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A STUDY OF MENTAL MODELS AND SOCIAL REPRESENTATIONS: A PATH TOWARDS THE DENATURALIZATION OF THE BELIEFS OF THE ACTORS.

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Summary:

In order to conduct a situational analysis of the needs expressed by the actors in the territory of “Trancas” in the province of Tucuman –Argentina – interviews were carried out in depth to technicians, milk producers, manufacturers and traders of that area.

The topics of the interviews were jointly produced with the actors. Though this strategy we evaluated: the type of activity, its characteristics, the production and economic exchanges that occurs in the area.

A qualitative analysis of the data was performed and then it has been presented to the actors in terms of tensions between the mental models and social representations of the various sectors that interact in the context of milk production. We used the Atlas.ti software support to analyze the results.

This first confrontation with their own beliefs and mental models allowed the increase of the capacity of consensus between them and a rethinking of short and medium term objectives. It is expected that this intervention contribute to improve the socio-ecological transition and territorial resilience of the area under study.

Resumen:

Con el objetivo de efectuar un diagnóstico situacional de las necesidades expresadas por los actores del territorio de Trancas, prov. de Tucumán, República Argentina, se realizaron entrevistas en profundidad a técnicos, productores lácteos, industriales y comerciantes de la localidad.

Los ejes temáticos de las entrevistas fueron generados conjuntamente con los actores y fueron: el tipo de actividad, las características de la misma, la producción e intercambios económicos que se producen en la zona. Se realizó un análisis cualitativo de los datos, los cuales se presentaron a los actores en términos de tensiones entre los modelos mentales y representaciones sociales de los distintos sectores que interactúan en el marco de la producción lechera. Se utilizó el soporte técnico del software Atlas.ti

Esta primera confrontación con sus propias creencias y modelos mentales permitió aumentar la capacidad de consenso entre ellos y un replanteo de objetivos a corto y mediano plazo. Se espera que esta intervención contribuya a mejorar la transición socio-ecológica y la resiliencia territorial del área bajo estudio.

Keywords: mental models – social representations – milk producers - socio-ecological transition

Mots clés: modelos mentales – representaciones sociales – productores lecheros – transición socio-ecológica.

A study of mental models and social representations: a path towards the denaturalization of the beliefs of the actors.

1. INTRODUCTION

Social representations are an organized and hierarchical set of knowledge (Moscovici, 1961) that a specific group produces about an object or social phenomenon (Abric, 1994).

Moreover, ideologies are, according to van Dijk (2003, 1999), belief systems or general representations that are abstract and shared by large and heterogeneous groups. The relationship between ideology and social representations must be understood in two different but complementary ways: a) social representations constitute ideology while its grouping and organization can lead to belief systems capable of guiding the behaviour of the members of a society; b) ideology generates representations according to its links to other ideologies or because of their characteristics, that is, their capability to regulate and give coherence to collective knowledge so as to be a framework for all forms of experience which determines the connection of praxis and concrete action (Brown, 2007).

The ideology is structured through two mechanisms: thematas (Moscovici, 2000) and schemas (Augustinians & Walker, 1995). The thematas (archetypal reasoning that it is usually expressed in dichotomous pairs) are also found at the base of the formation of social representations which constitute the contents on which there is the greatest possible degree of consensus. They are the values of the group, the source ideas and they are concepts in the form of stable images and spatiotemporal permanence. Meanwhile, schemas are mental structures capable of carrying general knowledge about the world in which the expectations, preconceptions, roles, rules and events are included; the scheme constitutes the mechanism through which the information is selected and prepared.

Functionally, social representations describe and explain reality. They guide the acting of a member of a group. They are resources of reasoning and

social action and cohesion to a group while ideologies provide sense to the world and mainly the social action (Brown, 2002).

The phenomena and interactions that should be contemplated to understand the relationships between different levels of abstraction of knowledge cover the difference between the cultural models and mental models. Both of them are mental representations of reality. Such a difference lies in the fact that the individual experience, much more subjective, is collected by mental models whereas the intersubjective experience, which is much more group or collective, is organized in cultural models that

according to the type of social experience are more or less conventional (Shore, 1996).

Subjective experience is represented by individuals in mental models based on two fundamental elements: the biological conditions of the individual and the physical, cultural and social context in which it operates; there is a broad interest to account for the mental phenomena as the starting point to explain the meaning. What shows this interest is the need to identify the conditions under which an individual (mental models) or a social group (social representations) assigns meaning to an object. In this sense, any representation has content with one or more objects. It presents a set of main relations and it is open to interpretation by “another” (Von Eckardt, 1999).

The common features to all become more tangible in mental models in which their content is framed by the abstraction of concrete and particular experiences of an individual with a specific object or event from a socio-cultural point and according to their functional characteristics (Johnson Laird, 1996).

When models are shared by a community that also provides them a functional organization a cultural model is structured, that is, the outlining common properties of individual models of the members of a

community and the establishing relationships that are focused by the socio-cultural organization and the conceptual logic of a community contribute to form a cultural model (Shore, 1996).

Augustinians and Walker (1995) define the schema like the structure that includes conceptualizations about the general expectations of the people, the social roles, the events and how to behave in a specific situation. These schemes are structures / mental processes that provide content on specific groups of stimuli as well as general knowledge about the reality that are manifested in the form of expectations and social behaviours.

The world of common sense is the confluence stage routines rules and rituals. The knowledge built in a pragmatic sense allows people to come into mutual relationship by which they try to understand themselves and others.

However, the result of these processes is experienced by the individual as "natural" removing the socio-cultural burden through which they are produced.

All categories of analysis of reality are themselves expressions of social representations that are constructed from naturalizing logic that is social and, therefore, contingent and contextualized. It is the result of the socio-cultural tension with the political and the economic. Denature would then be to produce a reverse process revealing subyacentes tensions to the ideas represented. It is a deconstruction of the crystallized (Aubone & Mateos, 2007).

In this paper it is considered that "territorial intelligence is the science that has as the object the sustainable development of the territories and as the subject the territorial communities" (Girardot, 2008). It is not possible to think of a subject that is committed to the sustainable development of the territories if its practice is anchored in social representations contrary to this ideology. Getting to know their social representations, which are denatured so that people can see their own constraints and mechanisms of domination, are a necessary step for the chance to choice alternative paths that can produce a social change.

2. CONTEXTUALIZATION

The production of milk in Tucuman is made up of partnership¹ formed by dairy producers, industry, university, provincial government, municipal government, the Cerela (CONICET) and INTA which works continuously and meets once a month since March 2006. The actions carried out by this multisectoral have triggered a lot of accomplishments that have given a enthusiasm and

high degree of and social capital of the institution and its members. Likewise, Tucumán has a remarkable experience in Argentina in interagency work: its sectoral committees, the cooperative work or their business chambers have helped to produce very significant achievements to a national as well as worldwide in industries in different areas such as sugar cane producer, lemon collectors and recently in the of strawberries and blueberries.

The Province of Tucuman has a long tradition in dairy production² and ecological conditions that allow achieving high standards of competitiveness towards central basins of Argentina and therefore the global dairy areas. The provincial dairy complex is located mainly in the department of Trancas with 96% of production and a small basin in Tafi del Valle which is of a great importance for the province due to the importance of regional brand that their cheeses have.

Providing that the freight rates reach historical prices the competitive ability will increase further due to the costs of transporting milk from the central basin to the NOA. At present, the dairy industry in Tucuman only caters 9% of the local consumption while the rest of the products come from the dairy industry of the Pampas. If it is added the milk production of the two major basins of NOA, Salta and Tucuman, it would be supplying 14% of the NOA consumption. Then, there is an enormous potential for the production in Tucuman to supply dairy products market in the NOA and this lies mainly in the close proximity to the markets and the combination of population growth in the region NOA and low per capita consumption recorded in comparison to the national average³. This region accounts for 10% of the population and 5% of domestic consumption. This situation opens possibilities for both local industry and primary production.

Regarding cluster actors, they have a great recognition mainly generated around the Dairy Board created in 2006. In that one all the actors that have some relation to the dairy cluster have participation: Provincial Government, National and Municipal Government, INTA, INTI, IDEP, Secretariat for Family Agriculture, Faculty of Agricultural Sciences, Faculty of Economics, service providers, cooperatives and producers. There is also a collective dynamic among primary producers as there are two cooperatives, two groups of Rural Change, a CREA Group as well as three groups of small producers in the field of Family Agriculture Undersecretary's Office. The Dairy Board has a work program and strategies agreed between actors. Despite the differences between the actors and the failures that lie on the collective past of the basin, it is relevant the interaction as a

habitual form of working and it has been done through the implementation to achieve the transformations.

Anyway, it can't be considered a "mature cluster or self-sufficient" as the strategic vision is not fully shared by all stakeholders. They have not solved a major problem that was declared by themselves as priority (six years ago) as the selling of raw milk is outside the province as well as the lack of confidence in the local industry; besides it misses a greater degree of participation of stakeholders in the decisions and visions. All these factors caused that the segment of the dairy business is not yet economically relevant for the added value that it generates or that it could generate. It is interesting to remark that they are still far from the competitive potential of the plot. This poses an interesting challenge to the Cluster project technical team which is to propose a methodology that catalyzes their collective aspirations and is assembled with existing collective dynamics.

3. OBJECTIVE

To analyze the tensions between the mental models and social representations of the different sectors that interacts in the context of milk production. The purpose is to confront them with their own beliefs by denaturing to increase the consensus capacity among them and to achieve a rethinking of short and long term to improve the sustainability and profitability of the territory under study.

4. WORK METHOD

To work with the actors it has been defined with them four main groups to do the task:

- a) The technical committee brings together professionals working in different institutions (INTA, INTI, Secretariat for Family Agriculture, Cerela-CONICET, University of Tucumán) and also those who work privately.
- b) The industrial committee brings together all Tucumán dairy producers and also is added two professionals from the Faculty of Economics (Departments of Agricultural Economics and Marketing) and Cerela-CONICET.
- c) The Bureau dairy validates all the work done by the previous two groups in which the business rationality is sought although in this group are also represented the different actors of the territory included the provincial and national government.
- d) Aproleche (producers association) Trancas cooperative and Rural Change group were also called to some meetings. The work was organized by a local coordinator and two methodological facilitators provided

by the Provincial Agricultural Services Program (Prosap) and the Tucuman Productive Development Institute (IDEP).

Regarding the stages of the work, the cited actors defined four stages:

- 1) The first stage started in September 2012 in which the commitment of the actors was sought as well as the definition of the Organizational Schema so as to achieve consensus on the working plan and the methodology to do so.
- 2) The second stage called "*Where are we?*", consisted on defining a diagnosis focusing the opportunities for the dairy and the actors capacities to take advantage of them. At this stage, we used denaturing tool of social representations to achieve a vision that overcomes the problems and achieve new dimensions to the solution of problems.
- 3) The third stage is called "*Where do we want to go?*" which goal is to agree on a vision and mission for the frame as well as to define the strategic objectives and lines of action (at this stage we are working).
- 4) The last stage is: "*How do we get there?*". In this stage we dump everything we worked on in a Competitive Improvement Plan where the ideas project has a consensus.

Regarding the stages of participation three areas were agreed.

- A) The first one is the **technical analysis** where the meetings with the technical and industrial committee, professionals and consultants were carried out in the necessary cases.
- B) The second one is the **contribution of business and managerial rationality** to the topic discussed in technical committees meetings held at the Dairy Board where producers and actors took part of it.
- C) Finally the last one is the **social validation** in which it was presented and discussed in a General Assembly all the work that has been done. The board gathered all the actors, producers, industry, government and university. So far there were two assemblies meetings: one to secure the commitment and the organizational schema and in the second one the diagnostic was presented and the opportunities were validated.

Meetings held so far: 12 technical committee meetings, 3 industrial committee meetings, 3

plenary meetings or assemblies or forums and 4 informal meetings with cheese and cottage cheese producers (two in Trancas and two in Tafi del Valle).

5. METHODOLOGY

Techniques and tools for data collection: For the diagnostic stage, we carried out surveys to the producers, industrial and commercial chain. Semi-structured interviews were developed to producers, industrial, commercial and technical chain. Both surveys and guidelines guide were conducted and discussed in seven technical committee meetings, three industrial committee meetings with the Dairy Board.

- a) Regarding the primary sector (producers): The surveys covered several areas of analysis: production, infrastructure, human resources, social capital, institutions' opinions and limiting review to growth, suppliers of inputs and services and business management. In the semi-structured interviews we worked on their perceptions of the activity and their beliefs and ideas in their sector as well as the industry and marketing.
- b) Regarding the industrial sector (industrial): Quantitative surveys showed their infrastructure, current processing capacity, current and potential marketing, product types, sales channels used, social capital and review of the obstacles for the growth. Regarding semi-structured interviews we have also worked on ideas, beliefs and practices of the sector and also on primary production and marketing.
- c) In relation to the commercial sector (shops, supermarkets and hypermarkets): although quantitative surveys were made, the low number in the sample (15) were considered for discussion of the results of the semi-structured interviews taken that covered the ideas, beliefs and practices on the local dairy products and their actors.

Surveys taken: Stores: 15 stores, markets, supermarkets and wholesalers; Producers 39 (90% of producers); Industrial. 5 (100%)

Additionally, we used a market survey of the NOA region (north western Argentina) conducted in 2011 by the Great Northern Programme funded by the World Bank. The study is complete and a current and future characterization of dairy in the NOA was done. Also the results of the surveys of the consumers were presented, the interviews to the referent industry as well as the comparison with the External Market (Chile, Bolivia and Peru).

Data analysis: To analyze the results of the semi-structured interviews, we used the software

"*Atlas.ti.*" We analyzed the social representations about the diagnosis they had about the activity. The most meaningful phrases were selected and they were discussed in the technical committee, the industrial committee and board milk. The survey data were analyzed with SPSS 19.0 support and it will be also done with the software "*Catalyse*".

Analysis components: a) It has been developed the "Characterization and sizing of the Dairy Cluster". To carry out such a task we interviewed the main actors of the dairy farms of the different areas where the producers are located; b) From this point and from a preliminary survey on the level of production / processing (own and producers) the map of the basin has been constructed; c) It has also surveyed the leading suppliers of machinery and services cluster to which they are included too; d) the industry and its capabilities have been surveyed; e) It has been gathered the information of the market in Tucuman and the NOA.

6. RESULTS

6. a. Diagnostic Results

One of the main issues that have been discussed in the plot is the export of 50% of milk industries in other provinces (mainly Molfino in Santa Fe) with the loss in the price of milk due to the high cost of transport and the export of raw milk without the possibility of local industry to add value and to have a greater capacity installed which is unused.

In the first sentences the different visions clearly arise between chain actors and even between two groups of producers. A producer group states: "*If we stop the export (raw milk) at the moment and if everything is sold here in the local industry, the system crashes. They are prepared to handle current surpluses commercially.*" The industry in a way wants to buy milk that export but they recognize that some months have difficulties: "*We're fine with the capacity to sell except from October to February in which we have difficulties.*"

Meanwhile the retail chain said that local industrialists "have good products such as fresh milk and some cheeses but they have the great disadvantage of a small market against the dairy market and a smaller presence in front of the demand. "*Now they have a business and a brand problem with Cootam*".

For the mean time, local producer that are integrated into the local industry believe that their peers should be delivering milk in a gradually way in order to get a stronger local industry. The exporting producers seek for an abrupt solution and as they do not trust the local industry they expect the installation of a new entrepreneur.

In the dialogue of the trade chain (especially with the retailer) it arose that they do not know the local products and they have lack of commercial inattention by the local industry. The retailer claimed that they do not know the product of Tucuman and complained for the lack of attention on the presale. They see positive the product of Tucuman which is *"cool and it has a quick connection with the consumer."* They say that if you have good quality they can be easily placed.

Meanwhile, the industry claims that supermarkets and hypermarkets: *"allow the sale of good volume of products and provide the chance to expose the brand. The self-stores markets and stores sell little volume"*. As great disadvantage they see the lack of interaction with the supermarkets and they claimed that they cannot set the final price due to the high cost of logistics in a single product.

According to the government and producers *"The industry is not responding to the problem"* and the industry claims that they cannot receive at once all of the milk received by producers that export because *"This volume (Molfino) dismantles us. We cannot grow at rapid rates. Also by having a single product industry we cannot balance the business"*.

The industrialists recognize that they have an installed capacity to process the milk but they don't have the financial or commercial capacity to place all the production. On the other hand, traders see that they have a capacity to trade that the industrialist are not taking advantage of. They themselves admit that if another industry is installed or if they export milk to other provinces *"it will be a threat to the local industry."* Producers also claim that they need a country average price and Molfino's price is lower due to the high cost of freight to Santa Fe and under this situation the dairy of Tucuman is affected as *"Molfino's price is taken as a reference for the basin"*.

6. b. Results of the intervention: Denaturalisation of the representations

The survey results were presented at meetings of the technical committee, the industry committee and the Dairy Board. The dynamics of the meetings consisted of presentation of data from surveys and interviews in a Power Point to discuss the analysis of the audience. In the case of social representations, they were left as the last block for discussion and they were presented by clarifying the concepts of culture, ideology, social and mental model representation. It was agreed that in addition to the data gathered via surveys or market studies they would discuss and compare the mental models as a part of the analysis. It has been understood that in order to modify their ideas, beliefs or behaviours were an important process of their mental models.

This explanation was given in the first slide which contained the title and an image representing mental models. In the second one it was exemplified the contrast of social representations taking three short sentences; one for each sector, which somehow summarized one of the central conflicts of the dairy products. This slide also served to show that each "summary phrase" had a colour according to the sector where it was extracted, that is, green for the primary sector, blue for the industry, light brown for the commerce and red for the government.

After this slide and by the use of a cover they separated the different approaches that contained the conflictive issues: PRODUCT (knowledge and benefits), MARKETING CHANNELS (advantages and disadvantages of the stores, supermarkets and hypermarkets) MARKETING MARGINS.

The last slide was a summary of the main tensions and divergent representations of the plot which were ordered in three columns: primary production, industry and trade.

This confrontation of different views (versions of the reality of social actors) combined with quantitative data from surveys and market research contributed to the mobilization of the opinions and open discussion. They even propose new scenarios that would show that the paradigmatic mental models are on track to be modified. This concept was reflected in the richness of the discussion of market opportunities where the strategy integration and confidence predominated that proved to be weak before that intervention.

These presentations of mental models were performed twice before the technical committee; once before the industry committee and once to the dairy board two days before the general meeting or Forum II held on April 11.

After presenting the data we work to define the OPPORTUNITIES and FEASIBILITY of the dairy products to take advantage of it for both the industry and the primary production.

1. Weight of attractive market opportunities.

We considered business volumes, unit price and growth trend of the target market.

2. Weight of market opportunities feasibility of the plot to take advantage of them.

We considered the characteristics of the market opportunity, the risks and threats that it faces as well as the characteristics of techno - productive cluster.

- The opportunities agreed by the primary production were:

1. To increase the sales of milk to industrials in Tucuman.

2. To increase sales to the extra-market in Tucuman (Molfino and others).
3. To sell the milk of differentiated quality a “Danone” or others.
4. To sell milk for other products. This can be integrated through contracts with industry (eg powdered milk, half and long life milk).
5. To diversify risk / price from delivering milk to various customers that forms a pool of producers.
 - The consensus of the industrial opportunities were:
 1. To increase sales of existing products in the retail market of Tucuman (stores, supermarkets, etc.).
 - a. Cheese and “dulce de leche” (milk caramel)
 - b. Yogurt and fluid milk
 2. To increase the production of social products
 3. To increase the presence of current products in retail channels of inner cities of Tucumán.
 4. To develop new products - linked to different cheeses (probiotic cheese, smoked cheese, etc.).
 5. To develop new products - linked to fluid milk and yogurt (yogurt with fruit / cereals, probiotic chocolate milk, etc.).
 6. To produce milk short and long life for the local and regional market.
 7. To increase the production of social products

6. c. Results of actions

At the general meeting held on April 11 it was presented a summary of the diagnosis and opportunities making emphasis in each of the requirements to get it as well as the ability or disability of the cluster to achieve it.

In the case of the producers five opportunities had been agreed and seven for the industrial products. They divided the participants into groups (two producers and two industrial) chain. The technicians specializing in primary production were divided into groups of producers and the industry specialists with industrialists.

In the groups it was discussed the strategic importance of opportunities according to their attractiveness and feasibility. In the case of producers as they were 5 they were asked to assign 5 points to what they considered the most attractive and 1 to the least attractive and the intermediate values for the other. The same procedure was done for the feasibility due to the strategic implication of

each of them. By doing this it was assigned a democratic prioritization.

In a group of producers each actor it was asked to vote on each of the opportunities and then an averaged for each of them was done. In the rest of the groups single note was achieved that has a consensual opportunity.

The producers prioritized the following opportunities:

Opportunity “TAMBEROS” (milk producers)	G1	G2	Strategic importance
To increase the sales of milk to industrials in Tucuman	16	4	10
To increase sales to the extra-market in Tucuman (Molfino and others).	3	6	4,5
To sell the milk of differentiated quality a “Danone” or others	2	2	2
To sell milk for other products. This can be integrated through contracts with industry (eg powdered milk, half and long life milk).	6	12	9
To diversify risk / price from delivering milk to various customers that forms a pool of producers.	25	25	25

Figure 1. Opportunities prioritized by the producers (means of punctuations from each group)

Industrialists prioritized:

Industrial Opportunity	G1	G2	Strategic importance
To increase sales of existing products in the retail market of Tucuman (stores, supermarkets, etc.).	15	30	22,5
To increase the presence of current products in retail channels of inner cities of Tucumán.	6	4	5
To develop new products - linked to different cheeses (probiotic cheese, smoked cheese, etc.).	24	30	27
To develop new products - linked to fluid milk and yogurt (yogurt with fruit / cereals, probiotic chocolate milk, etc.).	2	3	2,5
To produce milk short and long life for the local and regional market.	4	3	3,5
To increase the production of social products	30	16	23

Figure 2. Opportunities prioritized by the industrialists (means of punctuations from each group)

7. CONCLUSIONS

It is worth noting that the priority for producers is the creation of a pool of milk for all producers so they can jointly trade the whole milk of the basin and the second and third opportunity is to integrate with the industry to make new products and sell them to industrial in Tucuman. This shows a great change from the dominant paradigms so far: which focused on distrust to the pairs towards the local industry.

In a report carried out on an agreement FAO-SAGPyA (2007) the consultants mentioned: "*The lack of trust between producers and manufacturers is a constant under direct questioning on the subject. The failures occurred between '96 and 2001 of the cooperatives and private companies leaving milk producers without paying the milk are the main reasons cited as grounds for suspicion*". "*Reliability is what is missing in the system,*" stand in both sectors. *The producers claim that local industrialists are fragile to any crisis that could drag them to the debacle and so the industrial claim that the producers are not reliable because they only take into account the price and the contractual relationship and when they face any variation they fail to deliver and they change to another industry*" (Quintana et al., 2007).

In this sense it is remarkable to conclude that the diagnostic strategy and desnaturization of social representations and mental models of the actors is a way for cooperative consensus which is essential to build a sustainable development territory. In fact the territory is where sustainability is rooted not only in ecological basis but also in cultural identities (Leff, 2005).

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¹ The partnership is a process, more or less formalized, by which two or more actors of various kinds (public, private, etc.) agree to carry out a plan, a program, a joint project in strategies and actions. Partnership is a word that refers to forms of cooperation, networking between the public sector, private sector, civil society organizations and other institutions.

² In the first decade of the twentieth century established a dairy in the area of supply of the capital with several dairy model in the 20s has pasteurized milk and in the first decade, the first glass concrete milk in Tucumán's schools.

³ Equivalent of 125 litres of milk per capita per year in the NOA vs 210 litres per capita per year in the country.