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RESEARCH ARTICLE

The impossible and necessary coexistence of agricultural development models in the Pampas: the case of Santa Fe province (Argentina)

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Abstract

This article's objective is to highlight the different forms of agriculture present in the Argentinian Pampas, to analyse their logics, in particular in their relationships to the territory, and to discuss the relationships they have with each other. The theoretical framework adopted is that of "territorial pacts". This framework makes it possible to define for each form of agriculture through three dimensions of its local integration into the territory (territorial mediation) and through four dimensions of its integration into institutions (agricultural development model). This theoretical framework was taught and put into practice by a team of 7 or 8 researchers and teacher-researchers and 80 fifth-year students of agronomy within the framework of a 1-week study trip repeated in three consecutive years in Santa Fe province. This is an interesting province for studying this subject because of the historical importance of family farming and the growth of large business farms. The method includes analyses of the agronomist's skills and reflections with students. Three agricultural development models could be distinguished and analysed: business farming, small-scale family farming and conventional farming. These models highlight the roles of technicians, cities, markets, symbolic issues and personal projects. In conclusion, it appears that relationships between these different models are more along the lines of a co-presence and not of a coexistence. The latter would require the construction of a local public space and a profound change in the models' current strategies. Nevertheless, a plural conception—and one that is open to dialogue—of the study programmes of the university faculties of agronomy could be a first step towards coexistence, since it appears that these faculties are at the centre of the tensions arising from co-presence.

Keywords Argentina · Pampas · Agroecology · Agribusiness · Family farming · Territorial development

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Introduction

In Argentina, as in other countries with marked contrasts between peasant agriculture and large unproductive estates (*latifundios*), a class of capitalized farmers of medium to large-sized farms took over the modernization model of the 1960s to capture a monopoly over the development policies of the State, the link to science and technology and, in particular, the discourse on modernity and agriculture. The other forms of agriculture were relegated to being described as resilient, resistant, even relics, but never full-fledged models in their own right. The desire for universality of the development model of the 1960s and 1970s is an essential dimension of this model's hegemonic character, according to the meaning given to this latter notion by Gramsci (Piotte 1970). Hegemony gives it the strength to impose itself in the representations of both the dominant and the dominated. The dominated indeed end up thinking of themselves as marginalized, or even as revolutionaries proposing an alternative that could only become a replacement model by imposing itself in turn in a hegemonic manner. It is this centrality of hegemony in explanations of agricultural transformations that has led certain authors to see the emergence of 'family farming' movement or discourses of agroecology in Latin America, or of organic farming in Europe, not as models, but as marginalities. It would seem that one cannot conceive of a model without pretension or capacity for hegemony. In such a context, the 'alternatives' can even be interpreted as excuses that help make the productivist model more acceptable, which would thus continue to remain hegemonic, or even be strengthened with new discourses such as agribusiness (Vanloqueren and Baret 2009; Hernández and Gras 2009). Furthermore, the proliferation of terms designating alternative modes of agriculture (agroecology, family farming, organic farming, biodynamic farming, permaculture, etc.) contributes to confusion and a loss of focus or power, and thus props up further the idea of a model of hegemonic modernization surrounded by a plethora of 'alternatives', none of which is able to supplant it. But what if we questioned this hegemony of a model? What if the strength, even the violence, of an albeit dominant agricultural model was no longer accompanied by its hegemony? It is not an unreasonable assertion within the framework of Gramsci's theory, which distinguishes hegemony, 'a form of a rationalized political and moral leadership' (Giacaglia 2002; 153), from domination, which is unable to impose this leadership and requires greater recourse to coercion. It is this hypothesis that makes it possible to investigate forms of co-presence of development models. In this article, we study it in the context of the Argentinian Pampas, i.e. the overpowering emergence in the 1990s of the discourse of agribusiness, not only for field crops in particular, but also for other productions. This new discourse, despite its strength and often even its brutality, is today struggling to convince society and farmers of its claims to universality. It was very different at the time of the great modernization discourse of the 1960s and 1970s, when it had no difficulty in doing so, because, even if it was often criticized and played the role of a foil for some, it remained a reference for all at the time.

We study the new emerging forms of agriculture in an agricultural region known to be one of the world's richest for its soils and climate, the wet Pampas, and more precisely the central region where cultivation of GMO soya beans is expanding. However, we ensure that we study this movement of differentiation of forms of agriculture in a Pampean region in which family farming has been historically strong:

Santa Fe province. Indeed, we want to be able to observe the transformations of forms of agriculture that do not originate from the major agro-exporting estates. For the same reason, despite the growing influence of soya bean cultivation in this region, we have chosen to focus on dairy cattle farming, which is the traditional production in this territory and which is most likely to be practised by different agricultural forms of different sizes and technological characteristics.

To identify and characterize the forms of agriculture present in our geographical area of study, we will mobilize the theory of territorial pacts, developed and explained in other studies (Albaladejo 2004, 2009, 2017). This theory makes it possible to differentiate stable forms of practising agriculture, each with an internal logic and its own identity, and capable of being recognized by society, markets, the State and science. The theoretical framework and the method used are explained here before we propose an interpretation based on three co-present territorial pacts that we have identified using this theory in Santa Fe province, which we call new business farming, conventional farming (i.e. capitalized family farming which was the basis of the earlier hegemonic model) and small-scale family farming (so named to distinguish it from the previous model, but which corresponds to the 'family farming' movement in Argentina). In the discussion, we focus on the relationships between these models. In the article's conclusion, we analyse the modalities of these models' co-presence and the conditions necessary to be fulfilled before they can eventually coexist.

The theory of territorial pacts

It was the context that existed in Argentina of the late 1990s that led us to formulate a hypothesis of co-presence, and a perspective of coexistence, of agricultural development models, in the Pampas in particular. In fact, it was possible at the time to observe among small and medium Pampean farmers a large number of initiatives that could be called 'discreet innovations' (Albaladejo 2001), even though these farmers were surrounded by triumphantly expanding business farming and were witnessing a sharp fall in the number of family farms (both small family farms and 'conventional' family farms). Indeed, in the Pampas, more than a third of these farms disappeared between the last two censuses available, of 1988 and 2002 (Obschatko 2009). These innovations clearly highlighted original forms of farming, coherent and stable, although largely in the minority and unobtrusive. They were not defined primarily through their confrontation with a dominant capitalist model (Giarracca 1990), but as new modes of life, work and participation. Thus, in their discourses, the adopters and proponents of these innovations did not need to refer to a dominant model to define themselves. These discreet innovations also seemed to be vehicles for far wider territorial projects, and they seemed to be able to serve as a basis for local development and new forms of agriculture. This is the very foundation of the concept of 'territorial mediations' (Albaladejo 2009) that allows them to be characterized: the fact that a form of agriculture can be defined through its mode of territorial integration and therefore through the type of territory that it helps produce. The same theoretical viewpoint can also be applied to the dominant forms of agriculture in order to analyse their logics and highlight the type of territory they create, sometimes in spite of themselves. By using a theory that makes it possible to analyse the ways of practising agriculture through types of territorial integration, and therefore of creation of the territory, we arrive at the

observation of a co-presence between fundamentally different territorial mediations, at the national level of course, but also within the same agrarian localities (Albaladejo 2004, 2009).

The need to characterize a form of agriculture in all its dimensions arose from the observation on the ground of these cases of small-scale farming. A decade later, these very same cases were brought together by the 'family farming' movement (Nogueira and Urcola, 2013) (public policies, militant discourses, self-designation by agricultural leaders, etc.) using the same term that had seen success in Brazil and which we will adopt in the rest of this article to designate the 'small-scale family farming' model because it corresponds well, as we will see, to this farm type. To draw from the cases observed, but also to overcome their contingency, we must use an inductive approach that constantly links the theoretical to the on-ground reality. This approach is based on a theory of human activity (Arendt 1983) in combination with the theories of local development and territorial transformations of social geography (Raffestin 1987; Di Méo 1998). Social geography is also based on a theory of society (Giddens 1984), which accords a major role to the action of subjects in the contingency of local situations, without reducing the weightage of structural factors. Agricultural activity, once seen as human activity in the sense of H. Arendt, can be analysed according to its three main dimensions: 'labour', which is essentially the productive and economic part of the activity; 'work', which is the private and personal—or even creative—part, such as the life project for example; and 'action', which is fundamentally the political activity of presence in the city and participation in institutions and public debates. We also find therein a framework to define coexistence and differentiate it from co-presence. According to Arendt, action, which is the domain of speech and of citizens, is indeed the activity which makes it possible for all to live together and yet be different. We thus obtain a framework for understanding how it is possible for such antagonistic forms of agriculture as those found in localities in the south of Buenos Aires province to coexist (Tulet et al. 2001; Albaladejo 2009)—or even those that we study here in Santa Fe province.

What forms the difference between co-presence and coexistence is the existence in the latter case of a local public space in which 'action' is exercised, in other words the political and, more precisely, the discursive activities of the actors from different territorial mediations. Thus, coexistence, unlike co-presence, has a local public space in which the different forms of agriculture that are present confront each other. In contrast, co-presence relies on other forms of relationships: juxtaposition, denial or ignorance, verbal or physical violence, intimidation, domination or exploitation, or even manipulation, as is the case with the folklorization of certain forms of peasant agriculture. The modalities of co-presence are in fact very diverse. This theoretical framework, which has been published several times (Albaladejo, 2004, 2009, 2017), proposes distinguishing three dimensions in agricultural activity which can be represented in the form of three superimposed spheres, partially or completely dissociated, or included one in the other, because it is the relationships between these three dimensions that are key in characterizing the type of territorial mediation.

The characteristic of discreet innovations that consolidates them as territorial and development projects—and makes it clear that they cannot simply be described as resistant, remnant or resilient—is the fact that they are linked, even if weakly, to State and science institutions, markets and societal demands and that they are therefore not

isolated or marginal initiatives. In the 1990s, in the midst of neoliberal policies in Argentina and therefore of the withdrawal of the State from development, in particular from rural and agricultural development, these discreet innovations represented forms of agriculture linked either to academics from university faculties, mainly of agronomy and the veterinary sciences, to municipal administrations which, for the first time in their histories, undertook actions or even set up services for agricultural development, or, even in some cases, to field stations for small-scale family farming (Albaladejo 2009). Subsequently, in the 2000s with the change of policy at the national level in particular, these discreet innovations succeeded in becoming 'socially problematized issues' according to the concept of Oszlak and O'Donnell (1995) 110, namely in being included in the social agenda and even finally in the public agenda, i.e. in the issues taken into consideration by both the State and civil society. From the public agenda, they even finally managed to become part of public policy.

This social problematization gives these innovations the status of development models when they are able to add four converging dimensions of change (Albaladejo 2009, 2017):

1) A relationship with a stable and recognized science and technology sector—even a small one—which helps produce knowledge relevant to and compatible with the model;
2) Public policies that recognize and consolidate the agricultural model or at least the preoccupations that appear on the public agenda (Cobb and Elder 1971) and which justify aid and official recognition for this form of agriculture;
3) The construction of a market segment that is receptive to the products of this form of agriculture (specific standards, public markets, labels and certifications, etc.);
4) And last, but not the least, the linking with global and current concerns of a sector of society in order to be identified, even recognized, by this sector. This last dimension is directly linked to dimension no. 2, but is broader in scope, since it concerns in particular the identities, vocabulary, representations, discourses which are convergent between society and the model's actors. This is what Oszlak and O'Donnell (1995) call social problematization, i.e. inclusion in the social agenda.

This theorization of what is an agricultural development model combines with the theory of territorial mediations to constitute a theory of territorial pacts. A territorial pact is thus the combination of a development model and a type of territorial mediation (Albaladejo 2017). Formally, therefore, co-presence takes place not only between development models, but more broadly between territorial pacts. Should one pact have hegemony over others, other forms of agriculture will, in particular, fail to appear on the social agenda. Different agricultural forms thus manage to make the four dimensions of a model converge, although our field data show us, as we will see, that these dimensions are not always as consolidated or clearly demarcated as in the previous model of agricultural modernization. Co-presence is based on the fact that none of the pacts is complete, mainly because none of them has a capacity for hegemony over the others. We thus consider that there is an 'incomplete territorialization' of these different agricultural forms (Albaladejo 2009), a lack of completeness that is an essential condition for co-presence. For its part, coexistence is an objective, even an ideal type, because it corresponds to a plural and democratic form of territorialization.

The theory directly guides the methodology here, because these four dimensions which define a development model, as well as the three dimensions of territorial mediation, are the seven themes which guided our observations on the ground, our interviews with the actors and, subsequently, our processing and analysis (Table 1).

A method closely tied to teaching

In Argentina, a country with very diverse natural and agricultural environments, the 34 public or private university faculties of agronomy educate their students in the productive characteristics of the regions in which they are located: wine and viticulture in Mendoza, milk production and field crops in Esperanza in Santa Fe province, etc. Two faculties, however, train their students in a more general way, covering all of the country's productive systems: Buenos Aires and La Plata, perhaps because they are the two that are the most urban. In 2008, the new curriculum adopted at the National University of La Plata for agricultural engineer courses and forest engineer courses includes, at the end of the fifth year, a compulsory knowledge synthesis course of 64 h plus practical work: *Taller de Integración Curricular* (TIC: "Integration workshop course"). We proposed content for this course, based on the theory of territorial pacts, content which has been approved and adopted since 2010. In this article, we will focus only on the agricultural sector, and therefore of the work carried out with student agricultural engineers, since the domains of forest production and engineering are very different. The theoretical framework of territorial pacts has made it possible to formulate a hypothesis of the fragmentation of the professional universe of agricultural engineers into as many development models as have emerged over the past 20 years, following three decades of domination by a universalist model. The objective of the course is thus to accompany the students in a reflection on the evolution of their skills

Table 1 The seven dimensions of a territorial pact

A *territorial pact* is a form of agriculture capable of defending a specific horizon of development in the sector	It is a *development model* that brings together four dimensions…	A stable and specific relationship with *science* and technology (e.g. agroecology, agribusiness, etc.)
		A receptive *market* segment
		Concerns and interests represented in the *public agenda* of agriculture, or even in public policies
		A strong link to major preoccupations of *society*, or of a sector thereof, which in return recognizes, or even supports, this agricultural development model
	…in combination with a type of *territorial mediation*, in other words with a territorialized activity that takes place in three dimensions:	*Labor* = productive and economic part
		Work = private and personal part
		Action = political and community life

and on the conditions and modes of exercising their profession within this new context of coexistence or, failing that, of co-presence.

In addition, since 2008, this faculty has been organizing a week-long field work by the hundred or so agricultural engineering students at the end of the course and therefore at the time of its completion. This field work is carried on in the workshop, for which we are responsible. Some fellow teacher-researchers of the faculty and also of the research institutions of the International Agriterris Network are invited to participate. The three field trips organized in Santa Fe province in 2016, 2017 and 2018 are mobilized in our research here. The team of 80 students and six or seven researchers and teachers uses two buses and a van, available for the entire week, to get around. The course and its practical work, carried out before the field work, allow the students to be trained in methods and interview modalities. The students then write mainly descriptive group reports of the situations they encountered and a reflection on the exercise of their profession. The data available from the three trips of 2016, 2017 and 2018, collected in a format compatible with the theoretical framework being used, were the subject, during a second stage, of original interpretations proposed in this article about the coexistence of models.

Table 2 shows the agrarian structure of Santa Fe province in 2002, which is the last usable census. All the agricultural interlocutors we spoke to were unanimous in setting the threshold for a 'viable' farm at 500 ha. However, it can be seen that 82.8% of farms are smaller in size, and that the weightage of medium-sized farms of 100 to 500 ha in the total cultivated surface area is as much as 42%. Thus, even before considering the diversity of models and types of mediations, we obtain a first idea of the agricultural diversity in this region, on the condition that we reject a normative vision such as that of an 'economically viable farm'.

Table 3 lists all of the agricultural actors we contacted in the province. Most of these actors were contacted three times in a diachronic manner in the context of a deep crisis in Argentina's dairy sector and the adoption, in November 2015, of policies favourable to the business farming model by a new government, which followed more than a

Table 2 Agrarian structure of Santa Fe province

Farm size (hectares)	Number of farms	% of total number of farms	Total surface area for size category (hectares)	% of the total agricultural surface area
Up to 25	2762	10.3	38,641.6	0.4
25.1–100	8138	30.4	499,885.6	4.6
100.1–200	5514	20.6	805,241.0	7.4
200.1–500	5748	21.5	1,822,537.8	16.8
500.1–1000	2391	9.0	1,681,570.9	15.5
1000.1–2500	1506	5.7	2,244,117.2	20.6
2500.1–5000	440	1.6	1,515,579.0	14.0
5000.1–10,000	137	0.5	934,721.8	8.6
More than 10,000	72	0.3	1,316,800.4	12.1
Total for the province	26,708	100.0	10,859,095.3	100.0

Source: INDEC, 2002 agricultural census, reorganized by the author

decade of public policies in favour of so-called 'family' farming in the country (i.e. small-scale family farming). Figure 1 shows the main locations of the interviews. The choice of interlocutors was based on an assumption of the existence of three main types of development models: large-scale business farming, small-scale family farming, and conventional farming by capitalized family farmers. This last category corresponds to the concept of 'farmers' as defined by Archetti and Stölen (1975), or even the historical-institutional category that is called 'professional agriculture' in France. This hypothesis thus retains in an initial analysis the two categories which have been predominant in the public debates of these last 15 years (business farming, most notably—but not exclusively—vehicle and beneficiary of the discourse of agribusiness; and small-scale family farming, vehicle and beneficiary of the discourse of agroecology), as well as the social basis of the hegemonic modernization model of the 1960s and 1970s, which, although widely and firmly present in the territory and in institutions, no longer has its own discourse (Albaladejo and Cittadini 2017). The latter, often called 'conventional farming' in Argentina because of the type of technical discourse with which it is identified, is also family-based, but is clearly more capitalized than the 'family farming' model represented by the militant movement of the same name that has existed since the mid-2000s. In this framework 'agribusiness', 'agroecology', and 'conventional agricultural modernization' are for us discourses (accompanying currents of science, agricultural practices or militancy as noted by Wezel et al. (2009)), but they are not 'development models' in themselves, even if certain models rely predominantly on one or other of these discourses.

Through the interviews, we systematically sought to explore the seven dimensions of the theoretical framework, beginning with the four dimensions of the emergence of a development model: (1) becoming attached to a stable and recognized network of the scientific and technical community, (2) accessing a market, (3) finding a place on the public agenda and in public policies, and (4) being recognized by society and linking itself to society's problems. The three dimensions of territorial mediation (labour, work, action) were systematically discussed in interviews with farmers. Every interview ran for 2 to 3 h and was recorded. The majority of them were repeated three times at yearly intervals, helping us understand the dynamics and influence of the context (Giele and Elder 1998). At the beginning of each interview, a teacher-researcher encouraged the interviewee to tell the story of his or her agricultural activity's trajectory and to describe his or her current activity. Second, once the story was finished, the students asked questions, which had to encompass all the seven dimensions, or at least those insufficiently covered in the story. Finally, in a third step, the remainder of the interview consisted of a fairly free exchange in conversational mode. The processing carried out for this article consisted of a thematic analysis of the content of the interviews, on the basis of the seven dimensions of a territorial pact, with an aim of identifying the characteristics of the pacts and in particular of development models, as well as their relationships with other models.

The business farming model: a not so uniform world of business and excellence

We chose dairy farms because of their long history in this province and because dairy production is the farming activity most shared across different agricultural models. It is also the one that is undergoing the deepest crisis. This choice also makes sense because

Table 3 Interviews carried out during the three field visits

	Business farming model	Small-scale family farming model ('family farming' movement)	Conventional farming model (capitalized family farming)
Farms	- La Ramada SA farm - Raúl's farm - Luís's farm	- Isabel's farm - Marcos's farm - Leo's farm	- Santiago's farm - Soledad's farm (2016, 2017) - Pablo's farm
Organizations, cooperatives, development services, etc.	- ACA export port (*Puerto de exportación ACA*) at San Lorenzo - La Ramada SA milk powder factory	- NGO Surcando - Agriculture Education Centre (*Centro de Educación Agropecuaria*) of San Genaro - Family Farming Secretariat (*Secretaría a la Agricultura Familiar*) - Atalivia's cheese factory (2016)	- Sunchales cooperative - Avellaneda cooperative - ACA estate at Ramallo
Research and/or teaching entities	- INTA Rafaela robotic dairy farm	- INTA Reconquista Agroecology Module - INTA Reconquista Vegetable and horticultural unit - INTA Reconquista agricultural equipment for small farms - Atalivia agricultural college's farm (2016, 2018)	- Experimental dairy estate of the National University of Rosario - Experimental dairy estate of the National University of the Littoral - Experimental dairy estate of INTA Rafaela

For each actor, three interviews were conducted, in the month of November in 2016, 2017 and 2018, unless otherwise stated

*ACA: *Asociación Argentina de Cooperativas Agropecuarias* brings together 160 cooperatives of mid-sized Pampean producers

**INTA: *Instituto Nacional de Tecnología Agropecuaria* is an agricultural research institute providing national agricultural development services in Argentina

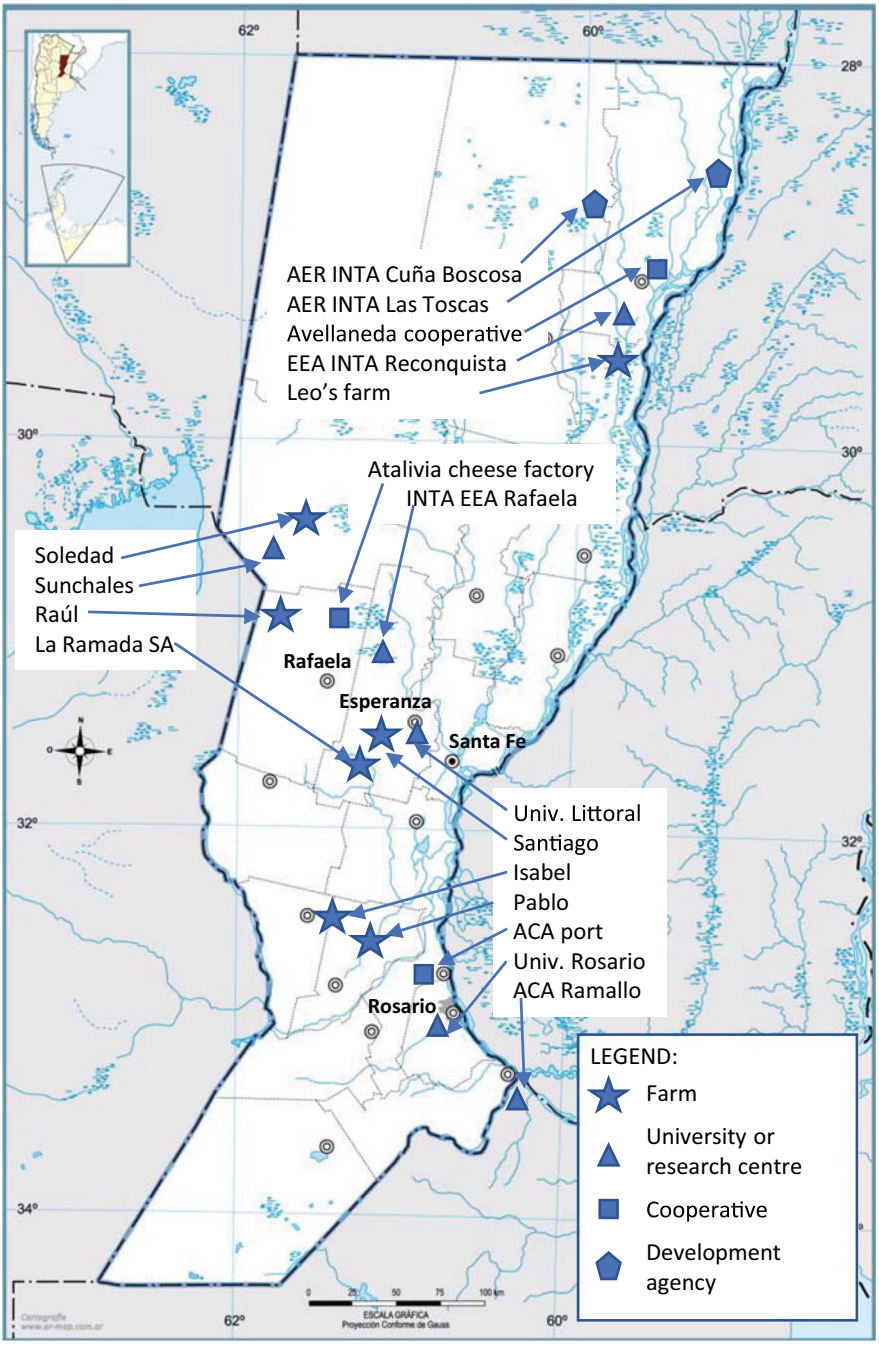

Fig. 1 Location of the main actors interviewed in Santa Fe province

the business farming model applied to the cultivation of field crops has already been widely studied in Argentina (Hernández and Gras 2009; Bisang et al. 2008) and is moreover the basis of agribusiness theories. However, this model's expression in milk

production has been very little studied. From amongst the companies we visited, we chose La Ramada SA's business farming model to study as the main case. This farm was described as exemplary by the majority of the technicians we met in the province. All those who work for this form of agriculture agree that it is an example of what 'works well' in Argentina in terms of milk production, in particular of being competitive in supplying outside markets, and that it is a textbook case in terms of 'incorporating the best available technologies'. It is even treated as a benchmark for the entire dairy sector and not just for the business farming model.

For a proper understanding of the case, it was necessary for us to avoid focusing on the technical dimension in order to apprehend the company's private strategy in its entirety. This was easier said than done, given that we were accompanied by 80 agronomy students, half of whom were fascinated by the technical aspects down to their minutest details, and the other half scandalized by the treatment of animals, the deleterious effects on the environment and the inadequate working conditions. It was also difficult to broach the private dimension of the firm's activities, because the agricultural students were not prepared by the faculty to take it into account, nor did they dare to ask questions about it. We were, however, able to learn that the firm's owner did not have any dairy or even agricultural background. He comes from a family with a long history in the boiler construction industry, whose factory is located in the small town of Franck. This local, and indeed rural, industrialist regularly visited many milk processing factories that were his customers, and, in the late 1990s, he decided to invest USD 60 million in a milk powder factory with a capacity of 500,000 l per day. He set up his factory in Franck and began to export the entirety of his production to Algeria. Very soon, this industrialist decided to pursue vertical integration, starting with an attempt at milk self-sufficiency with the purchase of twelve dairy farms close to Franck. These farms added up to a total of 8000 ha of land, of which half was owned by him and the other half rented, home to 3000 dairy cows, for a production of 100,000 l per day, all of it delivered to his factory (one third of the milk processed by the factory) to be exported in the form of milk powder in bulk to Algeria. Other steps towards vertical integration included the purchase of a cattle feed concentrate factory (USD 15 million), also in the same locality of Franck. This factory buys all the grain production (maize and wheat) from the company's twelve dairy farms and sells between 75 and 80% of its cattle feed production back to these same farms. In 2018, this vertical integration enabled the company to buy milk from its farms at 9.20 pesos per litre, at a time when the market price was 8 pesos on average.

An analysis of the technical and productive dimension of the company's dairy farms reveals that its self-sufficiency strategy also applies to agricultural labour and land. To minimize its dependence on agricultural contractors, the company owns all the cultivation equipment it needs and employs the machines' operators itself. In addition, in 2008, faced with an increase in land rents, the company decided to concentrate all of its production on the 4000 ha of land it owned and gave up all the rented land. This led to a complete transformation of its technical system: adoption of permanent animal stabling, and thus to an abandonment of pastures, and an intensification of fodder production. The company shut eight farms to concentrate all milk production at just four sites with 850 cows each, plus a heifer breeding farm for animal replacement purposes. Each of these sites produces around 27,000 l of milk per day, which corresponds to the company's tanker truck's capacity of 29,000 l. Thus, milk production did not decrease

with this reduction in farm land; it was instead the technical system that was completely transformed, going from an intensive grazing system to a permanent and full stabling one, which, in Argentina, is found only in the business farming model. The company therefore has a clear strategy of self-sufficiency and local anchoring, completely contradicting agribusiness precepts (Hernández and Gras, 2009) for field crops, which recommend the specialization of companies, their geographical spread by transforming them into a network of remote farms and rental of all the land necessary. We also observed, from other interviews, that these deviations from the agribusiness recommendations for business farmers are not limited to dairy farming. This business farming strategy completely changes the forms of interaction with other agricultural models by transforming the entrepreneur into a local actor (Franck is a rural locality of 5500 inhabitants), with his property and his business anchored to a particular rural territory.

However, what is in complete conformity with the discourse of agribusiness is La Ramada's constant quest for 'technical excellence', as our interlocutors term it, and in particular for 'precision' in practices, economies of scale, standardization and even digitization of techniques and knowledge that leads to an interchangeability of operators, and its orientation of producing and exporting standard agricultural raw materials. We thus find the same key operational concepts as for the cultivation of field crops. Taking the case of one of the four La Ramada farms that we visited, we noted that its 813 cows are milked three times a day and produce an average of 33 l each. A few cows producing more than 60 l are milked as many as five times a day. The average interval between gestations is 14 months. At this level of productivity, the productive life of dairy cows does not exceed 2.8 lactations, which entails their rapid replacement. Artificial insemination, always using Dutch breeds, is used and is facilitated by the systematic recourse to a hormone, prostaglandin. The complete confinement of the cattle and the high zootechnical yield result in very high veterinary costs to treat recurring problems of calcium deficiency, acidosis, ketosis, foot disease, pneumonia, omphalitis, lameness, etc. 'Cows are like top athletes,' a technician told us. 'They have to be taken care of accordingly.' Feed cost is high: the average 27 kg of dry matter consumed per animal per day consists of 50 to 65% of feed concentrates. This consumption is controlled precisely thanks to an investment of USD 2.8 million to equip each cow with an electronic collar. The collars, and the frequent milkings during which readings are taken, also make it possible to quickly detect when the cow is in heat, which, as we were explained, sometimes last as little as 6 h in such an intensive system. The concentration of animals and their sedentary confinement lead to a risk of groundwater and soil contamination. The company has thus invested USD 24 million in a sand litter system. The soiled sand is collected by machines then pumped with water into a large artificial pond lined by plastic sheeting. Eighty percent of the sand is recovered and reused, and solid waste is spread on the land. This system consumes 150,000 l of water per day and 1200 t of sand per month for each of the four farms. We were unable to determine this system's effects on the soil. It is therefore a fragile and expensive system, with low margins (production costs are equivalent to 31 l of milk per cow out of a production of 33 l), with a high environmental impact and very high consumption of inputs. This is how the verticalization and self-supply strategy (which is what allows the company to survive, according to the technicians) is far from being a strategy of self-sufficiency in the sense assigned, as we will see, to this term in the other models. It is instead a strategy of vertical scaling and of avoidance of markets for

inputs, which, however, is in no way accompanied by a reduction in their consumption. Likewise, the 'local' aspect of the company's strategy is based on an economy of proximity rather than on contributing to local development, i.e. the company's strategy is to use the synergies between companies or branches that are geographically close and not the development of a local population and a given territory. These are two completely different approaches adopted by different agricultural models. It is telling that total investments of USD 100 million in 10 years have led to the creation of a mere 105 jobs. There is no doubt that other forms of agriculture could do better.

La Ramada is undoubtedly an important example, but it does not represent the very diverse business farming model as a whole. For instance, it suffices to compare this company to the operations of Raúl, who owns seven dairy farms near the locality of Eusebia (1000 inhabitants, Fig. 1) and farms approximately the same area (3500 ha, 2100 dairy cows). Ninety percent of the land is rented, even though Raúl has the goal of buying 25 ha a year. He does not generate more jobs on his farms than does La Ramada (60 employees plus his family, i.e. a total 65 jobs), but with 1000 fewer cows and a sale of plant products, he has created a mixed pastoral system that puts less pressure on his livestock and on the environment. It is undoubtedly a completely different universe. And yet, Raúl is also at the heart of the business farming model; he is a member of the CREA[1] movement of professionalized producers, his father and grandfather were farmers and he has all his capital invested in the agricultural sector. This diversity must therefore be taken into account in interactions, in particular with other agricultural forms, because it does not appear simply as a gradient of adoption of the criteria of the business farming model, but reflects instead different variants of the same model. And, indeed, La Ramada and Raúl belong to the same model because they both mobilize the same four dimensions of science, the social agenda, the public agenda and markets. However, they have adopted two different production systems. This diversity is never highlighted or discussed in Argentina: this model, like the others, is presented (by technicians, agricultural leaders, researchers, grassroots actors themselves) in a supposed uniformity which hampers the understanding of its interactions at the local level with other agricultural development models.

In order to understand the interactions between different agricultural development models, we must also understand each model's ability to project itself into a future it assumes is possible, if not probable, or at the very least, to have a perspective that it can believe in and make others believe in. This is obviously a significant role for technical inventions, especially so before they are disseminated or indeed before they are even able to be disseminated. In any case in Argentina, interactions between models require considerable semantic, rhetorical and symbolic efforts. For instance, the case of robotic dairy farming, an experiment carried out jointly since 2015 by INTA Rafaela and the multinational company DeLaval seemed interesting to us because of the rhetorical possibilities it can contribute to the business farming model in the Argentinian context. The robot consists of two milking stations and has a maximum capacity of 65 to 75 cows. Each cow decides to go to be milked when she wants, with a collar limiting the daily number of milkings and regulating the distribution of feed. Information and

[1] CREA: *Consorcios Regionales de Experimentación Agropecuaria* (Regional Consortia for Agricultural Experimentation), development groups inspired by Consortia for Agricultural Technology Experimentation (CETA) in France.

alarms are sent to the operator's mobile phone. Each unit, costing USD 150,000 for the robot itself and USD 100,000 for the installation and other necessary accessories, is beyond the reach of other less capitalized agricultural models. We will not discuss here the multiple consequences on labour and production of such innovations, but they are considerable. What seems interesting to mention here is the possibility for large-scale business farming to make decision-makers and society believe that it can decentralize its production, thus reducing its environmental impact, as well as return to an (admittedly intensive) pastoral model, which currently its poster-boy company (La Ramada) no longer envisages. In other words, this model could embellish itself with qualities attributed to other models, at least in its representations. A comparable case is that of weed detection and uprooting robots for field crops. They could well fuel discourses of the readoption of mechanical weed control, which is still the prerogative of peasant systems, and leave the model of conventional farming to bear the brunt of attacks of the militant fight against chemical control.

The small-scale family farming model and the nearby city

This is the form of agriculture that has been promoted by the 'family farming' movement, and it seems important to distinguish it from conventional family farming by adding the 'small-scale' qualifier. The term 'small-scale family farming' seemed to us to be more suitable than 'peasant farming' to designate these small farms in the Pampas whose labour is provided exclusively by the family, but whose members do not live in communities as is the case in other parts of the country. As per the definition of Archetti and Stölen (1975), they cannot be called 'farmers', i.e. those owning capitalized medium-sized farms, not only because their capital is low, but above all because—as an analysis of their modes of territorial mediation shows—their logic is not that of production, much less of accumulation, but rather that of the personal and family life project. Isabel (40 years old, 42 cows, 30 ha) and Marcos (30 years old, 14 cows, 14 ha) are both good examples of small-scale family farmers. Both produce milk in San Jerónimo Department, near the small town of Díaz for Isabel (1900 inhabitants) and of San Genaro (9500 inhabitants) for Marcos. Both of them have rented their lands through informal oral contracts. In both cases, the milk produced is sold partly to a local private operator and partly directly to urban residents. Isabel also makes cheeses and milk jam, which Marcos also intends doing. He has been practising dairy farming for only 4 years, while Isabel has been doing so for more than 10 years, ever since her husband, who is over 60 years old at present, became unable to work on the farm due to health problems. Isabel and Marcos each own a secondhand milking machine and a 1000-l refrigerated milk tank. Their cows produce 20 to 24 l of milk per day, which is a good, though not exceptional, level for the region. These two dairy farmers also rear pigs (more than 60 piglets per year for direct sale for Marcos), chickens, geese and ducks for self-consumption and some local sales.

To meet these interlocutors, we decided to go through the technicians of an Agricultural Education Centre (CEA), which is one of the continuing education centres for adults in rural areas run by the provincial government. The CEA in Genaro employs nine agronomists and veterinarians and offers training to urban residents and farmers. In general, we always go through technicians to meet producers practising this form of agriculture, especially since it is not possible to just arrive with 40 students in tow at

any type of farm. On the ground, we quickly realized that it would have been difficult to do otherwise in any case, because a farm of this type, when it reveals itself, is always under the very close supervision of militant technicians belonging to NGOs or even more commonly to the State, in particular to the National Secretariat for Family Agriculture (SAF), educational institutions such as CEAs or agricultural colleges, or INTA. These producers usually have their own organizations, which, however, are themselves the product of interactions with technicians. This is the case of the Surcando Association of San Jerónimo, created in 2015, of which Isabel is the president. The formalization through Surcando of a network of more than 70 farming families has enabled them to participate in various family farming organizations and meetings, and, in particular, has allowed them to become part of MoPProFe (Provincial Movement of Small Farmers of Santa Fe). Participation in these organizations not only makes it possible to gain access to means of development (product processing facilities, etc.), but also to consolidate discourses and align their positioning. Militant technicians are thus at the heart of this model, while also acting as civil servants of the national government.

The first thing that one finds striking in this world of small-scale family farming is the dominance and uniformity of militant discourses, both by technicians and producers. It seems practically impossible to work for any significant length of time in this agricultural universe without adopting its rhetoric, and even its allegiances. 'Today you are fellow students,' a field technician said to our students, 'but tomorrow you will be competing against each other, […] you will have to recognize yourself as being part of the model that you will support, […] and some of you will be responsible for a system that forces people to leave the countryside.' But we have found that this rhetorical requirement and this discursive uniformity also underpin the other emerging model, that of business farming, even if an organized militant environment is not so visible. In San Jerónimo, this vision that divides the profession of agricultural engineer is complemented by the notion of kinship with parties with similar interests: 'We speak the same language. In spite of the differences between us, what [small-scale farmers] feel they need, we also need.' For agricultural engineers, and in particular for the youngest of them, this presentation—both as a divide at the heart of the profession and a coming together with similarly interested parties when dealing with the outside—contributes to a radicalization of positions and to a shift of professional identities and skills towards what, in Argentina, is called 'militancy'. In fact, the small-scale family farming model is positioned by our interlocutors in San Jerónimo entirely through its opposition to the discourse of another model: the discourse of agribusiness (see Fig. 2).

A structural analysis of the narrative (Demazière and Dubar 1997) of those interviews that were the most complete brought out the themes not of the theoretical model, but of the interviews themselves.[2] Both the structural analysis and the thematic analysis of the discourses, based on a territorial pact's seven theoretical dimensions, reveal a strong internal coherence within each and convergences, even alignment, between the visions of the technicians and that of leaders of small-scale family farming in San Jerónimo (Fig. 2). This has equipped us with effective means to understand the discourses of other actors practising the same agricultural model elsewhere in the

[2] We applied the structural analysis of the narrative to the most complete interviews of the other models, too, which allowed us to confirm that the theoretical model accounts well for the actors' thought systems.

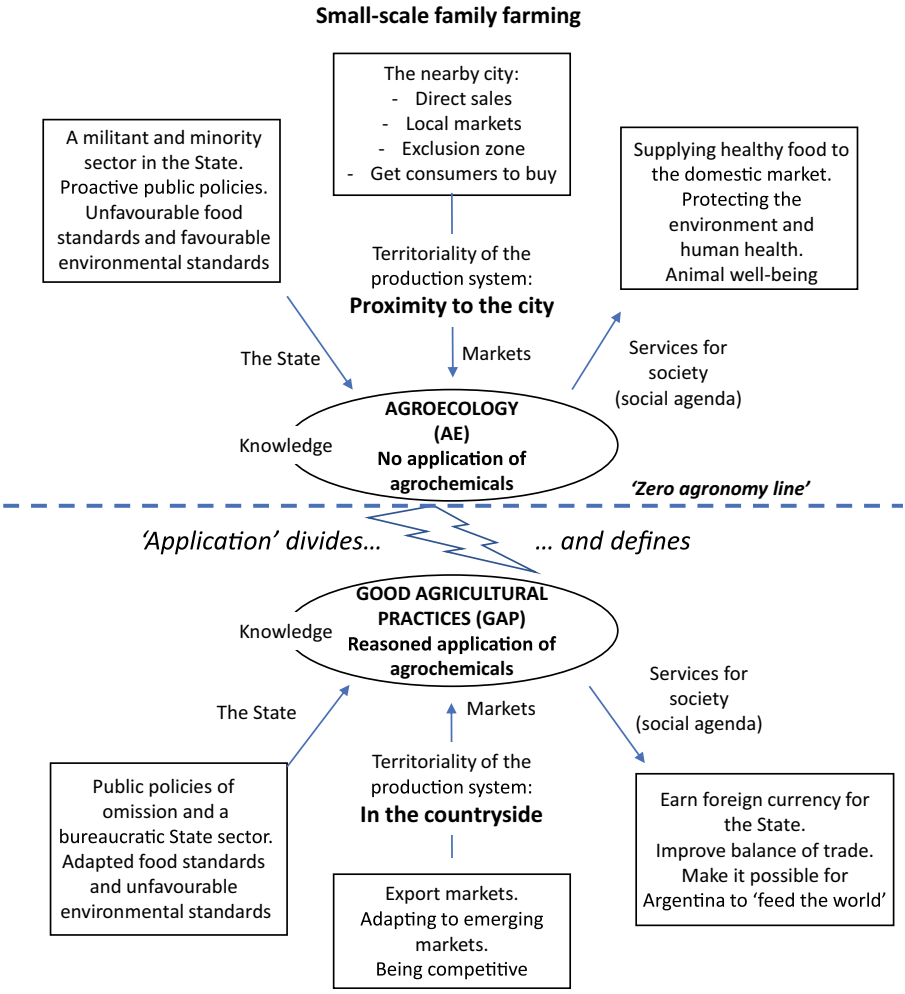

Fig. 2 Role of agroecology in the strategy of demarcation of small-scale family farming from other models

Pampas. 'Agroecology' is a discourse, more precisely a concept, around which, in this case, an agricultural model has been built. This does not mean, however, that all small-scale family farming is agroecological. However, here in San Jerónimo, this concept is constructed entirely around the idea of a direct and spatial opposition to agribusiness. The latter is another concept, which is undoubtedly, as we will see, key in the discourse of the business farming model, but which we discovered also at the heart, through its 'repelling' role, of the discourse of the actors of the small-scale family farming model. Indeed, agroecology is defined by the absence of a particular practice: the application of synthetic phytosanitary products. A technician even called it 'the zero agronomy line', an expression that speaks volumes about the relationships between agroecology and agronomy in Argentina, relationships which we will explore further in this article's discussion section. This strong expression originates from the public denunciation of the effects of agribusiness products, often with an emotional, even dramatic element. For example, Isabel is convinced that it was due to her exposure to the ground

application of synthetic products by a neighbour that her child was born with a spinal defect, which led to his death soon after birth. The fight for the total ban on the application of these products has found resonance in the urban context and has led to a concrete result in the form of a municipal decree (admittedly controversial, but real) prohibiting the application of these products within a radius of 100 m around urbanized areas (case of the city of Díaz) and even 500 m (case of San Jerónimo). A consequence has been that, according to our interlocutors, 'the big agribusiness producers' now describe a significant area of land (625 ha in the case of San Jerónimo) as 'unproductive' because they cannot cultivate it without 'agrochemicals'. We were told that to prevent illegal occupation or squatting on these lands, these owners prefer to rent them to known producers, such as Isabel or Marcos. In this line of thinking, we can thus understand that the efforts by the business farming model to adopt reasoned applications of synthetic products, for example by implementing Good Agricultural Practices (GAP), are systematically rejected by the small-scale farming model. 'Good practices are not viable, they cannot meet the requirement of a ban on the use of agrochemicals,' Isabel told us. We thus interpret that in this veritable ocean of fertile agricultural land, a small-scale family farmer who wants a (minimum) extent of land to farm has no other choice than (1) to cling to this principle of 'zero agronomy', not only to differentiate himself but above all to obtain land from large farms, and (2) to define agroecology as a 'struggle' and, more precisely, a radical opposition to everything that is symbolized by the concept of 'agribusiness'. We almost find here a type of analogy with the struggle for land reform. We can apprehend this contextual definition of agroecology more as a tactic than as a strategy, because in the longer term, it is not the best position for Pampean agroecology to take in order to discuss its technical criteria in an agricultural space that will be subject to regulation by a local public context. Indeed, it is based not on dialogue, but on a struggle. In the difficult context of Argentina, we can understand the effectiveness of a tactic that allows small-scale family farming to be (co-)present today, because without the zero agronomy line there would be no room for it to even exist. However, one can foresee the difficulties in the long term to build a plausible strategy of coexistence on these bases in an Argentina (no doubt still utopian) which could lead to local debates on these agricultural forms. The struggle for a type of territory is compatible with action in the public space, provided that the objective is not solely the elimination of others, but the construction of a negotiated common space, the objective of territorial development. Zero agronomy spaces as islands or enclaves can be perceived as the systematic search for a division of spaces and a refusal to countenance a division of the territory. In this context of opposing co-presences, no discussion is possible between models in order to build a common space; in other words, coexistence is not possible.

In the analysis of the territorial integration of this agricultural model in San Genaro, it is however necessary to consider a key element: the nearby city, which can allow the model to strengthen, or even reverse, its strategy pertaining to coexistence with other agricultural forms. We have already seen that the small city and a few nearby urban allies can make the 'zero agronomy line' possible, but, more broadly, this is also what allows the existence of the CEA as well as many other professionals, intellectuals allies, and institutions, such as the municipality which supports this type of agriculture (although not as much as it could). The nearby city is a current and potential market, especially for processed products with high added value. Milk sold there obtains prices two to three

times higher for the producer and Marcos realizes that it is direct selling that allows him to survive. It is a living space and service area for these farmers. It can be more than an urban centre surrounded by a small exclusion zone to keep out business farms. Through their desire for local and quality supplies and as areas of influence, small- and medium-sized nearby cities can form a key strategic axis for agroecological agriculture to reclaim a place in rural areas, well beyond the 100- or 500-m exclusion zones, forcing large-scale business farming to coexist throughout the local-supply hinterland.

Looking beyond the specific case of San Genaro Department, the logic of the territorial integration of small-scale family farming that we have just highlighted provides us with some analytical insights for other situations elsewhere in Argentina. But as we have shown in the case of the business farming model, we have to take the diversity of situations into account. The case of Leo, a 30-year-old small producer close to the city of Reconquista who has converted his farm to agroecology, is an interesting example to illustrate this diversity. Leo is supported and monitored by Federico, a technician from the Secretariat for Family Agriculture (SAF). The latter is a militant believer in biodynamic farming, which is another discourse—in addition to that of agroecology—available to small-scale family farming. He has had a major influence on Leo's decision to revert to agroecology. However, this conversion is also based on tragic events: the death of Leo's father due to cancer shortly before our first visit in 2016, as well as two miscarriages by Leo's wife, including one at 7 months. Leo believes these tragedies were the consequences of his 'applications' of synthetic chemicals on the farm before the reversion to agroecology. In his case, it is not the nearby city and the exclusion zone that is significant, but his farm is located in a United Nations-designated Ramsar Convention wetland conservation site. He has a very diversified production and sells surpluses to the nearby city, but his main production on his 118 ha is that of Braford cattle—weighing more than 500 k—destined for export. What is very similar with the cases seen at San Genaro is this relationship to the past, a specific relationship in Leo's case since his family has been on this farm for five generations, a claimed and reinvented past, in other words a past turned into a heritage and legacy, and the considerable force of personal projects, i.e. of the private dimension of his territorial mediation.

The conventional model: neither agroecology nor agribusiness

Of all the dairy farms that we visited, Soledad's is representative in particular of the conventional model insofar as it has been owned by over three generations of family dairy producers and as it is deeply anchored to the agricultural sector as conceived almost four decades ago. This anchoring takes the form most notably of participation in the cooperative system for medium-sized farms. Her family is a member of the mixed-farmers cooperative of Sunchales (for the sale of calves and surplus crops). In addition, Soledad proudly told us that her grandfather helped found SanCor, the large Argentinian dairy cooperative (the country's fourth largest milk processor by volume). Unfortunately, a year after our first interview, SanCor went bankrupt. When she recounted her family history, she emphasized that no one from her family had ever been a 'milker'. The milker, literally '*ordeñador*', is a type of traditional actor still called '*tambero*' in the region (which means 'dairy farm' in Spanish, but which is more correctly translated here as 'dairy worker'). The milker is an employee, remunerated in the form of a

percentage of production, who is responsible for the milking, most often with his family or at least with his spouse. He is an essential figure in the conventional model, at the heart of the organization of dairy farm labour and space. In Soledad's case, the family farm was transformed in 2013 into a public limited liability company, owned by her and both her parents. It employs all three of them as well as her husband (full-time) and sister (part-time). Soledad's company has three production sites, of which two are owned, 3 km apart, with 230 cows each. The third site, rented for 5 years, is located between the first two, and has 140 cows. On each of the farms, 'milker' families—who are informal employees, analogous to sharecroppers—are responsible for the labour and for milking, in particular. Soledad told us: 'There are a large number of families in the area who have worked with us for a long time […] There are more than eleven male workers, plus their wives and children, who work on the farms. We are in total more than 50 persons.' It is therefore undoubtedly a family business, but one that is relatively large, with 1200 ha of land (of which 600 are rented). A total of more than 600 cows, distributed over the three sites, produce more than 12,000 l of milk per day. It is obvious that the sociological nature and the social and emotional bond between the people of this company has nothing in common with that of more formal companies, like those belonging to the business farming model. In other cases we studied, such as of Pablo, a milker uses his savings to buy the farm on which he has worked and becomes a family farmer himself, with the same characteristics as the model followed by Soledad, even if his operations are more modest in size (Pablo farms 146 ha and owns 96 cows, producing more than 1800 l per day).

The mode of production can be perceived as specific to this model, once we acknowledge that there are other modes of agricultural and livestock production that are represented neither by the discourse of agribusiness nor by that of agroecology, and which are also not either a sort of vestige of the past or a transition to either of these two antagonistic forms. Soledad's cows, for example, are not pushed to produce more than 20–22 l of milk per day, and the system is essentially based on grazing and fodder self-sufficiency. But field crops, primarily intended for grain silos and for the in-house manufacture of feed concentrates, receive the same phytosanitary applications and doses and types of fertilizers, as well as the same chemical control of weeds, as in the case of business farming. Furthermore, the effluents are collected in immense natural lagoons that are not lined, therefore probably contaminating the ground water. The lagoons' liquid contents are pumped and spread on the crops on an ad hoc basis, without this practice being taken into account in the application of conventional fertilizer. Soledad has heard of agroecology, even of permaculture (yet another discourse pertaining to practices, knowledge and militancy). She is also an agricultural engineer from the National University of the Littoral and knows that these are now compulsory subjects of study in certain faculties. But she and her company appear more tied to the complex legacy of more than four decades of agricultural modernization, which results in fact in the sedimentation[3] of objects, techniques, advice and vocabularies, all of which are much more than resiliences or 'rugosities' of the past, to use the concept of Milton Santos (1997), because this model is made up of a complex system of technical objects.

[3] We use this term because we are dealing not only with a long process of accumulation of heterogeneous techniques, but also of their transformation over time, especially under the pressure of the advent and accumulation of new objects and techniques.

In fact, the same faculties of agronomy that have historically been drivers of the creation, fine tuning and dissemination of these techniques over this long period are still at work today, as we saw during our visits to the field stations of the National University of Rosario and the National University of the Littoral, producing technical references for this model that, for example, advocate retaining a solid pastoral base in the dairy farming system, without however giving up the use of chemical inputs for fodder production. In our opinion, however, this scientific and technical environment that is supporting this form of conventional production, and thereby helping to accord it a status of a model, is seriously remiss in not taking the 'sedimentation' of techniques and objects into account. We believe that this sedimentation is today intrinsically part of the technological logic of this agricultural model, because, just like the 'handyman' (*bricoleur*) of Claude Lévi-Strauss (1962), this model has to incorporate heterogeneous elements of a past made up of various waves of earlier modernizations. In contrast, the discourses of agribusiness and agroecology, like Claude Lévi-Strauss's (Op. Cit.) 'engineer' (*ingénieur*), have the luxury of getting upgrades of techniques. Given its links to the past, this may seem paradoxical in the case of agroecology, but the latter is, in fact, most often able to do some sort of engineering of its past, in other words to recast and reevaluate it, because this remote past no longer has the means to impose itself on the present. In the case of agroecology in Argentina, this past can thus be transformed into 'collective memory' (Halbwachs 1925), i.e. put at the service of the present. But this is not possible for the conventional model, which is struggling with its many technical rugosities, each capable of imposing its own logic, forged in a past that is not so distant and, in any case, not so different from the present. The conventional model must thus manage legacy farms that have inherited an accumulation of various modifications and additions resulting from four decades of reliance on classical modernization, just like the machines studied by Nicolas Dodier (1995). This is what makes this model of conventional farming both intermediary between agroecology and agribusiness (allowing, for example, the models to borrow from each other, and to transition from one to the other), while still being radically different from each of them. And this is why the university faculties of agronomy working on technologies for the other models find the conventional model interesting: it helps them design hybridized techniques, such as those of intensive pastoral dairy farming. Probably over time, and if they endure, the other models too will face the same challenge of sedimentation of techniques (to which will be added the challenge of borrowing from other models), but this is not yet the case.

The conventional agricultural model in Santa Fe remains closely tied to the concept of the sector as shown in Fig. 3. Indeed, Soledad's company was supplying the entirety of its milk production to SanCor at the time of our first visit, in 2016. After remaining unpaid for more than 4 months of supply, from February to June 2017, Soledad decided to switch from SanCor to Saputo, the large Canadian company, which is today the second largest dairy operator in Argentina and which has a processing plant in Sunchales. She told us, 'Even though I am glad they accepted us [as a supplier], it was very painful because my grandfather had helped found SanCor, but we had no choice ....' This change was forced upon on all our interlocutors and one of them told us, 'SanCor was a national price-setting reference. Without it, it is not the same thing, depending on Saputo is risky ....' Just like Soledad, this latter interlocutor then thought of selling less milk and processing more of it first, but neither of them were planning to

supply the nearby city, which could be a solution, although this could pit them in competition with small-scale family farming. On the other hand, everyone is worried because the national domestic market is controlled by large industrial operators who set prices, specify the types of products, impose technical standards, etc. In Argentina, this model of conventional farming is thus widespread in the territory and far from insignificant on the domestic market, but in the discourses, it does not manage to differentiate itself from business farming. However, at the technical level, it does rely on a very different approach (intensive grazing vs full stabling). The sectoral organization of activity and the cooperative world, which were its major institutions, are threatened, and the model is unable to find alternatives. The actors and the markets of medium-sized cities could be an alternative, for example, but the model's stakeholders are not interested in them. Furthermore, as we have shown in another article, this model has not succeeded in forging its own discourse (Albaladejo and Cittadini 2017; Albaladejo 2008) after having been the leading discourse—even a veritable 'hero'—of the agricultural world of the 1960s.

Discussion: relationships structured by the opposition between models

In this section, we examine the relationships between these different models (interplay between actors, discourses, institutional systems, functioning of the State and regulations) according to the four dimensions that constitute them and by taking into account the different levels of organization at which these relationships express themselves (local, provincial and national). Figures 2 and 3 summarize the key elements of these relationships. We will show that for every dimension, the type of relationship is characterized by an opposition, built by the actors, between small-scale family farming and business farming, a bipolar configuration in which conventional farming has not yet really found its place, mainly because it has not managed to differentiate itself from business farming.

As far as marketing of production is concerned, the relationships between the models are juxtapositional, i.e. there is little if any overlap in their markets. Business farming has the goal of conquering export markets, while small-scale family farming seeks to build a local market through direct contact with urban consumers, preferably in the context of either a shared belief in a cause (militant consumers or responsible citizens) or of class solidarity (poor consumers looking not for quality, but for price—which is a situation quite different from France, for example, where alternative forms of agricultures are oriented towards high quality, not low prices). There is no attempt to segment the same markets, but the divergent search for two quite separate markets. Even Marcos, who receives a higher price for direct sales of his production of milk, sells at cheaper rate to poor consumers who are unable to afford supermarket prices. Small-scale family farming has not invested in supplying the national market, which remains the preferred domain of the conventional model. Dairy cooperatives (mainly Pampean) represent a key element of the conventional model's institutional system. They allow this model to be present on the national market and even offer the possibility of exercising some control over this market. Such was the emblematic case of SanCor, which we referred to when describing Soledad's operations. This

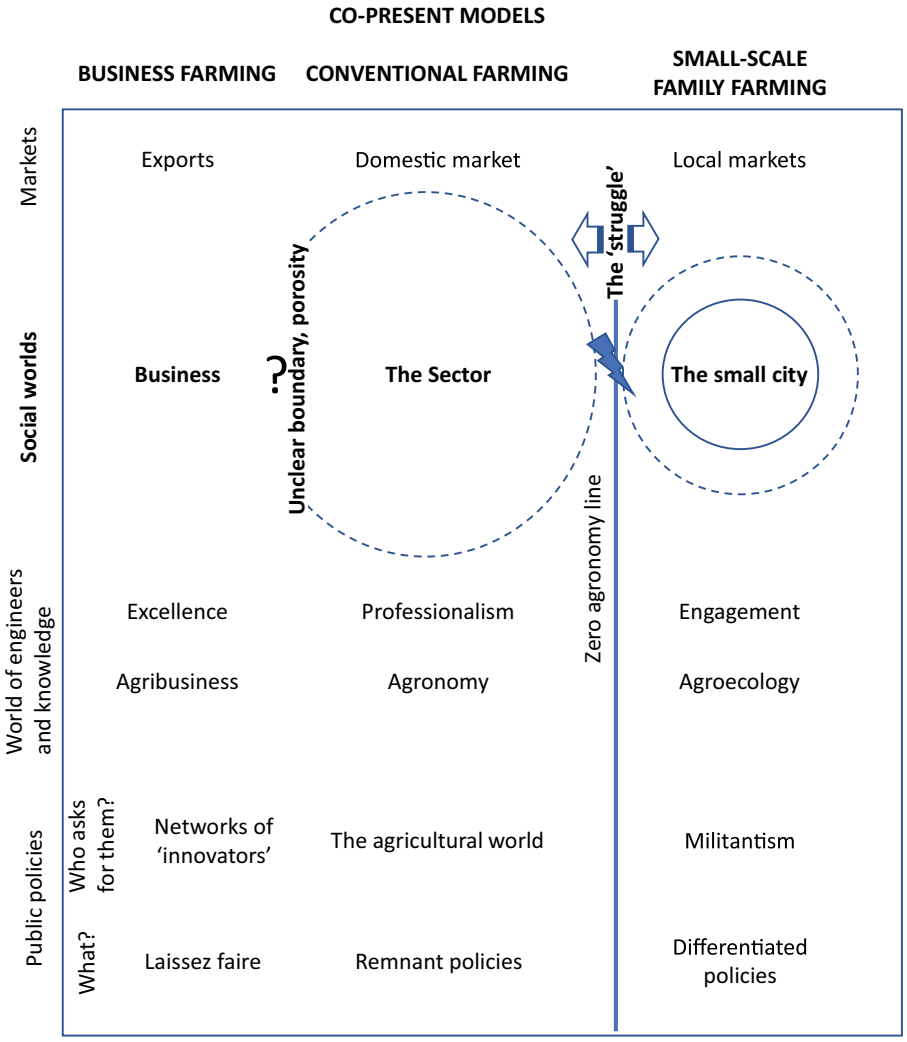

Fig. 3 The relationships between the three models analysed in Santa Fe in the domains of markets, society, knowledge, identities of agricultural engineers and public policy

juxtaposition is based on a clear demarcation between the family model and the other models (Fig. 2) and a blurred and largely porous border between the conventional and business farming models (Fig. 3). But this does not mean an absence of relationships between the actors of the different models, quite the contrary. On the one hand, the actors of the national market and of those in exports have the institutional means to set production standards, as well as quality norms for products for sale (food codes). They therefore force the small-scale family farming model to, in the best case, seek a simple municipal sales permission and, in the worst, operate clandestinely. In Argentina, local sales are therefore not just a strategy designed for or by small-scale family farming; they are also a restrictive solution imposed by actors of the other models. Furthermore, exports by the business farming model have direct consequences on the domestic

market, and therefore on the conventional model, such as, for example, a fall in prices or the requirement for large quantities of standard products, which clearly favours the largest producers, primarily for reasons of economies of scale. Here too, milk provides an apt illustration. Until the end of the 1980s, only surpluses on the domestic market were exported, representing at most 10% of production in the years when there was surplus production. In the 1990s, actors of the business farming model, driven by the concentration of production and new technologies, began to export a stable and significant share of production (more than 25%), thus putting huge pressure on the domestic market. All relationships between actors of the dairy sector have been affected. There are regular protests by dairy farmers calling for higher procurement prices and State intervention, but to no avail (Nogueira 2011).

The constitution of agricultural activity's social agenda is undoubtedly the dimension that sees the most oppositions, even confrontations, between models and this at all scales. The rhetorical and semantic exchanges between systems of actors are very intense since the issue is of utmost importance: to convince national society as a whole, as well as local society, of their own model's legitimacy. The organizations of the business farming model and its farmers present themselves in particular as having a mission: to feed the world. 'The Mission' was even the name of the 2017 national seminar of AAPRESID,[4] their flagship association. This title was printed on the seminar's poster, with its background depicting a ray of light coming down from the sky. In this model in Argentina, the reference to religion is never far away, as we discovered in our interviews. Even though, according to FAO data, Argentina accounts for only of 0.6 to 1.4% of world production, while a country of comparable surface area like India exceeds 15%, this myth is entrenched in the minds of all Argentinians. Another rhetorical element is the contribution, through export taxes, to the State's budget, presented as a service to the nation. At the local level, the argument is that of a spillover distribution of the wealth generated by agribusiness in villages and small rural towns, an effect however found not to exist by researchers (Gras and Bidaseca 2011). This 'everyone benefits' argument is one that many of our interlocutors used with us in regard to employment generation and investments by the dairy mega-farms. In contrast, small-scale family farming emphasizes its concern for health: environmental health because of its practices and human health through the consumption of its healthy food. Furthermore, each model tries to delegitimize the other with local or national society and/or consumers: the applications of glyphosate will lead to cancer, and the products of small-scale family farming could present health risks (trichinosis for pork, brucellosis for dairy products). We note that, in this context and despite the scale[5] of its production, organic farming across Argentina (and not just in Santa Fe) must not be considered as a model of development per se—as it is in France, for example—because it does not appear in these debates and does not seek to insert itself in any way into the social agenda. As for conventional farming, it only advocates for its case with society through the functioning of the agricultural sector, of its actors and organizations, and even of rural territories: the countryside's population must be maintained, there can be

[4] AAPRESID, Argentine Association of Direct Sowing Producers, the most passionate defender of the use of GMOs and glyphosate.

[5] In 2017, organic farming in Argentina accounted for 47% of all organic production in Latin America, covering more than 3 million hectares, but cultivated by only 1000 large farms (https://www.agencebio.org/wp-content/uploads/2018/10/carnet_monde_2017.pdf, in French).

'no farmers without farming' (slogan of FAA,[6] which is the main organization representing this model). Urban residents and consumers are conspicuously absent from its rhetoric. This is indeed what Soledad told us in the story of her relationships with cooperatives, milkers, and also with an agricultural history—a reference that actors from other models do not (yet) have. Indeed, the conventional model is the only model to have a history; not even small-scale family farming has one, despite its regular references to the past, because it has attempted to portray itself as a model of development only since the last 20 years.

A model s third dimension is science and technology. For this dimension too, relationships are in strong opposition between the two major 'discourses' of models (and forms of knowledge): agroecology, a discourse explicitly tied to small-scale family farming, and agribusiness, identified with business farming. This does not mean that agroecology is not of interest to business farms. Indeed, a few of them are attempting to incorporate agroecological principles in their practices. But the Argentinian research community allied with these attempts prefers to use the term 'socio-ecology' or orients their efforts towards the provision of ecosystem services (Mastrangelo and Laterra, 2015). Agronomy, in particular as taught by the university faculties, which have been closely tied to the conventional model, is currently an arena of contention between the actors of these different models. As shown in Fig. 2, based on an analysis at the local level, but which is a concrete reflection of national-level strategies, proponents of agroecology in Argentina, unlike in France, have made the strategic choice of differentiating it from agronomy and linking it explicitly to militancy. This does not signify a rift within the university faculties, as our 'zero agronomy line' interlocutors in the field would have us believe, because that would prevent the proponents of agroecology from fighting from inside the faculties. These struggles are reflected not only in changes in study programmes, elections to student associations (elected students have seats on the faculty councils and therefore wield a certain influence), academic debates and symposia, and the definition of postgraduate curricula, but also in the panels for professor selections and research grants. However, it is interesting to see, through the cases we studied in Santa Fe, how the actions of these university faculties remain, on the ground, fundamentally tied to the knowledge strategies of their historical allies: the actors of the conventional model. We note that their role is essential in adapting this model to allow it to remain in this co-presence, which they do by adopting a low profile in opposition-based rhetoric and choosing to not even develop this model's own discourse.

The fourth and last dimension, concerning the relationship of the model's actors to the public agenda and therefore ultimately to the formulation of public policies, has been the subject of fierce struggles within the State since the 1990s. Here too, the actors' discourses are structured by the agroecology-agribusiness opposition. In the Argentinian context, we propose to summarize the positions of the actors with respect to the State through three concepts: proactivism for small-scale family farming, omission or laissez-faire for business farming and remanence for conventional farming. Ever since the Specialized Meeting on Family Farming of MERCOSUR in 2004,[7] which forced the Argentinian State to take this farming model more into account, following the example of Brazil, and especially since the conflict between the business and

[6] FAA, Argentine Agrarian Federation, union of small (mainly Pampean) farmers.
[7] http://www.fao.org/family-farming/detail/en/c/338097/

conventional models and the Argentinian government in 2008 due to the imposition of export taxes, small-scale family farming has been making inroads into the public agenda, not driven by the social agenda, but by the government agenda. Unlike in Brazil, where grassroots organizations have played a fundamental role, in Argentina, it is militant technicians who have been crucial in the emergence of the family farming model. Indeed, public policies often translate into greater support for these technicians, many of whom have returned to the State or at least to its programmes and projects. This has had a negative consequence: a dependence on the government's political orientation. We were able to observe, in this context of opposition of the models, that many of them lost their position as State-employed technicians after 2015 (including some of our interlocutors from Santa Fe). Small-scale family farming only exists as a model because of the strong pressure on the State for adopting specific public policies and for providing funding. Thus, a national family farming law was passed in 2014 shortly before the change of government, but its implementation in the provinces was hampered by the change in the political environment. It is a very different situation from that of business farming. Public policies which favour the business farming model essentially promote a hands-off attitude towards market forces and support agrarian structures created a century ago and private and international systems for the creation of specific knowledge. At most, the State seeks to profit from this model's activities at a budgetary level through export taxes. These policies of omission require political effort, because it becomes ultimately necessary to justify agrarian structures that are overly favourable to a small percentage of large operators and to explain an absence of control over multinational enterprises driven by their own interests. However, it is possible to present this political effort not as such, but as market-driven logic, or commercial and technological common sense (as happened with GMOs). Between these two opposing models, conventional farming is content for the moment to take advantage of the benefits provided by the State and of public policies. It enjoys longstanding familiarity with the State, after 30 years of hegemony from whose loss it has not yet recovered (Albaladejo and Cittadini 2017). Some of the most illustrative examples of this are INTA, which still works largely for this model, and, as we have seen, the university faculties of agronomy.

Conclusion: the long road from co-presence to coexistence

By applying the theoretical framework of territorial pacts, we have been able to highlight the three development models that seem to correspond to three types of territorial mediation. Our analysis of the seven dimensions of a territorial pact leads us to conclude that even though all of these models are incomplete, each of them clearly manages to differentiate itself from the others, as shown in Fig. 3, by connecting to different social worlds, markets, types of knowledge, and networks of technicians and agricultural engineers. There is, however, a significant difference in the social construction of the boundaries between them, and in every case, these relationships result more from a co-presence, largely built on relationships of opposition, than from a coexistence in which a debate, even alliances or agreements—or, at the very least, mutual recognition—could be possible. But, on the contrary, the general method of building relationships relies on opposition, negation and juxtaposition.

The small-scale family farming model relies on the proximity of a small city to build alliances with the goal of a prohibition of any other form of farming in an exclusion zone around the city. This clearly shows that, without a strong urban influence on agricultural spaces, there is hardly any room for this model and, in particular, for agroecology, and that the division of the territory—consisting, as it does, of immense areas of field crops—between different models remains an illusion. This model's struggle is not to build a negotiated space, but to conquer space for itself. The only possibility (perhaps) for coexistence would be to increase the influence of cities, especially medium-sized ones, on rural areas. These cities in the Pampas indeed often seem to be islands of buildings in an immense agricultural space oriented towards the country's export ports rather than cities exercising any influence on a rural and agricultural hinterland.

In contrast, the business farming model clearly differentiates itself and constructs its identity around new concepts which clearly link it to the business world and no longer to an agricultural sector driven by a desire for professionalization and self-regulation. The agricultural world of the past, today termed 'conventional', now has great difficulty in reconstructing its identity in such a context. Ultimately, it is the business world that defines it, in the negative, by saying what it is not. Strangely enough, the university faculties of agronomy, or more precisely their institutional programmes, are the closest to this conventional model because, in contrast and in the same faculties, student associations define themselves through militancy for agroecology or agribusiness. No student movement identifies itself with conventional farming, even though nearly a quarter of the students come from or have close links to this social milieu, according to surveys that we conduct every year among fifth-year students. The absence of a specific semantic and symbolic activity of the conventional model (Albaladejo and Cittadini 2017), exacerbated by the great porosity of its border with the business farming model, is not conducive to the creation of a separate identity and then to a dialogue with other forms of agriculture, even less for a confrontation, and therefore of a coexistence with them.

However, it is the conventional model that seems, in this current context of the Argentinian wet Pampas, the most likely to enter into a discussion of the sharing of space by different forms of agriculture. In any case, in practice, it is the model that is the most able, within each farm, to accommodate and even suitably adapt heterogeneous technologies from different eras, technical rationales and operators. This is primarily due to this model's long association with 'modernization' transformation processes and also because the economic means of these farmers enable them to acquire certain technologies, but which means are not substantial enough to allow them to wipe the technological slate clean in order to start anew with the best of the latest innovations.

Can the first steps towards this coexistence, as yet unmanifest in the field, not be taken in the university faculties and in the exercise of the agricultural engineer's profession? As shown in Fig. 3, the co-presence framework, strongly anchored in the Pampas, is very clearly reflected in the education and in the identities of future agricultural engineers. But the university faculties and the academic and technical milieu should make it possible to train future professionals to participate in the debate in which they will find themselves in the future by getting involved in actual production situations on the ground.

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