

Local Development and Innovation: The Experience of a Brazilian Aquaculture Network

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Abstract

One of the Brazilian poorest regions, the Piauí State is facing an important revolution. An innovative production system promoted by CODEVASF (governmental company) is the basis of these changes. It's about the Local Productive Arrangements (LPA), a cluster type that consists of groups of agents performing related economic activities in the same region developing cooperation and learning processes. Among other activities the aquaculture is highlighting in the region since it wasn't intensively promoted there and now represents an important role in the local economy. The present paper discuss about the aquaculture network and its impacts in the local economy, such as the role of intermediary agents in stimulating the increase of social capital among the network. Although these agents cannot be considered the only and final solution for networks integration, they can support higher social capital exchange, what contributes for social and economic joint development, what facilitates innovative initiatives.

Key words: aquaculture, regional development, innovation, local productive arrangement

1. Introduction

In Brazilian history is common to point out that the public policy in the Northeast region have being acting only under emergency, to relieve momentarily the problem caused by the lack of rain and water in the rivers. In the last years this practice has being changing, and new concepts are being adopted, since some new policies are being done in the region, encouraging new activities. In this paper we are going to discuss a new activity that has being encouraged in the Northeast region of Brazil, focusing in the state of Piauí, that is the aquaculture. That region is known by its poverty (IBGE, 2005), lack of soil conditions to agriculture and high dependence of policies to promote its development. The aquaculture has changed the reality of that region since it represents a sustainable economic activity and a good alternative to promote the region development.

The experience occurred in Piauí is remarkable since it involves many innovations that really changed the social and economic situation in various municipalities in the region, generating employment, income and development to the people living there.

To achieve this, a new network alliance was encouraged (designated as a Local Productive Arrangement¹) and based on this, the small producers faced the challenge of working in a new activity based on the modern concepts of aquaculture.

Brazilian government has also a big role in this context. In the last 40 years they have been searching for alternatives to promote the development in the Northeast region of Brazil, and one element that focused the supporting actions was the São Francisco River, one of the most important rivers in Brazil that goes through a lot of States in the Northeast region. Based on its availability of water and natural resources, the government created CODEVASF. Its role has been proposing and supporting the development of economic activities over region. For this, in 2006 CODEVASF organized the PLANAP (Action plan to promote the integrated development of Parnaíba Valley), a study that discusses the regional conditions and pins out some guidance on government and local organizations actions to use and improve the already existent infrastructure in the region (Passador, Costa, Passador & Nascimento, 2009).

Considering this environment, since 2006, Costa, Silva, Santos, Santos, Sousa, and Menezes (2007) are studying the region and its development based on this LPA. Meanwhile, Marino (2010) developed his essay about the aquaculture local productive arrangement in the Piauí State. Based on them, this paper shows how the innovative system of Local Productive Arrangement promoted the local development showing how the main Cooperative in the region has been formed, the new strategies adopted by the public companies in the region and the producers current situation.

This paper aims to analyze and describe the public policy directed to the Parnaíba Valley Aquaculture Local Productive Arrangement in the State of Piauí, mainly the actions led by CODEVASF, and describe the local aquaculture context. Based on this, it was established as specific objective to analyze the organization process results of the Local Productive Arrangement of aquaculture in Parnaíba Valley in the state of Piauí and how these initiatives could improve local economic growth, generating novelties in managerial and operational processes.

2. Development of public policies to the Northeast region of Brazil: a historical background

Brazil passed through a industrialization period in the 1950's decade, in that period, the government direct investments were engaged to create infrastructure and intervention in the productive process focused on the Southeast region of the country (mainly to the states of São Paulo, Rio de Janeiro, south of Minas Gerais) (Mendes, 2003). Rocha e Bursztyn (2008) considers that the Northeast region entered in the central government scope only years later, through regional development strategies, in that occasion it was founded the Northeast Brazilian Bank (Banco do Nordeste do Brasil) and the Northeast Development Superintendency (SUDENE). However, Mendes (2003) says that these institutions performance was restricted to three States of that region – Bahia, Pernambuco and Ceará. Before this foundation, the government actions in the region were restricted to water infrastructure projects and emergency actions implemented by the “Against Drought Projects Inspectorate” (DNOCS) in 1945. In that period the managers considered that agriculture was impracticable in the Northeast region since it has an intense drought and also a high land property concentration, so the industrialization was the only way to boost the regional economy (Rocha & Bursztyn, 2008).

The proposed model didn't reach the expected results because the employment generation wasn't enough due to the industrial high technological pattern, and the adopted model didn't promote the expected social development (Rocha & Bursztyn, 2008). Due to the old model failure, the National Integration Ministry started to encourage the Local Productive Arrangements through the National Policy for Regional Development (Passador et al, 2009).

Aiming this new project objective, the government created in 1974 a company (CODEVASF) that was responsible by promoting the development and revitalization of the São Francisco Valley region through irrigation projects. Since this strategy was successfully conducted, in 2000 the government decided to expand the area of CODEVASF, reaching the Parnaíba Valley that involves the state of Piauí and other poor states in the Northeast region of Brazil. Thus, CODEVASF aimed to encourage activities to promote the development of both regions, focused on the regional development. They promoted some projects like the revitalization of São Francisco Valley, the action plan to integrate the development of Parnaíba Valley, the forestry development program and the environmental actions that enable the communities to have new perspectives and opportunities from the company's performance.

In the same period, the Brazilian Government was encouraging the fish activity all over the country, creating a secretariat to create policies that focus on this objective. One of the first projects implemented by this Secretariat was to modernize the fishing activity by stimulating partnerships with the municipal and state government through associations and cooperatives. The practices of the Secretariat started to work and the fishing activity started to become important to the economy of some States and in 2009, the federal government created a Ministry of Aquaculture, in this situation, the activity will receive the federal support to grow and become even more significant.

2.1 CODEVASF operation as a strategy to promote Parnaíba Valley development

The operation of CODEVASF in the Parnaíba Valley had as starting point the PLANAP (Action Plan to the Integrated Development of Parnaíba Valley). Created in 2006, it considers municipalities from the states of Piauí, Maranhão and Ceará (Veloso Filho, Silva, Carvalho & Ribeiro, 2009a). It's an innovative strategy plan that consists in a list of diagnosis and technical studies done by diverse institutions that acts on the Valley. It has a short term plan (with propositions that can be quickly implemented using the infrastructure already existent in the region), and a medium / long term plan including ecological and economical macro zoning, information system and strategic proposal to its execution (CODEVASF, 2010).

All the Action Plan (PLANAP) was developed based on two concepts that were: development and territory (CODEVASF 2008). The development dimensions considered in the plan was the endogenous, performed bottom-up, with local agents' participation by potential exploration in each territory. The territory concept goes beyond the geographic space, and incorporates the idea that the local network and its social relations determine the space. Thus, the territorial development results from public policy combination with endogenous development initiatives. The local agents started to perform an important role to the attributes identification and valuation in each region.

The area covered by the plan was divided into eleven development territories identified by the vocational study of each region. In the specific case of aquaculture, SEBRAE (Brazilian Support Service to Micro and Small Companies) has been the responsible by organizing the plan and monitor its performance. Besides, all the plan performance can be monitored by the Information System of Strategic Management Oriented to Results (SIGEOR), a website available for visitants and also partners that shows all the action plan steps, which results have already being reached and what activity is being done.

2.2 Aquaculture historic background in the Piauístate

The Parnaíba Valley has a high potential to the Aquaculture development since it has a lot of available water and favorable climate conditions in all over its extension. Despite all these natural resources availability, the Aquaculture activity had a late development in the region, it started only after the construction of Adhemar Braga Aquaculture Station, located in the Piri-piri city. The station belongs to the DNOCS and it shares most part of the fingerlings production to the dams restocking. According to DNOCS report of 2009 there were four main states in the fingerlings production in the Northeast region, the smaller one is Piauí with Adhemar de Braga Station, then it comes Bahia producing 3.7 million, Rio Grande do Norte with 7.43 and the biggest producer is Ceará, that has 6 stations producing 30.35 million in the total (DNOCS, 2010).

In the 80's the Fishery Development Superintendence (SUDEPE), encouraged the fishery and aquaculture by purchasing fingerlings and after restocking the dams, popularizing exotic species. After that the activity started to be encouraged in the state. In 1986 the Agriculture Secretariat of Piauí built the Nazária Aquaculture Station that nowadays was reformed and expanded with CODEVASF resources, and reopened as "Deputada Francisca Trindade Aquaculture Station".

From 1989 until 1991 the activity was done under attendance of PROPESCA (state organ linked to the Agriculture Secretariat). The organ gave a new dynamics to the activity by promoting technical support to the producers, teaching techniques of consortia production (with other creations such as pork, drake), associations, built some processing industries of fish and fingerlings production. Nowadays the fish production is experiencing a growth period, the Aquaculture Ministry published a report with the production from 2007 until 2009 in each state of the country, in Piauí the production was 7,941 ton in 2007 and reached 9,890.6ton in 2009 demonstrating a growth of about 25% in the period.

It still is one of the smallest fish productions in the Northeast region of Brazil, but since the encouraging activities are giving results, maybe in the next years it will be more representative (Brasil, 2010). The commercialization of fish in Piauí is more intense in Teresina, the capital of the state, but it's important to note that 80% of the commercialized fish comes from other states, since the production is not yet sufficient and recognized by the population. Now the effort aims to professionalize the production to give a quality impression to the consumers.

3. The Local Productive Arrangement Organization Process

According to Abramovay (2002) there is a wide literature that shows that although the impressive advance of globalization, the innovative process tend to be located and based on contracts among individuals. The author also says that the local development initiatives are more productive and innovative in the generation of employment and income. These two assumptions are the basis of the Local Productive Arrangement (LPA) concept.

The origin of these social-based inter-organizational networks researches comes from studies from the productive agglomerations in Italy. All the discussion emerged in an occasion that some small familiar companies faced a really strong crisis period performing an intense growth. The adopted strategy was to base their activities in cooperation and specialization and demonstrating a high development. The evolution of the studies about this example led to the creation of the Local Productive Arrangement concept that is based on the innovation system in all over of its dimensions. A Brazilian research group (Redesist) developed the concept based on the innovation system focusing specific sets of economic activity. Based on these thoughts, Cassiolato and Lastres (2003) define that the local productive arrangement involve groups of agents that perform activities related to an economic role in the same region in which the confidence relationship and interdependence leads to cooperation and learning processes and its activity promote the social inclusion and the local development.

The emergence of LPA is linked to the historic of identity construction and the formation of territory links (local and regional), another point is the existence of interaction, cooperation and trust among the actors that is favorable to the development of LPA. Other points that must be considered to its formations is the geographical concentration and also the participation of public and private organizations, these are related to the idea of network that enable the interconnection of producers, suppliers and consumers (Cassiolato & Lastres, 2003). So, it can be said that LPAs are strictly related to social capital theory and social relationships between local organizations.

Amorim, Moreira and Ipiranga (2004) reached a conclusion that the LPA consists of a transitory form to a more complex structure of relationship between companies, when the relationship evolves the interaction gets stronger, the cooperation and trust and the companies constitute no more an arrangement, but a Local Production System. In essay, networks can develop themselves and achieve higher complexity, mainly in social and institutional aspects (Lorange & Roos, 1996).

3.1 The formation of social capital and innovation in LPAs

Whereas the success of organizations is linked to the way in which it deals with its external relations, the most important facet of the organizational environment are its external social relations (Gulati, 1998). From such relationships emerges the social capital among the participants of the network, which makes it a matter of utmost importance to understand the relationships of interactions between agents. Hence, social capital is related to the available resources in a network of relationships understood and recognized among participating organizations (Bourdieu, 1985). The capital is an important factor for the creation of human capital, which causes it to be derived from relationships in which there are better conditions of cooperation and coordination among individuals (Coleman, 1988). This type of capital is characteristic of social organizations, whose actions bring mutual benefit from cooperating and solidarity (Putnam, 1993).

For creating this cooperation between organizations, there must be confidence provided between them (Gulati, 1995), being a constituent element of trust capital. Over time, the participants of the network shall support such confidence in standards formally constituted and has to live by the standards of the community and with the existence of disciplinary measures so as to punish those who looking down on these standards. The social capital represents standards, even if not institutionalized (Bourdieu, 1985), that facilitate collective action for mutual benefit (Woolcock, 1998).

From then on, there is a collective consciousness among participants in a network, which makes the individual acting in function of the collective and not strictly by many interests, and then individual commitment to the well-being of collectivity (Leana & van Buren III, 1999). Only with this spread of social capital can leverage invisible elements, however, fully operational in the context of development (Kliksberg, 1999). Along with this, MeloNeto and Froes (2002) say that social capital is a superior level, able to generate sustained development in ties of cooperation, solidarity and confidence that are embedded in cultural and social basis of the community where organization belongs.

The existence and the creation of a similar cultural environment are also related to social capital formation, which drives the creation of an environment that is culturally common among network participants. So, the capital of a community must be measured according to the network's history and their social relations (Lin, 1999), that shapes the social structure of a given community. This explains why it is necessary to have cultural links from local experience and sharing of experiences between individuals, before trading systems institutionalize norms between the network members (Fischer, 2004). Shared situations and experienced by individuals create a common culture that influences in generating social capital (MeloNeto & Froes, 2002).

This common environment where social capital is embedded, it may emerge the innovation culture diffused among network members. Innovation may arise as result of shared efforts and collective learning (Cooke & Wills, 1999). So, novelties may be means from where collaborative ties emerge and the propeller for the spread of social capital.

4. Procedures and methods

This paper uses a case study strategy (Yin, 2005) since it was collected data from interviews, observation from visits in the cooperatives installation producers and notes from meetings with the cooperatives members. Along with the study case strategy, the network historical background was also studied through secondary data (Carneiro da Cunha, Passador & Passador, 2012). This complementary strategy was adopted in order to understand the LPA formation and development, since its social-historical evolution can bring important elements to understand the actual stage of a network and to point out future possibilities for a network (Halinen & Törnroos, 2005).

So, in general, the data collection strategy was based on primary data collected through personal semi-structured interviews (which research tool was made based on theoretical review information) with CODEVASF technicians on visits made at their fish farms and secondary data collected from regional and institutional reports. So, it is a qualitative research, mainly because case studies support researches which objective is to understand a specific context based on perceptions described by the interviewed results and secondary data. The primary data collected was analyzed through discourse analysis (Gee, 2011) after all the interviews were transcribed. Afterwards, based on all data collected, some new strategies were proposed to the companies to invest and manage the local productive arrangements in the region. In sum, it was conducted seven interviews and researchers made five visits between March and May of 2009.

These interviews provided an important perception to the researchers about how the producers face the companies support. After the construction of the basic scenario, complementary information was collected in DNOCS reports, SEBRAE reports and website, and local newspapers. As for secondary data collection, it was collected CODEVASF reports showing the steps that the local productive arrangements have gone through (reports are being collected since 2007).

At last, with data from historical background of CODEVASF and Piau  region, along with primary data (personal interviews) and secondary data (third parties' reports and documents), some conclusions were made. Aquaculture LPA was not just described, but also, some success factors could be observed and some key points that propelled regional development could be also noticed with this data collected and charted.

5. Results

The operation of CODEVASF in the Parna ba Valley is coordinated by the 7th Regional Superintendence which headquarter is in Teresina (capital of Piau ) and it is responsible by the state of Piau  and part of the states of Maranh o and Cear . Since it has being implanted, this Superintendence works as partner with state government and prefectures to the execution of overriding constructions.

As a partner of CODEVASF there is another company, SEBRAE-PI, it consolidate itself as an entity composed by government and private representatives to contribute to the actions coordination with the national policies of economic and social development. (VelosoFilho, Silva, Carvalho & Ribeiro, 2009b). In 2002 SEBRAE established their priority in the region: work with the LPAs. They set a strategic partnership with Redesist that would be responsible by producing the technical and institutional material and also to constitute teams to work in an action plan to SEBRAE. As a result, in 2003 one reference term was published to guide SEBRAE's action with the LPAs.

5.1 Organizations action in Piauí

In the region, various institutions work to support the LPAs development. Each of them is responsible by identifying and choosing the LPA that they prefer to work with. In SEBRAE- PI case, in 2008, thirty projects were identified in Piauí state. These projects are related to apiculture, handicraft, aviculture, fruit crop, dairy products, aquaculture and tourism among others. From all of them, 5 projects were selected to receive priority attention, and in its scope 72 municipalities were contemplated. The projects are: cashew crop, dairy products in the north, red ceramic arts, Sheep and Goat farm and Aquaculture.

The aquaculture project in the state is analyzed by two points of view. For the State Government, CODEVASF and DNOCS it's considered to have a pole city, Bocaína and all the efforts are done to this project. For SEBRAE-PI the project is bigger, involves the municipalities of Esperantina, José de Freitas, Piracuruca, Teresina, Elesbão Veloso, Luzilândia, Piripiri, Parnaíba, Joaquim Pires and Inhumas, but although it's considered a priority project, it doesn't have a productive development plan.

The state government works with DNOCS in the Bocaína Project and in 2006 they produced more than 300 tons of fish, and their expectation was to reach the production of 1000 tons per year. There is a Federal Policy that supports the state action named "Local Direct Purchase Program for Family Farming", in this program the state government buy the production of registered family farmers and send to schools, social programs, shelters. They also created a fish processing industry (UBP/Bocaína) in which the fish is processed and add value through extracting the filet, packing and freezing.

CODEVASF is also acting in the region considering the São Francisco Valley and Parnaíba Valley potentialities to the Aquiculture. In 2004 they started a support program to structure the Aquiculture LPAs in the region, other organizations as the State Government, the Federal University of Piauí, and the Embrapa, among other organizations, gave support to this work.

SEBRAE-PI actions in the region consists in a different job, they consider more municipalities in the project. The institution objective is to strengthen the Aquaculture through the production growth, its commercialization, and providing a sustainable economic improvement to the producers. They set some goals to the LPAs, first of all is to increase the producer's income, and to reach this is necessary two points: raise the production level and regulate their environmental license. They started working in the region in 2008, in these three years they have done some activities to stimulate the production, they accessed new technologies, participated on events, received technological consulting, updated their knowledge about basic aquaculture, commercialization and fish processing.

Before SEBRAE-PI act there, there were no collective organizations, the producers used to work individually. Available data from 2009 shows that 70% of the assisted municipalities already had aquiculture associations or cooperatives. Based on this, the produced amount has grown, in 2007 the production was about 5 ton of fish, and in 2009 the production was 50 ton (CNA, 2009).

5.2 CODEVASF actions in Piauí aquiculture

After 2004 CODEVASF assumed the encouraging actions in complement to the state government, and they promoted the Aquiculture Sustainable Development program in Piauí State. In 2005 CODEVASF provided 70 cages to the COAP (Aquaculture Cooperative) members, this was considered the starting point of the program actions. The program stimulated actions to strengthen the aquaculture productive basis, regarding the fingerlings production stations that had incentives to be reformed and expanded, and promoted fish artificial reproduction training courses.

These actions aimed to increase the fingerlings quality in public stations. Regarding the production system organizing actions, all the public interventions in the aquaculture stations have produced a beneficial effect to the sector, mainly considering the high quality of fingerlings supply that partially provided the total demand of Piauí state.

The aquaculture basis strengthen in Parnaíba Valley covered some actions like: the reform and expansion of public aquaculture stations such as “*Dourival Guimarães*” Aquaculture Station (Municipal Station), “*Deputada Francisca Trindade*” Station (State Government), “*Adhemar Braga*” Station (DNOCS) and “*Parnaíba*” Aquaculture Unit (Municipal Station); implanted seven aquaculture cage projects (purchased of cages, equipments (boats and motors); constructed feed deposits; provided basic inputs and technical assistance to some cities like “*Campo Maior*” and “*Valença do Piauí*”. They also promoted the aquaculture in tanks by building land tanks (nurseries), and promoted Research and Teaching by providing research centers and training schools.

The project also created fish processing plants aiming to add value to the fish production in Bocaína city, the plant is almost ready and will work with fish from all local productive arrangement producers. The installed capacity is about 2,000 kg/day, it required an investment of about half million dollars. In 2004 CODEVASF signed agreements with SEBRAE/PI and COAP (Aquaculture Cooperative) totaling more than R\$ 350,000 (near US\$175,000) invested only in projects to promote fish farming in cages, aiming to implement projects in the towns of Valença do Piauí-PI, Bocaína, São João do Piauí, São Miguel do Fidalgo, Nonato, and Paulistana, and implement management systems processing in Bocaína city. The implemented projects benefited more than 250 families. Since 2003 until today the aquaculture activity has consolidated itself in the region and nowadays there is about five hundred cages producing over than 240 ton/year of fish (CODEVASF, 2010).

One of the latest projects promoted by CODEVASF was the creation of a Aquiculture Reference Center of Parnaíba Valley (CERAQUA-PHB), the project has the support of the Ministry of Aquaculture, the State Government and also Embrapa, it's in Parnaíba city, a little bit far from the production center (Bocaína) around 550 km. This project will be fundamental to the development of research activities, technology transference, aquaculture production, extension and aquaculture resources management in the Parnaíba Valley (Piauí). The center has specialized labs to develop research and productions in aquaculture, nourishment, pathology, genetics, biotechnology, and have the support structures as researchers housing, restaurant, auditorium and training rooms (CODEVASF, 2010).

However, CADEVASF direct participation inside local community could stimulate higher levels of interaction and collaboration among network members. With the trigger of initiatives led by CODEVASF, higher interaction moments happened. Even considering that it was a community where social capital already existed, it can be said that this relationships got more proximity and higher levels of social capital were exchanged between members. This consideration can be taken from comments and ascriptions from all interviewed participants. All they see CODEVASF as a partner and trust in its intermediation to propel relationships and to facilitate commercial and operational resolutions.

None the less, CODEVASF was also seen as a legitimized mediator to solve little issues among participants. The public agency has the perceived power to intercede and arbitrate disputes, as well as to manage collaborative initiatives. So, CODEVASF has a central role in the network to stimulate interaction and to provide operational support. Without this agency participation, it is clear that interaction would happen in less intensity. That is why it can be said that CODEVASF had an important role to stimulate initiatives both in explicit matters as in the tacit dimension of the social capital.

5.3 The Aquiculture Cooperative

This environment propelled by CODEVASF initiatives brought also practical results. One year after CODEVASF action in Bocaína (2005) 43 small fish producers created a cooperative to encourage small producers to seek a more sustainable production. The COAP (Regional Aquaculture Cooperative of Picos) is a profit cooperative that aims to work in the aquaculture expansion in Bocaína. CODEVASF support to COAP started by setting-up the cages in Bocaína dam, they donated 70 cages and also installed COAP's cages and tanks (155 cages, 35 fingerlings cages and a tank), expanding the production to 125 ton. In 2006, from January until April, the cooperative sold 135 ton due to the aquaculture projects installed by CODEVASF.

All the project actions were done through the agreement with SEBRAE-PI. They hired two specialized technicians in aquaculture to follow the projects and work directly in the productive management, this was really positive to the project development. Araújo and Moraes (2010) points that nowadays the cooperative have 40 registered associated but it's not all of them that really participate in the cooperative activities, only five producers are intensive participants (they have cages in the cooperative and also join the proposed activities), the others associated have punctual participations. The authors also arguments that the cooperative do not have strong perspectives to the future since the participants do not participate intensively; they do not encourage new producers to enter in the cooperative.

6. Conclusions and final discussions

The presented paper focus on a remarkable experience that changed the social and economic situation in the Northeast region of Brazil. The innovation and the spread of social capital have an important role to the success of the promoted activities. First of all the creation of a public company responsible by promoting the local development has shown itself as a positive strategy. It shows that public agencies initiatives can, at least, startup collaborative actions among network participants. Another point is about the new production system implemented by CODEVASF because it gives the opportunity to small producers to become representative by acting together and receive technical support from the public companies that work in the region. So, public agencies not only foment the network ties, but also support these ties and the LPAs participants in their operational issues and routine. More than promoting social inclusion, their activities include operational support to many actors in the whole productive chain, mainly fisherman, small farmers and fish producers.

In the specific case of Piauí state, CODEVASF and SEBRAE-PI action encouraging the aquaculture production in local productive arrangement has already given important results. With regional similarities already existed in Piauí's context, social capital could be improved by intermediary agencies that could work in order to achieve higher levels of trust, confidence and collaboration among network members. It shows that collaboration emerges not only between network members, but also among foment agencies (public ones or not). These collaboration among all network levels from show that what is really behind the collaboration scheme is the embedded social capital in the region, that is stimulated in a mutual cycle, both by agencies, as well as by its own active members.

It is also relevant to point out that there was a crescent historical development of institutional apparatus to support the following initiatives, both from CODEVASF as well as from SEBRAE-PI. The constant initiatives from public agencies, previously from the entrance of these institutions, started the development of an institutional environment where the following agencies could take advantage. So, it cannot be said that CODEVASF or SEBRAE-PI led all the development by themselves. Of course they had a fundamental role in this process, however, it cannot be said that they are the only responsible for the local development.

Moreover, it is possible to think about a revolution that is happening in Piauí social and economic conditions. The main actors are the small and medium rural entrepreneurs that are incorporating in their business, top technologies in rural production and management. In this context, the Aquaculture Local Productive Arrangement in Parnaíba Valley analysis shows that it is a well-established activity and now represents an important issue in the State economy. It is not said that the network does not need improvements, but that it can be considered sustainable.

The investments analysis shows that the actions promoted by the government and CODEVASF were made through agreements mainly between the state government, federal universities and nonprofit organizations. This agreement type gives more visibility to the promoted actions and become easier to get new activity partners, and in specific cases the agreements between the state government, city halls and federal organizations enables higher targets since the financial counterpart that is added to the financial values invested by CODEVASF, promoting the local development.

Another important support that is being really helpful and important to structure the Aquaculture LPA in Piauí is the SEBRAE-PI support. This organization act together with CODEVASF and even develop parallel plans to stimulate the producers in a wide range of cities, they give technical support, training and encourage the new participants to keep on the activity and believe that they are being watched and are not alone. It is important to emphasize the existence of an intention protocol to the involved institutions keep on strengthening the local productive arrangement basis, mainly supporting the increase of fish production by installing cages in the reservoirs and instigate the fish farms in tanks.

Another important point to the Parnaíba Valley development incentive politics is the fact that the fish bought by the direct purchase do not goes away of the production region, being distributed to schools, churches, elderly shelters, and others. In the last years the attention directed to the Northeast region of Brazil by promoting projects and actions to the productive field through the familiar agriculture, irrigation projects, fruit and caprine production and apiculture changed the region situation. Due to the increase of economic activity in this area the following conditions became indispensable such as construction of roads to the communities, water and energy supply and mainly the citizenship promotion, and without them, would be impossible to provide a consistent grow in the economy and aquaculture in the region.

As for innovation, it can be said that this case brings lessons not only related to operational innovations emerged from network collaborative learning. There were also novelties related to management actions. The way the network was leaded, as well as the way that initiatives were conducted, made this experience unique and brought innovation from network management. This innovation is not feed only by the intermediary agency that leads most of network initiatives, but also from all network participants that legitimate and act in accordance to established common objectives. The innovation emerges from the whole network and from the local environment that creates mechanism that allow these initiatives to occur. It cannot be said that they are not result only from one agency actions.

As for limitations, even considering that national and international study case researches on inter-organizational networks are hard to be placed in the same stage in order achieve high levels of understanding and theory construction (Carneiro da Cunha et al, 2011), academic efforts should still continue to seek robust results that can explain, at least, a particular case in a specific theoretical background. Doubtless, Piauí's case is important to understand and to support theories build on networks innovation and local development (Eisenhardt & Graebner, 2007), however, researcher should be aware that specific cases are linked to their specific realities and cannot be induced to a general view of reality. Besides, considering internal network representativeness, the sample of seven interviewed persons could be also increased to a higher sample.

As for future studies, it is recommended a replication of this research in other innovative network, in Brazil or in any other country. This could enable a greater comparison of results. Considering this, other sectors with LPA formation in Piauí State could be also investigated in order to define similar cultural factors that could lead to an innovative profile or to identify any novelty that regional culture or local environment may bring.

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¹LPA is the abbreviation Local Productive Arrangement, a term that comes from the Portuguese direct translation of APL (Arranjo Produtivo Local). According to Carneiro da Cunha (2008), this term does not exist anywhere besides Brazil and it has its own conceptual framework supported by phenomenological network theories supported by the existence of social capital in its ties, different from clusters, that has the support of utilitarian and technical-economic theories. Since the network studied is from Brazil, where this term is diffused and accepted by researchers, authors from this paper decided to use the translated term in order to do not lose any specification from local reality.