Apuntes 83, 5-34
ISSN: 0252-1865
eISSN: 2223-1757
doi: https://doi.org/10.21678/apuntes.83.908

Article received on April 8, 2017
Final version approved for publication on March 20, 2018

How to solve agri-problems in the Argentine interior? State initiatives for training technicians and conducting scientific research in La Pampa (1952-1959)[1]

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Abstract. The goal of this paper is to analyze institutional, educational and extension formation in relation to agriculture in La Pampa (Argentina) between 1952 and 1959. In this way, and using little-explored sources, we will demonstrate that the initiatives implemented in this period were part of a public agenda previously defined in a context of agri-ecological crisis. This in turn will help us explain the role that the new institutions assumed in the state formation period, and the concrete actions that were taken to address the main agri-production problems in a marginal space.

Keywords: Agricultural education; agricultural research; experimental stations; agricultural extension; agrarian policy; soil conservation; Argentina.

1 This study falls within the framework of the targeted research project entitled "Development, region and state capacities: a study of institutions, companies and public policies in the long term," financed by the National Council of Scientific and Technical Research (Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET) and the Universidad Nacional de La Pampa (UNLPAM).

Acronyms

CONICET	National Council for Scientific and Technical Research (Consejo Nacional de Investigaciones Científicas y Técnicas)
FAO	Food and Agriculture Organization of the United Nations
IDB	Inter-American Development Bank
INTA	National Institute of Agricultural Technology (Instituto Nacional de Tecnología Agropecuaria).
UCRI	Intransigent Radical Civic Union (Unión Cívica Radical Intransigente)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNLP	Universidad Nacional de La Plata
UNLPAM	Universidad Nacional de La Pampa

Introduction

The aim of this article is to explore the growth of the institutional educational and scientific-technical complex oriented towards the agricultural sector in La Pampa, in the period 1952-1959. To this end, we focus on the frustrated initiatives announced by governments of La Pampa from the 1940s onwards, so as to better understand the role played by the new institutions and their contribution to the local economy. In so doing, we seek to contribute to the debate around the development of educational policies and the creation of state institutions oriented towards producing and diffusing agricultural science and technology. But our analysis of this era will also help explain the emergence of a common problematic across various Latin American countries: the presence of arid and semi-arid areas with specific productive particularities. This new emphasis became evident in the 1960s, through conventions and conferences on the issue of soil conservation, attended — as we will see here — by specialists from different parts of the Americas.

As Van Ausdal (2013, p. 15-16) observes, Latin American agricultural history has undergone a significant revival in recent decades, leading not only to the formulation of new and stimulating questions but also to the proliferation of interesting case studies. Among these studies, the author refers to those that focus on the link between state-building and the creation of institutions aimed at producing scientific knowledge. There is a diversity of studies on this subject, dealing with different Latin American experiences.[2]

Argentine historiography provides solid evidence of the state's efforts at improving cereal, sugar, and wine production starting from the late 19th century.[3] However, the idea that the most substantial initiatives to further agricultural science and technology only began to emerge in 1956, following the establishment of the National Institute of Agricultural Technology (Instituto Nacional de Tecnología Agropecuaria, INTA), continues to predominate. Here, we attempt to qualify that perspective.

As to the geographical area studied (see Map 1), in previous studies we point to the manner in which an institutional complex was organized within the national territory of La Pampa[4] in the early 20th century, with a view to generating and disseminating agricultural knowledge in a framework of

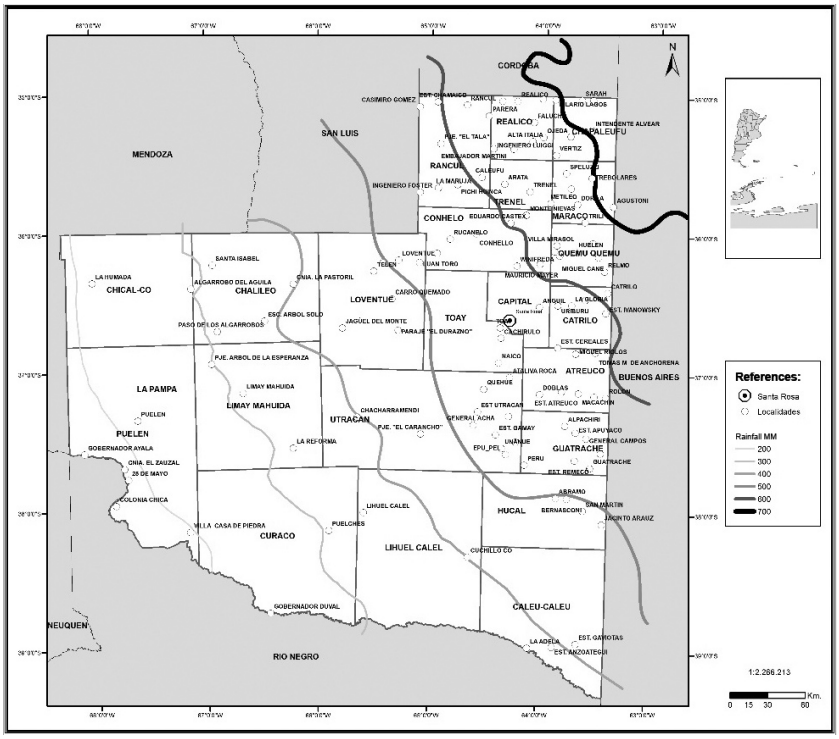
2 Examples include: McCook (2002); Arellano Hernández, Kreimer, Ocampo Ledesma, & Vessuri (2005); Mendonça (2007); Olmstead & Rhode (2008); De Souza Oliver (2009); Beretta Curi (2011); Saldaña (2013); Sanches (2015); among others.

3 See, to name but a few: Gutiérrez (2007); Moyano (2011); Rodríguez Vázquez (2013); Lenis & Rodríguez Vázquez (2014); Djenderedjian (2014).

4 Hereafter: Territory.

increased cereal production in the eastern part of the region: that is, on the border with the province of Buenos Aires and the 500 mm isohyet.[5]

Map 1
Province of La Pampa[6]



The panorama, sketched out in studies about this problematic during the region's cereal boom, changed markedly during the 1940s: on the economic front, cereal production gave way to livestock; while on the administrative and political front, the Territory acquired the status of a province in 1951; La Pampa had been classified as a "national territory" from 1884 because, like many other national spaces, it did not have the requisite number of inhabitants for legal designation as a "province."[7] This conferral of provincial status

5 See: Martocci (2011, 2014).

6 It should be noted that the map corresponds to La Pampa's (current) administrative status as a province, so the isohyets may differ slightly in comparison with the first half of the 20th century. The author thanks Juan Pable Bossa for preparing this map.

7 The legal framework underpinning the "national territories" was based on Law 1532, promulgated in 1884. These regulations applied to the territories of La Pampa, Río Negro, Neuquén, Chubut, Santa Cruz, Tierra del Fuego, Chaco, Formosa, and Misiones. In these spaces, the governors were appointed by the national executive and only those localities with a population of

(the former territory was renamed Eva Perón in honor of the wife of President Juan D. Perón) provided its governor with greater autonomy to decide upon specific policies, among other things. In 1955, after the self-styled Revolución Libertadora uprising toppled Perón's government, the province of Eva Perón reverted to its former name of La Pampa. The hypothesis guiding this investigation is that provincialization created the necessary conditions for the provincial authorities to fulfill many of the initiatives proposed by the last governors of the territorial stage, during the critical years of the 1930s and 1940s. One outstanding initiative was the expansion of the institutional framework for training agricultural specialists and promoting experimentation; the aim was to develop forage species suited to the area and improve agricultural management techniques based on conservation, with particular emphasis on the problem of wind erosion.

This study corresponds to a line of research about the training of experts, the institutionalization of knowledge, state know-how, and the role of government agencies in Argentina. We take into consideration the proposals of Bohoslavsky and Soprano (2010, pp. 23-28) in order to reinterpret research about the Argentine state: here, we "personalize" and "decentralize" the state by examining the work of specialists at the different laboratories in this geographical and productive periphery, whose activities necessarily implied interaction with actors in the rural sphere. In turn, the then recent bureaucratic-administrative formation of the provincial state of La Pampa allows exploration, as Plotkin and Zimmermann (2012a, p. 11) propose, of the mutually constitutive links between certain forms of knowledge and their institutionalization, on the one hand; and the formation of expert elites and the state, on the other.[8] In other words, the provincial state needed

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at least 1,000 were entitled to an elected municipal council. Unlike their counterparts in the provinces, the inhabitants of the territories possessed limited political rights, going without parliamentary representation or authorization to vote in presidential elections. Moreover, the autonomy of the governors was somewhat limited, although this situation began to be addressed to some extent with provincialization.

8 By proposing that the provincial government was still undergoing formation in bureaucratic terms, we seek, without overlooking the clear presence of certain attributes of statehood during the territorial stage, to make a distinction between the older Argentine provinces (such as Santiago del Estero, Entre Ríos, Córdoba, and Buenos Aires, among other examples) and those that were established in the second half of the 20th century (most of them ex-national territories). Ultimately, this reflects the achievements, but also the weaknesses, of the national state during its secular expansion. To express this in the terms employed by Bohoslavsky and Soprano (2010, p. 27), to whom we refer to expand this debate, the chosen perspective enables construction of "a more realistic image of the multiplicity of state faces." As such, we refer, on the one hand, to the national state, conceived in more omnipresent terms a few decades previously; and on the other, to the provincial state. For this case, we explore the state institutions tasked with training human resources and generating knowledge and technology for agriculture: an approach that has been employed by other authors to study agencies linked to health and education services, and even the

the knowledge provided by specialists, while these specialists required the provincial state for their institutional consolidation process.

Here, we make a specific contribution to these lines of analysis by centering on specialists: a group that has received very little attention in the literature, which has tended to concentrate on the traditional professions afforded greater social status during the period, such as medicine, law, or economics.[9] Indeed, scholars who have explored the gaps in this area point to a lack of studies about scientific-technical policies and knowledge-generating institutions (Plotkin & Zimmermann, 2012b, pp. 236-237). The 1950s were central to the organization of these institutions on a national level, and in La Pampa the process coincided with the emergence of an increasingly complex bureaucratic structure to cover the needs of a state that was still being built. It was in this context that the various provincial ministries were created; the Ministry of the Economy and Agrarian Affairs arose in December 1954, reflecting the importance of agricultural production to the province's economic development.[10]

In this article we seek to propose an explanation as to why training specialists and conducting research for agriculture was so vital in La Pampa. In so doing, we will gain a better understanding of the significance that actions to promote agricultural innovation had for the provincial state. In other words, we will shed light on the "innovation system" in a marginal productive area of Argentina. This perspective will allow us to explore the relationship between the state institutions responsible for education and experimentation; that is, to explain institutional expansion as a process in which interaction plays a fundamental role and changes are accumulative and incremental (Lundvall, 1992/2009).

The article is organized as follows: first, we analyze the appeals of local governors in the 1930s and 1940s regarding the creation of agricultural experimental, education, and extension centers, which coincided with the development of a production crisis. Second, we study the actions taken during the early years by the Victorica Agriculture and Livestock School and the Anguil Agriculture Experimental Station, as well as inter-institutional linkage. Third, we explore the importance that the province placed on the creation of the Faculty of Agronomy in 1958.

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police and armed forces.

9 Exceptions can be found in Ruffini and Blacha (2011).

10 See laws 40 to 121, which were approved in 1954 (Ministerio de Gobierno y Obras Públicas, 1954, pp. 233-234).

1. Government claims at times of crisis

In the 1930s, the territory of La Pampa suffered an unprecedented agroclimatic crisis, whose impact worsened the critical economic situation brought on by the Great Depression. This was added to an erosion event following an extreme drought, leading, among other things, to a significant decline in agricultural production and the depletion of the rural population.[11] In these circumstances, governors started raising the need to train producers and create new regional experimental and agronomic stations, while insisting upon a school of agriculture. As we have argued in earlier studies, the teaching of agriculture was placed firmly on the agendas of local authorities during the 1930s (Martocci, 2011, pp. 108-109). However, as we will see here, the vast majority of these initiatives only materialized after provincialization.

The unprecedented agroclimatic crisis posed challenges for the production capacity of the Territory, where the development of rainfed agriculture had been hampered since the start of the 20th century by unstable rainfall and soil conditions. The breakdown of the ecological balance was a product of a series of factors, among them the over-exploitation of native woodland (the main species is the caldén), wheat monoculture, and flawed soil management practices. This came on top of irregular rainfall, extreme drought, locust plagues, and ash fall, leading to crop failure, reduced cereal plantings, and a rise in livestock production (Lluch, 2008, pp. 156-158). The quantitative evidence is clear. Moreover, it should be recalled that all this occurred in a context where agriculture remained the main economic activity, which rendered the situation all the more alarming.

In his *Memoria* of 1935, Governor Evaristo Pérez Virasoro (1933-1939) included a comparative table of cereal production over the period 1912-1935: average wheat production in the 1920s was 775,460 tons, but this had collapsed to 113,744 tons by the middle of the following decade (Pérez Virasoro, 1936, p.74). The scale of the drought attracted the attention of this governor, for whom the Territory urgently needed agriculture or livestock schools so that children could complete their studies after finishing primary school. Indeed, he considered the possibility of creating such an institution on a 200-hectare site offered to the national state some years previously by residents of Ceballos and Intendente Alvear (Pérez Virasoro, 1938, p. 11).

Miguel Duval (1939-1946), Pérez Virasoro's successor as governor, identified late frosts and winds as two of the factors that thwarted agricultural

11 In 1935, according to the *General Census of the National Territory of La Pampa*, La Pampa had a rural population of 86,798, which fell to 68,255 in 1942 (Ministerio del Interior, 1942, p. 16).

production. In his view, it was necessary to "civilize" La Pampa's climate by way of a vigorous forestation plan. Duval saw trees as a "climate regulating factor," and woodland as a government problem. Thus, while in office he embarked upon the "biggest" forestation campaign in local history, involving regional agricultural engineers from the National Ministry of Agriculture (Duval, 1940, pp. 17-28). Forestry, as we will see, would remain a fundamental issue for the authorities in subsequent decades.

In addition, Duval declared his opposition to wheat monoculture. In his view, it was necessary to abandon "routine" working methods and train new generations for agricultural work. Thus, he stressed the importance of establishing agriculture schools and experimental stations. But he not only sought to found stations for trials of cereal varieties, in 1941, he voted in favor of national deputy Alcibíades Devoto Acosta's bill to create an experimental wool-production station in General Acha, a locality in the heart of a sheep-farming area (Duval, 1941, pp. 423-424).

Duval's stance was in consonance with the region's second wool boom following the agroclimatic crisis.[12] For him, the experimental station would address the indifference of local children towards rural activities and, hence, arrest their migration to the cities. In this way, he sought to curb rising urban unemployment and poverty, guaranteeing a mixed economy in which agriculture and livestock coexisted. To this end, it would be necessary to instruct producers, as Duval stressed in his demands:

> The creation of a Special School of Agriculture and Livestock is a need that is felt in this Territory, where, as has already been stated, very few rural workers apply efficient cultivation methods. […] This problem, which is not exclusively *Pampeano*, should give statesmen pause to reflect, especially in a country such as ours, which is essentially agricultural. It is necessary to channel energies towards soil cultivation; awaken and nurture in the son of the farmhand, a love of the land: the main productive source of national wealth[13] (Duval, 1941, pp. 32-33).

The matter remained open in the appeals of local authorities. Governor Juan Páez (1946-1948) also called for the creation of an Agriculture and Livestock School for Regional Adaption in Santa Rosa. To this end, in May 1947, he wrote in a memo to the Minister of the Interior:

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12 On this, see: Lluch & Olmos (2010, p. 19).

13 Translations of quotes from government documents and remarks by officials are by *Apuntes*.

> La Pampa needs Regional Adaptation Schools, and it needs them urgently. It is inconceivable that a Territory such as this, dedicated exclusively to crop and livestock production, should remain bound to improvisation, empiricism, and the routine of the earliest times, in terms of working the land and the utilization and industrialization of its products (Páez, 1948, pp. 45-46).

If the creation of such a school was a pressing issue for the authorities starting from the mid-1930s, figures from Argentine agricultural education also stressed the need. In the mid-1940s, Guillermo Aubone, ex-Director General of Agricultural Teaching and Promotion, drafted a five-year plan to create agricultural education institutes and expand schools already in existence. The plan pointed out that, as of 1946, there were no schools of this type in any national territory, prompting their inclusion on a list of recommended new institutions and their locations (Aubone, 1948, pp. 59-64). In La Pampa, an institution was opened in Victorica, as intended, in 1952 amid the expansion of livestock production, the reemergence of erosion, and the rainfed agriculture crisis.

The drought of those years, however, was not confined to the Territory. Between the late 1930s and the early 1940s, the phenomenon extended to the provinces of Buenos Aires, San Luis, and Córdoba. And between 1951 and 1952, the lack of rainfall again affected agricultural development in the Humid Pampas ecoregion, of which La Pampa is a periphery. This situation, alongside the economic crisis of the late 1940s, compelled President Perón to implement a series of agriculture-oriented measures, including an increase in credit, more favorable prices during planting season, and incentives for the rural machinery and equipment industry.[14] As Girbal-Blacha (2002, p. 14) notes, in this context of "going back to the countryside," in 1953 the Minister of Agriculture and Livestock used his speeches to stress the active efforts of specialists in his ministry, defense of natural resources, promotion of agricultural research, and endeavors to provide technical assistance to rural producers. A study of decreasing soil fertility in central Argentina quickly followed, and the Ministry of Agriculture and Livestock publicized the contributions of specialists who attended a symposium sponsored by the Argentine Agricultural Society. According to these studies, some parts of La Pampa were subject to yearly or permanent semi-aridity due to the lack of rainfall. In response, the specialists recommended mixed exploitation for

14 On this, see: Lattuada (1986); Girbal-Blacha (2003); Barsky & Gelman (2005).

the area between the 500 mm and 700 mm isohyets, with crop production serving as a complement to livestock husbandry.

In the 1940s and 1950s, two questions took on increased importance for the authorities: on the one hand, protection of native woodland and the possibility of environmentally responsible exploitation; and on the other, soil conservation through specific practices aimed at preventing wind erosion. It is no coincidence that one of the first laws (Law No. 9) passed by the province's Chamber of Representatives in 1953 declared soil conservation as a matter of public interest (Lluch & Comerci, 2011, p. 28). The institutions that we will examine in the next section were established locally in an attempt to address, through concrete actions, these very questions. Below, we will explore the activities of the Victorica School of Agriculture and Livestock and the Anguil Experimental Agriculture Station, created in 1952 and 1954, respectively, both under the Argentine Ministry of Agriculture and Livestock.

2. Agricultural education and experimentation: aims and interactions

The Argentine Minister of Public Works, Juan Pistarini — who was born in Victorica — played an important role in founding the School of Agriculture and Livestock. Moreover, a committee was set up in Victorica to interest the minister, in what was arguably a case of social initiative combining with state agency. The school was located on 1,963 hectare property in a calden forest. Matriculation opened in 1952, and was publicized by LRA Radio del Estado de Santa Rosa, the local public broadcaster. In April, the school year was inaugurated with the presence of Pistarini, Carlos A. Emery, the Minister of Agriculture and Livestock, and provincial authorities.[15] Classes commenced with a total of 30 students enrolled, of whom ten were from the countryside and 20 came from urban areas (Escuela de Agricultura y Ganadería de Victorica, 1952, pp. 1-27).[16]

The faculty included rural administrator Florencio Peirone, who was in charge of the subject of Livestock; specialist Federico Neeven, responsible for Agriculture; and agricultural engineer Juan Carlos Lassalle, who, besides

15 The study program at the Victorica school lasted three years. Graduates would be qualified as Rural Practicants (*Prácticos Rurales*), while those interested had the option of entering the second year of study at the Special Agricultural Schools of Casilda (Santa Fe), Bell Ville (Córdoba), and Salta, or the Rural Administration School at the Universidad Nacional de La Pampa (UNLPAM). In 1967, the administration of the school was transferred, along with other institutions of its kind, to the Ministry of Education.

16 Hereafter: Memorias.

teaching Arboriculture, was the school's director.[17] Students rotated through different units, such as Livestock, Agriculture-Forestry, Parks and Farms, and Workshops. Thus, they participated in all of the practical work carried out, as a complement to the classroom teaching. Indeed, as Lassalle (1980, p. 14) recalls, the number of hours of manual work in the study program caused a degree of "unrest", and even resistance, among students. The three-year study program included general subjects, such as Genetics and Zoology, as well as other more specific courses related mostly to sheep-farming (and, to a lesser extent, to horse and cattle production) and forest management. Each year, complementary courses were also offered, including Mathematics, Religion, Morals, Physical Education, Rural Administration, Civic Culture, and Natural History, as well as practical assignments (Escuela de Agriculture y Ganaderia de Victorica, 1955b, pp. 6-8).

The school's director clearly stated its purpose in a memo published in El Eco de Tandil, and later included in Memorias of 1952:

> In the middle of one of these forests, a school of Agriculture has been built. Everyone here asks: But why? When there is no agriculture here. Of course not, because what is done here is to destroy the forest and destroy the balance of the natural factors that maintain soil fertility. […] nowhere is there an agricultural school better positioned to teach how to obtain produce by conserving soil fertility, which is the purpose of true agriculture. At the same time we will teach appreciation of nature and inculcate the culture and tradition of the heroic deeds exuded by those age-old calden trees (Escuela de Agricultura y Ganadera de Victorica, 1952, p. 32).

There, Lassalle also stressed the importance of "responsible" exploitation of calden trees, and of complementing it in the Victorica area by planting fodder species and sheep-farming. This formed part of the ideas to be found in the 1948 Law for the Defense of Forest Wealth (Law 13273), to which Lassalle referred in the above memo. But the local authorities were also interested in forestry because of the vitality of the timber industry, which

17 Lassalle graduated in 1930 from the Agriculture and Veterinary Faculty of the Universidad de Buenos Aires. From 1954 to 1955 he was director of the Victorica school, before transferring to Santa Rosa to work at the Office of Plant Health. Between 1958 and 1961, he ran the Guatraché Forest Nursery. While still working at the nursery, he began traveling twice-weekly to Santa Rosa to give classes at the Rural Administration School, part of the Universidad de La Pampa. When offered the position of director there, he moved to Santa Rosa and remained in post until 1968. By 1960, he was also professor in the Faculty of Agriculture, and the following year he was appointed to the chair of Agricultural Phenology and Climatology (interview with Ana María Lassalle).

was one of the province's largest. Indeed, it occupied third place behind manufacturing and food and drink. In terms of value added, in La Pampa it was exceeded only by the manufacturing industry (Lluch & Comerci, 2011, p. 24).

In the school's rules, it was asserted that special attention would be given to combating erosion, "responsible" management of grazing, selection of sheep for producing wool of improved quality and uniformity, utilization of the native forest, and industrialization of its timber (Escuela de Agricultura y Ganadería de Victorica, 1955, p. 1). This matter of non-excessive use of the trees was of central importance. Lassalle recalled hearing of Pistarini ordering, during the building's construction, that the calden trees be respected, warning that "if anyone cuts down a tree, even if it's just a shrub, I'll boot them out" (1980, p. 3). The *Memoria Institutional* proposed, as a central aim, to create "popular awareness" around the conservation of calden, and extension conferences were held to inform producers and the general public about the issue. In 1952, Lassalle discoursed about Law 13273 and management of native woodland, while a technician from the Institute of Soils and Agri-Technology spoke of the problems caused by erosion and how to solve them (Escuela de Agricultura y Ganadería de Victorica, 1952, pp. 43-53).

The conservationist orientation was also reflected in the activities of the students. During the first year a sawmill was built to exploit timber, and was intended to serve as an example to those producers in the area who did not value forest wealth. Fodder crops were planted in an attempt to increase the suitability of the fields for livestock grazing, but not without addressing the problem of erosion. To this end, a collection of 180 fodder species developed at the experimental stations of General Pico and Castelar, as well as another of grain sorghum selected at the Guatraché station, were planted as a trial. In addition to forest conservation, improving sheep production became another priority, prompting the school to look for high-quality breeders to sell to the producers. Recommended breeds included the Corriedale and the Australian Merino (Escuela de Agricultura y Ganadería de Victorica, 1952, pp. 57-69).

These activities were complemented by visits to livestock enterprises, participation in expos, and assistance of experimental stations in the region. In 1954, members of the school attended the opening of the Anguil station, which was described as an experience of "great didactic value." They also visited the General Pico station, where they saw the Pico MAG rye variety, famous for its drought resistance (Escuela de Agricultura y Ganadería de Victorica, 1954, pp. 13-25). Rye was, according to Neeven, the only type of crop that could be grown in the region, and thus he recommended con-

stant contact with the Anguil station to keep abreast of the trials (Escuela de Agricultura y Ganadería de Victorica, 1954, p. 55).

Although the school interacted with other public institutions, such as the Guatraché and General Pico experimental stations, from 1954 it was the Anguil station that, somewhat logically, became a point of reference. Indeed, the Institute of Soil and Agri-Technology had recommended the foundation of the latter establishment on the basis of a study of soil from the so-called wind erosion region. The station's main purpose, then, would be to address the multiple problems associated with soil usage and treatment, especially in the central and southern parts of the province. An agreement was signed for its creation and the provincial government donated a 2,507-hectare field in good condition to the Ministry of Agriculture and Livestock. The agreement stipulated that the experimental center conduct studies aimed at solving problems of "pasture improvement and management", soil-use "planning," the pursuit of methods conducive to "preventing and combating erosion," and the "technification" of rainfed crops (Ipucha Aguerre, 1964, pp. 15-16). These plans were followed through at Anguil, under the leadership of agricultural engineer Guillermo Covas.[18]

In the study conducted by the Institute of Soils and Agri-Technology, it was proposed that the station would contribute to solving the problems facing agricultural production. In particular, it would tackle soil conservation in view of its susceptibility to erosion, as well as optimal rainwater use. But the adaptation and improvement of forage crops and implementation of pasture was also anticipated as a means of protecting the soil, as was the gradual reorientation of cereal production towards a complementary role in relation to livestock-farming (Prego, Tallarico, Bellón, & Calcagno, 1955, pp. 12-15). Thus, soil conservation and optimum water usage were fundamental issues at the station. The institution summed up its first years as follows:

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18 Covas graduated from the Universidad Nacional de La Plata (UNLP) in 1935, and then started work at the Experimental Institute of Agricultural Research in the province of Santa Fe. In 1938 he joined the Faculty of Agriculture at the UNLP as head of Practical Botany, and then as contract hire professor of Forage Crop Management. In 1941 he relocated to Mendoza and became a professor at the Universidad Nacional de Cuyo. In 1947 he entered the Castelar Institute of Phytotechnics (Instituto de Fitotecnia de Castelar) under his ex-professor, Santiago Boaglio. In 1954, he moved to La Pampa to lead the Anguil experimental station. By then, he had a graduate degree from the University of California in the United States, where he studied on a scholarship from the Argentine Association for the Progress of the Sciences. There, he specialized in Biosystematics under the guidance of an expert on organic evolution: George L. Stebbins. In 1955, after the fall of Perón, he became *interventor* of the Faculty of Sciences at the Universidad Nacional de Cuyo. He played an important role in the Faculty of Agronomy in La Pampa after it was created in 1958 (interview with María Regina Covas; Covas, n.d.).

> During the period between June 1, 1955 and May 31, 1959, the Anguil Experimental Station pursued and expanded the plans implemented soon after its foundation in March 1954, related fundamentally to conservation and management of the soil, phytotechnics of fodder crops, and management of meadows and pastures. The incorporation of a dozen techniques during 1958 has allowed us to tackle in a comprehensive way the problems posed by the development of the agricultural industry in the area of influence of the Experimental Station, which makes up a good part of the sub-humid, semi-arid, and arid sectors of the plains of La Pampa (Estación Experimental Agropecuaria de Anguil, 1960, p. 1).

The fodder crops involved in the trials included rye, feed barley, tall wheatgrass, tall fescue, agrotricum, Bromus auleticus (*cebadilla chaqueña*), Bromus brevis (*cebadilla pampeana*), cowpea, yellow sweet clover, black sorghum, weeping lovegrass, and alfalfa. In the cases of alfalfa and black sorghum, the nurseries were located at the General Pico experimental station, where the Pico MAG variety of rye was first developed; since 1956, attempts had been made to reselect this variety at Anguil to obtain a seed that was later maturing, more homogeneous, and resistant to leaf rust. The experiences with these crops raised awareness about fodder species that were suited to the area, but also about the required planting depth and density. Meanwhile, the Gral. Roca MAG and Pergamino Gaboto wheat varieties stood out in the trials for their high productivity, while the semi-lister and sparse planting methods yielded good results for grain sorghum and wheat, respectively. To increase crop yields and, in turn, conserve soil moisture levels, fallowing was promoted. Although the production of regionally adapted cereal and fodder seeds were the mainstay of the station's activities during the early years, there was also some emphasis on zootechnics: for instance, a study was conducted to determine the factors behind the low calving percentages, one of which was poor farm management practices.

In the late 1950s, the station made strenuous efforts to disseminate its trials and experiences, with the so-called **extension circulars** playing a central role. In these circulars, some of the leading specialists provided two-, three-, or four-page overviews of the research outcomes so that the target readership of producers could learn about the latest advances. The first circular, written by Covas and Gualberto Pose Rodríguez, reported on the Pico MAG variety of rye, whose characteristics were excellent for the semi-arid region, whether for grazing or grain production. Most of the circulars concluded with a text box summarizing their contents. The first of these urged "prudence" when working the land, and offered the following

recommendations: employing disc harrows on erodible soil; keeping the land under vegetation or mulch; plowing early to promote the accumulation of soil moisture; eliminating weeds through specific growers; rotating crops to include legumes (alfalfa, peas, cowpea, sweet pea, or yellow sweet clover) to improve soil fertility; and introducing permanent meadows with alfalfa, wheatgrass, or fescue to protect the soil and provide pasture. The intention was to avoid old mistakes, such as the use of moldboard plows, excessive tillage, and monoculture: practices that contributed to soil deterioration and, in turn, erosion (Covas & Pose Rodríguez, 1958).

As a result of the trials, by the end of the 1950s a critical mass of knowledge had started to accumulate at the Anguil station, ready to be disseminated to producers in the region. In almost all cases, this information concerned techniques for tilling and cultivating the soil, paying close attention to the problems that had hampered agricultural development in La Pampa. In other circulars, Covas (1958) addressed the benefits of using weeping lovegrass as a perennial forage crop; Carlos Itria (1958) wrote about the benefits of growing black sorghum in erodible soil; Pose Rodríguez (1959) recommended practices for conserving soil moisture; and Rafael Silberman (1959) discussed the problem of grubs, one of the region's most destructive pests, in alfalfa crops. This material could be consulted alongside the specialized literature at the station's library, which, as the librarian recalled during an interview, was open at all times to producers and the academic community.[19]

From our analysis thus far, it can be discerned that the Victorica school and the Anguil station were central to the province's expansion process, in terms of the development of institutions geared towards training human resources and producing knowledge applicable to agriculture. Moreover, their lines of action clearly reflected the issues that affected the region's economic outlook. This was why local authorities backed the creation of the Anguil station by donating land, and even granted scholarships for Victorica graduates to continue their studies. In 1954, during the graduation of the first cohort of so-called rural practicants, Governor Salvador Ananía referred to the school as an institution that "advanced the progress of western La Pampa," and promised to take graduates into account when recruiting staff for the Under-Secretariat of Agrarian Affairs (Escuela de Agricultura y Ganadería de Victorica, 1954, pp. 26-29). Indeed, in 1955 he reported that four graduates were working at the Provincial Directorate of Forests,

19 Interview with Osvaldo Tuya.

discharging their responsibilities "to the complete satisfaction of their superiors" (Escuela de Agricultura y Ganadería de Victorica, 1955, p. 1).[20]

It is important to note that the governor conceived of the school as a means of "advancing" the western part of the province, which, on a productive level, did not attract the interest of local authorities in the first half of the 20th century. This emphasis on developing the productive capacities of the west could be seen in one of the bigger projects: in his inaugural address to the Chamber of Representatives, Ananía stated that colonization would be the object of "careful study," and expressed his hopes that "several thousands of hectares reclaimed from the desert" — a term that was still used to refer to the west of La Pampa — would be in production come the end of his term. One of the areas of greatest interest was that close to the Colorado River, given that irrigated agriculture had now come under consideration. To this end, "complete agricultural mechanization," the use of "modern cultivation systems" and the "incorporation of sprinkler irrigation" were anticipated in order to extend crop production and increase yields (La Reforma, 1953).

The overthrow of Perón in September 1995 brought considerable changes to the province, such as the arrest of Ananía (as part of the persecution of Peronist activists and officials), police intervention, and the start of a period marked by the rotation of authorities. In this context, and given that it was seen as a "dangerous hotbed of counterrevolution," the new regime also took control of the Victorica school until they were satisfied that local Peronists were not engaged in plotting (Lassalle, 1980, p. 25). However, the use of water from the Colorado River for irrigation remained high on the agenda of the government that had pushed out Ananía. Indeed, such was the government's recognition of irrigation's "extraordinary importance" to the provincial economy that one of its first measures, in December 1955, was to allocate 900,400 pesos for the necessary works, and prepare 500 hectares for irrigation in Colonia 25 de Mayo (Boletín Oficial, 1955). In 1956, the Ministry of the Economy and Agrarian Affairs hired a specialist to conduct a study and prepare a soil map in order to determine the characteristics, distribution, and area of the soils that were suitable for irrigation (Boletín Oficial, 1956). Government interest in the matter remained on the agenda of Ismael Amit, one of the last *interventores*, as we will see in the next section.

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20 Ten students graduated from the school in 1955, followed by 14 in 1956; then the number dropped back to ten in 1957, to nine in 1958, and to six in 1959. The decrease in the number of graduates may have been due to the school's demanding study program and the intensity of the manual work, about which, as we have seen, Lassalle himself spoke out. By the end of the 1950s, some of the Victorica graduates were working at the Anguil experimental station (see Escuela Agrotécnica de Victorica, 2002, pp. 45-48).

In sum, and as we have demonstrated here, the institutions created in Victorica and Anguil oriented their actions to tackling matters related directly to the province's economic development: specifically, agricultural production, soil conservation, and "responsible" exploitation of native woodland. This occurred in the context of the Perón administration's conception of scientific and technical activities as key components of economic planning, and their creation of institutions to this end (Hurtado, 2010, pp. 73-75). For its part, the provincial state aided the aforementioned efforts by donating land, granting scholarships, and initiating production activities in western La Pampa, especially Colonia 25 de Mayo. As we have seen, by the mid-1950s there was a thematic agenda in place for tackling agricultural problems on the regional level. Part of this agenda was retained after 1955, including the exploitation of the Colorado River for agricultural purposes. But there was also continuity in terms of the training of technicians with the expertise to generate agricultural knowledge and advise the men in the fields. This explains why the La Pampa government had an outstanding role in the creation of Universidad Nacional de La Pampa (UNLPAM).

3. The origins of a local "agronomic field"?

The nationwide creation of the Instituto Nacional de Tecnología Agropecuaria (INTA) in 1956 undoubtedly gave the Anguil experimental station fresh impetus, since it was chosen as the agency's La Pampa headquarters and became one of the most important centers of experimentation in the sub-humid and semi-arid parts of Argentina. Much of the research on INTA, conducted in some cases by its members, points to its indisputable significance in the field of agricultural research and extension.[21] But thus far, as we have noted, studies about the institutional framework inherited by this agency remain scant.

Moreover, in La Pampa, the INTA found a number of matters that required urgent attention, as discussed above. Soil conservation and groundwater management were issues that began to be investigated in 1954, after the creation of the Anguil station — not the INTA. Thus, the program governing the activities of the former was already well defined by the time the latter started operating.

It was in the training of human resources that INTA's contribution was decisive, promoting the training of their staff abroad.[22] In the case of Anguil, several of the original staff members obtained graduate degrees in

21 References in: Carballo (2002); Alemany (2004); Losada (2005); Tort (2008).
22 On this, see: Barsky & Gelman (2005, p. 334).

the United States, a country that suffered a similar process of soil degradation in the 1930s (Worster, 1979). One notable case is that of agricultural engineer Antonio Cairnie, who received a scholarship from INTA for a 20-month Master's degree program in Animal Nutrition in Oklahoma.[23] Oscar Hernández, who joined Anguil soon after, also completed a Master's in Kansas on an INTA scholarship (Hernández, n. d.). It should be recalled that Covas, after starting at Anguil, himself gained a postgraduate degree from the University of California. Thus, by the end of the 1950s, a number of Anguil specialists had been trained in a country known for exporting knowledge and transferring techniques to improve national production across Latin America.[24] In 1958, other specialists were hired by the Anguil station, allowing the problems associated with agricultural development to be approached "in a comprehensive way," as the institution itself recognized (Estación Experimental Agropecuaria de Anguil,1960, p. 1).

We noted earlier that there was continuity during the second half of the 1950s in terms of training specialists in agricultural disciplines; that is, the initiatives of the Perón administration were not cast aside in La Pampa following the Revolución Libertadora, despite strong criticism of that regime. This may be explained by a lack of human resources so soon after the establishment of provincial state agencies, and by the need to define agricultural policies — a task which fell to the provincial governors, who enjoyed more autonomy than did their predecessors during the territorial period. Thus, the state sought to hire suitably qualified specialists. Amit, in his capacity as *interventor*, signed a decree to compensate public employees with credentials conferred by provincial or national institutions for their "professional training." Specifically, this bonus was targeted at those who worked in the fields of mining, industry, and agricultural production, all of which were of utmost importance to Amit (Boletín Oficial, 1958). The *interventor* also promoted the training of professionals on a local level, and thus backed the creation of UNLPAM.

This institution of higher learning was founded in 1958 and its first two faculties were "Economic Sciences" and "Agronomy and Veterinary Medicine," although to begin with the latter only offered a degree program in Agricultural Engineering.[25] The School of Rural Administration, also created that year, was also part of the university, and trained administra-

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23 Interview with Antonio Cairnie.

24 On its influence in Mexico, especially on wheat production in Sonora, see Cerutti (2015).

25 The university, at the time of its creation, had provincial status; this continued until 1973, when it was nationalized. Thus, during the period analyzed here, the provincial state played a central role in financing UNLPAM.

tors of rural enterprises, conferring Bachelor of Agriculture degrees. It was later reassigned to the School of Livestock Experts. In November 1958, an agreement was signed between UNLP and UNLPAM, whereby the faculties of the former were incorporated into the study program of the latter. In turn, the UNLP validated the degrees issued by the new institution, and had a say in the appointment of professors who taught at La Pampa through selection panels with a La Plata representative. Thereafter, another agreement was signed between UNLPAM and INTA so as to furnish the former with basic supplies and facilities for its Faculty of Agronomy. This agreement specified that INTA would give preference to "*técnicos*" from the Faculty of Agronomy whenever vacancies arose, that staff from both institutions would have free access to existing libraries and laboratories, and that they would exchange the results of their activities. To regulate the relationship between the two institutions, a coordinating committee was set up, composed of two members of each entity and the university rector. As such, the Faculty of Agronomy was able to incorporate INTA's Anguil-based staff into its teaching faculty, on the condition that the agency's *técnicos* discharge this role ad honorem and the subjects they taught be related to the "specialties" developed at INTA (Universidad de La Pampa, 1959, pp. 25-39).

Was it just the state that had an interest in training agricultural engineers? There are indications that this was not the case. According to Lassalle, in 1957 posters bearing the slogan "We want a Faculty of Agronomics," were distributed among businesses for display, attesting to a degree of social demand. It might thus be inferred, as with the Victorica school some years earlier, that this state initiative was accompanied by public support. In turn, local magazines highlighted the actions of institutions that trained agricultural technicians. Lympha, to cite one example, cited the Victorica school as an important institution because it trained rural practicants for work in specific production operations, and also served as an excellent platform from which to occupy "positions of importance" at the National Directorate of Forests, the INTA station in Anguil, or private ranches. The publication also stressed the school's interaction with other institutions, especially the Anguil station (Lympha, 1959, pp. 19-21).[26]

Amit's efforts to promote the foundation of a local university also have a valid explanation. This official, leader of the Intransigent Radical Civil Union (Unión Cívica Radical Intransigente, UCRI) in La Pampa, was appointed

26 *Lympha* was published in Santa Rosa, capital of La Pampa, between 1958-1964, and brought together a core of Catholic artists and intellectuals. It covered a wide range of topics including the province's economic situation and its public and private institutions, as we will see.

interventor by Arturo Frondizi after he assumed the Argentine presidency.[27] At that time, Amit shared Frondizi's developmentalist ideas, in a context in which the problematic of development attracted a broad intellectual spectrum from across political lines. The adherents of developmentalism were bound together not only out of conviction that the country ought to abandon the primary export model but also that such a change could not happen by way of spontaneous economic evolution. State participation was acknowledged as vital to consolidating an integrated economic structure, even though there were divergences regarding the scope, forms, and areas of its economic intervention (Altamirano, 2007, pp. 74-76). Agriculture, for its part, remained important to the Argentine economy at the end of the 1950s, constituting its main source of foreign exchange (a vital resource for industrialization). In this regard, the central planks of Frondizi's agricultural policies were technification, mechanization, and the stability of rural producers, marking a departure from the ideas regarding agrarian reform that UCRI had proposed starting at the end of the previous decade (Lázzaro, 2012, pp. 132-139). In the words of the president himself, it was necessary to do everything possible to leave behind "the era of horse-drawn plows." For him, modernization enabled an increase in productivity while reducing costs and raising living standards in the agricultural sector. In sum, Frondizi was convinced that the policy of development would create conditions for agricultural production "through modern technical-scientific models" (Luna, 1963, pp. 175-176).

Amit's efforts to train human resources for agricultural work occurred in a context in which productivity increases and scientific-technical diffusion were on the government's agenda. This also explains his interest in hiring qualified specialists to teach at the Faculty of Agronomy, to the point of suggesting names to Gerardo Marchioli, the university secretary — one was Lassalle, later a professor at the School of Rural Administration and the Faculty of Agronomics (Lassalle, 1980, unpublished). But the personal connections already established by specialists at La Pampa also played a key role in attracting professors to the new faculty. Without a doubt, the most influential was Covas, who had teaching experience at UNLP, had been dean of the Faculty of Agronomy at the Universidad Nacional de Cuyo (Mendoza) after the fall of Perón, and had the standing that came from being director of the INTA station in Anguil. This latter role prevented

27 In 1957, The Radical Civil Union split into two parties: the UCRI led by Frondizi and the Radical Civil Union of the People led by Ricardo Balbín.

Covas from serving as founding dean at the La Pampa faculty, although he did act as the "the driving figure behind the scenes" (Gómez, 2008, p. 4).

Covas, one of the speakers alongside Amit and the rector at UNLPAM's opening ceremony of April 1959, underlined INTA's commitment to the faculty. As a UNLP graduate, his links with professors and other former colleagues there were central at a time when many educators were leaving La Plata; the curriculum at the two universities was the same; and the UNLP issued degree certificates to local graduates of the other institution. One of the most outstanding agricultural engineers to join the faculty on the strength of his relationship with Covas was Santiago Boaglio, who was a professor at UNLP. Other arrivals included Benno Schnack and Andrés Ringuelet: the former was an old university classmate (and brother-in-law) of Covas, while the latter went on to lead the Agricultural Promotion Plan under Amit's governorship.

As *interventor*, Amit was concerned with creating the institutional conditions necessary for training human resources, and continued with topographic studies and surveys to establish an irrigation zone in Colonia 25 de Mayo (Amit, 1959, pp. 20-24). Towards the end of the 1950s, INTA expanded into the west, opening an extension agency in Carro Quemado and an experimental substation in Chacharramendi: two places that were far from the traditional production area situated between the border with Buenos Aires province and the 500 mm isohyet (Instituto Nacional de Tecnología Agropecuaria, INTA, 1959, p. 24). A new development that took place during the following decade, but one whose analysis is beyond the scope of this article, was Amit's push to industrialize primary products in a framework in which industrial development and agricultural expansion were on a collision course — because Frondizi maintained high rates on capital goods to encourage local production, thus exposing producers to elevated prices (Gerchunoff & Llach, 2010, p. 274). This initiative coincided with the introduction of the aforementioned Agricultural Promotion Plan, which again is outside the timeframe covered in this article.

Soon after the foundation of UNLPAM, one magazine stated that the university's aim was to train "specialized *técnicos*" to exploit the "enormous potential wealth of the Province." The magazine went on to note that the Faculty of Agronomy and the Anguil experimental station contributed through their studies to a "substantial change in the unfavorable conditions in the area." According to the publication, the "economic conditions of underdeveloped areas," in allusion to the economic theories that were in

vogue at the time, would be solved by the "concentration of *técnicos* there"[28] (*Lympha*, 1961, pp. 22-23).

However, to answer the question posed in the heading of this section, we must keep a certain distance from the enthusiastic perceptions of the day and approach the matter through a critical lens. Thus, it might be suggested that to speak of the existence of an agronomic **field**[29] in La Pampa by the end of the decade studied is perhaps somewhat hasty. Rather, what can be clearly discerned is that the institutions analyzed formed the basis more for the training of specialists and the creation of a body of knowledge to address agricultural problems in a semiarid region. Although nothing decisive came from the concentration of specialists per se, the institutional foundations for tackling agricultural matters were laid between 1952 and 1959, thus fulfilling one of the stated requirements of the local authorities. The establishment of this field, a process that took place later than in other provinces,[30] began to occur during this period in a context marked by the profound agroecological crisis that had preceded it. In this process, interaction with peers from other countries and the circulation of knowledge applicable to agricultural production were vital.

In the 1960s, exchanges between specialists and public officials in different Latin American countries gave way to meetings of specialists to address the problem of soil conservation. Some Argentine agricultural engineers, of whom Covas was certainly one, gained renown in this context. In 1966, at the Pan-American Soil Conservation Convention in São Paulo, Brazil, he presented a study entitled "Management of erosion-degraded soil in the semi-arid Pampas region of the Argentine Republic"[31] (Covas, n. d.). Drawing on the expertise he acquired at Anguil, this specialist succeeded in positioning himself as an authority on the matter. But there is also evidence to suggest that by the end of this decade, the Anguil experimental station had become a useful vantage point from which to look for answers to the problematics affecting semi-arid regions. In 1969, the UN Food and Agriculture Organization (FAO) sponsored the Technical Conference on Soil Conservation in Latin America, held in Buenos Aires. The event was attended by Covas, Silberman, and Martín Monsalve, all technicians at the Anguil station; delegates from Peru, Chile, the United States, Barbados, Uruguay, Venezuela, and Argentina; as well as representatives from the UN

28 Translation of quotes by *Apuntes*.
29 For a conceptual definition of the term "field," see Bourdieu (2006, pp. 23-42).
30 See: Graciano (2001).
31 Translation by *Apuntes*.

Development Program, the Inter-American Development Bank (IDB), and the UN Educational, Scientific and Cultural Organization (UNESCO).

In the framework of this conference, a delegation of foreign nationals toured part of Buenos Aires province and east central La Pampa. One of the stops on the tour was the Anguil station, where the visitors observed trials related to soil conservation, increasing animal production, and phytotechnical improvements, as well as the center's machinery (INTA, 1970, p. 159). Thus, the delegates were able to see an experimental station that had become a benchmark for agricultural science and technology, especially when it came to studying production in a semi-arid region of Argentina.

At that time, specialists estimated that 35% of cropland in the country was affected by erosion, prompting the UN, FAO, and INTA to initiate a project to investigate the problematic and promote land-use planning. Their aim was to establish a National Soil and Water Conservation Program in Argentina, the central aspects of which were laid out at the conference. This would be the first time, according to FAO specialist Robert D. Flannery, that a project of this type was undertaken outside the United States, and it was hoped that it would serve as an example for the rest of Latin America. Indeed, the delegates from Venezuela and Chile expressed great interest in obtaining further details about duration and financing, respectively (INTA, 1970, pp. 25-28).

This was an issue that was attracting the interest of specialists from various countries by the close of the 1960s, but one that had long been on the agenda of several state institutions in Argentina. When summarizing Argentina's conservationist activities, Julio Ipucha Aguerre — a technician at the Institute of Soils and Agri-Technology and member of the conference's organizing committee — highlighted the work done during the preceding decades by certain provincial governments, such as those of Tucumán, Misiones, and La Pampa (INTA, 1970, pp. 139). Many studies, some of which we have cited here, acknowledge that INTA inherited a pre-existing institutional framework, but fewer focus on the research agendas that predated the institute, and which it then continued. The case analyzed shows how soil conservation and the prevention of ecological problems in La Pampa remained relevant issues. The state institutions we have studied succeeded, from disparate locations but with converging goals, in alleviating these problems. The results of their initiatives, along with their limitations, became apparent in the subsequent decades.

Final considerations

The creation of the Faculty of Agronomy at the end of the 1950s was perhaps the most important link in a long chain of actions going back to the 1930s, when the territorial governors began to call for the establishment of experimental and educational institutions geared towards agriculture. These initiatives, which were not ultimately effective despite the insistence of the authorities, were cemented after the Territory became a province. The agroecological crisis that scourged the region, especially the severe wind erosion, had a tremendous impact on society and compelled the government to look for ways to alleviate the situation. One of the most important initiatives, if not the only one, was the creation of institutions that produced scientific knowledge and trained human resources to advise agricultural producers. The foundation of these institutions took place when the incipient provincial state was being organized, against the backdrop of Juan D. Perón's presidency. The educational and experimental orientation of these institutions was founded on preserving native woodland, livestock farming, obtaining suitable fodder crops, and soil conservation. The interactions between these institutions took the form of coordinating extension activities, conducting joint trials, and sending students from Victorica to the various experimental stations in La Pampa.

Perón's removal in 1955 brought about changes in the province, such as a new official name and the ousting of Salvador Ananía, but did not greatly affect the development of most agricultural policies. On the contrary, there was continuity in terms of the agricultural exploitation of water from the Colorado River and the training of the "*técnicos*," as they tended to be called, tasked with producing and disseminating agricultural science and technology. Without a doubt, the high point of these efforts was the creation of the Faculty of Agronomy at the heart of the UNLPAM, which occurred under the *interventor* Ismael Amit, a radical who shared the developmentalist ideas of President Arturo Frondizi. The establishment of this faculty required the support of INTA by way of the Anguil station, whose specialists joined the teaching staff. Personal connections were also central at this stage, as evidenced by the arrival of professors from La Plata — many of whom were highly educated and experienced. Guillermo Covas played an important role in this regard, given the relationship between the local university and UNLP. Some of the professors who made the journey, such as Andrés Ringuelet, joined the Under-Secretariat of Agrarian Affairs the following decade, when Amit was elected governor.

Researchers, including those with special expertise, usually accept the hypothesis that INTA played the central role in the Argentine agricultural

innovation system, with its regional role and achievements rippling out to other countries in Latin America. However, we argue here that INTA was founded on a pre-existing institutional structure, in some cases — such as that of La Pampa — inheriting a research agenda that was already defined. If this history is ignored, it is difficult to explain the gradual changes in the production of agricultural science and technology. In our study, we have been able to demonstrate the interactions between national and provincial governments, the synergy generated between the institutions analyzed, and the technical links forged at national and international levels during this stage.

The literature on innovation systems have not yet sufficiently explored the topic of generating and disseminating specific knowledge. This study makes a contribution by approaching this problematic from a micro-perspective. Unlike the experiences of other Argentine provinces, the state in La Pampa was still in its formative state in the 1950s, hence its great interest in institutional development and the training of "*técnicos*" capable of occupying important public-sector positions. By the end of that decade, the institutional framework that would set the pace for agricultural science and technology in La Pampa was already in place. What occurred from that point on certainly merits further exploration.

References

Primary sources

Amit, I. (1959). *Mensaje al pueblo de La Pampa*. Santa Rosa: Intervención Nacional.

Aubone, G. (1948). *Organización de la enseñanza agrícola*. Buenos Aires: El Ateneo.

Boletín Oficial (December 16, 1955). La Dirección de Agua y Energía habilitará 500 hectáreas para riego en Colonia 25 de Mayo (pp. 450-451). Santa Rosa.

Boletín Oficial (May 4, 1956). Contratando los servicios de un profesional (pp. 254-255). Santa Rosa.

Boletín Oficial (June 27, 1958). Bonificaciones por títulos de capacitación profesional (p. 373). Santa Rosa.

Covas, G. (1958). *Pasto llorón. Forrajera perenne muy rústica y productiva para la región semiárida de la Argentina*. Circular de extensión Nº 3. Anguil: INTA.

Covas, G. (n. d.). *Legajo*. Unpublished paper. Santa Rosa: Facultad de Agronomía-UNLPAM.

Covas, G., & Pose Rodríguez, G. (1958). *Centeno Pico M. A. G. Excelente variedad para la región semiárida de buena productividad de pasto y grano*. Circular de extensión Nº 1. Anguil: INTA.

Duval, M. (1940). *Memoria presentada al Superior Gobierno de la Nación 1939-1940*. Santa Rosa: Talleres Gráficos de la Gobernación de La Pampa.

Duval, M. (1941). *Memoria presentada al Superior Gobierno de la Nación, Período: 1940-1941*. Santa Rosa: Talleres Gráficos de la Gobernación de la Pampa.

Escuela Agrotécnica de Victorica. (2002). *Memorial de una Escuela Pionera.* Victorica: Escuela Agrotécnica de Victorica.

Escuela de Agricultura y Ganadería de Victorica. (1952-1955a). *Memorias de la Escuela de Agricultura y Ganadería de Victorica.* Buenos Aires: Dirección General de Enseñanza Agrícola-Ministerio de Agricultura y Ganadería de la Nación.

Escuela de Agricultura y Ganadería de Victorica. (1955b). *Reglamentos de la Escuela de Agricultura y Ganadería de Victorica*. Victorica: Talleres Gráficos La Reforma.

Estación Experimental Agropecuaria de Anguil. (1960). *Memoria técnica de la Estación Experimental Agropecuaria de Anguil*. Buenos Aires: INTA.

Hernández, O. (n. d.). *Legajo*. Unpublished manuscript. Santa Rosa: Facultad de Agronomía-UNLPAM.

Instituto Nacional de Tecnología Agropecuaria, INTA. (1959). *Una etapa en las realizaciones del INTA*. Buenos Aires: INTA.

Instituto Nacional de Tecnología Agropecuaria, INTA. (1970). Conferencia técnica sobre conservación de suelos en América Latina. *IDIA, Informativo de Investigaciones Agrícolas*, (23), pp. 1-169.

Ipucha Aguerre, J. (1964). La estación experimental de Anguil. *IDIA*, (13), 15-18.

Itria, C. (1958). *Sorgo negro. Una buena forrajera perenne para la región semiárida apta para consolidar suelos erosionables*. Circular de extensión Nº 6. Anguil: INTA.

La Reforma. (1953). General Pico, La Pampa.

La Reforma. (December 31, 1953). Mensaje al pueblo de la provincia (pp. 1-2). General Pico, La Pampa.

Lassalle, J. C. (1980). *Cuentan mis cosas*. Unpublished manuscript; private collection of Ana María Lassalle.

Luna, F. (1963). *Diálogos con Frondizi*. Buenos Aires: Editorial Desarrollo.

Lympha (1959). Escuela de Agricultura y Ganadería de Victorica. *Lympha*, (4), 18-21.

Lympha (1961). Universidad de La Pampa. *Lympha,* (13), 22-23.

Ministerio de Gobierno y Obras Públicas. (1954). *Leyes sancionadas durante el año 1954. Leyes 40 a 121*. Santa Rosa: Registro Oficial de Leyes-Ministerio de Gobierno y Obras Públicas.

Ministerio del Interior (1942). *Censo general del territorio nacional de La Pampa*, t. I, *Población*. Buenos Aires: Ministerio del Interior.

Molfino, R., Prego, A., Offermann, A., Zaffanella, M., & Reichart, M. (1952). *La fertilidad del suelo pampeano*. Buenos Aires: Publicaciones del Instituto de Suelos y Agrotecnia-Ministerio de Agricultura y Ganadería de la Nación.

Páez, J. (1948). *Por La Pampa y sus hombres (dos años de gobierno del territorio)*. Santa Rosa: Gobernación de La Pampa.

Pérez Virasoro, E. (1936). *Memoria presentada al Superior Gobierno de la Nación año 1935*. Santa Rosa: Talleres Gráficos de la Gobernación de La Pampa.

Pérez Virasoro, E. (1938). *Memoria presentada al Superior Gobierno de La Nación años 1936-1937*. Santa Rosa: Talleres Gráficos de la Gobernación de La Pampa.

Pose Rodríguez, G. (1959). *Almacenamiento, conservación y uso de la humedad del suelo. Prácticas sencillas que contribuyen a evitar los efectos de los períodos de sequía en la región semiárida*. Circular de extensión Nº 12. Anguil: INTA.

Prego, A., Tallarico, L., Bellón, C., & Calcagno, J. (1955). *Relevamiento detallado del área de la Estación Experimental de Anguil (Pcia. de La Pampa)*. Buenos Aires: Instituto de Suelos y Agrotecnia-Ministerio de Agricultura y Ganadería de la Nación.

Silberman, R. (1959). *Isoca de la alfalfa. La plaga animal que mayores daños causa a los alfalfares en la región semiárida*. Circular de extensión Nº 10. Anguil: INTA.

Universidad de La Pampa (1959). *Universidad de La Pampa. Antecedentes. Creación. Organización. 1958-1959.* Santa Rosa: Talleres Gráficos de la Dirección de Imprenta y Boletín Oficial.

Secondary sources

Aldaña, J. J. (2013). Un tratado tecnológico mexicano para la industria de la seda en la época del Porfiriato. *Quipu. Revista Latinoamericana de Historia de las Ciencias y la Tecnología*, *15*(1), 47-64.

Alemany, C. (2004). Apuntes para la construcción de los períodos históricos de la Extensión Rural del INTA. In R. Thornton & G. Cimadevilla (Eds.) *La extensión rural en debate. Concepciones, retrospectivas, cambios y estrategias para el Mercosur* (pp. 137-171). Buenos Aires: INTA.

Altamirano, C. (2007). *Bajo el signo de las masas (1943-1973)*. Buenos Aires: Emecé.

Arellano Hernández, A., Kreimer, P., Ocampo Ledesma, J., & Vessuri, H. (2005). *Ciencias agrícolas y cultura científica en América Latina.* Buenos Aires: Prometeo.

Barsky, O., & Gelman, J. (2005). *Historia del agro argentino. De la Conquista hasta fines del siglo XX*. Buenos Aires: Mondadori.

Beretta Curi, A. (2011). *Agricultura y modernización, 1840-1930*. Montevideo: Universidad de la República and CSIC.

Bohoslavsky, E., & Soprano, G. (2010). Una evaluación y propuestas para el estudio del Estado en Argentina. In E. Bohoslavsky & G. Soprano (Eds.). *Un Estado con rostro humano. Funcionarios e instituciones estatales en Argentina (desde 1880 a la actualidad)* (pp. 9-55). Buenos Aires: Prometeo and UNGS.

Bourdieu, P. (2006). *Intelectuales, política y poder*. Buenos Aires: Eudeba.

Carballo, C. (2002). *Extensión y transferencia de tecnología en el sector agropecuario argentino*. Buenos Aires: Editorial Facultad de Agronomía.

Cerutti, M. (2015). La agriculturización del desierto. Estado, riego y agricultura en el norte de México (1925-1970). *Apuntes. Revista de Ciencias Sociales*, *42*(77), 91-127. doi https://doi.org/10.21678/apuntes.77.740

De Souza Oliver, G. (2009). *Institucionalização das ciencias agrícolas e seu ensino no Brasil, 1930-1950*. São Paulo: Annablume.

Djenderedjian, J. (2014). El Estado, presente. Aproximación a las políticas gubernamentales de desarrollo tecnológico, investigación y extensión rural en la Argentina de finales del siglo XIX e inicios del XX. In *Revista de Historia Americana y Argentina*, *49*(2), 77-110. Retrieved from http://www.scielo.org.ar/scielo.php?script=sci_arttext&pid=S2314-15492014000200004&lng=es&nrm=iso

Gerchunoff, P., & Llach, L. (2010). *El ciclo de la ilusión y el desencanto. Un siglo de políticas económicas argentinas*. Buenos Aires: Emecé.

Girbal-Blacha, N. (2002). Políticas públicas para el agro se ofrecen. Llamar al Estado peronista (1943-1955). *Mundo Agrario. Revista de Estudios Rurales*, *3*(5), 1-17. Retrieved from http://www.mundoagrario.unlp.edu.ar/article/view/v03n05a01/1481

Girbal-Blacha, N. (2003). *Mitos, paradojas y realidades en la Argentina peronista (1946-1955). Una interpretación histórica de sus decisiones político-económicas*. Buenos Aires: Bernal.

Gómez, H. (2008). Facultad de Agronomía de La Pampa, 50 años. *Revista de la Facultad de Agronomía*, (19), 3-9.

Graciano, O. (2001). La construcción de un espacio profesional agronómico: programa y práctica de los ingenieros agrónomos argentinos, 1890-1910. *Anuario IEHS*, (16), 445-469.

Gutiérrez, T. (2007). *Educación, agro y sociedad. Políticas educativas agrarias en la región pampeana (1897-1955)*. Buenos Aires: Bernal.

Hurtado, D. (2010). *La ciencia argentina. Un proyecto inconcluso: 1930-2000*. Buenos Aires: Edhasa.

Lattuada, M (1986). *La política agraria peronista (1943-1983)*. Buenos Aires: CEAL.

Lázzaro, S. (2012). El desarrollismo y el problema agrario durante las décadas de 1950 y 1960. *Secuencia*, (84), 125-160. doi: https://doi.org/10.18234/secuencia.v0i84.1171

Lenis, M., & Rodríguez Vázquez, F. (2014). Instituciones agronómicas y economías regionales en Argentina: el vino mendocino y el azúcar tucumano, 1890-1916. *Historia Agraria*, (62), 117-145. Retrieved from http://www.historiaagraria.com/info_articulo.php?id=654

Lluch, A. (2008). La economía desde la ocupación capitalista a la crisis del '30 y los años posteriores. In A. Lluch & C. Salomón Tarquini (Eds.) *Historia de La Pampa. Sociedad, política, economía. Desde los poblamientos iniciales hasta la provincialización (ca. 8.000 AP a 1952)* (pp. 131-161). Santa Rosa: Edunlpam.

Lluch, A., & Comerci, M. E. (2011). La economía de La Pampa: una perspectiva de largo plazo (1930-2001). In A. Lluch & M. S. Di Liscia (Eds.). *Historia de La Pampa II. Sociedad, política y economía de la crisis del treinta al inicio de un nuevo siglo* (pp. 15-56). Santa Rosa: Edunlpam.

Lluch, A., & Olmos, S. (2010). Producción y redes de comercialización de lanas en La Pampa (1884-1950). In A. Lluch & M. Moroni (Eds.). *Tierra adentro… Instituciones económicas y sociales en los territorios nacionales (1884-1951)* (pp. 19-42). Rosario: Prohistoria.

Losada, F. (2005). Los orígenes del Instituto Nacional de Tecnología Agropecuaria (INTA). *Realidad Económica*, (210), 21-40.

Lundvall, B.-A. (Ed.). (1992/2009). *Sistemas nacionales de innovación. Hacia una teoría de la innovación y el aprendizaje por interacción*. San Martín: Unsam Edita.

Martocci, F. (2011). *Enseñar a cultivar en el territorio pampeano. Escuelas, agronomías y estaciones experimentales (1900-1953)*. Anguil: Ediciones INTA.

Martocci, F. (2014). Cultivar al agricultor en la pampa seca. Generación y difusión de conocimientos agrícolas en las primeras décadas del siglo XX. *Mundo Agrario. Revista de Estudios Rurales*, *15*(29), 1-26. Retrieved from http://www.mundoagrario.unlp.edu.ar/article/view/2320

Mc Cook, S. (2002). *States of Nature. Science, Agriculture, and Environment in the Spanish Caribbean, 1760-1940*. Austin: University of Texas Press.

Mendonça, S. R. (2007). *Estado e educação rural no Brasil: alguns escritos*. Río de Janeiro: Faperj-Vício de Leitura.

Moyano, D. (2011). La Escuela de Arboricultura y Sacarotecnia de Tucumán y su papel en el desarrollo agroindustrial de la provincia, 1880-1920. *Travesía. Revista de Historia Económica y Social*, (13), 229-246.

Olmstead, A. L., & Rhode, P. W. (2008). *Creating Abundance. Biological Innovation and American Agricultural Development*. Cambridge: Cambridge University Press.

Plotkin, M., & Zimmermann, E. (2012a). Introducción. Saberes de Estado en la Argentina, siglos XIX y XX. In *Los saberes del Estado* (pp. 9-28). Buenos Aires: Edhasa.

Plotkin, M., & Zimmermann, E. (2012b). Algunas reflexiones finales. In *Las prácticas del Estado. Política, sociedad y elites estatales en la Argentina del siglo XX* (pp. 235-239). Buenos Aires: Edhasa.

Rodríguez Vázquez, F. (2013). *Educación y vitivinicultura. Formación de recursos humanos y generación de conocimientos técnicos en Mendoza (1890-1920)*. Rosario: Prohistoria.

Ruffini, M., & Blacha, L. (2011). *Burocracia, tecnología y agro en espacios marginales*. Rosario: Prohistoria.

Saldaña, J. J. (2013). Un tratado tecnológico mexicano para la industria de la seda en la época del Porfiriato. *Quipu. Revista Latinoamericana de Historia de las Ciencias y la Tecnología*, *15*(1), 47-64.

Sanches, J. (2015). Política econômica e de ciência e tecnologia paulista para o café durante a Primeira República (1889-1930): ações complementares ou divergencia de interesses? *Revista Brasileira de História da Ciência*, *8*(1), 100-114. Retrieved from http://www.sbhc.org.br/revistahistoria/view?ID_REVISTA_HISTORIA=53

Tort, M. I. (2008). Enfoques de la extensión rural. In "nuestro agro: ¿evolución, complementación u oposición?" In J. Balsa, G. Mateo & S. Silvia (Eds.). *Pasado y presente en el agro argentino* (pp. 429-450). Buenos Aires: Editorial Lumiere.

Van Ausdal, S. (2013). Presentación del *dossier* "Nuevas historias agrarias de América Latina." *Historia Crítica*, (51), 13-19. doi 10.7440/histcrit51.2013.01

Worster, D. (1979). *Dust Bowl: The Southern Plains in the 1930s.* New York: Oxford University Press.

Interviews

Antonio Cairnie (Santa Rosa, La Pampa, November 13, 2015).

María Regina Covas (Santa Rosa, La Pampa; August 18, 2015).

Ana María Lassalle (Santa Rosa, La Pampa, October 7, 2015).

Osvaldo Tuya (Anguil, La Pampa; June 30, 2010).