can now be sold, rented, sharecropped and mortgaged with the sale to outsiders of the *ejido* requiring approval by two-thirds of the *ejido* assembly (Assies 2008). Besides, *ejidatarios* can organise themselves to maximise economies of scale (Ibid.) entailing the opportunity of new production organisations (Perramond, 2008). It has been recorded indeed that the number of *ejido* involved in some forms of economic organisations increased between 1991 and 2007 while the indices regarding the presence of equipment and infrastructures decreased (Robles, 2012). Finally, doors were also opened to foreign capital as long as they do not own more than 49% of the *ejido* land.

Another relevant point of the reforms is that the government can no longer remove the land right of an *ejidatario* who does not work on the land because of, for instance, migration. As a consequence of this regulation, and because of the uncertain and difficult socio-economic environment, migration to the U.S.A. increased during the 1980s and 90s. Not surprisingly, remittances reaching Mexico from the U.S. have increased from 3.7\$ billion in 1995 to 23\$ billion by 2006 (Fox and Bada, 2008). Guanajuato is the third recipient of remittances across the country (Caballero, 2017) while being one of the main agro-export states of Mexico. These mobilities of both commodities and people make the observation of the dynamics that occurred and are occurring in this part of central Mexico very relevant.

Finally, the new law promoted also the programme *dominio pleno*. If the *ejido* approves this programme, each *ejidatario* can privatise their plot. The *ejido* dissolves when more than 80% of the *ejidatarios* privatise their plots (Nuijten, 2003; Assies, 2008). Based on the idea that restriction on land circulation impedes production modernisation, PROCEDURE and *dominio pleno* were intended to create a land market system that could lead to the reduction or elimination of the Mexican communal land system in favour of the agro-export sector (Robles, 2012; Barnes, 2014). While high participation into the PROCEDURE programme [78,4% of the national *ejido*'s surface, (RAN, 2006<sup>5</sup>)], very low participation into *dominio pleno* is recorded (Nuijten, 2003; Robles, 2012). In Guanajuato, 81,1 % of the land is certified under the PROCEDURE programme, whereas only 1,8% of the total *ejido*'s surface is under the *dominio pleno* scheme, a system that has been mostly adopted in the north of the country where larger sales rates and foreign investments presences are recorded (Robles, 2012). According to the National Institute of Statistics and Geography (INEGI), land sales occurred in two out of three *ejido* (INEGI in Robles, 2012). Yet, this regards only 2,9% of the 105 million hectares of *ejido*'s surface and the majority of the land transactions (82,4%) occurred within members of the *ejidos* (Robles, 2012). Scholars debate whether land concentration dynamics occurred in Mexico shall be labelled under the land grabbing folder (Saturnino et al., 2012) or not (Robles, 2012). Yet, it is widely accepted that forms of land control occurs especially through land rentals (Tetreault, 2010) and through “a very high concentration and foreignization of the agricultural value chain” (García, 2017: 12) instead of a concentration of land *per se*.

Within which broader agrarian reforms were the land policies just described implemented? The next sub-section will try to answer this question.

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<sup>5</sup> Retrieved from <https://www.gob.mx/pa>. (Accessed on 16.04.2018)



### 3.2 Mexican agrarian reforms during the 20<sup>th</sup> century

This first and large land re-distribution plan took place while the agro-export enterprises suffered the 1929 depression. Many *ejidos* were formed by the expropriation of land large-scale plantations in order to reduce the production of commercial crops such as coffee and cotton while favouring the productivity of crops for the national market (Assies, 2008). Hence, the new-established *ejidos* were supported with technical assistance, credit, input supply and other social services such as education and health facilities (Ibid.). By 1940, *ejido* land represented the 22.5% of the agricultural land and 47.4% of the arable land (Ibid.).

Despite the *Cardenismo* (Lázaro Cárdenas del Río served as president of Mexico between 1934 and 1940) era, the attention to providing smallholders with access to land and technical resources was not accompanied, in the following decades, by an attempt to include the communal lands into the agro-modernization process that Mexico started in the 40s. The state-led import substitution industrialization (ISI) economic development paradigm conducted between the 1940s and 70s aimed at supporting the exports-oriented industries while discouraging the importation of foreign products. With respect to the agriculture sector, the promotion of vegetable and fruit products such as broccoli, tomatoes and strawberries was associated with the application of new technologies, pesticides and fertilizers (Rodriguez, 2011). These inputs were not affordable for the Mexican peasantry given the capital-intensive agricultural development programme during the “Green Revolution” from which the agribusiness sector took advantage (Sonnenfeld, 1992). Rather than trying to involve the *ejido* sector in these commodities chains, this agriculture policy framework entailed a system of staple crops production, guaranteed prices and highly subsidised communal rural economy. Moreover, during the 1950s and 1960s, expropriations halted, increasing the concentration of land ownership in the hands of a modernised private sector which could benefit from large public investment in irrigation projects (Assies, 2008). Thus, the *ejido* sector could not move from semi-subsistence production to market-oriented production one. Some authors indeed argue that the Mexican rural land policy has never looked at the *ejido* in terms of economic opportunity but, instead, as both a source of cheap labour for the commercial agricultural and non-agricultural sectors and as a supplier of low cost food (Stavenhagen in Rodriguez, 2011; Assies, 2008). Furthermore, it has been noted that land redistribution (see figure 3.1) represented a federal government strategy meant to control social unrest while keeping its power across the country, especially during the Díaz-Ordaz administration [1964-1970 (Roriguez, 2011)].

During the 1970s, Mexico faced a risk of political instability given the unrest in rural areas as response to two decades of policies in favour of the agriculture private sector. Thus, land distribution policies got enforced as showed in figure 3.1. The New Federal Agrarian Law (1971) was meant to strengthen the control of the state on the *ejidos* and agrarian communities and to satisfy the demand for land from the rural population (Assies, 2008). The simultaneous discovery of oil and gas deposits allowed the enforcement of the programme *Sistema Alimentario Mexicano* (SAM) oriented to the “middle poor” and to regain food self-sufficiency through supporting peasantry production (Ibid.). This process in favour of the smallholding sector halted during the *sexenio* (1976-82) of José Lopez Portillo due to the pressure of the business sector (Ibid). By that time, the peasants – defined as farmers who work less than 25 wage days of labour per year – accounted for 86.6% of total producers controlling 57% of the arable land (Ibid.). 56% of the peasants were subsistence producers (Ibid.). On the other side, capitalist producers – employing

more than 500 wage days of labour annually – constituted 2% of total agricultural producers, owning 21% of the arable land (Ibid.). In between, “transitional producers” mainly relied on unpaid family labour.

To sum up, the Mexican agriculture political paradigm, before and during the “modernization era” (1940-80), has favoured a dual system. This has, on the one hand, guaranteed the participation of the agriculture sector into the Mexican economic growth that principally fostered the incomes of the urban middle class, large industrialists and commercial agriculture producers. On the other hand, the poorest 10% of the population – mostly made of rural labourers - suffered from a stagnation of their incomes (Latapí and de la Rocha, 1995). As such, this double channel approach led Mexico to achieve unprecedented production rates of (cheap) food through the alliance between large landholders, the industry and international institutions at the expenses of the smallholding sector that provided the private producers with cheap labour. This closes the circle of what de Janvry has defined *functional dualism*, “the integration through the labour market of a commercial agriculture and a large non-capitalist subsistence sector” (de Janvry, 1981: 215). Yet, rurality cannot be simply distinguished between a modern and a peasant sector, given the structural differences acknowledged in the latter (Jansen, 2000). With respect to Mexico, for example, it is estimated that only 3% of the *ejidos* were involved in the production of fruit and vegetables in 2000 (Nock, 2000) confirming that only a little part of the smallholding sector could place itself among the more competitive farmers within the global commercialisation chains. It is important to underline these aspects before showing how the evolution of Mexican agrarian reforms will bring, between the 1980s and 90s, to the dismantlement of the institution in charge of supporting the livelihoods of the peasantry.

The ISI strategy did not give proof of sustainability. A conjuncture of events made the Mexican economy collapse at the dawn of the 80s, starting a process that shifted the country from a state-led economy to a market-oriented one in the years in which the neoliberal paradigm proliferated worldwide. The “Lost Decade”, the denomination of the economic crisis that Latin America faced during the 1980s, started to become reality in Mexico in 1982 when a debt crisis highly affected the economy of the country (Latapí and de la Rocha, 1995). The simultaneous global oil crisis due to a price decrease – of which revenues had allowed the central state to keep a smallholding subsidised agriculture sector while supporting the commercial one in the 60s and 70s - worsened the situation in a country that lost its food self-sufficiency as staple food imports exceeded the exports from 1979 to 1985 (Barkin, 1987). The economic boom witnessed between the 1950s and 1970s reached its end with an inflation that peaked at 159% in 1987, several devaluations of the peso, and with heavy cuts in public social expenditure (Latapí and de la Rocha, 1995). As counter response, Mexico started to open its economy to the international markets so that imports started to have a major impact on domestic market while Mexican exports were scarce (Ibid.) By joining the General Agreement on Tariffs and Trade (GATT) in 1986, the government started the process to reduce the trade barriers – tariffs and quotas - the country had. This process culminated into the North America Free Trade Agreement (NAFTA) signed with the United States of America and Canada in 1992 and implemented from 1994 onwards. This agreement had a massive impact on Mexican agriculture sector. It aimed to remove agriculture tariffs between the signatory countries in order to ease trade flows between them. So, it highly affected agriculture production trends, wages and employment rates. Given the higher U.S.A. productivity, many Mexican family farms could not compete with U.S.A. production. About 4.9 million family farmers were displaced, 3 million of which were re-distributed in the seasonal and expanding agro-export industry (Weisbrot et al., 2017). Between

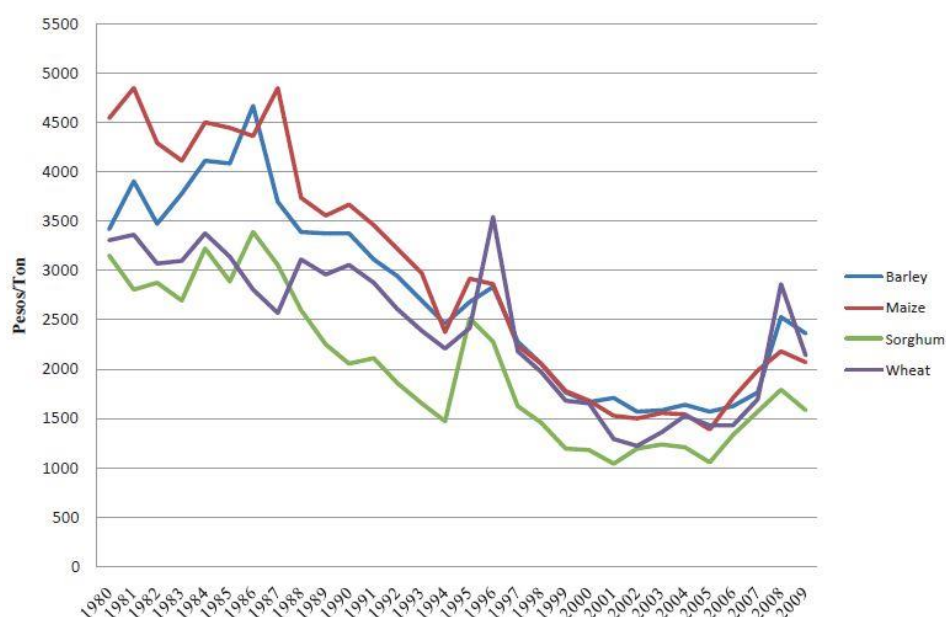
1991 and 2007, the remunerated jobs increased by 123% but the permanent positions in the sector witnessed a slight decrease (-1%) while the seasonal (less than 6 months) occupation increased drastically (151%), revealing an increase of unstable living conditions for agriculture sector workers (Scott, 2010). Primary sector real wages declined by 2.2% annually in the period 1989-1994 before a collapse (-12.2%) in 1995-1996 and a steady low increase (1.4%) between 1997 and 2007 (Ibid.). Yet, in the period 1993-2004 agriculture real wages were 40% lower than the national average (Tetreault, 2010).

Mexico's weak economic growth coupled with the displacement of million family farmers are considered to be two of the main reasons that made migration from Mexico to the U.S.A. increase by 79% between 1994 and 2000 (Weisbrot et al., 2017).

While the role of the international market started to play a major role, domestic government policies turned towards the reduction of state involvement in the national economy by adopting Structural Adjustments Policies (SAP). With respect to agriculture, such policies regarded the institutions that had previously sustained the rural economy by shaping food production, consumption, incomes, input and credit provision (Naylor et al., 2001; Yunez-Naude, 2003). The privatisation of FERTIMEX, the Mexican Fertilizer Company, in 1992, implied the end of subsidised fertilizer provision (Massink, 2016; Naylor et al., 2001). BANRURAL (the National Rural Credit Bank), entered into a re-structuration plan that made reduce its number of *ejido* beneficiaries from 1 million to 500,000 (Naylor et al., 2001) before its full elimination in 2003. Finally, the liquidation of the Parastatal and State Trading Enterprise (STE) CONASUPO (National Company of Popular Subsistence) in 1999 represented the end of the organisation in charge of regulating the markets of staples and protect both low-income consumers and producers through measures directed to increase the purchasing power of the consumers and the income of small producers (Yunez-Naude, 2003). Until its dismantlement, CONASUPO itself used to buy a large part of basic grains production. In 1993 and 1994 it still bought some 45% of the maize production of the country, compared to just 12.5 in 1998 (Yunez-Naude, 2002). Yet, maize production rates increased in the following years (de Janvry et al., 1995 and Yunez-Naude, 2009). Higher production rates are explained by the need for many rural households to produce more for self-consumption rather than for economic purposes. This strengthens the concern that rather than prices fluctuations, smallholders were affected especially by the rural market disruption (Dube et al., 2016).

In order to counterbalance the implications of the new tariffs and quotas system introduced by the economic international agreements and the institutional setting change, some measures were adopted. The major consequence of the trade opening, from a smallholding agriculture point of view, was the expected drop of maize prices given the higher competitiveness of U.S.A. farmers coupled with the end of the subsidising prices programmes (Assies, 2008). Figure 3.2 shows the trend of basic grains real prices between 1980 and 2009.





**Figure 3.2 Producer real prices of selected crops, 1980-2009 (source: Yunez-Naude, 2015)**

Since NAFTA, corn and wheat exports from the U.S.A. to Mexico increased by 240% and 182% respectively. On the other side, Mexican vegetable production for the U.S.A. market increased by 80% (Wilder, 2006). Mexico mainly exports non-strategic products such as fruit, vegetable, beer and tequila while it imports basic grain products (maize, rice, soya). The consequent trade deficit is mainly affected by the imports of production domestically consumed. In 2004, the agriculture trade deficit was equal to 3,435\$ million despite the fact that exports more than doubled between 1994 and 2003 (Ibid.). At the same time, agricultural imports in 2005 represented 40% of the whole food national consumption (García, 2017).

If vegetables are generally produced by large commercial farms and grains mainly by *ejidatarios*, the smallholding sector was highly affected by the opening to U.S.A. grains imports. Therefore, a price compensation was needed for the smallholding sector. Through the creation, in 1991, of the agency ASERCA (Support Services for Agricultural Marketing), the provision of a direct income transfer to compensate the elimination of crop prices support was set up. Hence, in 1993, the government launched PROCAMPO (Programme for the Direct Support to the Rural Area). Initially, it consisted of a direct payment system for the producers of nine crops, including maize and beans, allocated according to the land size ownership, the irrigation capacity of the farmers, and the agriculture production purpose. Table 3.2<sup>6</sup> summarises the 2017 conditions to receive PROCAMPO, now named Proagro Productivo.

<sup>6</sup> Information available at:

[http://www.sagarpa.gob.mx/ProgramasSAGARPA/2017/fomento%20agricultura/proagro\\_productivo/Paginas/Conceptos\\_de\\_apoyo.aspx](http://www.sagarpa.gob.mx/ProgramasSAGARPA/2017/fomento%20agricultura/proagro_productivo/Paginas/Conceptos_de_apoyo.aspx) (last access on 21.04.2018).

**Table 3.2 Proagro Productivo 2017 conditions and transfer values**

Type of producer	Rainfed-based agriculture surface (ha's)	Income transfer value (MXN)	Irrigation-based agriculture surface (ha)	Income transfer value (MXN)
Self-consumption	$\leq 3$	1300 (70\$)	$\leq 0.2$ ha's	1300
	$3 < \text{ha's} \leq 5$	1500 (80\$)		
Transition*	$5 < \text{ha's} \leq 20$	750 (40\$)	$0.2 < \text{ha's} \leq 5$	750
Commercial	$20 < \text{ha's} \leq 50$	450 (24\$)	$5 < \text{ha's} \leq 12.5$	450
	$> 50$	180 (10\$)	$> 12.5$	180
*The “transition producer” is supposed to be a semi-subsistence producer.				

While PROCAMPO was intended to allow farmers to afford investments aimed at the market economy, the outcome turned out to be different as the direct payment was a sufficient instrument to keep farmers work their land but generally not sufficient to make market transitions (Rodriguez, 2011). Originally, PROCAMPO was meant as a 15 years measure to balance the counter implications of the NAFTA agreement, fully enforced by 2008. However, Mexican farmers still receive it regardless of which crops are sown in the fields.

While the public sector made this expenditure effort, access to credit started to largely be a matter of the private sphere. Public credit to agriculture in the period 1984-90 used to represent, on average, 54.80% of the credit to the sector. In the period 1996 – 2000, this percentage halved while private credit reached the 75% of the credit distribution to the primary sector (Yunez-Naude, 2002). Moreover, the public investment in the agriculture sector represented the 16.4% (annual average) of the total public investment in the period 1977-82 while it was only the 5.8% in 1991-96 (Rodriguez-Oreggia, E., 2004). Moreover, Scott (2010) shows how the relation between rural public supports (decreased by 60% between 1980 and 2008) and agriculture activity is weak due to an unfair distribution of subsidies from which the northern richer agriculture states benefit the most. The removal of the public credit providers and the simultaneous opening of the *ejido* sector to land market dynamics through the PROCEDE and *dominio pleno* projects meant that *ejidatarios* either started to organise themselves to enter the agro-exports markets or would have to diversify their livelihoods.

Besides land and socio-economic resources, a fundamental resource to be commercially productive is water due to its importance to irrigate the land. Next sub-section discusses the main water reforms carried out during the last century. Particular attention is given to groundwater given its relevance in the case study selected.

### 3.3 Groundwater reforms

Like land resources, water ones have been always at the core of the agrarian reforms presented above given the intrinsic relation between the two elements. It is important to be aware of how water has been involved in the Mexican agrarian landscape during the last century as access to this crucial resource depends on the land tenure arrangements within the *ejido* (Massink, 2016). Already

in 1910, the Water Law (*Ley de Agua*) states that all water are public property for common use (Hoogesteger and Wester, 2017). According to the constitution emanated in 1917, water belongs to the nation. Therefore, the central government became the authority in charge of distributing it to the users across the country. The permit to exploit the water underlying the land a user was entitled to, made increase the pressure on groundwater resources, urging its regulation (Ibid.).

In this thesis, attention is given to groundwater resources. In 1945 the Federal Government modified article 27 of the constitution stating that the state can regulate the extraction and utilization of groundwater for public interests. The rise of tube well technologies and the simultaneous increase of groundwater demand made the Federal Government introduce the bans (*veda*) to new drilling actions in overexploited areas (*area de veda*) in 1972, when the Federal Water Law was promoted. Groundwater depletion is indeed a compelling issue in many Mexican states, among which Guanajuato. Here, given the scarcity of this resource in a semi-arid region that wants to become “the refrigerator of the whole country”<sup>7</sup> through – also - the exploitation of groundwater, a major source of irrigation water in the state (Wester, 2008), the depletion is the result of the increase in groundwater irrigation from around 24,000 hectares in 1960 to around 250,000 hectares in the 1990s (Wester et al., 2011) while the total expansion of irrigated area reached 798,000 hectares in 2000 (Hoogesteger, 2004). Despite the whole state of Guanajuato is under a full strict *veda* since 1983, the exploitation of this resource does not seem to diminish (Wester, 2008; Hoogesteger and Wester, 2017). Several studies, in fact, report that the number of wells across Guanajuato increased despite the ban initiatives undertaken since the 1940s (Marañón, 1999; Hoogesteger, 2004; WB, 2004;). By the end of the 1990s, more than 17.000 wells were counted in Guanajuato, the state with the highest number of wells in the whole country [about 25% of the national total (Marañón, 1999)].

Later on, other relevant changes with respect to water use in Mexico occurred in 1992 when the presidency of Salinas promoted a new federal water law, *Ley de Aguas Nacionales* (LAN), three years after having announced the “birth of a new water culture” (Wilder, 2002: 13) based on the decentralisation of water management, the creation of a water market system and on the increase of users’ participation in water management (Ibid; Hearne and Trava, 1997). Moreover, similarly to the creation of the land public registry PROCEDE, the new LAN introduced the Public Register of Water Rights (REPDA) in order to provide the users with information about each concession, give legal validity of the concession and control and record the information for future water concession grants (Hearne and Trava, 1997). The concession determines the volume of water the user can benefit for per year for a given number of years (Hoogesteger and Wester, 2017). According to volume, the fee is calculated and every three months the users shall submit to CONAGUA the volumes extracted. However, this is often neglected despite a subsidy policy to promote installation of a water meter in each well (Ibid.). This is partly explained by the weak effectiveness of the established bureaucracy.

While maintaining the national property over water resources, CONAGUA (CNA, the National Water Commission created in 1989 as an independent agency within the Ministry of Environment) substituted the central government in assuming the role of water distribution to the users. The federal CNA would have received support from each Mexican state government through the

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<sup>7</sup> Words pronounced by the governor of Guanajuato Miguel Márquez Márquez. Retrieved from El Financiero. <http://www.elfinanciero.com.mx/bajo/agroindustria-de-exportacion-la-siguiente-apuesta-de-guanajuato.html> (Accessed on 19.12.2017)

creation of state water commissions. In Guanajuato, this occurred in 1991 with the creation of the Guanajuato State Water Commission (CEAG)(Hoogesteger, 2004). This decentralisation strategy was implemented also through the creation of the Aquifer Management Councils (COTAS) in 1995, to “stimulate the organised interaction of aquifer users with the aim to establish mutual agreements for controlling groundwater depletion” (Hoogester, 2004:56-57). Guanajuato has been among the first states to create this institution that is now present across the whole country, has received a constitutional recognition and can count on about 90 local commissions.

Finally, in line with the land reforms, the bureaucratic normative framework was, for the first time, accompanied by a new market normative framework (Hoogesteger and Wester, 2017). From now onwards, individual water concessions could be traded within the then-established water market aimed at optimising the use of water (Ibid). Nevertheless, formally it not allowed to pay for water concession (Reis, 2014). These new markets relations were introduced to provide the users with a legal instrument to obtain water concession in *veda* areas. Still, illegal wells could obtain the concessions if their antiquity was proved (Hoogesteger and Wester, 2017). If a concession is traded, whether partially or totally, the new user can exploit groundwater in any sector (agriculture, industrial, potable) as long as the well used is located within the same hydrologic system than before (Ibid.). In Guanajuato, as many wells are drying up, agricultures users are keen to sell their surpluses or concessions. In particular, smallholders sell concessions of dried out wells as they do not have enough capital to replace or deepen them (Ibid.).

Another pivotal market relation regarding groundwater regulation is electricity pricing as the majority of well are powered by it (Ibid.). A conflict that involves farmers, policy makers and the state-owned CFE finds its roots in the 1990s when electricity bills raised drastically and many smallholders could not keep their production profitable given the high electricity costs faced coupled with the diminishing role of the state in purchasing smallholders’ products. Table 3.3 shows how electricity prices started to steadily increase by the end of the 1980s. Yet, while core inflation was generally higher than energy inflation during the 1980s except for the years 1982, 1983 and 1986, since 1991 energy inflation is constantly higher than core inflation (OECD, 2018<sup>8</sup>).

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<sup>8</sup> Data available at: <https://data.oecd.org/price/inflation-cpi.htm> (last access on 23.04.2018).

**Table 3.3 Electricity prices MXN/Kwh for sector, 1980 -2006**

	Industrial	Agriculture	Domestic	Commercial and general use	Public service	Total
1980	0.0008	0.0004	0.0011	0.0012	0.0008	0.0008
1981	0.0010	0.0004	0.0014	0.0015	0.0009	0.0010
1982	0.0014	0.0004	0.0019	0.0021	0.0012	0.0014
1983	0.0022	0.0006	0.0028	0.0034	0.0019	0.0022
1984	0.0051	0.0019	0.0061	0.0076	0.0046	0.0052
1985	0.0080	0.0019	0.0088	0.0119	0.0073	0.0079
1986	0.0173	0.0035	0.0182	0.0267	0.0166	0.0141
1987	0.0381	0.0072	0.0325	0.0595	0.0377	0.0356
1988	0.0798	0.0220	0.0713	0.1499	0.0871	0.0806
1989	0.1021	0.0225	0.0819	0.2052	0.1263	0.1022
1990	0.1241	0.0316	0.1132	0.2596	0.1925	0.1316
1991	0.1561	0.0681	0.1525	0.3372	0.2469	0.1718
1992	0.1734	0.0989	0.1918	0.4103	0.3005	0.2055
1993	0.1749	0.1254	0.2009	0.4414	0.3260	0.2149
1994	0.1671	0.1276	0.2129	0.4695	0.3395	0.2157
1995	0.1982	0.1347	0.2523	0.6021	0.4155	0.2556
1996	0.2776	0.1676	0.3193	0.7599	0.5491	0.3322
1997	0.3607	0.1962	0.3752	0.9071	0.6512	0.4109
1998	0.3867	0.2260	0.4367	1.0317	0.8139	0.4606
1999	0.4387	0.2573	0.4927	1.1832	0.9316	0.5227
2000	0.5229	0.2868	0.5590	1.2603	1.0468	0.6021
2001	0.5346	0.3133	0.6074	1.3037	1.1305	0.6335
2002	0.5912	0.3358	0.7744	1.3776	1.2514	0.7215
2003	0.7253	0.3641	0.8459	1.6148	1.3405	0.8484
2004	0.8435	0.3925	0.8835	1.8676	1.4101	0.9548
2005	0.9215	0.4360	0.9201	2.0544	1.4802	1.0264
2006	1.0389	0.4439	0.9835	2.3158	1.5704	1.3790

Source: *El Sector Eléctrico en México, 1980-2006*, Public Finance Study Centre (CEFP) of the Mexican Chamber of Deputies, data from CFE<sup>9</sup>

In 1992 Mexico implemented a reform of the electrical industry. On the one hand, this ended a national monopoly in the sector by allowing private capital to enter the electricity production sector. On the other end, it created a monopsony as CFE is the only buyer allowed to buy electricity from the new private producers and, at the same time, maintained the distribution sector monopolistic regime (Vargas, 2016). Today, electricity used for agriculture purposes is priced with the tariff 9 and its variation 9M, 9N, 9CU. Tariff 9M regards groundwater consumption and each user has an established Annual Energy Limit (AEL) in kWh/year per well. If the AEL is surpassed, the users will pay 9 and 9M tariffs which are higher (Hoogesteger and Wester, 2017). However, the application of these fares is often not effective and CFE does not manage to bill the payments. In Guanajuato, many farmers joined the *Comité Pro-Mejoramiento del Agro Nacional Guanajuatense* (CPANG), a national movement that demands lower electricity fares in the agriculture sector. This strengthens the claims made by the farmers while it weakens the CFE which is unable to intervene. In fact, if their inspectors disconnect the electricity grids, farmers easily reconnect them. As many farmers' electricity bills debts are often higher than their production value, the federal government has conceded partial amnesties to reduce the debts while collecting part of the credits. Yet, a common practice reported by Hoogesteger and Wester (2017) is the negotiation between users and CFE to agree on a fixed amount of fare to be paid monthly despite the real consumption of

<sup>9</sup> Available at: <http://www.cefp.gob.mx/intr/edocumentos/pdf/cefp/cefp0732006.pdf> (Last access on 18.04.2018)

electricity to use groundwater. This creates a situation in which farmers owning deeper wells and consumer electricity can face lower costs than those actually using less groundwater. Thus, the regulation of groundwater fails to tackle its main objective.

Land, agricultural policy and water reforms are fundamental facets of the Mexican agrarian change. Presenting these aspects help in understanding the dynamics occurring in *Jesús María la Petaca* that are discussed in the following chapters.



## 4. Access to land and water in *Jesús María la Petaca*

Access to land and water in *Jesús María la Petaca* is highly embedded with the Mexican historical pattern described in the previous chapter. The development paradigm in which land, agrarian and water reforms were inserted into affected the access to land and water resources, entailing different agriculture production and livelihood trajectories that will be discussed in chapter 5 and 6.

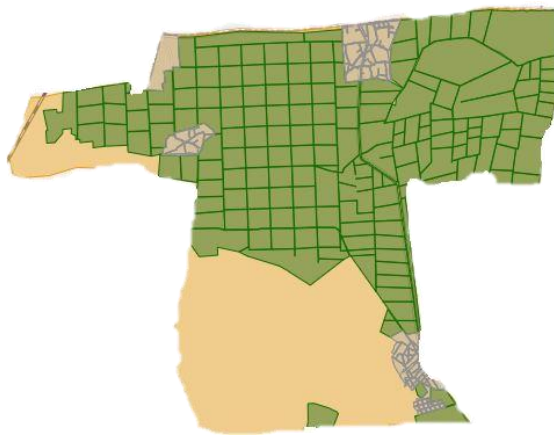
### 4.1 Access to land before the implementation of PROCEDE

The enclosure of the lands now belonging to the *ejido* finds its origins in the 16<sup>th</sup> century when the *hacienda La Petaca* was established with the approval of the Viceroy of New Spain. The *hacienda* did not escape the clashing relations between its landlords and its workers described in chapter 3. The Mexican turmoil of the first part of the XX century did not abstain from the state of Guanajuato. The peak of land redistribution plan occurred in the 1930s in Guanajuato, the decade in which the *ejido Jesús María la Petaca* started to be formed. Given its large surface, 3,187 hectares compared to a national average of about 2000 (Assies, 2008), the original 125 *ejidatarios* who claimed land plots, received 11 hectares each [higher than the national average of 8.8 (De Ita, 2006)]. Yet, distribution varied heavily across each federal state and little more than half of the *ejidatarios* possessed less than 5 hectares at national level (Assies, 2008; Ibid.). Besides the land assigned for mere production purposes, each *ejidatario* could use common grazing land areas. Initially, these were several hilly surfaces and each community had close and free access to them.

Access to land changed in two precise moments that reflect the different political economy approaches undergone by the federal government throughout the last century. Firstly, the government financed the clearing of some natural vegetation in the eastern part of the *ejido* during the 1960s. The clearing of this area meant the creation of new land plots to be used for agriculture purposes. No well was installed in the *ejido* at that time yet, though. As agriculture was still rainfed-based, the enlargement of land possessions across the *ejidatarios* did not set up the conditions to move from the production of traditional crops like maize, beans and wheat to grow alfalfa for cattle feed nor NTCs export-oriented. The new parcels were thus equally distributed among the *ejidatarios*, which received four hectares each. However, many households saw this as an opportunity to distribute their possessions within the family. Some land plots were directly donated by the government, through approval of the *ejido*'s assembly, to young people. This explains why the number of *ejidatarios* increased from the original 125 ones and the sizes of the parcels differ among them. Figure 4.1<sup>10</sup> gives an idea of the *ejido* land distribution. The map likely refers to the land parcels as allocated at the end of the clearing of natural vegetation process. In the central part of the map, the original plots can be observed. In the eastern part of the *ejido*, the new parcels present different sizes because of the land distribution process undergone after the dismantlement of this area. According to the RAN, the *ejido* has 162 *ejidatarios* and 53 *posesionarios* (informant no. 60).

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<sup>10</sup> Retrieved from: <http://www.ran.gob.mx/ran/index.php/sistemas-de-consulta/phina> (accessed on 6/02/2018)



**Figure 4.1 Map of the ejido. In green the land plots, in yellow the common grazing land, in grey the urban areas.**

**Source: Agrarian National Registry**

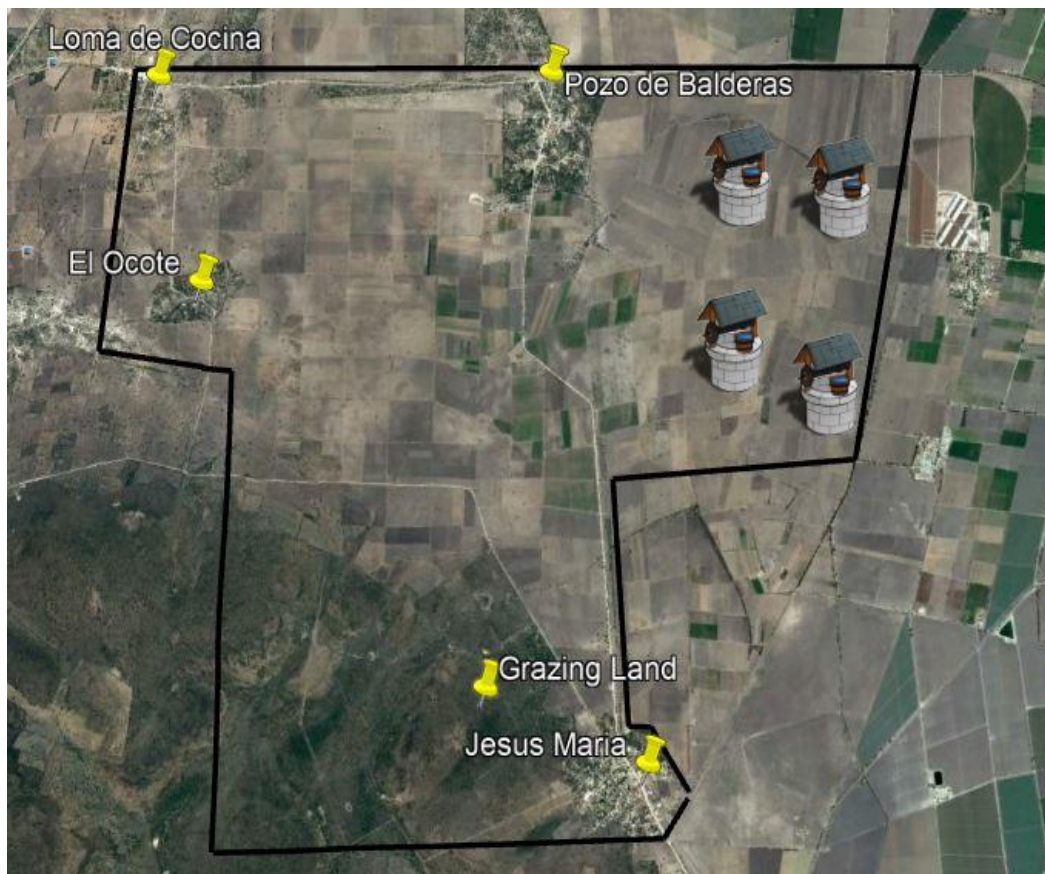
In order to understand how access to land modified after the implementation of the land reform PROCDE, it is first important to show how access to groundwater for agriculture purposes got shaped throughout the history of the *ejido*. By doing so, it becomes clearer how these resources are intertwined and how production practices change as consequence of accessing them.

#### **4.2 Access to groundwater in *Jesús María la Petaca*: a historical overview**

Access to water is a pivotal variable in times of agrarian change to ensure adequate livelihoods (Scott and Shah, 2004; Wilder, 2010). Mexican agrarian reforms presented in the previous chapter have greatly affected access to this fundamental resource and, by that, agriculture production in the *ejido*. Like for land resources, different historical phases have implied different access to water patterns. Importantly, access to water has been always gone hand in hand with access to land dynamics, affecting social differentiation over time.

First access to water for agriculture purposes, in fact, goes back to the clearing of natural vegetation plan by the government to make more hectares suitable for agriculture practices during the 1960s. At that time, the distribution of the land plots was led quite randomly because there were no concrete plans yet to dig wells in the area despite the idea of the government to provide each farmer with water for agriculture purposes. In *Jesús María la Petaca*, this idea took shape between the 1970s and 1980s. Four wells were dug in the eastern part of the *ejido* (see figure 4.2) with the idea of creating several groups of users that would have taken advantage of them. The involvement of the state in the investments for irrigation works find its origins in the *Plan Nacional de Obras de Pequeña Irrigación* (National Plan of Small Irrigation Works), launched in 1968 by the Mexican president Gustavo Díaz Ordaz.





**Figure 4.2. Map of the wells in Jesús María la Petaca at the dawn of the 1980s**

According to many informants, generally the sons of the original users, the wells represented not only the first way to exploit groundwater resources but also the first attempt to share production practices among the inhabitants of the *ejido*. In fact, the logic behind the state support was to provide access to groundwater to the farmers while increasing social cohesion through the creation of groups of users. However, not all the *ejidatarios* got access to water given the distance of their parcels from the wells. Moreover, some probably did not show willingness to join the groups given the fear the wells would have dried out and a low attitude to work jointly (informant no. 46). From the different talks conducted, around 60 *ejidatarios* formed four groups, probably made of 18, 17, 15 and 10 people respectively. The majority of them came from *Jesús María* and *Loma de Cocina*, a smaller part from *Pozo de Balderas* and *El Ocote* (informants no. 3, 18 and 24). It is difficult to establish how groups were created as I could not talk with people who were directly involved in it. In that period the representative roles of the *ejido* (the *ejido*'s commissioner, the authority of the assembly, and the delegates of each community) had a major role regarding the relations with the government (informant no. 4). *Jesús María* is still the place in which people from other communities need to go when the government officials deliver the cash transfer PROGRESA (now *Oportunidades*, a poverty alleviation instrument launched in 1997 by the Mexican government). Hence, stronger nets between people from *Jesús María* and *Loma de Cocina* might have favoured them, compared to the smallholders living in *El Ocote*, the most isolated and smallest community of the four, and *Pozo de Balderas*, of which the majority of farmers benefited from governments interventions later on.

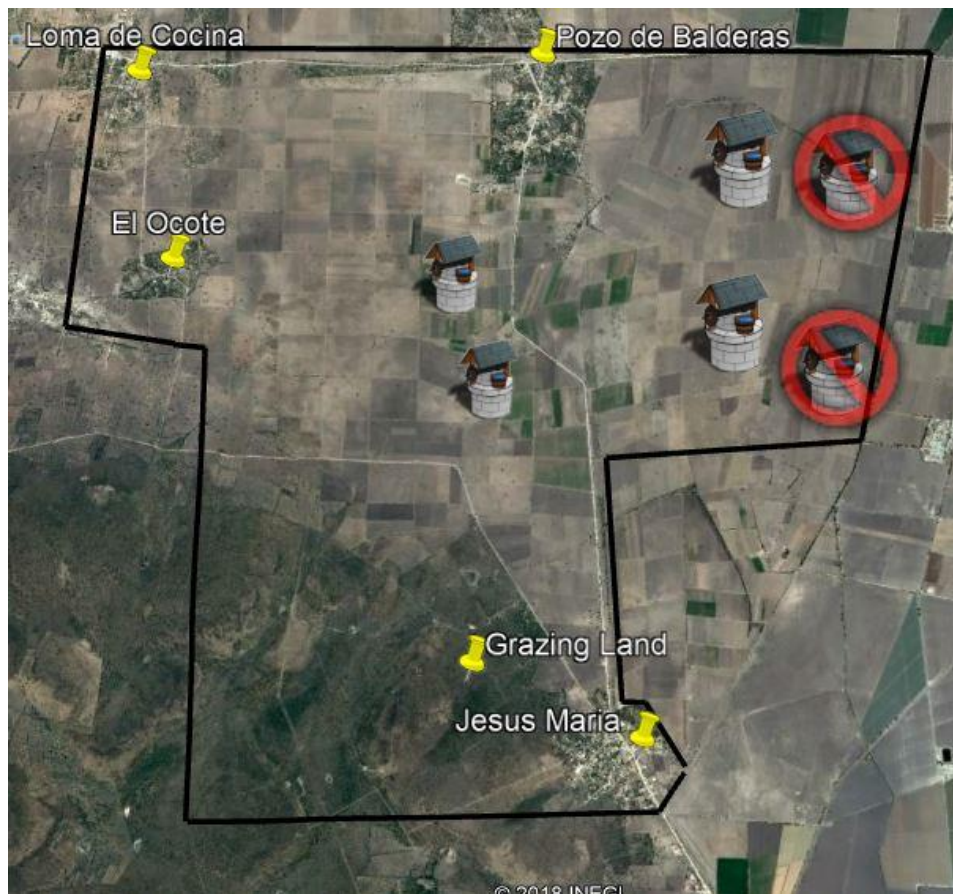
Unfortunately, obtaining precise information about the dynamics of these groups was not possible as the groups do not exist anymore for already many years and several users passed away. Yet,

some information was collected. In the surface around the wells, every user grew alfalfa. In the maize and bean seasons (*ciclo primavera – verano*, or spring - summer crop production cycle), many farmers managed to irrigate part of their fields in which these crops were located thank to the higher humidity of the rainy season. This guaranteed both enough self-subsistence production from the rainfed parcels and the chance to sell the surplus from the irrigated area. Depending on the different size of the groups, every farmer had the right to irrigate its plot every two weeks for approximately 15 hours. With this respect, poor information does not help in clarifying the irrigation practices. Likely, different diameter dimensions and engine capacities explain the different number of users per group and different irrigation shifts length. Monthly, buyers from the surroundings used to come there, cut and buy the bales of alfalfa obtained. Sales were done as a group. Its members would have then shared the revenues. Moreover, BANRURAL supported the acquisition of equipment, in particular of a tractor per group. Initially, production was worthy as already in the first years of the 1980s the users of the group had given back the money borrowed from the bank (informant no.4). To organise themselves and be represented in front of the institutions, each group used to have a representative, a *pocero*. However, every year a different user would have been appointed. This continuous shift probably explains why nobody knows what happened with the concessions of the wells. Given the digging ban, in fact, well concessions have a very high value today as they represent the only legal way to dig a new well in the same hydrological area. “I really would like to have the chance to ask my dad what happened to the well concession. It must exist but nobody never heard about it and many of us, the youths, used to spend some months of the year in the U.S.A., so we gave an help to our fathers but we were not involved in group decision processes nor in matters of the *ejido*. I was in the United States when they stopped working the well. It was the last well that still worked.” (informant no. 30).

The four wells did not last long. According to the different stories heard, two of them were not working anymore already by the end of the 1980s. While two wells stopped working, two more (wells number 5 and 8) were dug in the central part of the *ejido* (see figure 4.3 and 4.4) despite the ineffective digging ban previously mentioned. This fuelled the government plan to provide each farmer with irrigation capacity. The majority of the beneficiaries of these two belong to the community of *Pozo de Balderas*.



**Photo 1. Two of the four abandoned wells (photos by the author)**



**Figure 4.3. Map of the wells in Jesús María la Petaca at the dawn of the 1990s**

The other two in the eastern part worked some years more, one probably until 1993 and the last one until 1997. However, already in the last years, they were not giving much water because of groundwater drawdown, the reduction of the groundwater level that occurs when the extraction rate is higher than the natural recharge one.<sup>11</sup>

So, in the *ejido* groundwater could be exploited but the wells were not deep enough – likely, they already reached around 150 metres deep - so that interventions were needed. However, these never occurred. While the wells started to pump less water, in fact, Mexico was witnessing the beginning of the development paradigm shift, from an economy based on the state apparatus interventions to the opening to the markets. Different factors made the farmers very reluctant to invest in digging more. Agriculture prices were decreasing, access to credit and output market were limited and electricity prices started to increase as shown in chapter 3. On the contrary, private farmers outside the *ejido* sector – who usually get water from more powerful wells of 8 inches in diameter compared to 3 to 6 inches of the smallholders - do not lack the means to face the groundwater overexploitation issues by digging their wells deeper or by the acquisitions of water rights from other users. Furthermore, controls on the replacement, renewing and deepening wells are very poor (Hoogesteger and Wester, 2017). Access to groundwater becomes a matter of accessing financial means, technological improvements and legal capacity. With respect to a legal and political issue, it

<sup>11</sup> This situation is common in Guanajuato as consequence of the government-led massive investments into irrigation infrastructures in the 1960s and 70s. In 2002, more than 17,300 wells were counted in Guanajuato (Hoogesteger and Wester, 2017), of which about 84% of them are used for agriculture purposes. Moreover, between 1977 and 1994 the average depth of the wells in the state reached 150 metres with an estimated decrease of three meters per year of the groundwater level (Martínez-Yáñez, 2013).



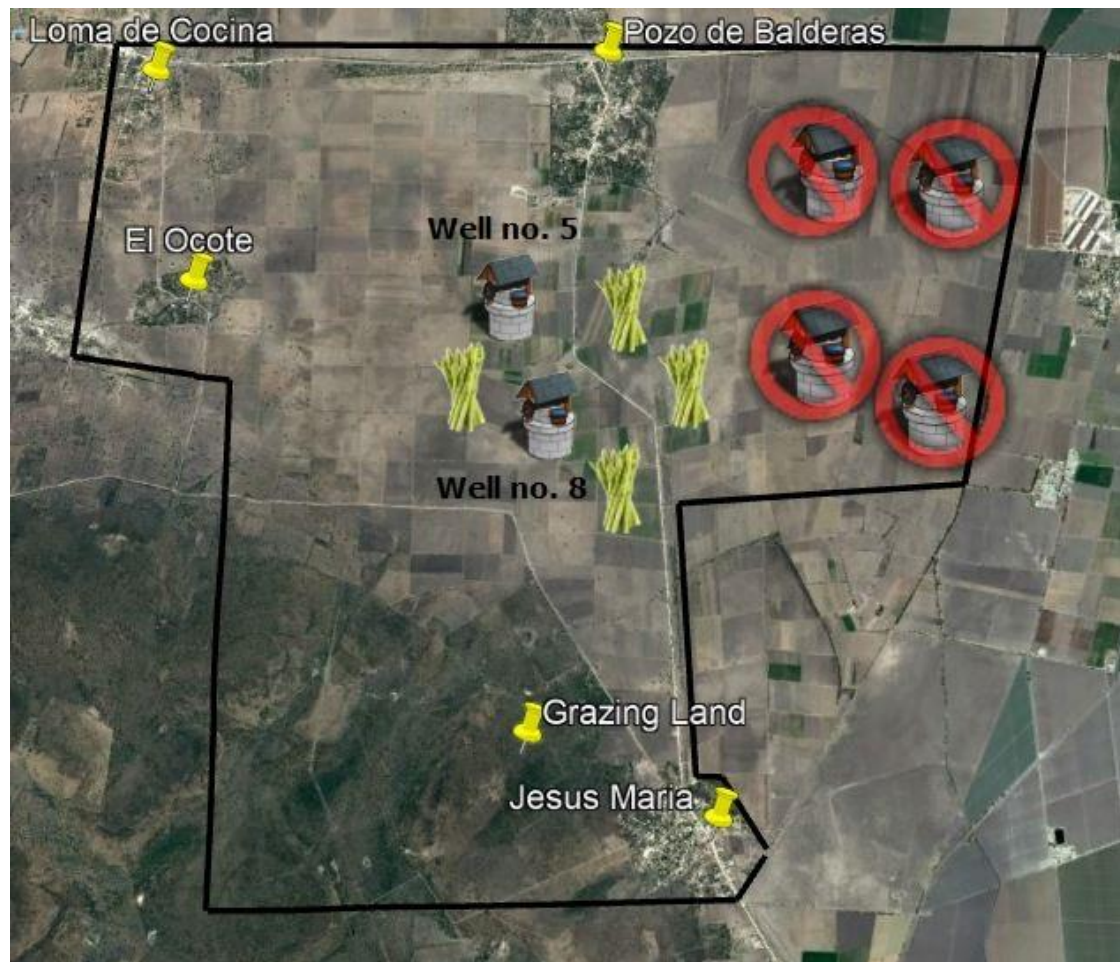
can insightful notifying that the assembly of the local COTAS is composed only by staff members and private producers, who gain benefit from this membership through a better knowledge of legislation changes, government supports and, generally, favourable channels regarding groundwater aspects that strengthen their socio-political influence and force on the sector.

The increase of electricity bills and the impossibility to pay them took also the shape of a conflict between the *ejidatarios* and the CFE as farmers started to stop paying the fees and the CFE used to cut the electricity cable to its users. However, the farmers managed to replace the cables through the black market and, if necessary, connect the transmission to other electricity grids of the area (informant no. 17). Yet, as CFE capacity to bill the payments decreased over time, the chances to get the transmission cut diminished. Current users of groundwater through other wells (see next sub-section), in fact, accumulated a large debt with the CFE as they have been refusing to pay the bills for at least 10 years (informant no. 2) but they never risked to lose their electricity capacity. In chapter 5 it will be shown how, instead, they managed to find an agreement with CFE to pay a fixed monthly sum for the electricity.

Today, in the areas close to the abandoned wells, maize and beans grow thanks to the rains during the spring – summer crop production cycle. No one group ever tried to evaluate whether to make the wells function again despite a general interest regarding understanding what happened with the wells concessions. Nowadays, in fact, the lack of financial capital is not the only obstacle to fix the wells. Trace of the old permissions cannot be found either in the *ejido* nor in the water rights registry of CONAGUA. Nevertheless, *Jesús María la Petaca* proves how law enforcement with respect to water resources is very weak and how the lack of financial capital is the real obstacle for the smallholders. In the fields between *Jesús María* and *El Ocote*, in fact, a new well is under construction. This will start working in 2018 as a sort of private well of a *poseionario* who got a new concession thanks to the engineer who filled in the bureaucracy with CONAGUA and arranged the construction of the well. Uncertainty about the concessions remains as “I told him [the *poseionario*] that I could arrange everything for him as I have a cousin working at CONAGUA. However, he preferred to do everything through an engineer. Surely he paid some commission to do that. Yet, my land is close to his one, maybe I will try to buy some irrigation hours” (informant no. 33).

#### 4.3 Current access to groundwater and its organisation

Two other water concessions can be found in the registry of REPDA. These refer to wells numbers 5 and 8, as depicted in figure 4.3 and 4.4, according to the numeration used by their users. They are located alongside the road between *Jesús María* and *Pozo de Balderas*. Number 8 started working in 1989 (informant no. 2) while the other one a few years earlier. These two wells had a crucial importance in shaping the agriculture production within the *ejido* as the field around them are those in which the asparagus producers cooperative (see chapter 5) was initially organised. Before setting up the association all the partners worked individually their own alfalfa.



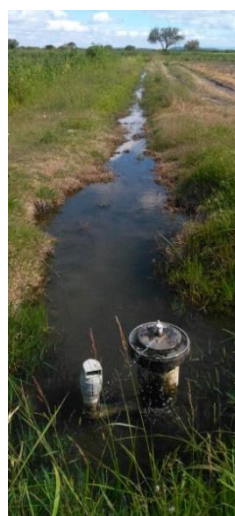
**Figure 4.4. At the end of the 1990s only two wells are still working. Asparagus production starts around them**

Today, well number 5 counts 12 partners. It pumps 24 litres per second and each user has the right to irrigate 60 hours per month, divided into two shifts of 30 hours. On the other hand, well number 8 has 15 partners. The well pumps 36 litres per second and each user can irrigate 48 hours per month in two shifts of 24 hours. Yet, one partner bought the land of 6 previous partners of the group becoming the major user of the group. This, in fact, means that he has right to 6 irrigation shifts per month on his land. In both wells, each partner has the right to irrigate up to 4 hectares. However, in well number 5 one partner can irrigate only 1 hectare while another one 3. Similarly, also in well number 8, four partners share their irrigation rights. Moreover, according to the season, the distance to the well, the irrigation technique used and to the asparagus production cycle, farmers either irrigate less or more during each shift. These complicate the understanding of mere irrigation practices, indeed not conceptualised in this thesis. A basic understanding of them, however, is necessary given their intrinsic relation with access to land and asparagus production.

The official partners are often not the actual users as they rent out their land to members of the asparagus association, discussed in chapter 5. Aware of the groundwater depletion issue given the experiences witnessed also within the *ejido*, the fear of getting the wells dried exists among the groups. According to the representatives, the *pocero*, of the wells (informants no. 3 and 10), the level they obtain water from is steadily decreasing 10 meters every 10 years. So far, they managed to dig a bit more every time it was needed. The group seems financially strong enough to afford these costs as both wells often get some breakdowns that require maintenance fees. Moreover, good

relations with the local COTAS staff ease proper maintenance. The *pocero* is important to keep these activities, as responsible for the organisational water control. Besides, they are in charge of collecting the electricity fees and they call the assembly of the users. However, very seldom meetings are called as they occur only if a well breaks down. The role of the *pocero* is assigned on voluntary basis. Current *poceros* do it for several years as they both possess the necessary technical knowledge to understand possible breakdowns and to monitor the extraction volumes to be reported to the COTAS official in charge of conducting the bureaucratic controls and with whom they managed to consolidate a good relation, helpful to face any technical issue. Interestingly, one *pocero* is a *de facto* leader while on paper another person appears. The official representative is also the *ejidal* commissioner, the authority of the *ejido*'s assembly. However, he reduced his role in the well users' group as he decided to rent out his land where asparagus is grown by the leader of the asparagus cooperative producers. Yet, he is very important to make any bureaucratic document legal. At the same time, the effective *pocero* started to play an important role in the users' group of the well number 8 when he decided to rent the hectares where he grows asparagus. So, the *poceros* do play a role in the organisation control of water distribution, "the regulation and control of human behaviour, particularly with regard to the forms of cooperation necessary to make irrigation systems function" (Mollinga, 1998:26), whereas they do not employ systematic technical control, "the physical control of water flow by means of irrigation technology" (Ibid.:25), on other users. This means that each user is in charge and allowed to irrigate his or her parcel when it is their turn. Yet, in chapter 5 it will be shown how the earlier asparagus producers, who benefit from higher land possessions and yields, employ some technical control thanks to their powerful position they hold within the asparagus cooperative. If someone does not need to irrigate in a specific period of the year due to heavy rains in the same days, or any crop-related reason, the user simply does not make use of the shift and the next user will start their turn as planned. It is not common to exchange nor sell any irrigation hours to another user nor to another member of the *ejido*.

Next chapter will discuss further elements regarding the relation between groundwater resources and asparagus production and about irrigation facilities the members of the group might adopt to increase their production capacity.



**Photo 2. A functioning well; when a valve is open, the water reaches its area; furrow irrigation by means of pale (photos by the author)**



#### 4.4 Access to land and groundwater after PROCEDE.

Even before the implementation of PROCEDE in 1998, six years later the creation of this land rights registry at national level, informal sales and acquisitions of land possessions among *ejidatarios* were occurring (informant no. 17). These transactions involved people living within the *ejido* who could easily negotiate informal agreements. Yet, through PROCEDE, land market in the *ejido* started to involve outside investors. For some years, *ejidatarios* who had access to groundwater were suffering the high electricity costs together with the reduction of crop purchases by government institutions and the diminution of channels to access to credit as explained in chapter 3.

Thus, many started to wonder whether to sell their irrigated parcels, keep only rainfed-based plots and make their living out of agrarian and non-agrarian wage labour in Mexico or in the U.S.A. (informant no. 47). At the same time, there is some evidence that confirms the reasons that explain why production of maize, for instance, increased in the aftermath of trade liberalisation. “In the past [in the 1970s 1980s], in some years farmers did not need to work the full plots, we could make a living out of fewer hectares. Later on, lower yields, lower prices, variable rains and the need of findings better markets options implied the necessity to work more land, mostly for self-consumption” (informant no. 30). This situation probably favoured a quick sale of the irrigated parcels that did not bring enough profits from alfalfa sales. “I wanted to sell, I could not afford the electricity costs of the well. Yet, I felt betrayed. A relative of mine who worked the land for me, bought the land at the name of an outside person. They made the deal with my wife and sons, they paid a fair price but yet I wanted to wait a bit more” (informant no. 47). This transaction probably represents an extreme case given the procedure of the negotiations. Yet, this quote is important to assess a certain attitude to sell land parcels as enabled by PROCEDE. It is important to report that the buyer of this parcel became a *posesionario* bringing outside capitals that enabled the beginning of the production of the asparagus. Moreover, the “relative” mentioned above is currently the organisational leader of the asparagus growers who managed to identify the potential of irrigated land together with the buyer of the parcel. This anecdote already reveals how financial capital, social relations and knowledge of potentially profitable agriculture practices and markets highly shaped access to land after the implementation of PROCEDE. Besides, by setting up the conditions to create the cooperative, these transactions already traced the way about the authority dynamics of the future asparagus growers group.

Official data about sales and acquisitions within the *ejido* were not traceable through the RAN. Moreover, the sample for this study is limited to a small part of the *ejido* population and many of those who sold the land do not live here anymore. Yet, it is clear and expectable that the majority of the transactions, at least the ones involving outside investors, took place in the area close to one of the two functioning wells. “When they dug a well, my grandfather was supposed to become partner of the group. Let’s say that he was not a very reliable person. When the well was almost ready he had not made some payments so he was excluded. I work that land now, it is so close to the well but I am not member of the group. I am one of the few, if not the only one, who did not sell in that area, where asparagus grow. And I know they would like it. I will not sell though. You can irrigate that but it is not considered irrigated land so they offer lower prices than what should be” (informant no. 54). Actually, only three of the current asparagus producers are not originally from the *ejido*. They all took advantage from the implementation of PROCEDE coupled with the willingness of some

*ejidatarios* to sell their plots to finalise their acquisitions through capitals that came from diversified private activities (shop, local transport company and production of vegetables in another area). However, only one entered into the *ejido* with the idea of producing asparagus, as he set up the business opportunity. What differs between outside buyers and original smallholders is that the former ones could buy as many hectares as they could afford in the area around the wells while the original *ejidatarios* do not own more than 4 hectares in the area because those were parcels given after the clearing of natural vegetation. Thus, they can potentially irrigate more hectares. In relation with this aspect, it is important to note that even if the maximum of irrigated hectares should be 4 for each user, all the asparagus growers who produce this crop on a larger surface manage to irrigate all of it, confirming the impression that there is no a strict control on it.

Furthermore, out of the original *ejidatarios*, only two manage to work and irrigate more hectares (respectively 20 and 10 hectares). They manage to do it through two strategies: renting the land of other members of the groups of well's users and by using some of the irrigation hours that are entitled to the *poseionario* who bought land from six well partners and thus is entitled to all the respective irrigation shifts. Not surprisingly, they are (actually one is the son of an original asparagus producer) the three that started the production of asparagus at the end of the 1990s who understood the potential of the "green gold" and that had the means to rent the land from people that, on the contrary, lacked and still lack financial capital and labour force to afford the investments needed to switch to a NTC production. Thus, they either rented out their land or kept alfalfa production for cattle feed. Production of alfalfa in the *ejido* has been a common practice since the first well was installed. The users of the wells number 5 and 8, however, have never cooperated to produce it together, possibly due to the fact that the groups of the dried up wells did not work so smoothly and thus preferred to work independently. Therefore, the initial cooperation in asparagus production was a first attempt to operate jointly, a factor that possibly made other producers more tempted by the possibility to join the group as knowledge regarding the asparagus crop cycle was not present in the *ejido* until this period.

Besides the above mentioned acquisitions, other transactions took place. However, they often refer to rainfed land bought from other *ejidatarios*. Otherwise, large investors try to buy parcels with the idea of digging a private well. An attempt was done also by a large producer of the area, the former Secretary of Agriculture who controls at least 2,000 hectares in the area (King et al., 2013). However, due to some bureaucracy issues and the low willingness to sell to such a large producer, the attempt failed. According to informant no. 17, what made doubt the intermediary of the former Secretary of Agriculture has been the fact that the assembly of the *ejido* has not approved the *dominio pleno* reform, meaning that an outside buyer cannot operate as private producer but he or she has to operate under the *ejido* legislation, as *poseionario*. Yet, if a similar transaction would succeed, the equilibrium within the *ejido* would probably drastically change. Moreover, given his political influence and financial availability, implications would strictly regard also groundwater extraction. The attempt, in fact, was done with a *poseionario* who does not live in the *ejido* and who already bought in it in the area of the dried up wells.

As the above mentioned acquisition attempt failed and *dominio pleno* is not implemented in the *ejido*, large land holdings concentration in the hands of a private producer has not occurred. However, it has been reported how the implementation of PROCEDE together with the inflow of relatively large private financial capital possession within the *ejido* modified the agriculture structure of *Jesús María la Petaca* in terms of production practices due to new forms of accessing

land and groundwater resources. Next chapter will provide a more detailed description of the asparagus producers association.

## 4.5 Conclusion

This chapter attempts to provide an answer to the research question SQ1: How, and triggered by which policy and socio-economic changes have access to land and groundwater resources changed in the researched ejido between the 1980s and 1990s? It was shown how both right-based and structural and relational access mechanisms have shaped access to land and groundwater resources in *Jesús María la Petaca*. Since the 1930s, constitutional rules have played a crucial role to enforce land distribution to landless peasants in the *ejido*. Between the 1960s and late 80s, government plans aimed to provide each farm with irrigation capacity through the exploitation of groundwater resources. Yet, between the 1980s and 90s, socio-economic changes started to trigger different forms of access to land and groundwater resources that kept occurring during the 2000s. In this phase, access to groundwater can be identified as the flow of particular benefit of interest Ribot and Peluso (2003) refer to. Access to groundwater resources is not anymore only a matter of land possession and financial and technology capacity. Doubts regarding the actual economic benefit of accessing groundwater emerge in the *ejido* due to the broader agrarian context described. Structural and relational access mechanisms start to be fundamental to fully recognise how such agrarian context can allow a profit-oriented agriculture practice. Drawing from Ribot and Peluso (2003), I conclude that financial *capital*, *labour* and *knowledge* are the main structural and relation access mechanism that have fuelled land transactions within the *ejido*, especially in the irrigated area. They can be identified as the mechanisms that made some actors gain, control and maintain the benefit flow and its distribution. In particular, financial capital allowed some farmers to buy and rent land plots, and keep irrigation technology functioning in an area in which agriculture practices started to be less profitable throughout the 1990s. On the other hand, lack of financial capital did not allow many groundwater users to face the groundwater drawdown problem that emerged in another area of the *ejido*. *Labour* is another crucial element as presence of labour force within a household makes the difference between being able to work the land or not. Migration to the U.S.A. increased when agriculture started to be a less viable livelihood option. *Knowledge* of the production technology and market potential of a different land use convinced an outside investor to buy some land in the *ejido*, bringing the necessary equipment and information to start producing a NTC (i.e. asparagus).

## 5. The asparagus production

This chapter gives attention to the asparagus production dynamics. It first presents the early stage of the cooperative establishment, showing how the reforms presented in chapter 3 created the conditions to set it up. Then, space is given to the asparagus producers in order to trace their livelihood trajectories and strategies. Current cooperative dynamics are introduced through the explanation of the crop itself in order to understand its production cycle but also the economic potential asparagus started to have in Mexico during the 1990s. Asparagus is considered as a second flow of particular benefit of interest of which access is shaped by structural and relational access mechanisms within the association. Specific attention is given to financial capital, market, labour, knowledge authority, and access via the negotiations of social relations. Finally, some potential developments of the cooperative are discussed. While being “firmly rooted in context and place” (Scoones, 2009: 188), this chapter shows how such context changes due to external drivers that enter the place.

### 5.1 Setting up the cooperative

In 1998, six years after the national launch of the programme, PROCEDURE was implemented in *Jesús María la Petaca*. All the land parcels got registered into the land entitlements registry. At that time, the smallholders of the *ejido* were already living the implications of the broader rural development frame shift PROCEDURE was enforced in. The abolishment of the institutions in charge of providing financial support such as BANRURAL, the limitation in accessing groundwater for many farmers and the decrease of the crops price had already made impossible for many farmers living on agriculture. Hence, the *ejido* witnessed higher waves of migration to the U.S.A. and the abandonment of profitable agriculture activities, substituted by agriculture wage labours in the area. The youths were mainly involved in these flows. What differs from previous migrations waves that had regarded older generations, from the 90s onwards full families started to move while before were usually only the men to spend some months of the year *al norte* (informant no. 30). This is something that already happened throughout the country since the 1970s (Nuijten, 1998). Yet, given the access to groundwater resources for the majority of the smallholders until the 1980s, the movements of full families to the U.S.A. started later in *Jesús María la Petaca*. In particular, its population started to migrate to Texas and Salt Lake City, Utah, which is the main destination especially for people coming from *Pozo de Balderas*. These transnational communities (Long, 1998; Nuijten, 1998) strengthened the networks between communities living beyond the border and played a role for some of the now asparagus producers as shown in next sub-section through the description of the mentioned producers.

Land was still worked by the older people, mainly for self-consumption purposes while those who still had access to groundwater could make some profit out of alfalfa sales, within the *ejido* and in the area. However, due to the high electricity prices, rather than making profits, well users could just break even (informant no. 62). Within this context, official sales and acquisitions of land rights were allowed because of PROCEDURE. Outsiders investors could, therefore, buy land. This is what occurred in 1998 entailing the beginning of a process that would have changed both the livelihoods of many people within the *ejido* and the land control dynamics within the community.

One of the first capital inflow entered the *ejido* by a manager of some hundreds of hectares of asparagus at the close commercial asparagus firm AGRIZAR who decided to buy few irrigated hectares within the *ejido* becoming *posesionario*. He came from the close community of *San Isidro del Monte*, of which socio-demographic characteristics do not differ much from the villages belonging to the *ejido* of *Jesús María la Petaca*. Among these places, many people know each other and they often work together in the same commercial farms of the area. Many buses who transport the personnel to the working places collect the workers from all these neighbouring communities.

Thus, the outside investor proposed to an *ejidatario* who already knew from previous working relations in AGRIZAR and another *ejidatario* from *Pozo de Balderas*, to exploit the access to groundwater by starting the production of a cash crop. Given his expertise, the choice was straightforward. Thanks to his occupation, he did not bring only the know-how to start seeding the asparagus but he also brought seeds and necessary equipment to start working. Undoubtedly, this reduced the costs faced by the two other asparagus partners who mostly counted on savings and a support from the outside investor (informant no. 2). Most importantly, as employee at AGRIZAR, he gave them direct access to the international market as the same commercial company was the first buyer and exporter of the asparagus harvested in *Jesús María la Petaca*. Initially, the surface worked was very little (1-2 hectare per person) and the labour force came directly from each household. Meanwhile, the two *ejidatarios* kept working alfalfa to get a monthly constant revenue while the *posesionario* started to expand his land holding thanks also to the awareness of the tough circumstances many farmers were facing. Moreover, one *ejidatario* turned out to play an important intermediary role between the buyer and the sellers, as shown in chapter 4. Not surprisingly, he was more aware about the dynamics occurring within the *ejido* (it is useful to remind that he was in charge of working the land of one seller when the latter one was in the U.S.A.) so that he could make use of his social relations to guarantee access to land and groundwater resources to the outside investors by directly conducting the acquisitions negotiations with potential sellers. Hence, the investor and the *ejidatarios* merged their knowledge, the former regarding the external dynamics (international market, networking with packaging and exporter company) and the technical knowledge regarding the asparagus crop, whereas the other one regarding the internal *ejido* situation. Access to land around the wells used for irrigation started to change as financial capital, social relations and knowledge became the main driver of transactions that previously could not occur in this form. Asparagus started to represent, together with groundwater, what Ribot and Peluso define as the object of inquiry or “that flow of the particular benefit of interest” (Ribot and Peluso, 2003: 161) which derives from a particular resource.

The group made of three producers started to sow more hectares per person per year, the *ejidatarios* on their 4 hectares parcels while the *pesesionario* on the acquired and rented plots that today equal 28 hectares that are located close to the wells so that can be irrigated. Over time, one *ejidatario* started to rent irrigated land from other well’s users increasing its production. Until 2005, no other farmer joined the group. In that year two alfalfa producers decided to sow some hectares of asparagus as partner of the *posesionario* who helped to afford the initial investments in exchange of a part of the profits. By 2010 and 2013 respectively, they have sowed 2 and 4.5 hectares and were independent. The 2008 food prices crisis likely made many other farmers join the group (informant no. 3) that by 2011 counted on the 13 direct producers. Among the new producers, two are *posesionarios* who bought land at the end of the 1990s. The majority of them started by sowing a little part of their land tenure, expanding it over time and reaching the maximum potential

(informants no. 32 and 38). Indeed, only those who originally started the business and the *posesionarios* (by definition) work acquired land besides. The capacity of enlarging the surface at disposal goes hand-in-hand with the possibility of accessing groundwater through land acquisitions of irrigated land or plots that can be reached by the water, as explained in chapter 4. I have shown how the role of the *pocero* does not involve a technical control as each farmer knows when to stop and start their irrigation turn. Yet, two asparagus producers complained that the early producers, who are entitled to more irrigation shifts though, are stricter than others in notifying when their shift ends. On the other side, “nobody would complain to them if they are using more hours of irrigation (informant no. 38)”. It is difficult to establish whether a real abuse of irrigation occurs as the early producers are indeed entitled to more irrigation shifts. Moreover, fieldwork took place during the rainy season, meaning that many irrigation shifts were not needed due to the rains. Yet, a powerful position within the asparagus association seems to be reflected also in the use of groundwater.

Before discussing the dynamics of the association of the asparagus producers, the profile of the producers that joined the group over time is presented.

## 5.2 The asparagus producer

According to Cousins (2010), the term smallholder “is problematic because it tends to obscure inequalities and significant class-based differences within the large population of households engaged in agricultural production on a relatively small scale” (Cousins, 2010:3). He argues that smallholders are often considered as members of a quite homogenous group while heterogeneity is often present. Moreover, this standardisation impedes a proper analysis of the social differentiation within the populations of small farmers. Attention to the heterogeneity of the asparagus producers is needed to understand how “accumulation from below” occurs in different forms. Some farmers, in fact, managed to make consistent surplus profits to be reinvested in agriculture activities while others do not. As can be observed in table 5.1 and 5.2, the asparagus size areas differ among the producers. This allows some to exploit economies of scales enlarging their surface through either renting more land or sowing more asparagus every year in their hectares. The disparate land possession volumes – often used as indicator to classify the different farmers – makes challenging the categorization of the farmers belonging to this sample.



**Table 5.1. Descriptive statistics of the asparagus producers, a first look**

	Number of observations*	Mean/Percentage	Minimum Value	Maximum Value
<b>Gender: Male (%)</b>	13	92		
<b>Age (years)</b>	11	53.9	33	76
<b>Household Size (persons)</b>	11	5.3	2	18
<b>Education (%)</b>				
No education	11	27.3		
Primary school not completed	11	36.4		
Primary school	11	9.1		
Secondary school not completed	11	0.0		
Secondary school	11	18.2		
Preparatoria **	11	9.1		
University	11	0.0		
<b>Place of Residence (%)</b>				
Pozo de Balderas	13	69.2		
Jesus Maria	13	15.4		
Los Rodriguez	13	7.7		
U.S.A.	13	7.7		
Loma de Cocina	13	0.0		
El Ocote	13	0.0		
<b>Land Size (hectares)</b>				
Cultivated land size (owned+rented)***	13	13.0	3	38
Asparagus area size	13	7.7	1.5	28
Satisfaction asparagus agreement (from 1 to 5)	11	4	3	5
<p>* I conducted 11 full surveys among the 13 producers. One refused to fill it in but I could get some information through informal talks with him. The same occurred with another one as he lives in the U.S.A. When he visited the <i>ejido</i>, I preferred to use the little time he had to conduct a semi-structured interview rather than filling the survey as he plays a major role in the organisation. His land information is inserted in the table.</p> <p>** Preparatoria is usually 3 years high school that either prepares for the university or provide vocational training. Students generally start at the age of 15.</p> <p>*** Data about the year 2016 and regarding only the land within the <i>ejido</i> as 3 producers also work some rented land in another <i>ejido</i>. Some producers increased their asparagus surface in 2017.</p>				

Source: own survey

Table 5.2 gives more details about when each member joined the cooperative, the initial and current land areas cultivated by each producer. It can be noted that each member increased their land areas cultivated with time and two farmers will harvest from larger surfaces from 2018 onwards. Moreover, it is shown how the three early asparagus producers are currently working way larger areas (28, 20 and 13 ha's respectively) than the other partners. Besides them, from 2018 two *posesionarios* will grow asparagus on the largest possessions (8 and 6.5 ha's respectively) among

the other members of the group. This information is already insightful with respect to land accumulation dynamics in the *ejido*. Reaping the benefits of joining international markets chains before than others implied that early producers could lead land transactions in order to accrue their surface and groundwater resources to irrigate the fields. Moreover, external investors (*posesionarios*) bought land in the *ejido* to diversify their livelihood strategies. Given their financial capital availability, they attempt to carry out agriculture practices based on cash crops. Finally, the other asparagus producers, belonging to households originally from the *ejido* lack both financial and natural resources to expand the asparagus production.

**Table 5.2 Asparagus producers cultivated land information**

	Who	When*	Initial asparagus surface (ha)	2017 asparagus surface (ha)**
1	<i>Posesionario</i>	1998	2	28
2	<i>ejidatario</i>	1998	1.5	20
3	Son of <i>Ejidatario</i>	1998	1	13
4	<i>Avecindado</i> ***	2005	2	2
5	<i>Ejidatario</i>	2005	2	4.5
6	<i>Posesionaria</i>	2007	3.5	3.5 (6.5 in 2018)
7	<i>Posesionario</i>	2008	Unknown	8
8	Son of <i>ejidatario</i>	2009	2	6
9	<i>Ejidatario</i>	2010	2	3.5 (2 with a partner)
10	<i>Ejidatario</i>	2011	2	3
11	<i>Ejidatario</i>	2011	1	4 (2 with a partner)
12	<i>Ejidatario</i>	2011	1	2 (6 in 2018)
13	<i>Ejidatario</i>	2011	1	1.5
<b>Total</b>			22	99

\*Refers to first sow. First harvest occurs two years later.

\*\*Surfaces that are almost totally irrigated. Number 1 and 2 benefit from acquisition and rental of land from (ex) wells' partners. Number 3 is a well partner for 4 ha's. In addition, he rents 10 ha's, of which 5 are irrigated land. With respect to the others, the capacity to irrigate more than 4 ha's is assumed to happen due to a lack of actual control of the irrigated land. Yet, in dry period (October – May), is unlikely that water can reach the furthest plots, entailing lower yields.

\*\*\**Avecindado* on paper. His mother was an *ejidataria* who did not declare any heir. However, the government recognised the informant as actual person in charge of working the land so that he has a permission. Within the *ejido*, he is considered as actual *ejidatario*.

Source: own survey

Table 5.3 provides an overview of the diversification of income sources of the asparagus producers. Diversification details can be found in annex 3. Matching table 5.3 with table 3.2 it can be observed that the three large asparagus producers rely also on other farm activities, either outside the *ejido* (producer no. 1) or through the production of chili in the *ejido* (producers no. 2 and 3). Similarly, production of alfalfa outside the *ejido* supports the households of one asparagus grower (producer no. 10). On the contrary, production of chili and milk (producer no. 4) and alfalfa (producer no. 5) coupled with a relatively limited asparagus production does not guarantee financial sustainability to two asparagus growers who rely also on remittances or on occasional wage labour in the U.S.A.

Furthermore, three producers (two of them are *poseisionarios*) can count also on own business to guarantee to the households other income sources. Such activities let the investments in asparagus production. Finally, three producers' households diversify their livelihood strategies through off-farm wage labour (producers no. 9, 11 and 13) and sale of milk (producer no. 13) while only one farmer (producer no. 12) relies on constant revenues from milk production.

**Table 5.3 2017 Agricultural and household livelihood diversification of asparagus producers**

	Cultivated crops (if any)	Surface (ha)	Destination of output	Irrigated Land (ha)	Livestock	Destination of output	Livelihood diversification (if any)
1							Farm outside <i>ejido</i>
2	Maize	10	Self-consumption	0	30 sheep	Sale	None
	Beans	6	Self-consumption	0			
	Chili	2	Sale	2			
3	Chili	1 (father's land)	Sale	1			None
4	Chili	1	Sale	1	1 cow	Sale of milk	Remittances
5	Maize	1	Self-consumption	0			Migration
	Beans	1	Self-consumption	0			
	Alfalfa	0.5	Sale	0.5			
6							Own business
7	Maize	2	Self-consumption	0			Own business
	Beans	1	Self-consumption	0			
8	Maize	6	Self-consumption & sale	0	50 Sheep	Sale	Own business
	Beans	3	Self-consumption	0			
9	Maize	5.5	Self-consumption	0			Off-farm wage labour
	Beans	1	Self-consumption	0			
10	Maize	2	Self-consumption	0	25 Sheep	Sale	Farm outside <i>ejido</i>
	Alfalfa	1.5	Cattle feed	1.5			
11	Maize	3	Self-consumption & sale	0			Off-farm wage labour
	Beans	4	Self-consumption	0			
12	Maize	5	Self-consumption	0	40 Sheep	Sale	None
	Beans	3	Self-consumption	0	1 Cow	Sale of milk	
13	Maize	6	Self-consumption	1.5	10 Cows	Sale of milk	Off-farm wage labour
	Alfalfa	1	Cattle feed	1			

Source: own survey

Despite the differences in terms of land ownership, asparagus surfaces and livelihood strategies, some common points are found among the asparagus producers. Except for the data about agricultural practices that are also reported in tables 5.2 and 5.3, these information are based on informal talks and in-depth semi-structured interview I had with asparagus producers during the fieldwork period. They are complementary to the data reported in the tables in order to better understand the current livelihood strategies of each asparagus producer.

Asparagus producers are likely middle age men who either inherited the land from their fathers, work it for them or bought irrigated land becoming also partner of a well group. Five of them share the fact that have spent a period working in the U.S.A. throughout the 1990s and beginning of 2000. As older brothers, they received from their fathers the possibility to work the irrigated land. For them, the choice of permanently getting back from the U.S.A. and the decision to move from alfalfa to asparagus often coincide, confirming the chance to make their living mostly on agriculture through, initially, earnings from the time spent *al norte* to move to a high value crop. Their younger brothers work with the asparagus only during the harvest season while during the rest of the year work either as bricklayer or in commercial farms. To maintain the economic benefits over time and expand their production capacity, three of them have other sources of income, one from a shop and two from agriculture wage labour. Hence, farming is the main activity for nine of the asparagus producers – without this meaning that asparagus production is also the main income source - considering also that those who diversify their activities own and work more land beside the hectares in which asparagus grow. With respect to this, very little diversification occurs. Alfalfa production has been almost fully quitted from the direct asparagus producers as it requires more work, needs more water and entails fewer revenues. Only one farmer still grows it within a surface smaller than one hectare but he often harvests a few amount of bales. Another profitable diversification has been made by three producers who irrigate and grow also chili besides asparagus as cash-crop. They do not collaborate in this production and they sell them in the local shops in the *ejido* and in the market *El Refugio* which is located close to the *ejido* on the highway number 57 and that has historically been the main market to sell the products harvested in the area from smallholders. In addition, almost all the asparagus producers work the rainfed parcels to produce maize and beans for self-consumption purposes.

The other three producers from the *ejido* never moved to the U.S.A. as seasonal labourers and agriculture has represented the main occupation, either as independent farmer or as worker in commercial farm. More specifically, the oldest asparagus producer has being producing milk throughout his whole life. However, revenues started to decrease together with the value of his livestock so that he decided to start producing asparagus on 1 hectare with the help of his son who is now in charge of working it. The decision was mainly driven by the idea of making the base for a more profitable activity for him while keeping a constant weekly income from milk sales. The *avecindado* inherited the land from his mother and was the first one to join the three early asparagus producers. Favoured by a kin relationship (cousin) with one of them, he started as partner of the *poseionario*, quitting alfalfa production. He now produces a bit of chili on 1 hectare while asparagus cover 2 hectares. Yet, his household counts also on the remittances sent by three children who work in the U.S.A. Finally, the third producer of this little sub-group is not originally from *Jesús María la Petaca* but from another *ejido* where he produces alfalfa. He used to work in a commercial farm before marrying with a woman from *Pozo de Balderas*. His father-in-law use to grow alfalfa but as he got older he let and helped his son-in-law to lead the production shift from

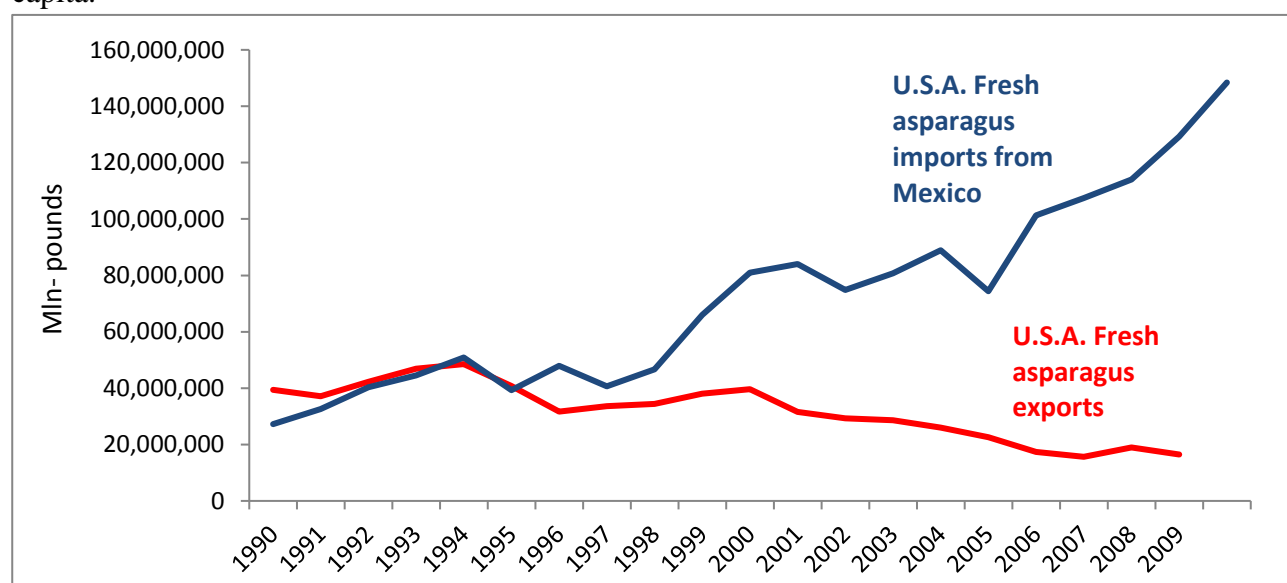
alfalfa to asparagus. Currently, they work 4 hectares with asparagus and about 1.5 with alfalfa. All of them and the previous five producers increased their asparagus surface. Many of them do not have much more space to expand it nor they would not have the financial possibility to afford more investments in the asparagus production (informants no. 22, 32 and 38).

Another sub-group can be identified among the asparagus growers. It is composed by the *posesionarios*, whose conditions differ from all the other farmers as they have a completely different background and bought the land in the *ejido* in order to diversify their income sources. Due to personal issues, the *posesionario* who started the production of asparagus together with two partners, had to move to the U.S.A. This transfer entailed an higher concentration of power in the hands of the two early partners who control the production process all the year. The *posesionario* comes back occasionally from the U.S.A., especially at the end of the harvesting season (September/October) to participate into the final meeting with all the producers. With respect to the other two outside investors, they both bought land thanks to financial capital coming from a set of diversified activities in several sectors. They started producing self-consumption crops but are now producing mostly asparagus out of their parcels of 6.5 and 11 hectares respectively. All of them took advantage from the financial capital availability and the possibility of entering the *ejido* as *posesionario* who *de facto* behave as private producers while respecting the *ejido* regulation. They all showed very little willingness to try to become *ejidatario* as they reckon it would imply a bit more of bureaucratic issues that are glad to avoid. Having presented the heterogeneity of the members of the cooperative of asparagus producers, the dynamics of the association are discussed in the next chapter.

### 5.3 The asparagus. Its production in favourable market conditions

It has been shown how the earliest producers originally from the *ejido* needed an extra capital source to start the asparagus production. Furthermore, they benefitted from accessing the necessary equipment from the *posesionario* who had it thanks to his job in a large asparagus producer company. Without these initial supports, in fact, it would be difficult for a smallholder to start living on asparagus production. This is a perennial crop that needs about 18 months before being harvested for the first time. Moreover, asparagus is planted using a 1-year-old crown, a plant grown from seed. If a farmer does not have the capacity to growth the crown, he or she needs to rely on greenhouse production. According to the seed used, the crop can remain productive up to 15- 20 years (Moore, 2017). Yet, the seed used within the *ejido* keeps its productivity for some 7/8 years (informant no. 63). Usually, in Mexico farmers sow it in autumn and harvest from the beginning of June until the beginning of September. The 18 months wait drawback explains also why the smallholders have traditionally opted for producing alfalfa when it is about sales. As alfalfa harvests are monthly, they secure a constant revenue to its producers. Asparagus is a labour intensive crop during the harvest seasons as it needs to be snapped once, if not twice, per day. In *Jesús María la Petaca* harvest is done every morning from the beginning of June until early September. Within this period, the plant needs to be irrigated, fertilised and fumigated. Besides this period, asparagus spears do not grow and the plants that mature on the fields are collected every about 100 days and can be used as forage. Irrigation does not occur constantly as farmers in the *ejido* make the monthly irrigation turn every 3 months in the non-harvest period (informant no. 10).

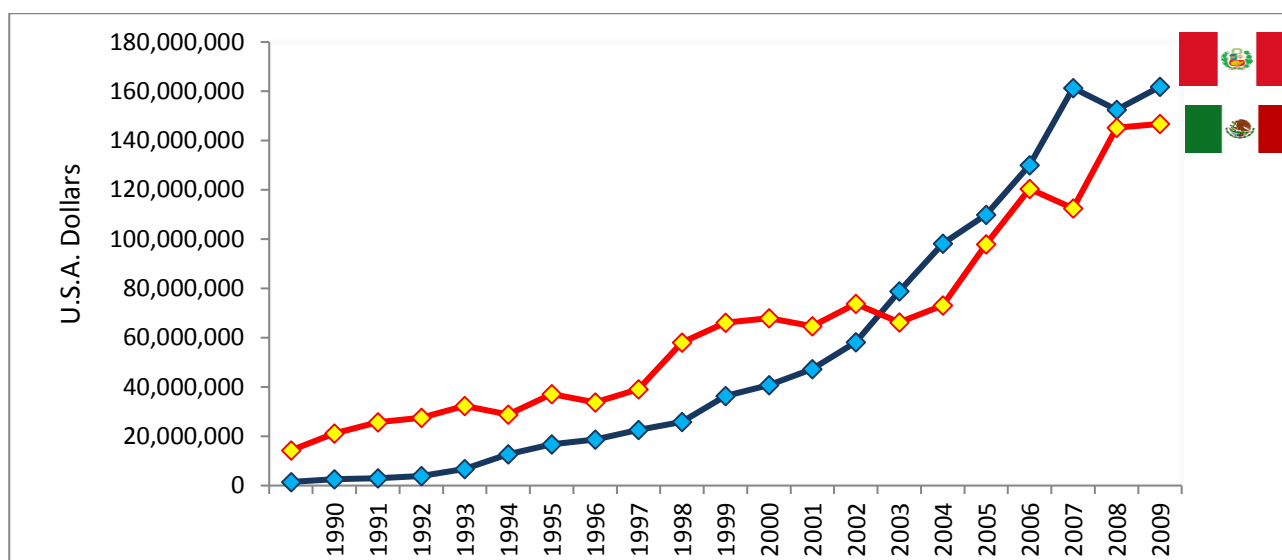
Following these procedures, at the beginning of the 2000s, three partners, through family labour, harvested and exported for the first time the “green gold”. Thus, the asparagus coming from a bit more than three hectares located in the *ejido* joined the Mexican exports to the U.S.A. At that time, U.S.A. imports of this vegetable were steadily increasing (see figure 5.1). In particular, Mexico and Peru, the largest asparagus exporter of asparagus worldwide, started to direct their production to the U.S.A. (see figure 5.2). A factor that enabled this boom was the elimination on the importation duties of asparagus into U.S.A., set up at 25% in 1993 and phased out by the end of the decade to enforce the NAFTA agreement (Wilder, 2006). Mexican asparagus production increased from an annual average of 31.000 tonnes in the period 1983-1990 to 40.000 in the period 1994 – 2000 (Yunez-Naude, 2002). In 2016, Mexico produced about 217.000 tonnes (SAGARPA, 2017), of which about 29,000 tonnes were produced in Guanajuato, the second producer in terms of volume after the state of Sonora (about 131.000 tonnes). Asparagus production represents 1.4% of the national vegetable production and its domestic annual average consumption equals 0.6 kg per capita.



**Figure 5.1. U.S.A. fresh asparagus imports of fresh asparagus from Mexico and total exports, 1990 – 2009**  
**Self-elaboration. Data source: ERS – Economic Research Service, U.S.A. Department of Agriculture <sup>12</sup>**

<sup>12</sup> Available at: <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1771>  
 (Last access on 18.04.2018)





**Figure 5.2. Value of U.S.A. imports of fresh asparagus from Peru and Mexico, 1989 – 2009**  
*Self-elaboration. Data source: ERS – Economic Research Service, U.S.A. Department of Agriculture*

Given these favourable market conditions, the choice of moving part of the alfalfa production to asparagus started to pay off. The group slowly grew up enlarging its asparagus production area and thus the volume of the business. Since the beginning of the association, ten more people joined it, most of them quitting the production of alfalfa. This proves that this entrepreneurial choice has been worthy to the first and provides positive economics returns although the situation differs for each producer as explained later. Yet, the association can now count of 13 direct partners or people who produce asparagus on their own land, and a surface of about 120 hectares – considering recently sown land by two members and two more farmers of the *ejido* who will join the group in 2018. Besides them, at least 10 people more are involved as well. These either share the costs and revenues as partners of a person owning the land where asparagus are harvested or rent their land out and get part of the profits. A more detailed description of the identities behind the asparagus production and its organising dynamics is provided in the next sub-section.

## 5.4 The organisation dynamics

### Box 5.1 A snapshot: following the asparagus

I drive my Chevy Monza accompanied by my supervisor Jaime. We drive the 20 km that separate San Miguel de Allende from Los Rodriguez before taking the last 7 km of dirt road that connects Los Rodriguez to Pozo de Balderas. As we pass Jesus Maria, asparagus fields appear on both sides of the road. Around 7:30 a.m., we see the workers. Likely, they are about 100 people. If they do not belong to the asparagus producers' family, they come from close communities. In the three months asparagus harvest, they receive 185 MXN (about 10\$) per 4 hours of work per day. Each of them walks in a different furrow, picks up asparagus, puts them in a bucket they carry with them. When the bucket is half-full, they bring them to Francisco and Rolando, they fill the about 20 kg boxes before putting them on the trailer of the tractor. Some tractors and cars follow the pickers throughout the about 100 hectares of asparagus. Around 11:00 a.m., the daily harvest is over. The majority of the workers go back home before going to other places to work, whether in their own land or farms of the area. The day after they will start again at 7 a.m. The producers and

some pickers drive the products to Pozo de Balderas. A truck is loaded with around 180 boxes in a space in front of the cooperative leader's house. Rolando's wife and Rafael take notes of the boxes delivered by each producer.

Around 1.00 p.m., I accompany Jose and his son to San Luis de la Paz, some 40 km far, where the packaging company is located. It takes us one hour to reach the factory of *Agro Frescos el Bailón*. Here, around 100 workers, in the peak season, process the asparagus. Seven producers from all over the country are now bringing asparagus here, they are all private producers except the smallholders of *Jesús María la Petaca*. Some 1000 boxes arrive here daily from the beginning of June to the end of August. The production chief and the owner of the company explain to me that they are building their network up but they are a relatively small packaging company. To get an idea about the business dimension in the area, the company AGRIZAR, owned by Zarattini, "he used to be the king of the asparagus", is a large commercial producer owning packaging facilities at the same time and can manage to send thousands of boxes every day to the U.S.A. "Have you seen the packaging facilities of *Frescos Don GU* just in the surroundings of San Miguel? We started to work together after the implementation of NAFTA because they already complied some requirements the NAFTA introduced that we did not have. *Don Gu* grew and we separated as we also got our network. Until last year, *Don Gu* used to work here renting this place. They managed to build their own facilities with a larger capacity". They reckon there are 29 packaging companies of fresh vegetables in Guanajuato compared to 13 until 10-15 years ago.

Meanwhile, the asparagus are unloaded, stored, cooled, hydrated, cut, hydro-cooled and packed in 5kg boxes according to the different sizes of the products. The blue packages labelled by the brand "Americas", owned by the U.S.A. based company Progressive Produce whose majority stake has been recently bought by the Irish firm Total Produce, are now ready to be brought to the consumers. Given the relatively small amount of boxes packed, they send them twice or three times per week. They will first reach McAllen, Texas, before being delivered in the U.S.A. east coast supermarkets, as shown in figure 5.3. As the Mexican asparagus season ends, those supermarkets will receive the asparagus grown in Peru, the major exporter of this vegetable worldwide that enters the game in September, just in time to do not compete with the Mexican market. When Peru will stop to export, U.S.A. producers begin to harvest as the asparagus season there starts around January to end by June.



**Figure 5.3. The asparagus journey - Self-elaboration**

Besides the movements that flow from south to north, other flows take the opposite direction. Progressive Produce is the buyer of the asparagus produced in *Jesús María la Petaca*. Thus, every week they send the weekly payments to *Agro Frescos el Bailón* which keeps a small part of it while the rest goes to the producers. These payments represent only the fixed prices as agreed between the stakeholders. At the end of the “100 days season”, the 3 actors of the chain – the commercial company, the packaging one and the producers - do the “*finiquito*”, the final counts that take into account the real markets prices throughout the season.

I drive back to San Miguel de Allende noticing all the trucks carrying vegetables produced by large companies and the buses that bring the personnel of the same companies. I wonder whether in a couple of years also these asparagus will reach Europe as “U.S.A. and Canada markets are quite saturated but many producers are starting to grow asparagus in Guanajuato”.

The establishment of rural cooperatives can represent a potentially viable livelihood strategy as response to and motivated by neo-liberal policies (King et al., 2013). Usually, studies on cooperative enterprises pose their attention on productivity and economic efficiency omitting

cultural, political and cultural norms (Ibid.). Clearly, the association studied here was created and driven by economic ambitions. “I bring the know-how, some equipment, input and financial capital if necessary so that we can take advantage out of the market conditions and water resources” (informant no. 63) was the idea behind the initial agreement between few partners. Moreover, later participants confirmed they were primarily driven by profit reasons when they decided to join the project. The indirect producers, or those who rent out their land, usually do it given labour constraints that do not allow working the land. Yet, the involvement of more farmers made possible for them to pursue social and political goals besides the mere economics ones. Sceptical about considering fully sustainable the whole organisation given the heterogeneity of its members, I argue that more stable livelihoods have been pursuable and obtained by them. So, how does the cooperative work? Table 5.4 summarises the role that some members have within the group. It can be easily noted that few producers control the organisation of the whole association while the majority does not have any particular role. They are responsible for their own land and product but they depend on others with respect to input demand and accountability. Moreover, matching table 5.2 and 5.4 make clear how the asparagus producers who originally started the production are not only having a major role in the organisation of the association but concentrate in their hands the majority of the hectares sown. Current organisation is still based on the administrative role of one of the two early producers but also on their sons who started to work with the asparagus as harvester before any other farmer joined the group. This situation create forms of asymmetric knowledge between the producers. There is temporal asymmetry, meaning that some people get noticed of important issues (for instance, crop prices) before other, easing their decision-making processes. Furthermore, there is unbalanced knowledge regarding specific production practices, entailing the dependence of some people on others. A third asymmetry consists of unequal knowledge of output market opportunities; those who are more aware of such possibilities will generally able to negotiate better opportunities and will only afterwards notify other cooperative’s members. Even if these dynamics do not mean direct economic benefit (disadvantages) to the farmers, such forms of unequal knowledge access increase the authority of some people on others.

**Table 5.4 Role in the cooperative of each member**

	Role in the cooperative (if any)
1	Negotiates with buyer and packaging companies; brought the know-how and equipment in the community; lives in the U.S.A. but always present to conclude the cooperative bookkeeping in September.
2	<i>De facto</i> leader on the field; supervisor of harvest procedures; chair of the group meetings; access to number 1 bank account to face unforeseen costs; his son buys and distributes fertilizer and pesticides as demanded by other producers; his daughter-in-law checks amount of daily boxes of each producer; his sons work some 20 ha's of no.1 land in another place and the 28 ha's in the <i>ejido</i> during the whole year; no. 3 and him own more equipment that rent out to other producers; they also provide new members with necessary information and seeds.
3	Bookkeeping; Representative well no. 8; intermediary role with packaging companies; he and no. 2 own more equipment that rent to other producers to work the crop.
4	
5	
6	
7	
8	Representative well no. 5; together with producer no. 3 bureaucracy regarding drip irrigation adoption, collects electricity fees.
9	
10	
11	
12	
13	

“Do not forget that, yes, we are an association. But an association of individuals who come together to sell the product and buy some inputs but not to share other practices” (informant no. 63). This statement is quite contradictory with respect to the organisation dynamics of the cooperative. While formally there is no agreement between the producers, informal collective action is fundamental for all of them to guarantee access to production factors and achieve common benefits. The quote must be understood in economic terms. In fact, except for the salary of the truck driver who deliver the product to the packaging company which is paid jointly, other input and production factors costs are strictly paid separately. A tight bookkeeping ensures that each farmer receives the correct income according to their production and the costs faced individually. This is, of course, a consequence of the heterogeneity of the group. Given such heterogeneity, the producers with greater equipment ownership would not benefit from pooling assets and resources.

Smallholders get often access to market through farmer organisation and collective action (Hellin et al., 2008). Given the relatively little amount of asparagus per hectare harvested from the farmers, access to market would not be possible for the majority of them. Moreover, high transport costs coupled with the lack of those international market networks entered in the *ejido* in 1998, would create more challenges. Historically, access to market in the *ejido* has meant local markets or direct

sales of fodder to large milk or meat producers, without dealing with companies involved in exports and retail activities. Hence, a new partner enters the association aware of the fact that his or her product will flow into long-lasting market relations. On the other hand, the whole group of asparagus producers strengthens its production capacity enlarging its sales volume and being a worthier producer to the buyer. Between the producers, there is no a formal agreement. Thus, it can be considered as an informal cooperative which has informal deals also with the other actors of the chain. There are no contracts between the producers, the packaging company and the commercialising company. Arrangements based on trust instead of written deals gives more freedom when it is time to find a better offer on the market (informant no. 2, 3 and 63). In June 2017, the group started to bring the asparagus to a packaging company to which they have been delivered their products for many years. However, as they were paid too little in their opinion, they opted for a new commercial partner, Progressive Producer, and a new packaging services provider. As this is a new partnership, the deal does not go beyond the sales of asparagus. If trust between the partners will increase over time, they might agree on enlarging their business through the provision of inputs to the producers, for instance (informant no. 64).

During the about 100 days of harvest, access to working capital for growing asparagus is organised as follows. Every 8 days, the packaging company receives payments from the commercial partner. This is a fixed amount per a 5 kg box of asparagus. In 2017, the amount was equal to 11.5\$ for box, 2.5\$ of which go to the packaging company. The money transferred weekly to the asparagus producers are mostly used for weekly expenditure such as labour force, fertilizer and for the truck driver's salary which is a shared cost. The *finiquito* ends the payment process in September according to the actual quantity produced by each producer and is based on the daily market price. Yet, if it happens that a producer needs more finance during the harvest season to face the costs, these additional payments will be deducted from the final revenues. Therefore, a person is in charge of checking the inflows and outflows of each member.

A weekly cost faced by the producers is the salary of the labourers which is equal to about 70\$ per week per person. Among the workers, in charge of picking up the asparagus, there are households members of the producers, relatives who live within the *ejido* and people coming from close communities such as *La Palmilla* and *San Isidro del Monte*. The relatively high salary paid to the pickers is the key variable to ensure access to and control on labour during the peak season of the asparagus production cycle, from the beginning of June to the end of July, the first two months of the harvest period. In August, harvests are smaller so that some people may be asked not to keep coming. Moreover, as harvest is led in the morning, the *jornaleros* are likely to undertake other activities later on. Out of the 13 direct producers, only two informants fully rely on households members while the rest needs to contract more people, up to 20 in one case. Among the workers, some are men who are contracted from the asparagus producers also in other periods of the year to work on other crops (maize and beans) and irrigate the land, according to the needs. Usually, they lead the different groups of workers. Each farmer is aware of how many workers are needed to snap the asparagus. Yet, their work is not limited to the parcel of the employer. The about 100 workers are divided into four group that start collecting asparagus in different points. By the end of the morning, they all work in the central part of the asparagus surface. Meanwhile, when the hectares of a producer are completed, the farmer brings his boxes to *Pozo de Balderas* where the truck must be loaded. He delivers them reporting how many boxes have been filled and he takes empty boxes for the coming day.



Finally, social and power relations play a pivotal role in the whole organisation dynamics. As the majority of the asparagus producers belong to the same village, *Pozo de Balderas*, and are partners of the well group, social relations between them are long-lasting. However, shared production practices in the form described in this section never occurred in the *ejido*. Despite this, the socio-physical closeness has definitely eased the engagement of new partners in the asparagus group. Usually, the negotiations to enlarge the association have been straightforward. The new potential partner show their interests to the *de facto* authorities of the group who are the three who started the business, organise the meetings and keep the contacts with the packaging and commercial companies. Given the forced migration to the U.S.A. of the largest partner of the group, his lands are worked by the family members of the second larger producer, who is considered the actual leader of the group and can also access a savings account of the partner if needed. Moreover, only the two of them can sell the crown of the plant to the others, a practice that occurs when another members wants to enlarge its asparagus surface or a new partners starts to sow. Once that the agreement is reached, the new partners rely on the know-how of the first ones in order to know the treatment asparagus needs. Yet, the pure knowledge of the practices needed do not make the new partners independent. In fact, equipment ownership differs a lot between the asparagus producers. The lack of tractors among the farmers obliges a little more than half of them to pay someone else to work their asparagus land a couple of times per year. This favours those who have more means. Renting equipment in the *ejido* is a common practice. When it is about the asparagus, the farmers that possess both know-how and equipment are, not surprisingly, the ones who started from the principle. This brings more revenues to the three of them who compose a powerful small group within the broader association as they organise the production phases of the whole cooperative, control the major surfaces of the group, keep the contacts with the partners involved and organise the meetings to discuss any relevant issue. “Yes we are a group, but there is a lot of difference within it” (informant no. 10). Overall, these factors result in asymmetric information, different social capital channels, assets and inputs ownership and control differentiation, highly variable natural resources properties and different economic capital availability.

## 5.5 What is next?

How does the future looks like for the informal cooperative established in *Jesús María la Petaca*? Aware of some speculation risks, some observations made during the fieldwork provide with some elements regarding the pattern that the association might follow. To begin with, it is noticed a general satisfaction regarding the asparagus business. However, while I have conducted talks with all the direct producers involved, this has not been possible for all the partners who share only part of the annual revenues. Yet, the discussions with some of them have highlighted less enthusiasm about the agreements given relatively little or none economic advantages compared to what was done before, generally alfalfa production. In fact, most of the people who rent out their land do it as unable to keep working the land due to the lack of labour force. A well group partner and milk producer explained how what he gets from asparagus revenues is fully used to buy alfalfa for his cows while before he used to grow it but as he gets older he needs to reduce his activities. Other two informants who rent out their land showed some satisfaction about the deal but yet this agreement is result of the fact that the labour force of the households moved to the U.S.A. or got to old. Finally, a young farmer and relative of a direct asparagus producer through whom he also gets groundwater to irrigate his land, shifted his alfalfa production to asparagus four years ago because his land is quite far from the well and therefore he used to harvest very volatile alfalfa yields every

month. Due to this location problem, he is not convinced yet about the profitability of this choice on the long-term. This increases the attention on future group dynamics. While the 13 direct producers tend to share many moments together, the indirect partners tend to interact merely with their partner. Thus, reality in the future might either see a closer relation between all the people somehow involved in asparagus production or an increase of this distance between the two types of producer.

Besides the pure production factors, the partners of the two irrigation wells have reached two important socio-political goals. The first one regards the tensions with the CFE. For at least ten years, while the asparagus producer association was growing, the users of wells did not pay the electricity fees, accumulating a huge debt (informant no. 2). Hence, the groups joined the CPANG that in area represents more than ten groups of well users (informant no. 3). The *pocero* of well number 8 represents the two wells of *Jesús María la Petaca*. As member of the CPANG coalition, well representatives managed to deal with the CFE a fixed monthly electricity fee per hectare irrigated despite the actual consumption of water. Yet, the wells group and the CFE have not negotiated the payment of the debt the users have accumulated. Given the involvement in the asparagus production of basically all the well groups partners, this achievement directly strengthens and brings economic advantages to the members of the cooperative. The current fee the wells representatives agreed with the CFE is lower than the average bills delivered before reaching the deal. The debt does not increase anymore and the tension between the CFE and the farmers reduced.

Similarly, irrigation technological improvements would be likely to give advantages to the asparagus producers. While I was in Mexico, the wells users were organising themselves to complete the necessary bureaucracy to obtain government subsidies to adopt drip irrigation. SAGARPA sustains this technology adoption providing 50% of the costs faced by a farmer until a maximum of 25.000 MXN (about 1.300 U.S.A. dollars) per hectare. Hopefully, drip irrigation facilities will be installed and functioning by summer of 2018, in time for another asparagus harvest. Each partner shall install the drip irrigation system on two hectares. While the questionnaires have revealed a positive evaluation on current irrigation uses, semi-structured interviews and informal talks have clearly showed willingness to shift to drip irrigation but few informants have reported their concerns about the impossibility of affording the investment required given too low earnings from the asparagus sales. At the same time, other informants explained the potential they see behind this technological improvement. Instead of considering primarily the water saving advantages given the depletion issue faced in the area, they see it as an efficiency-oriented tool in terms of possible expansion of irrigated land and thus asparagus production as they would irrigate, say four hectares, with the water they currently use to irrigate two hectares. However, this would necessitate further investments that likely not every well user could face. This might represent another different form in which “accumulation from below” occurs. Irrigation practices are already creating some tensions among groundwater users. While some claim that others abuse of groundwater, the latter ones blame the others for wasting a lot of water that does not reach the furrows. The “abuse” some refer to can possibly be explained by the production practices. Asparagus is a crop that does not need a monthly irrigation shift like alfalfa. Yet, in the harvest season, simultaneous to the rains period, monthly irrigation shifts are constant unless heavy rainfall. Exploiting the humidity of the land, more hectares can be irrigated as the water flows more. As many land acquisitions took place around the wells area and the land buyers became also partners of the wells groups, the irrigation hours they get the right on are probably enough to extend to irrigate

larger surface than what is expected. Moreover, different financial capital availability might increase the inequality among the producers if some would decide to install drip irrigation facilities over more hectares, possibly by transporting water to other area by use of tubes (informant no. 63). If that would happen, both organisational and technical control over groundwater would probably need some adjustments that take into account the relations within the *ejido*.

Finally, the evolution of the cooperative cannot be considered without taking account the international market dynamics, specifically the asparagus chain. Once, I visited the packaging during the presentation of a new mechanic machinery that speed up the selection process of the vegetable. All the asparagus producers that bring their product there and potential new ones went to see this. Besides the *ejidatarios* of *Jesús María la Petaca*, all the others belong to the private and large commercial farms sphere. If the U.S.A. and Canada markets get saturated but the offer keeps increasing through enterprises that navigate into the international markets for more time and with higher volumes, how might the producers from *Jesús María la Petaca* adapt to it? “Cash crops diversification for us is quite difficult. We work quite safely with this product because of our establish experience and networks. If we start producing another crop, asparagus one would be limited because of little land and water resources. Moreover, would we be able to produce enough to satisfy a niche of the market?” (informant no. 63). The impression is that the group will try to reinforce their asparagus production. “I would like to diversify more, but it is not easy and the older ones do not seem very up to” (informant no.3).

## 5.6 Conclusion

This chapter addresses the research questions SQ<sub>2</sub>: How are these changes in access to land and groundwater interrelated with the transformation of agricultural production practices in the researched *ejido* since the mid-1990s? Presenting the history of the asparagus producers cooperative has revealed both how the production of a NTC emerged in the *ejido* and how access to land and groundwater resources is highly interrelated with agriculture production practices in *Jesús María la Petaca*. Mexican land reforms were the first driver to enhance land transactions in the *ejido* in the late 1990s. Later, different types of capital (*livelihood resources*) started to have a different role in *Jesús María la Petaca*, modifying agriculture production practices. Through the reforms, outside financial *capital* could quite easily benefit of the then-established land market as many *ejidatarios* could not make their living on agriculture alone. An outside investor with a relevant experience in the asparagus production sector could acquire several irrigated parcels in which he started the asparagus production together with two *ejidatarios* in 1998. The *ejidatarios* could take advantage of the *knowledge* regarding the asparagus production process as well as the favourable international *market* conditions of this crop. The three early producers strengthened their collaboration to export to the U.S.A. while enlarging the cultivated surfaces and increasing their production. For a while, no other farmers decided to join the group. Instead, many wells partners kept selling or renting out their parcels to the early asparagus producers who could accumulate larger shares of *natural capital*. Since 2005, more farmers started to join the group of which organisation is mainly managed by members of the initial producers’ households. Their *authority* concentration within the group is evident as only the three early producers play *de facto* a fundamental role in managing the different phases of asparagus production. *Social capital* played a major role to reinforce the initial collaboration that keeps shaping unbalanced power relationships within the group. Yet, *social relations* still have a fundamental function for the collective action of the group as the more

experienced farmers initially help the newcomers by providing them with seeds, know-how and equipment, ensuring access to *physical capital*. At the same time, indirect producers – partners of direct farmers or land owners who rent out the land as they lack financial capital and labour force - become relevant actors to let the association accrue its production.

The expansion of the association made almost disappear the traditional cultivation of alfalfa, sold as feed for cattle in the past and now substituted by asparagus. Only three farmers are also involved in a small and individual chili production. To some extent, these production shifts made land and groundwater resources concentrate in the hands of few producers who are the first ones who started the cultivation of the “green gold”. This chapter has shown how agriculture activities can play a major role in the livelihood strategies of rural households. Despite this important role, agriculture is often not the only income source for many of the 13 producers of the cooperative, though. Other income sources are necessary for many families due to the social differentiation within the group. Some could expand their asparagus production but the majority has probably reached its maximum due to the lack of financial capital as well as land and groundwater resources. The limited capacity to expand the asparagus production means that it is difficult that the whole group can further agriculture diversification, limiting their dependence on only one output market.

## 6. Livelihood patterns in *Jesús María la Petaca*

The explanation of the asparagus cooperative dynamics emerged in *Jesús María la Petaca* partly shows the evolution of production practices and thus livelihood strategies in the *ejido* as result of the agrarian policies carried out in Mexico especially in the 1980s and 1990s. Overall, the members of the asparagus association place agriculture production at the core of their livelihood strategies. Yet, the majority of the population of the *ejido* has been excluded from the possibility of drastically change their agriculture production practices due to the reforms that have shaped access to land and water across the country. This chapter investigates how livelihood strategies of those who are not directly involved in the asparagus production have changed over time. The data presented report also the asparagus growers who took the survey in order to compare the main household groups identified. Five groups are distinguished according to the relevance of the main activities - in terms of income sources and activities undertaken- carried out by the households' members.

### 6.1 Livelihood resources

Assessing livelihood resources distribution in the context studied helps understanding the social reproduction of a community. This sub-section provides a first basic overview of livelihood resources in *Jesús María la Petaca* before presenting the livelihood strategies undertaken by the informants' households I interacted with. The concept of household can be defined in several ways and there is not just one accepted definition (de Janvry and Sautolet, 2016). Yet, among the most common interpretations of household, economists tend to think of the household as “a group of people who jointly make decisions regarding production (or income generation), consumption and reproduction (through demographic and investment decisions)” (Ibid.: 780) whilst anthropologists tend to see the household as a group of people who eat from the same pot. In this thesis, household refers to the people living under the same roof. Basic human information has been questioned only with respect to these people. Yet, given the importance of migration decisions in the area and the attention to livelihood diversification in the population sampled, questions regarding family members who live outside the *ejido* were asked to understand the dynamics behind migrations patterns and, especially, financial capital flows and transnational social capital important. Firstly, table 6.1 summarises basic information about the 47 informants who do not belong to the asparagus producers cooperative or are not considered fully member.

**Table 6.1 Basic information of 47 non (direct) asparagus producers informants**

	Observations	Mean/Percentage	Minimum Value	Maximum Value
<b>Gender: Male (%)</b>	47	82.6		
<b>Age (Years)</b>	47	59.63	29	82
<b>Household size (Persons)</b>	47	4.87	1	10
<b>Education (%)</b>				
No education	47	41.4		
Primary school not completed	47	32.8		
Primary school	47	17.1		
Secondary school not completed	47	2.1		
Secondary school	47	6.4		
Preparatoria	47	0.0		
University	47	0.0		
<b>Place of Residence (%)</b>				
<i>Pozo de Balderas</i>	47	31.9		
<i>Jesús María</i>	47	40.4		
<i>Los Rodriguez</i>	47	6.4		
<i>Loma de Cocina</i>	47	14.9		
<i>El Ocote</i>	47	6.4		
<b>Land Size (ha's)</b>				
Cultivated land size*	47	13.26	0	60
Owned land size	47	10.78	0	24
<b>Access to water: yes (%)</b>	47	21.3		
<b>Livestock ownership: yes (%)</b>	47	76.6		
* Data refer to 2016. Worked land refers to land worked by the informant's household.				

Source: own survey

Chapter 4 has helped to understand of how access to land and groundwater resources has changed over time in the *ejido* proving how the access itself has to be considered a crucial asset for livelihood strategies (Nunan, 2015). In particular, access to groundwater makes the difference between pursuing profit-oriented agriculture activities or self-subsistence strategies. Groundwater is one of the linking points between the SLA and the historical pattern described throughout the thesis to understand current livelihood strategies. As reported in table 6.1, 10 out of 47 informants declared to have access to groundwater. Nine of them belong to the two groups of users of the wells located in the *ejido*. Seven are partners of the well number 5 while two belong to the group of the well number 8. Only one is not officially an user of the well but can use groundwater as partner of an asparagus producer who uses his land whilst sharing costs and revenues with the partner. Among the nine groundwater users, two can irrigate only 1 hectare, two can irrigate 2 hectares and five irrigate a maximum of 3 hectares. However, only two people are the actual users of the groundwater as they grow alfalfa to feed their livestock. The others rent out their land to asparagus producers and



thus the irrigation hours they have the right to according to their weight – in terms of the amount of hectares that can be irrigated - as well partner.

Besides access to groundwater, other livelihood resources influence and explain livelihood strategies. For this reason, all the 58 informants are divided in five clusters according to the livelihood strategies undertaken. The groups are named 1) Asparagus farmers with agricultural diversification 2) Asparagus farmers with livelihood diversification 3) On-farm 4) Diversification 5) U.S.A. The first two groups are made by the members of the asparagus producers' cooperative discussed in chapter 5 and count on 6 and 5 households respectively. Group 3 is composed by thirteen households that rely mostly on on-farm activities. Group 4 is the largest cluster and it is made by 22 households that make their living mostly on off-farm activities. Finally, 12 households compose the last group of which financial sources come from the U.S.A., in the form of remittances, pension and seasonal agrarian wage labour. An overview of livelihood resources is insightful to grasp the livelihood strategies of each group discussed in sub-section 6.2. I first present several tables regarding different types of capital. Table 6.2 shows some information about human and social capital of the first two clusters.

**Table 6.2 Human and social capital, groups 1 - 2**

	<b>Group 1</b> <b>N = 6</b> Asparagus farmers with agricultural diversification	<b>Group 2</b> <b>N = 5</b> Asparagus farmers with livelihood diversification
<b>Gender (%)</b>		
Male	100	80
<b>Age (years)</b>		
Mean	52.5	55.6
<b>Household Size (persons)</b>		
Mean	7	4
<b>Education (%)</b>		
No Education	50	20
Primary not completed		60
Primary	16.7	
Secondary not completed		
Secondary	16.7	20
<i>Preparatoria</i>	16.7	
<b>Place of Residence</b>		
<i>Pozo de Balderas</i>	83.3	60
<i>Jesús María</i>	16.7	20
<i>El Ocote</i>		
<i>Loma de Cocina</i>		
<i>Los Rodriguez</i>		20
<b>Land Entitlement (%)</b>		
<i>Ejidatario/a</i>	100	60
<i>Posesionario/a</i>		20
<i>Avecindado/a</i>		20
<b>Professional Background (%)**</b>		
On-farm	33.3	20
Livestock (milk+ cattle market)	16.7	0

Off-farm	50	80
<b>Relatives Abroad [yes= 1 (%)]</b>	83.3	80
<b>Member of Economic Organisation (%)</b>	100	100

Source: own survey

Group 1 presents the highest average household size (7), implying higher chance of labour force presence especially in the labour-intensive asparagus season, the harvest period. On the contrary, group 2 has a lower average household size (4) and many members are involved in off-farm activities. Low education levels are recorded. Half of group 1 members and 60% of group 2 did not attend school. Yet, to group 1 belongs the only informant who attended the *preparatoria*. He plays a major role in the asparagus producers' organisation as responsible of bookkeeping, intermediary between the producers and the packaging companies and representative of a well. The place of residence is interesting with respect to membership into the asparagus producers' association and access to groundwater. The majority of the cooperatives come from *Pozo de Balderas* (83.3% of group 1 and 60% of group 2) and *Jesús María* (16.6 % and 20% ). It is confirmed that almost all the households in which agriculture is relevant in terms of income source come from *Pozo de Balderas*, the community of which farmers got access to groundwater later than the others. This facilitates the relations between the group members and eased the enlargement of the association.

Professional background data can be slightly misleading. Data regard the informants and they do not say much about the household professional background. The off-farm background of group 1 (50%) refers to migration to the U.S.A. and non-agrarian wage labour of current asparagus growers whose parents were working alfalfa in the past. They are all major brothers so that they took over land management from their parents. The two farmers with a background in on-farm activities, instead, saw asparagus as the mean to diversify their agricultural livelihood strategy, moving from alfalfa to asparagus and chili or from just alfalfa production aimed at feeding livestock to asparagus coupled with a reduced alfalfa production. A similar pattern is observed also in group 2 in which originally off-farm farmers moved back from the U.S.A. in the early 2000s. Moreover, the presence of one *poseionario* is reflected in the off-farm background presence. Expectedly, all the members of both groups belong to an economic organisation in the *ejido*. Finally, many informants declare to have relatives in the U.S.A., a confirmation of the high migration rates from the communities to the U.S.A. Yet, it will be shown how relatives abroad do not imply large flows of remittances for this group except for one case. Still, two asparagus producers received a loan from relatives in the U.S.A. to start the asparagus business while the others who spent many years there made use of the earnings generated *al norte*. Land entitlement data are included as indicator of how the legal framework influences access to land resources in the *ejido*. Professional background refers to the main activity in terms of time spent and income source undertaken in the past by the informants. It is interesting to look at this in order to understand current households' livelihood strategies and how they changed over time. Having relatives abroad strengthen transnational networks and can imply remittances inflows. Finally, membership into economic organisation refers to the asparagus producers' association as well as a milk producers' group that work together to transport the product to the livestock centre of the area. Participation into these groups entail both economic advantages and reinforce the social cohesion of the communities.

Next, table 6.3 presents the human and social capital information about the groups 3,4 and 5.

**Table 6.3 Human and social capital, groups 3 - 5**

	<b>Group 3</b> <b>N = 13</b> On-farm	<b>Group 4</b> <b>N= 22</b> Diversification	<b>Group 5</b> <b>N = 12</b> U.S.A.
<b>Gender (%)</b>			
Male	92.3	86.4	81.8
<b>Age (years)</b>			
Mean	58	53.68	60.27
<b>Household Size (persons)</b>			
Mean	4.07	5.09	3.81
<b>Education (%)</b>			
No Education	61.5	45.5	27.3
Primary not completed	7.7	31.8	54.5
Primary	30.8	18.2	
Secondary not completed			8.3
Secondary		4.5	8.3
<i>Preparatoria</i>			
<b>Place of Residence (%)</b>			
<i>Pozo de Balderas</i>	76.9	22.7	8.3
<i>Jesús María</i>	15.4	40.9	66.7
<i>El Ocote</i>		13.6	
<i>Loma de Cocina</i>	7.7	18.2	16.7
<i>Los Rodriguez</i>	7.7	4.5	8.3
<b>Land Entitlement (%)</b>			
<i>Ejidatario/a</i>	76.9	95.5	83.3
<i>Posesionario/a</i>	15.4		8.3
<i>Avecindado/a</i>	7.7	4.5	8.3
<b>Professional Background (%)</b>			
On-farm	15.4	13.6	27.3
Livestock (milk+ cattle market)	61.5	9.1	18.2
Off-farm	23.1	77.3	54.5
<b>Relatives Abroad [yes= 1 (%)]</b>	53.8	40.9	100
<b>Member of Economic Organisation (%)</b>	53.8		

Source: own survey

The dimensions of these groups are higher than the first two with populations of 13, 22 and 12 households respectively. Group 3 and group 5 present the highest informants' age mean (58 and 60.27) and relatively low household dimensions (4.07 and 3.81) while group 4 average size (5.09) is the second highest of the five groups. Informants' education levels are quite low as "No education" (61.5%, 45.5% and 27.3%) and "Primary not completed" (7.7%, 31.8% and 54.5%) represent the majority of the informants. Once again, place of residence information seem to confirm that *Pozo de Balderas* is the community mostly enabled to pursue agriculture-oriented livelihood strategies as 76.9% of the households of the on-farm group comes from *Pozo de Balderas*. Group 4 is the only one in which people from all the five places inserted in the questionnaire are present. In the group "U.S.A.", 66.7% of the households come from *Jesús María*, the largest community of the *ejido* of which population benefitted especially from the first government plans to provide each farmer with irrigation capacity. Off-farm backgrounds of the last two groups (77.3% and 54.54%) seems confirming the fact that on-farm activities were constrained by the diminishing possibility to access

groundwater. Members of the “Diversification” groups declare the lowest percentage (40.90%) of relatives living abroad. This makes hypothesize that diversification occurs mainly through wage labour in the area. Not surprisingly, no member of groups 4 and 5 is member of economic organisation while 53.8% of the group “On-farm” do belong to economic organisation, the milk producers’ association. To better grasp the livelihood patterns of each group, natural capital information are reported. Table 6.4 is dedicated to natural capital assets of groups 1 ad 2. Attention is to livestock and land and groundwater resources.

**Table 6.4 Natural capital groups 1 - 2**

	<b>Group 1</b> <b>N = 6</b> Asparagus farmers with agricultural diversification	<b>Group 2</b> <b>N = 5</b> Asparagus farmers with livelihood diversification
<b>Land (ha’s)</b>		
Cultivated area mean	14.83	9.01
<b>Water</b>		
Well partners (%)	100	100
Indirect access (%)		
Irrigated worked surface	53	21
<b>Livestock*</b>		
Cow [yes=1 (%)]	16.7	20
Average (number of head)	10	1
Sheep [yes=1 (%)]	50	20
Average (number of head)	31.66	50
Goat [yes=1 (%)]		
Average (number of head)		
Pig [yes=1 (%)]		
Average (number of head)		
*Livestock ownership that can entail income revenues. Average cows value is estimated in 13.000 MXN (675\$), sheep and goat value in 1.200 MXN(62\$) and pigs meat sale 70 MXN/kg.		

Source: own survey

Between the first two groups, it does not surprise that the average cultivated land of group 1 (14.83 ha’s) is higher than the mean of group 2 (9.01 ha’s). Two of the farmers of group 1, in fact, are early asparagus producers who could lead an *agricultural extensification* over time by accumulating land and groundwater resources together with the *posesionario* not included in the survey. For the households of group 1 that joined the cooperative later and could not enlarge their working land, asparagus production became a way to diversify agricultural practices. On the other hand, asparagus production for group 2 households is part of broader livelihood strategies that seek financial sustainability through complementary off-farm activities. With respect to access to groundwater, the eleven asparagus producers are groundwater users. The total irrigated surface of group 1 (53 ha’s) is larger than group 2 (21) mainly due to the fact that no member of group 2 works land of other landlords. Finally, livestock ownership is very limited for these two clusters, symptom of a diminishing involvement in livestock-related activities and of the idea that this activity might be

further reduced (informants no. 12 and 32). Among those who own cattle (16.7% and 20% of the first two groups' members), average ownership equals 10 and 1 heads respectively. With respect to sheep, 50% and 20% possess some of them and the averages are 31.66 and 50 heads. Despite low livestock possessions, it will be shown how milk production is still important for some asparagus producers. Next, table 6.5 focuses on the other 3 groups.

**Table 6.5 Natural capital, groups 3 - 5**

	<b>Group 3</b> <b>N = 13</b> On-farm	<b>Group 4</b> <b>N = 22</b> Diversification	<b>Group 5</b> <b>N= 12</b> U.S.A.
<b>Land (ha's)</b>			
Cultivated area mean	17.38	10.17	8.41
<b>Water</b>			
Well partners (%)	61.5		8.3
Indirect access (%)	7.7		
Irrigated worked surface (ha's)*	9		0
<b>Livestock</b>			
Cow [yes=1 (%)]	84.6	31.8	50
Average (number of head)	20.73	32.86	11.5
Sheep [yes=1 (%)]	61.6	63.6	25
Average (number of head)	92.25	23	30
Goat [yes=1 (%)]	7.7	13.6	
Average (number of head)	8	12.33	
Pig [yes=1 (%)]	7.7		
Average (number of head)	12		

Source: own survey

Table 6.5 shows that group 3 presents the largest cultivated land size (17.38 ha's) while group 5 the lowest one (8.41 ha's). In between, group 4 presents a value of 10.17 ha's. More than half (61.5% of the households of the group "On-farm" are partners of wells' groups. Yet, only 9 ha's are directly irrigated by some of them. The majority is rented out to asparagus producers. Only one informant of group 5 is partner of a well but its household rents out the irrigated land. Livestock play an important role for these clusters with 84.6% of the "On-farm" group possessing, on average, 20.73 cows. In the same group, 61.6% households own, on average, 92.25 sheep. Within the "Diversification" cluster, 31.8% of households possess 32.86 cows and 63.6% own 23 sheep. Finally, 50% of the "U.S.A." group presents the lowest cattle ownership (11.5) among these clusters and 25% of the households have, on average, 30 sheep.

Before moving to livelihood strategies analysis, attention is given to financial resources. Financial resources refer to savings, access to credit and money inflows except for income sources. Yet, formal access to credit through appointed institutes has been very rarely recorded. More information about remittances, pensions and government-based subsidies inflows were collected. Table 6.6 presents these information for the first two groups.

**Table 6.6 Financial capital groups 1 - 2**

	<b>Group 1</b> <b>N = 6</b> Asparagus farmers with agricultural diversification	<b>Group 2</b> <b>N = 5</b> Asparagus farmers with livelihood diversification
<b>Income supports (MXN)</b> <i>Proagro Productivo</i> [yes= 1 (%)] Average year amount <i>Oportunidades</i> [yes= 1 (%)] <b>Elderly age</b> [yes= 1 (%)]**	83.3 6.660 (323\$)	80 8.250 (404\$)
<b>Remittances reception</b> [yes= 1 (%)] Average amount	16.7 Unknown	20 Unknown
<b>Pension</b>		

Source: own survey

The agriculture-related income support Proagro Productivo is received by all the households except for two, one per group. This is explained by the fact that one informant of group 2 is an *avecindado* who does not own some necessary documents while in group 1 the support is not directly received by an informant who works his father land. Group 2 shows the highest average per year (8.250MXN). Group 1 and 2 are the only two clusters in which no member receives the *oportunidades* cash transfer nor the elderly age support despite personal requirements such as age, school enrolment of the youths, and female fertility age are often met. The Secretariat of Social Development provides the elderly age support to people older than 65 years old every two months. Its amount equals 1160MXN per person. A relatively financial better-off possibly explains this as the monthly well-being of these groups is likely to be higher than the minimum required (1.092 MXN per month with respect to the elderly age, 1.054 MXN for *oportunidades* at March 2018). Finally, remittances do not play a major role in income sources for these groups. The lack of precise information about the amounts received is due to the fact that they do not received them constantly. This differs for the remaining 3 groups.

**Table 6.7 Financial capital groups 3 - 5**

	<b>Group 3</b> <b>N = 13</b> On-farm	<b>Group 4</b> <b>N = 22</b> Diversification	<b>Group 5</b> <b>N= 12</b> U.S.A.
<b>Income supports (MXN)</b> <b>Proagro Productivo</b> [yes= 1 (%)] Average amount <i>Oportunidades</i> [yes= 1 (%)] Average two-months amount <b>Elderly age</b> [yes= 1 (%)] Average two-months amount	92.3 7.700 (377\$) 7.7 Unknown 15.38 825(40\$)	80 7.643 (374\$) 27.27 1.442 (75\$) 31.31 2.154 (111\$)	72.72 5.895 (306\$) 16.66 1.500 (78\$) 33.33 1.740 (90\$)
<b>Remittances</b> [yes= 1 (%)] Average monthly amount (MXN)	15.38 Unknown	9.09 12.780 (665\$)	83.33 7.582 (394\$)



<b>Pension [yes= 1 (%)]</b>	7.7		8.33
Average monthly amount (MXN)	Unknown		15.400 (800\$)*
*Received in the U.S.A by a <i>posesionario</i> who has double nationality.			

Source: own survey

Not surprisingly, government income supports are more recurrent in these groups. Among the households that receive Proagro Productivo, the average year values are 7.700, 7.643 and 5.895 MXN. *Oportunidades* is received by one household in group 3, six in groups 4 and two in group 5. It is mainly used to sustain the education costs of the youths, increasing the human capital. On the other hand, elderly age support can help sustaining health costs and it is received respectively by two, seven and four households per group. Government support is strictly related to social network, social cohesion but also production practices within the *ejido* for several reasons. Firstly, until few years ago, the subsidies were collected by a unique person who was then in charge of distributing the cash payments to the recipients (informants no.3 and 4). Now, each beneficiary has to fill in some bureaucracy to directly receive the supports. People more experienced with these issues tend to have consolidated relations with SAGARPA's officers that facilitate the request and transfer of the payments. Hence, one *ejidatario* is in charge of facilitating the communication between SAGARPA and the other *ejidatarios* and *posesionarios*, notifying them regarding the practices they have to follow. Yet, some beneficiaries ask help to farmers more used to deal with these issues to fill in the papers, often paying a little commission to them (informant no.4, 37 and 47). The importance of these cash transfers are even more relevant considering how difficult is accessing credit for these households. During my fieldwork, I have recorded only one case of bank loan received aimed at an economic activity, the enlargement of the asparagus area of a member of the cooperative (informant no. 38). Besides that, many reported to ask a relative or a friend a support if needed for economic activities while asking small loans to a local bank occurs for occasional domestic expenditures such as fixing or buying appliances (informants no. 8, 39 and 29). Possibly, the commercial farms some informants work for might allow the concession of small loans if requested by their employees or the withdraw of part of the money deposited in pension funds (informant no. 37). Few labourers have access to these mechanisms, though, as it requires a relatively stable working relation while many workers are employed seasonally.

Finally, remittances play a very important role to sustain the economy of many households as well as to increase social capital. In group 3, only two members mentioned to receive remittances occasionally. In group 4, two members can rely on money sent by children in the U.S.A. The average amount received is 12.780 MXN per month. Expectedly, 83.33% of the members of group 5 receive remittances with a monthly average value of 7.582 MXN. The remaining two households count on a pension earned in the U.S.A. and seasonal migration al *norte*. Remittances are often used to build up houses for families migrated in the U.S.A. that would like to get back. Yet, "Who knows whether they really came back. Life there is tough but gives you more chances. Some might have thought of building an house here or have started to build it up but then they do not come back" (informant no. 68). Remittances can be used collectively to pursue the construction of building with common interest such as the church of *Pozo de Balderas*. Social capital coupled with economic capital can strengthen also the public capital, the capital resources used by the government to affect economic growth and productivity (de Haan et al., 2008). For Instance, the paving of the dirt road that connects the *ejido* to the close village of *Los Rodriguez* started at the end of 2017 through the collection by the families of the *ejido* that cover the costs not covered by the government. Similarly,

families of *Pozo de Balderas* financially sustain and directly work to make a square in front of the church of the community so that people can gather. “Yet, many do not like paying for common goal as they reckon we [the people in charge of collecting money and representing the community to the municipality of San Miguel de Allende] steal the money” (informants no. 10 and 49). With respect to that, it can be useful to better understand how the *ejido* and each community belonging to it are organised. The *ejido* structure implies the existence of more organisations within one. Each community has a delegate elected by the communal assembly which is called in order to discuss the basic needs of the community, such as potable water and electricity bills payments, schooling and problematic issues such as abuse of potable water to irrigate private gardens where some households grow vegetables for own consumption and thefts of livestock. Instead, from a mere *ejido* point of view, the main authority is the assembly in which *ejidatarios* discuss issues regarding common land management (Amado et al., 2012), notify land transactions and discuss whether or not accept government programmes such as PROCEDE and *dominio pleno*. Thus, the assembly is the “principal decision-making body” within the *ejido* according to the law (Haenn, 2006:138). At the assembly, *posesionarios* are not allowed to participate unless the assembly decides differently in order to increase the participation, generally diminished in the *ejidos* due to migration patterns and the diminished decision-making power the assembly has (informant no. 66). Possibly, attempts aimed at modifying the decision-making processes within the *ejido* might shape new forms of collaboration with respect to natural capital and by that agricultural practices.

Armed with these information regarding livelihood resources of each group of the total population, livelihood strategies of each cluster are discussed.

## 6.2 Livelihood strategies

Scoones (1998) depicts agricultural *extensification-intensification*, *livelihood diversification* and *migration* as possible livelihood strategies trajectories identified in rural settings as combination of the different capitals possessed. The comparative analysis of different types of capital for each cluster already shows how all of these strategies are undertaken in *Jesús María la Petaca*. Given the importance of agricultural practices, attention is first given to the use that the households do of their natural capital possessions. Details regard the land transactions undertaken since 1998, the crops cultivated and the use of livestock. Table 6.8 focuses on the asparagus producers belonging to the first two groups.

**Table 6.8 Agricultural livelihood strategies groups 1-2**

	<b>Group 1</b> <b>N = 6</b> Asparagus farmers with agricultural diversification	<b>Group 2</b> <b>N = 5</b> Asparagus farmers with livelihood diversification
<b>Land transactions</b>		
Buyer (%)	16.7	20
Surface (ha's)	4	7.5
Seller (%)		
Surface (ha's)		
Renting in (%)	50	
Surface (ha's)	26	
Renting out (%)		
Surface (ha's)		
<b>Crops</b>		
<i><b>Asparagus</b></i>		
Producers (%)	100	100
Total surface (ha's)	49	17
<i><b>Maize</b></i>		
Producers (%)	83.33	60
Total surface (ha's)	24	14.5
<i><b>Beans</b></i>		
Producers (%)	66.6	60
Total surface (ha's)	14	8
<i><b>Alfalfa</b></i>		
Producers (%)	50	
Total surface (ha's)	3	
<i><b>Chili</b></i>		
Producers (%)	33.33	20
Total surface (ha's)	4	1
<b>Livestock</b>		
Milk producers (%)	33.3	20
Average weekly production (ltr)	196	70
Cattle market participation (%)	66.66	40

Source: own survey

First of all, it can be noted that no member of the two groups carried out any land transactions aimed at reducing the cultivated area. Land transactions recorded refer only to enlargements of the surfaces worked. In particular, one member of group 1 bought 4 hectares while one member of group 2 acquired 7.5 hectares. Besides, 3 members of group 1 rent a total surface of 26 hectares, 23 of which concentrated in the hands of two early asparagus producers. Obviously, asparagus is grown by all the members of these two groups. Yet, the asparagus surface (49 ha's) cultivated by the first group producers is almost three times larger than the area worked by the second group (17 ha's) despite the fact that the two groups dimensions differ of only one person. Besides asparagus production, two households of group 1 grow chili, two cultivate alfalfa while two other households combine farm activities with milk production. This heterogeneity is given by the different capitals

possessions. On one hand, the early asparagus producers accrued their surfaces placing asparagus production at the core of their strategies. On the other side, asparagus production became the way to diversify agricultural practices for other members of group 1 or broader livelihood strategies for group 2 households. In fact, only one household of group 2 is involved in profitable agricultural practices that are chili and milk production. Yet, remittances play a major role in this household as the land cultivated by the male head of the household is limited to 3 hectares and milk production is not sufficient to entail enough income. Next, table 6.9 provides with more details about the income sources of the first two groups.

**Table 6.9 Income sources, groups 1 - 2**

		<b>Group 1</b> <b>Observations = 6</b> Asparagus farmers with agricultural diversification	<b>Group 2</b> <b>Observations = 5</b> Asparagus farmers with livelihood diversification
<b>Agricultural income sources (%)</b>			
	Sale of:		
	Asparagus	100	100
	Chili	33.3	20
	Alfalfa	33.3	
	Wheat		
	Beans	16.6	20
	Maize		50
	Milk	33.3	20
<b>Other income sources (%)</b>			
	Renting out equipment	66.6	
	Renting out land		
	Own business		40
	Agrarian wage labour		40
	Non-agrarian wage labour		20

Source: own survey

Chili, alfalfa and milk production strengthen the importance of agriculture for economic purposes for the two groups while large participation into maize and beans generally aims at self-consumption. Expectedly, members of group 1 possess more agriculture machinery that is rented out in order to increase their incomes. On the contrary, no household of group 2 declared to rent out agricultural equipment. Instead, two asparagus producers of group 2 depend on members of group 1 to work their fields. The off-farm diversification of the second group occurs as follows. Two households run a grocery shop, one in *Pozo de Balderas* and one in *Los Rodriguez*. Two asparagus producers work in commercial farm throughout the whole year and other members of the households work in packaging and transport companies as the on-farm work is quite limited to the harvest period. Finally, non-agrarian wage labour regards one asparagus producers whose children spend several months in the U.S.A. from where they send remittances.

Table 6.10 gives attention to the agricultural livelihood strategies of the last three groups.

**Table 6.10 Agricultural livelihood strategies groups 3-5**

	<b>Group 3</b> <b>N = 13</b> On-farm	<b>Group 4</b> <b>N = 22</b> Diversification	<b>Group 5</b> <b>N= 12</b> U.S.A.
<b>Land transactions</b>			
Buyer (%)	53.8	4.54	8.3
Surface (ha's)	54	12	3
Seller (%)	38.5	22.7	8.3
Surface (ha's)	15.5	19.5	3
Renting in (%)	53.8	9.09	
Surface (ha's)	73.5	33	
Renting out (%)	46.2		25
Surface (ha's)	15		9
<b>Crops</b>			
<b>Maize</b>			
Producers (%)	92.3	90.90	83.3
Total surface (ha's)	172	113.5	82
<b>Beans</b>			
Producers (%)	23.0	77.27	16.6
Total surface (ha's)	4.5	72.75	4
<b>Alfalfa</b>			
Producers(%)	30.8		
Total surface (ha's)	4		
<b>Wheat</b>			
Producers (%)	15.38	18.18	8.33
Total surface (ha's)	7.5	22.5	4
<b>Oat</b>			
Producers (%)	38.5		16.66
Total surface (ha's)	18		9
<b>Barley</b>			
Producers (%)	7.7		
Total surface (ha's)	20		
<b>Sorghum</b>			
Producers (%)		4.54	8.33
Total surface (ha's)		15	2
<b>Livestock</b>			
Milk producers (%)	53.84		
Average weekly production (ltr)	577		
Cattle market participation (%)	100	63.63	50

Source: own survey

Table 6.10 clearly shows that group 3 is the most dynamic group in terms of land market within the *ejido* as it is involved in all the land transactions recorded. On one hand, more than half (53.8%) of the members enlarged the working surface either acquiring land parcels (totally 54 ha's) or renting in other plots (73.5 ha's). This explain why the households of the group "On-farm" work, on average, the largest area (17.38 ha's). At the same time, many transactions that involve members of this group are meant to reduce the working surface. Overall, 38.5% households sold 15.5 hectares while 46.2% of the households rent out 15 hectares. Such dynamicity is based on the types of surfaces and households involved. In fact, the acquired and rented surfaces are concentrated in the

hands of producers who rely on rainfed parcels and that tend to work more land to get enough surplus or to grow more feed for cattle (oat, sorghum but also stubble from maize fields). With very limited direct use of groundwater (4 ha's) and with a the possession of livestock by the whole group, livestock is clearly the main asset for this group and four of the six milk producers own milking machinery, not possessed by any of the asparagus producers who produce also milk. Relatively high presence (61.5%) of farmers with access to groundwater is crucial to understand the importance of livestock for the livelihood pathways of this group. Groundwater has ensured cattle feed harvests and thus milk production. On the other hand, landlords who lack labour force in their households rent out irrigated land to asparagus producers in order to get income while keeping possession of land and groundwater resources. This strategy is pursued by milk producers who used to grow alfalfa for cattle feed. In order to avoid to deprive their households of natural capital, they preferred to quit alfalfa production and use the revenues coming from the sharecropping deals to acquire the cattle feed needed. Only one farmer of group 3 plans to break the deal in order to become member of the asparagus producers group. To do so, he has to wait until the end of the asparagus cycle sowed on their land as this is a perennial crop. Thus, one *ejidatario* (informant no. 17) will work his own asparagus from next year. Similarly, a *posesionario* (informant no. 56) who rents out land and is inserted into group 5, reckons he has to wait some four years more when it will be the time to plant the asparagus again and he will face all the initial investments costs.

To conclude the overview regarding land transactions, few more agreements are recorded. In the group "Diversification", 22.7% households sold a total of 19.5 hectares while only one household of group 5 sold the entire land possession of 3 hectares. Moreover, in the group "Diversification" nobody rents land out. This stresses the importance of working rainfed-based land for self-consumption purposes. On the contrary, 3 households of group 5 rent out land to asparagus producers as these parcels are close to the wells and can be irrigated. With respect to transactions aimed at enlarging the working surface, 12 hectares were acquired by an household of group 4 and 3 hectares by the *posesionario* of group 5. Finally, it does not surprise that no household of group 5 rents in land parcels as they depend mostly on remittances coming from the youth living in the U.S.A. Instead, in the group "Diversification", two households work 33 rented hectares. Table 6.11 gives more details about the importance that cultivations – together with other activities - have in terms of income sources for the groups 3,4 and 5.



**Table 6.11 Income sources, groups 3-5**

		<b>Group 3</b> N = 13 On-farm	<b>Group 4</b> N = 22 Diversification	<b>Group 5</b> N = 12 U.S.A.
<b>Agricultural income sources (%)</b>				
Sale of:	Asparagus*	53.8		8.33
	Chili			
	Alfalfa	7.7		
	Wheat	7.7	4.54	
	Barley	7.7	4.54	8.33
	Beans	7.7	13.63	
	Maize	23.1	27.27	16.16
	Milk	53.8		
<b>Other income sources (%)</b>				
Renting out equipment		7.7		8.33
Renting out land				8.33
Own business			13.63	16.66
Agrarian wage labour		15.4	45.45	
Non-agrarian wage labour		15.4	54.54	
<p>*As partners who rent out the land and get part of the asparagus sales revenues. For this reason their income source is not included in “renting out land” entry in group 3. On the contrary, one <i>posesionario</i> belonging to group 5 receives a fixed amount by an asparagus producer who rents his land.</p> <p>**Received in the U.S.A. by a <i>posesionario</i> who has dual nationality (Mexico and U.S.A).</p>				

The income sources of the other three groups are more variegated than the first two clusters. With respect to agricultural income sources, revenues from asparagus production are still relevant for seven households of group 3 (53.8%) and one of group 5 (8.3%). This is due to the sharecropping deals between seven households of the group “On-farm” with the asparagus producers of the first two groups. In particular, five landlords rent out their land while two are partners of two asparagus producers with whom they share costs and revenues. Besides sharecropping agreements, group 3 rely mostly on milk production (53.8% of its members), maize surplus (23.1%) and from relatively large livestock and land holdings as already described in table 6.5. Usually, households’ members of group 3 in working age support on-farm activities. Yet, traces of diversification at household level are reported. Non-agrarian wage labour is registered in two households as well as agrarian wage labour. Expectedly, renting out equipment is not a very much viable income source for these clusters (only one person in group 3 and one in group 5 do it) as equipment belongs to many people who share it and prefer to equally make use of it. Reminiscences of past shared production practices are still present in the community in the form of physical capital, of which information are not presented in the tables. 50% farmers of group 4 are still members of the groups that used to share equipment to work alfalfa. The other half depend on other farmers of the area who hold equipment. Similarly, 6 households of group 5 can count on sharing practices in order to reduce the labour and hiring costs to work rain-based land. A substantial difference between the partners of the functioning wells and those of the dried up ones is given by the fact that agricultural physical capital has been always privately owned by the farmers as production practices were not shared. So, many asparagus farmers can rely on machinery that can be rented to other farmers without needing the approval of the group.

With respect to group 4, agricultural income sources, sale of beans and maize represent an income source for three and six households while wheat and barley for one household. In group 5, instead, two households manage to partly sell maize and one household barley. A relatively high percentage in both groups 4 and 5 (13.13% and 16.66%) run a little own business. These are informal groceries shops usually run within the own homes by the female heads of the households. With respect to the “Diversification” group, non-agrarian wage labour is opted by more household (54.54%) than agrarian wage labour (45.45%). Off-agriculture labour is mostly concentrated in the factories located in Queretaro<sup>13</sup>. In group 5, instead, no traces of wage labour are recorded as the trajectory of this last group is mainly featured by migrations flow to the U.S.A.

### 6.3 Conclusion

All the households of which information was collected about were clustered in 5 different groups based on their current livelihood strategies in order to answer research question SQ<sub>3</sub>: How are these changes in access to land and groundwater and agricultural production practices related to shifts in the livelihood strategies of the population of the *ejido*? The first two groups, made of 6 and 5 households respectively, are characterised by the fact that asparagus production plays a major role within their livelihood strategies. They are named “Asparagus farmers with agricultural diversification” and “Asparagus farmers with livelihood diversification”. Group 3, 4 and 5 are larger as 13, 22 and 12 households compose them. Group 3 is defined as “On-farm”, group 4 is named “Diversification” and the fifth cluster is labelled “U.S.A.” as the major income sources are made either from remittances, pension earned in the U.S.A. or seasonal wage labour *al norte*.

The outcome of such division is a better understanding of the regular production and livelihood patterns within the groups, based on the forms of accessing land and groundwater resources over time in the *ejido*. It is evident how access to groundwater resources is a necessary prerequisite to keep agriculture productive in terms of income source and how social differentiation evolved dichotomously within the *ejido*. Group 1 and 2 are mostly made by the households that never witnessed groundwater deprivation since they had access to in the late 1980s. Therefore, they are the family farms that used to work alfalfa during the 1990s and 2000s until each household started to join the asparagus producers association, slowly quitting all the alfalfa production. Despite the economic advantages made by entering the agro-export markets, both groups’ members need to diversify their activities. Group 1 is based on agriculture cultivations (chili and alfalfa) or livestock (milk). The only asparagus producer who is wondering whether to leave the association faces economic troubles due to the little revenues from the only diversified profit-oriented cultivation, alfalfa. Members of group 2, instead, make their living on asparagus production coupled with livelihood diversification. This choice is explained by the fact that the surface on which asparagus grow are limited and few land transactions aimed at acquiring or renting more land were carried out compared to group 1. Group 3 highly interacts with the first two as land transactions between the groups occur. In particular, some farmers of group 3 rent land out to asparagus producers in order to receive part of the profit. Lack of labour force explains this choice. As they mostly rely on milk

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<sup>13</sup> Queretaro is located some 80 km south from *Jesús María la Petaca*. It is a highly industrialised city in which a lot of rural labour force from the federal states of Guanajuato and Queretaro converges. Usually, such companies set the daily personnel transport. Workers from the *ejido* leaves in the early morning in order to start the eight hours shift around 8 a.m. Generally, they work six days per week.

production, revenues are used to buy alfalfa which is a labour-intensive crop. Finally, other members of this group show larger livestock possessions and great involvement in the land market in order to work more hectares. Even if land is rainfed-based, extensification coupled with small households size allow enough surplus to be sold. Similarly, large livestock holdings permit an higher participation into the livestock market if milk production does not occur. Finally, group 4 and 5 are mainly made by households that witnessed groundwater deprivation between the late 1980s and early 90s. Thus, diversification became necessary either in the form of migration to the U.S.A. or through wage labour. Not surprisingly, the majority of the informants never worked alfalfa as this is possible only through irrigation, a capacity held by the previous generation. Both groups tend to keep working the land in order to produce for self-consumption. Group 4 members make their living mostly on wage labour but government income supports are important too. Similarly, group 5 counts on cash flows, especially on remittances.

Different access capacities to land and groundwater water resources and thus to agriculture production potential represented a watershed for *Jesús María la Petaca* population. Current livelihood strategies in *Jesús María la Petaca* are consequences of the socio-economic changes that Mexico witnessed between the 1980s and 90s. Within this *ejido*, agrarian reforms have created the premises for a dual path in which social differentiation is shaped by the different agriculture production potential that some farmers have (not) benefited from. In particular, access to groundwater turns out to be the linking point between the ability and possibility to place agriculture at the core of livelihood strategy. Groundwater has been pivotal for many farmers who took advantages from new social relations between outside investors and original *ejidatarios*. This *matching* enabled the production of know-how for asparagus producers who can count on a more stable livelihood strategy. Despite this study is based on fieldwork carried out just at the local scale, the study is insightful with respect to themes that intertwine the local realities and practices with global trend and forces. Thus, next chapters wants to conclude the historical description presented alongside the whole thesis summing up the findings from the research that can further the debate regarding Mexican rurality.

## 7. Discussion and conclusion

This final chapter first presents a discussion regarding the concepts and issues on which the thesis is based on. Accordingly, it suggests further research themes that should get more attention. Secondly, the conclusive sub-section sums up the study's results by answering the research and sub-research questions.

### 7.1 Discussion

This research underlines the importance of analysing both the external as well as the internal processes that influence access to socio-economic and natural resources within rural communities. The *ejido* of *Jesús María la Petaca* was selected to understand the effects of the liberalisation of Mexican agrarian policies in terms of access to land and groundwater resources, production practices and livelihood strategies.

Understanding the access mechanisms to land and groundwater resources helped to find the link between the broader political economy landscape and the local context. Theory of access has been used to grasp the factors that locally influence the ability to benefit from such resources. A political economy approach first helps to place the context studied within a broader policy framework in which several actors interact and then addresses the local specificities of livelihood strategies. Access to knowledge coupled with access to groundwater resources for irrigation purposes have been particularly decisive to create two paths within the *ejido*. One pattern places agriculture at the core of livelihood strategies through new forms of cooperative actions aimed at producing agro-export oriented asparagus while the other one is based on diversification strategies. This implies that social differentiation can occur through agriculture only for a small part of the communities while the majority takes alternative pathways out of poverty. Such pathways can possibly reduce poverty in terms of income but, overall, the risk is to exit agriculture “on least advantageous terms” (Li, 2011: 295). Least advantageous terms refer to the unstable and harsh conditions that (non)agriculture wage labour and migration can entail.

The study of two different livelihood pathways show how, on one hand, some smallholders could start to produce surplus, re-invest and expand their production, engaging themselves in what Cousins (2013) define “expanded reproduction”. On the other side, the sale of labour is the strategy undertaken by the majority of the population. Yet, also among those who place agriculture central in their livelihood strategies, processes of accumulation differ as some could concentrate more land and groundwater resources, possess more agriculture physical capital and information regarding market dynamics that increase their authority among the asparagus producers. It is evident how the main Mexican smallholding land tenure system, the *ejido*, has turned out to be both an enabling and hindering structure. Some could enter into the international agro-export market as consequence of the agrarian reforms while many could not because of the loss of access to groundwater due to groundwater drawdown coupled with the lack of financial capital to improve the technology capacity. The groundwater drawdown phenomenon is problematic in the majority of the overexploited aquifers located in the state of Guanajuato. Moreover, despite a legal framework potentially able to balance groundwater extraction, water institutions are unable to limit the overexploitation (Hoogesteger and Wester, 2017). A major reason is represented by the fact that the electricity used in the agriculture sector for irrigation purposes is poorly billed by the CFE. Many

farmers manage to arrange agreements with CFE in order to pay a fixed monthly electricity fee despite the actual groundwater use. This practice occurs especially through the coalition of many farmers into associations that demand a reduction of electricity prices as reported also in this thesis. Low bill payments enforcements risk to increase inequalities not only between those who rely on rainfed-based agriculture and those who have irrigation capacity but also between groundwater users too as large private farmers can arrange favourable deals while increasing their irrigation potential. Unequal groundwater-related material conditions emerged in *Jesús María la Petaca* when Mexico embraced the neoliberal wave as four well dried up between the late 80s and 1997. With time, the divergence between farmers with access to groundwater and without it increased. The *ejidatarios* and *posesionarios* who could benefit from the agrarian reforms are characterised by access to groundwater as well as private financial capital possessions that enabled setting up of the asparagus production and its enlargement over time.

With respect to the internal processes, other organisational experiences can provide interesting insights. For instance, the assembly of an *ejido* in the surroundings of San Miguel de Allende decided to “give the word in the assembly” to the *posesionarios*, in order to allow them to participate together with the *ejidatararios* in the assembly, the principal decision-making authority within the *ejido* (informant no. 66). Such attempts can help increasing the social participation into the political activity of the *ejido*, enhancing the social cohesion among its members and, eventually, reinforce the claims regarding more assistance from institutional organisations. Moreover, it would facilitate the relations between *ejidatarios* and *posesionarios* which often do not match and act as too different subjects within the same agrarian structure. In *Jesús María la Petaca*, the fact that a *posesionario* is digging a new well to exploit groundwater despite the drilling ban and the drawbacks that might entail for the other wells’ users, shows how *posesionarios* actions are not particularly contested. Furthermore, *ejidos* in which high value and/or export-oriented crops production occurs can surely provide more insights about the relation between the Mexican smallholding sector and access to markets. It would be interesting to observe whether cooperative behaviours emerged and if this happened “from the *ejido* itself” or through the engagement of external actors with the *ejido*. With respect to the relation between the producers and the markets, Massink (2016) already shows how the population of another *ejido* located in the same area of *Jesús María la Petaca* engages with local markets thanks to the production of organic tomatoes. Attention to the consumption side of food production processes could reinforce programmes aimed at reinforcing regional markets.

## 7.2 Conclusion

This thesis sought to examine the impact that agrarian reforms carried out in Mexico between the 1980s and 90s had in terms of social differentiation in the *ejido* of *Jesús María la Petaca*. Given the importance that access to land and groundwater resources have in shaping agricultural practices and livelihood patterns, the research question that this thesis addresses is:

*What effects have been brought about by the liberalisation of agrarian policies, land and water markets in terms of access to land and water, production practices and livelihoods strategies in the ejido of Jesús María la Petaca, Guanajuato, Mexico?*

The social reproduction of the four communities belonging to the *ejido* of *Jesús María la Petaca* has drastically changed since the late 1990s, the period in which the agrarian reforms undergone in

Mexico were enforced in the case study analysed. The new policy framework established the conditions to create a dual path, one in which agriculture is fundamental for rural households and is undergone from a small part of the smallholders and another one, undergone by the majority of the population studied, in which agriculture is marginal and aims at providing households with staples for self-consumption. Overall, out of the 58 households I collected information on, 5 groups have been distinguished. Access to groundwater is the linchpin of such division as the households with access to groundwater have in agricultural production practices an important source of income and thus agricultural production is central in their livelihood strategies. The groups are named 1) Asparagus farmers with agricultural diversification 2) asparagus farmers with livelihood diversification 3) On-farm 4) Diversification 5) U.S.A. The first three, made of 6, 5 and 13 households are characterised by a relatively importance of agriculture within their livelihood strategies in terms of labour involvement and thus income source. Groups 1 and 2 are directly involved in asparagus production while group 3 is made mostly of milk producers and farmers who rely on higher land or livestock possessions, ensuring higher surplus despite a rainfed-based agriculture or through the sale of animals. Moreover, 7 landlords of this group benefits from asparagus production either as partners of asparagus producers (2 landlords) or as landlords who have sharecropping agreements with asparagus producers (5 landlords). The other two clusters, made of 22 and 12 households respectively, generally keep working the land but for self-consumption purposes. Livelihood diversification through wage labour in the region of *Jesús María la Petaca* is the many livelihood strategy for group 4 while migration to the U.S.A. plays a major role in livelihood diversification strategies of the households inserted in group 5.

Answering the four Bernstein's political economy questions helps to sum up how social differentiation evolved within and between the groups clustered and what is the current situation in the case study selected. "*Who owns what (or who has access to what)?*" is answered by observing that the first three groups count on higher land and, often, groundwater resources possessions or have access to them through renting agreements. On the other side, the groups "Diversification" and "U.S.A." lack sufficient natural resources to use them for their livelihood strategies. The loss of access to groundwater occurred between the 1980s and 90s and can be associated with the diminishing involvement of the government in supporting the peasantry. Moreover, another natural capital – livestock – is used by many households of the first three groups for income diversification through milk production that ensure weekly revenues to its producers. Despite such general trend, property of assets and resources differ among the members of each group. This suggests the answer of the second political economy question "*Who does what?*" in terms of labour division. Few asparagus growers, the early producers, manage to get enough surplus to work mostly on this cultivation through household labour force. Many, instead, need more diversification that takes place both in on-farm activities or off-farms ones. "On-farm" members are mainly dedicated to milk production and those might benefit from groundwater access. They lack the labour force and financial capital to join the cooperative of asparagus producers. Households of the groups "Diversification" and "U.S.A." instead, sell their labour. Wage labour is the main income source. Moreover, some households' members of this group provide labour to the asparagus producers in the labour-intensive season, the harvest period, that occurs between June and the end of August. The importance of wage labour suggests further-studies on the labour market in the region of interest in order to deepen the analysis of labour conditions. A gender perspective should be prioritised in labour division analyses due to the increasing participation of women in the labour market, especially in the agriculture sector. "*Who gets what?*" helps to trace patterns of



accumulation for few asparagus producers who could benefit from the ability to enlarge their asparagus working surface in the early phases of its production. The households that count on diversified income sources might witness a relatively wellbeing increase due to an increase of incomes. Yet, mere income perspective risks to underestimate the importance of the broader social dimension of livelihood diversification strategies on which further research is suggested. “*What do they do with?*” addresses the livelihood strategies undertaken by the population studied. Generally, asparagus producers could re-invest part of their financial capital to enlarge their cultivation. However, only few could lead a real extensification strategy by acquiring or renting other land possessions. Many, instead, could slowly enlarge their asparagus cultivation within their original land tenure. It seems difficult that they can increase further as the irrigated area close to the functioning wells is almost totally used and high capital investments in irrigation technology would be needed to expand the irrigated areas. The impact of irrigating more hectares in terms of groundwater use, even if water-saving irrigation systems would be installed, should get consideration to assess the actual consumption of groundwater and observe whether overexploitation of it occurs. Finally, “On-farm” households show the tendency to re-invest their revenues in the main activity undertaken and in increasing the human capital of the youths who can benefit from higher education levels. Similarly, incomes sources of the groups “Diversification” and “U.S.A.” make possible higher education level for the youths. With respect to the group “U.S.A.”, that represents the importance of transnational communities for rural households, it will be crucial to observe the decisions made by the families migrated to the U.S.A. regarding the future place of residence.

To fully grasp the effect brought by the liberalisation of agrarian policies, it is important to answer the fifth question suggested by Ribot and Peluso (2003) regarding “when (that is, in what circumstance)” such processes could drastically change, shaping different livelihood and production patterns within a context. In *Jesús María la Petaca*, the enforcement of a new legal policy framework made possible the entry of external knowledge in the *ejido* through outside investments aimed at acquiring and working irrigated land by a *posesionario*. Such knowledge regarded not only the know-how about asparagus production but also the connection with experienced actors of the agri-business sector, to which access is generally prohibitive for smallholders. Access to knowledge coupled with access to groundwater resources created the conditions to set up a cooperative that produced a high value crop for global chains. Even though the case study might appear as a “success story”, the nuanced reality shows that access to market has been possible only for producers with better social and material conditions. Yet, social differentiation is evolving differently also within the association of producers itself. These differences occur mainly due to unbalanced power relations, based on asymmetric information and differences in financial, physical, human and natural resources. In order to allow more farmers to adapt to structural changes of the agricultural sector, favouring also production shifts, attention should be given to the role of political economy for development to identify mechanisms that can place agriculture at the core of rural livelihood strategies through state-led interventions that favour collective actions in rural communities. To start with, investments in hydrological infrastructures and water-saving technologies should be prioritised to actually enable more farmers to get market access through the production of rentable crops. Yet, market mechanisms should support the production of low water consuming crops.

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## Annexes

### Annex 1 – Questionnaire (English version)

**Date:**

**Place:**

**Name Informant:**

#### 1. Informant's information

<b>Name</b>	
<b>Sex</b>	
<b>Age</b>	
<b>Years of education</b>	
<b>Main occupation</b> 1: farming 2: agr wage labour 3: Other (namely) 4: student 5: own business (namely)	
<b>Daily wage or average monthly profit (M\$)</b>	
<b>Occupation 20 years ago (if applicable)</b>	

#### 2. Household information

Member	Relation to informant	Sex	Age	Years of Education	Occupation	Daily wage or average monthly profit (M\$)	Occupation 10 years ago (if applicable)	Religion
	Son – 1	Man – 1		0 = No education	1: farming			
	Daughter – 2	Women – 2		1 = Primary education, not finished	2: agr wage labour			
	Wife – 3			2 = Primary education	3: Other (namely)			
	Husband – 4				4: student			
					5: own business			

	Grandson – 5 Grandchild – 6 Nephew – 7 Brother – 8 Sister – 9 Father in law – 10  Mother in law – 11 mum 12 dad - 13 brother in law 14			3 = Secondary education 4 = Secondary education, not finished 5= Prepa 6= university	(namely)			

<b>Member (from previous table)</b>	<b>Place of Work</b> 1: within the area 2: in close city (namely) 3: outside the region 4: outside country	<b>Type of work</b> (if agr, name activity)	<b>Number of agriculture working weeks (2016)</b>	<b>Number of non- agriculture working weeks</b>	<b>Working days per week (2016)</b>	<b>Working hours per day (2016)</b>

Does the household belong to the community Pozos de Balderas, associated to the ejido Jesús María la Petaca? (YES\NO)	
If yes, how are you affiliated to it? (ejidatario, posesionario, avecindada, other)	
Does the household belong to the cooperative of asparagus producers? (YES\NO).	
If yes, since when?	
What have been the reasons to start the production of asparagus?	
Have you received the plant seed from an external company? (YES/NO?	
Do you receive any input from an external company? (YES/NO)	
Do you receive other service from external partners? If yes, which ones?	
Are you satisfied with the agreement on the production of asparagus? 1: not satisfied 2: little satisfied 3: not satisfied nor unsatisfied 4: quite satisfied 5: very satisfied	

Do you currently receive any agricultural subsidy ? (YES\NO)	
If yes, which one?	
If yes, since when do you receive it?	
If yes, what is its current amount?	
What are its conditions? (eligibility, duration, amount, reason..)	
Could you mention any other subsidy received this year?(for water, for electricity, other)	
Have you received agricultural subsidies between 1992 and 2005?	
If yes, which one and for how long?	

What were the conditions? (eligibility, duration, amount, reason, ..)	

Does any member of the household live outside the region? (YES\NO)		
Since when?		
If yes, permanently? Where?		
Which activity do they perform?		
Wage amount (\$M per day)		
Does any member of the household currently send money back? (YES\NO)		
Since when do you receive remittances?		

### 3. Land and Water

How much land do you work at the moment (hectares)? (possessed + rented)	
Is this quantity smaller/same/larger than last year? (specify possible difference)	
How much land does the household possess (hectares)?	
Do you currently rent land from someone else? (YES\NO)	
If yes, how much?	
If yes, at which cost?	
Do you currently rent out your land to someone else? (YES\NO)	
If yes, how much?	
If yes, what is the revenue?	
Have you rented out part of your land between 1992 and 2005? (YES\NO)	
Have you sold part of your land between 1992 and 2005? (YES\NO)	
If yes, when and how much? (if applicable, mention more sales)	

Have you ever acquired more land? (YES\NO)?	
If yes, when and how much? (if applicable, mention more acquisitions)	

Do you have access to groundwater for agricultural purposes?	
Is the rights registered in the public registry of water concession (REPDA)	
Which well do you get your water from for irrigation?	
How many water turns are you entitled to for each crop?	
Do you pays any fees to get access to water? If yes, how much and when?	
Who do you pay the fees to?	
Are you involved in the water delivery and maintenance operations? Explain how	
Which irrigation system do you have? (sprinkler, drip irrigation, pipe irrigation, other – specify)	
Have you ceded any water turns between 2010 and 2017?	
If yes, why?	
Do you receive a payments for it? (YES\NO)	
If yes, what is its amount?	
Have you used all the water available in the year 2016? (YES/NO)	
Are you satisfied with the water supply services? 1: not satisfied 2: little satisfied 3: not satisfied nor unsatisfied 4: quite satisfied 5: very satisfied	

#### 4. Crops Production Practices (2016)

Crops	Total area (hectares)	Annual production	Amount of sales (percentage)	Price (M\$\'unit)	Where do you sell your output? (choose all the options that apply)	Amount of own consumption (percentage)

					1: exports (specify where) 2: local markets (where) 3: external company 4: other (namely)	

Crop	Total amount of fertilizer (per year)	Total value of fertilizer (per year)	Total Amount of pesticide (per year)	Total value of pesticide (per year)	Quantity of seeds (per year)	Quantity own seeds	Quantity bought seeds	Price per unit of seeds	Amount of water use (unit per season)

#### 4.1 Past Production Uses

Crops grown 20 years ago	Annual production	Amount of sales	Self-consumption	Where did you use to sell your products?	Reasons to switch to current crops (If applicable)

How large is your planted area compared to 15 years ago?

If a variation occurs, in which percentage?



## 4.2 Livestock

If you don't possess any livestock, skip to 4.3

Livestock types	Quantity of livestock	Purposes of livestock	Annual production per unit	If applicable, quantity for the household consumption	If applicable, quantity for sales	Price (M\$/unit in 2016)	Estimated value of the livestock (M\$)

Working days of the household (per year 2016)	Working days of hired labour	Daily wage of hired labour (M\$)	Type of livestock feed	Quantity of feed for per year	Price of livestock feed (M\$/unit)

## 4.3 Labour and external partners

Do you hire labour? (YES\NO)	
Own farm labour (days)	
Which functions are led by household members (land preparation, harvesting, irrigation, ..)?	
Hired labour (days per year 2016)	
What are the functions of hired labour? (preparation of land, harvesting, irrigating..)	
What is the hired labourer wage (M\$ per day)?	
Is any external partner involved in your production process (packaging company, export company..)?	
What are the activities led by other partners?	

## 5. Other Inputs and Assets

Which farm equipment do you own? (tractors, pumps..)	
Total farm equipment value (estimate M\$)	
Do rent any farm equipment?	
If yes, from whom?	
If yes, what and how many times per year (if applicable)?	
If yes, cost faced (M\$).	
Do you occasionally rent out any farm equipment?	
If yes, to whom?	
If yes, what and in which occasions?	
Possible revenue for renting (M\$)	
Electricity. Quantity and costs faced in 2016	
Diesel. Quantity and costs faced in 2016	
Estimate value of the transport means (car, motorbike, truck..) M\$	
Have you received any improved variety seed in the last 10 years?	
If yes, which one and from whom?	

Do you receive any financial support or loan from external subjects (cooperative, bank, government programme, other)? YES\NO	
If YES, from whom and since when?	
If yes, what is its amount?	
If yes, repaid amount (if applicable)	
What are the purposes of the financial support (buy input, education fees, health expenditures, consumption, other business, name other)?	
What are the conditions of the loan service? (interest rates and involvement of a guaranteeing partner, collateral)	
Are you satisfied with it? 1: not satisfied 2: little satisfied 3: not satisfied nor unsatisfied 4: quite satisfied	

5: very satisfied	
Do you own a savings account?	
What is its amount?	

## 6. Non-agricultural activities business

Since when do members of the household carry out their own business?	
Have you received a financial support to start it?	
If yes, from whom?	
If yes, what has been its amount?	
Do other members of the household work in the business?	
Are employees hired?	
If yes, how many?	

Would you consider to start a non-agricultural activity?	
If yes, which one?	
What would be the reasons to start a new activity?	
Would you consider, instead, to enlarge your agricultural activity?	

## Annex 2 – List of survey respondents

/	When	Gender	Who	Where
1	13/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
2	15/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
3	16/08/2017	M	Son of <i>Ejidatario</i>	<i>Pozo de Balderas</i>
4	16/08/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
5	16/08/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
6	17/08/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>
7	17/08/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>
8	19/08/2017	F	<i>Ejidataria</i>	<i>Pozo de Balderas</i>
9	21/08/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>
10	21/08/2017	M	Son of <i>Ejidatario</i>	<i>Pozo de Balderas</i>
11	22/08/2017	F	Granddaughter of <i>ejidatario</i>	<i>Pozo de Balderas</i>
12	23/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
13	24/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
14	25/08/2017	F	<i>Ejidataria</i>	<i>Loma de Cocina</i>
15	25/08/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>
16	25/08/2017	M	<i>Ejidatario</i>	<i>El Ocote</i>
17	26/08/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
18	28/08/2017	M	<i>Ejidatario</i>	<i>El Ocote</i>
19	28/08/2017	M	<i>Avecindado</i>	<i>Jesús María</i>
20	29/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
21	29/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
22	29/08/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
23	30/08/2017	F	<i>Posesionaria</i>	<i>Los Rodriguez</i>
24	3/09/2017	F	<i>Ejidataria</i>	<i>El Ocote</i>
25	3/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
26	4/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
27	4/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
28	4/09/2017	M	Son of <i>Ejidatario</i>	<i>Jesús María</i>
29	4/09/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
30	13/09/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
31	13/09/2017	M	<i>Avecindado</i>	<i>Jesús María</i>
32	14/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
33	14/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
34	18/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
35	18/09/2017	M	<i>Posesionario</i>	<i>Los Rodriguez</i>
36	21/09/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>

37	22/09/2018	M	<i>Ejidatario</i>	<i>Jesús María</i>
38	26/09/2017	F	Wife of <i>ejidatario</i>	<i>Jesús María</i>
39	28/09/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
40	1/10/2017	M	Son of <i>ejidatario</i>	<i>Jesús María</i>
41	3/10/2017	M	Son of <i>ejidataria</i>	<i>Pozo de Balderas</i>
42	3/10/2017	M	<i>Avecindado</i>	<i>Pozo de Balderas</i>
43	4/10/2017	M	<i>Ejidatario</i>	<i>Loma de Cocina</i>
44	5/10/2017	M	Son of <i>ejidatario</i>	<i>Los Rodriguez</i>
45	6/10/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
46	7/10/2017	F	Daughter of <i>Ejidatario</i>	<i>Jesús María</i>
47	8/10/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
48	8/10/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
49	12/10/2017	M	Son of <i>ejidataria</i>	<i>Pozo de Balderas</i>
50	13/10/2017	M	<i>Posesionario</i>	<i>Pozo de Balderas</i>
51	15/10/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
52	16/10/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
53	21/10/2017	M	Son of <i>ejidatario</i>	<i>Jesús María</i>
54	25/10/2017	F	<i>Avecindada</i> (sister in law of <i>ejidataria</i> )	<i>Pozo de Balderas</i>
55	27/10/2017	M	<i>Ejidatario</i>	<i>Pozo de Balderas</i>
56	27/10/2017	M	<i>Posesionario</i>	<i>Los Rodriguez</i>
57	30/10/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>
58	2/11/2017	M	<i>Ejidatario</i>	<i>Jesús María</i>

### Annex 3 – Asparagus producers livelihood diversification

1	Owens some more 20 ha in another community. Possible activities in the U.S.A. unknown.
2	Sale of chili.
3	Sale of chili.
4	Sale of milk. Remittances play a major role in the household income.
5	Tends to go to the U.S.A. every two years to work 5/6 months.
6	Run a groceries shop in Los Rodriguez.
7	Owner transport company.
8	Groceries shop run by wife and sister-in-law.
9	Agrarian wage labour during the whole year. Nephew works as bus driver.
10	Cultivation of alfalfa for sale in another <i>ejido</i> .
11	Agrarian wage labour October-May. Two daughters work in a packaging company.
12	Sale of milk.
13	One son works in a plastic factory in San Miguel de Allende.