

# THE SITUATION AND PERSPECTIVES OF AGRICULTURAL COOPERATIVES IN THE SURROUNDING AREA OF THE ITAPARICA RESERVOIR IN NORTHEAST BRAZIL

A SITUAÇÃO E AS PERSPECTIVAS DAS COOPERATIVAS AGROPECUÁRIAS NO ENTORNO DO RESERVATÓRIO ITAPARICA NO NORDESTE DO BRASIL

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## **ABSTRACT**

Over 20 years after the implementation of irrigation schemes in the surrounding area of the Itaparica Reservoir, in the semi-arid region of Northeast Brazil, insufficient infrastructure and low market power still impact smallholders' incomes and development of market strategies to support rental increase from the smallholders. Lack of access to credit, high input costs, and low producer prices for major crops have helped to maintain the poverty status of smallholders that equally affects small agricultural producers like cattle breeders. Agricultural cooperatives have contributed to increase their members' market power in agricultural commerce and facilitate their access to credit and agricultural expansion. To analyze the historical context of this situation, as well as the potentials and constraints of agricultural cooperatives and associations, 24 qualitative expert interviews were conducted among members of cooperatives or associations and consultants involved with technical assistance to smallholders. During the study period, no active agricultural cooperatives could be identified. Financial problems related with lack of financial resources, inadequate government support, absence of leadership and poor organization, and missing solidarity and mistrust were considered the main reasons for the cooperatives' poor situation. However, the potential of these cooperatives are illustrated by the efficiency of the fishery and apiculture associations.

**Keywords:** Agriculture; cooperatives; Itaparica reservoir; semi-arid region.

## **RESUMO**

Com mais de 20 anos da implementação dos projetos de irrigação no entorno do Reservatório de Itaparica, no Semiárido Nordeste, uma infraestrutura insuficiente e um baixo poder de mercado ainda impactam os rendimentos de pequenos proprietários e do desenvolvimento de estratégias de mercado para apoio ao aumento de renda dos pequenos produtores. A falta de acesso ao crédito, os elevados preços dos insumos e os baixos preços dos produtos agrícolas têm contribuído para manutenção do status de pobreza que afeta tanto os pequenos produtores agrícolas como os pequenos pecuaristas. As cooperativas agrícolas têm contribuído para aumentar o poder de barganha na comercialização agrícola e facilitar o acesso ao crédito e à extensão rural. Com o objetivo de analisar a história dessa situação, os potenciais e as restrições das cooperativas e associações, foram aplicados 24 questionários aos técnicos envolvidos na assistência técnica aos pequenos produtores. Por ocasião deste estudo, não foram identificadas cooperativas em ação na região. Problemas relacionados com a falta de recursos financeiros, falta de apoio dos governos, falta de liderança e organização, desconfiança e descrédito na eficácia das cooperativas foram as principais razões para esse baixo desempenho das cooperativas. No entanto, o potencial impacto das cooperativas pode ser ilustrado pela eficácia das associações de pescadores e de apicultores.

**Palavras-chave:** Agricultura; cooperativas; Reservatório de Itaparica, semiárido.

## INTRODUCTION

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Since the 1950s, Brazil's government and governmental authorities promoted the construction of several dams and reservoirs along the São Francisco River for hydroelectricity generation (THE WORLD BANK, 1998). These processes involved the promotion of irrigated agriculture to compensate local people for flooded land and reduce the traditionally high poverty in the semi-arid region (CAMELO FILHO, 2011). Despite significant progress in poverty reduction in the recent decades (ROCHA *et al.*, 2012), the income level in the region is far below the national average. Around 61% of the local population is still classified as vulnerable to poverty<sup>1</sup> (ATLAS DO DESENVOLVIMENTO HUMANO DO BRASIL, 2013).

The situation in the irrigation schemes around the Itaparica Reservoir represents many aspects of the situation that family farmers face in the semi-arid region. After the construction of the reservoir, local smallholders and formerly landless laborers received irrigated land inside irrigation schemes (THE WORLD BANK, 1998). Due to several complications during the implementation, soils with low fertility and lack of infrastructure, many smallholders still live in poverty even after more than 20 years after the first irrigation schemes went into production (DA COSTA, 2010; UNTIED, 2005). Despite indirect subsidies in the form of free irrigation water, returns from most crops are still low and depend on low wages for day laborers (HAGEL *et al.*, 2014).

Especially in the semi-arid Northeast with an agrarian structure characterized by a high share of small family farmers, agricultural cooperatives have the potential

to improve small farmers' access to several means of production, markets for product commercialization, credits, and information and expansion (SABOURIN *et al.*, 2004). UNTIED (2005) identified these issues as the major constraints of smallholders around the Itaparica Reservoir. When implementing the irrigation schemes of the Itaparica system, the dam operator CHESF (São Francisco's Hydroelectric Company) attempted to establish agricultural cooperatives. Although many farmers were organized in cooperatives and associations at the beginning, most of them were not satisfied with their support and so their influence was declining constantly (UNTIED, 2005). In 2006, 80% of the 8,724 farmers in the Itaparica region were not organized in any kind of association (IBGE, 2006).

Regardless, the potential of agricultural cooperatives were emphasized at the 2012 World Food Day "Agricultural cooperatives: key to feeding the world" at the University of Hohenheim (DA SILVA, 2012) and more recently by Altman (2015). The National Service of Learning about Cooperatives (SESCOOP) constantly registers increasing members of cooperatives (SESCOOP, 2012). RIBEIRO *et al.* (2013) illustrate the benefits of agricultural cooperatives for family farmers in the municipality of Petrolina, around 300 km from the Itaparica Reservoir. Thus, this study intends to assess and analyze the historical and actual situation of agricultural and livestock cooperatives within the irrigation schemes around the Itaparica Reservoir, analyze the reasons for their success and failure, and identify their recent developments and potentials.

## MATERIAL AND METHODS

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### Study area

The study was conducted in Petrolândia, in Pernambuco state, and the three irrigation schemes within and around the municipality – Apolônio Sales, Icó-Mandantes (Block 3 and 4), and Barreiras (Block 1 and 2)<sup>2</sup>.

The irrigation schemes were implemented in the late 1980s during the construction of the Itaparica Reservoir, to compensate about 4,900 rural families for flooded land (excluding around 1,000 so-called "pa-

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<sup>1</sup>People earning less than R\$ 255.00 (BRL of August 2010) where defined as vulnerable to poverty.

<sup>2</sup>Before the dam construction there had been an irrigation project called Barreiras, which should not be mistaken for the new irrigation schemes Barreiras Block 1 and 2. References to the former project (flooded nowadays) are indicated by "Old Barreiras".

ra-rurals” who had moved to town, but retained the right to an irrigated lot). Due to administrative difficulties and unsuitable soils, all schemes were operational with a delay of many years and went into production in the mid and late 1990s (WORLD BANK, 1998). During the study period in 2013, the last irrigation scheme – Barreiras Block 2 – had just recently started operations.

Irrigated land in the study area is relatively equally distributed. In Petrolândia, 83% of the total irrigated area (3,179 ha) belongs to the 714 farms (96% of total farms) with each possessing less than 10 ha (IBGE,

### Data collection and analysis

Data were collected from March to May 2013 by semi-structured qualitative in-depth expert interviews following the guidelines of Atteslander (2010). The interview guideline was adapted to regional characteristics and supported by former agricultural consultants in the region. After the identification of the first experts in Petrolândia, further experts were found during the first interviews by snowball sampling. In total, 24 expert interviews were conducted representing experts from several institutions as illustrated in Table 1. To achieve a representative insight into the potential of agricultural cooperatives, three interviews were held in Curitiba, in the state of Paraná, which serves as an example for the suc-

cessful implementation and promotion of agricultural cooperatives to empower relatively small family farmers (see also RITOSSA & BULGACOV, 2009). All interviews were recorded with permission of the interviewees.

Data were analyzed using methods of the qualitative content analysis according to Atteslander (2010) and Mayring (2010). Retrieved information was coded and categorized in several steps, and allocated to the research questions. Coding and categorizing allows the (quantitative) illustration of qualitative data and facilitates the analysis, interpretation, and the reproducibility of the study.

**Table 1 – Interviewed experts by category and interview location.**

| Location            | Category of expert                                | No. of interviews |
|---------------------|---|-------------------|
| Petrolândia/PE      | Members of agricultural or livestock cooperatives | 6                 |
|                     | Members of agricultural or livestock associations | 7                 |
|                     | Members of the farmworker union                   | 1                 |
|                     | Agricultural consultants                          | 3                 |
|                     | Local authorities                                 | 3                 |
| Recife and Curitiba | Members of cooperative unions                     | 3                 |
| Curitiba            | Scientist   | 1                 |
|                     | Total   | 24                |

## RESULTS

### Overview on the situation of agricultural cooperatives in Northeast Brazil

The analysis of the situation of agricultural cooperatives in the study region requires a general understanding of the history and situation of cooperatives in the Northeast of Brazil. Research from other sources and the two expert interviews in Recife provided the necessary information. Derr (2013) discusses the history of cooperatives in Brazil in detail. The interviews in Curitiba completed the findings and helped to widen the perspective considering the national context. In the South and Southeast of Brazil, agricultural cooperatives achieved high economic and social relevance. European and Asian immigrants owning small farms imported the ideals and values of cooperatives to the region. Favorable climate for agricultural activities, cash availability, high educational attainment of the rural population, economic growth in the region, and governmental support, such as the cooperative union of the state of Paraná (OCEPAR) favored this development (DUARTE & WEHRMANN, 2006).

In contrast to the development in the South and Southeast regions, agricultural cooperatives in the Northeast were facing various difficulties. Though Ribero *et al.* (2013) names the state of Pernambuco a precursor of cooperatives in Brazil, the interviewed experts and several authors mentioned that agricultural cooperatives

were often misused in a system of clientelism to preserve the uneven balance of power. The first agricultural cooperatives were founded by owners of large or medium properties or politicians in order to receive governmental funds (DUARTE & WEHRMANN, 2006; SABOURIN, 1999). Cooperatives founded by the government or governmental authorities later failed because their members did not identify strongly with the organization. The low levels of education of the rural population, unfavorable conditions for a reliable agricultural production due to droughts, farmers' lack of capital, and urbanization aggravated the situation. Despite these difficulties, there are positive examples of agricultural cooperatives in the more prosperous area around Petrolina such as COANA, COOPEXFRUIT, COOPEX VALE, or the farmers' association APRNVI analyzed by Ribeiro *et al.* (2013).

Interviewed experts mentioned the successful implementation of agricultural cooperation a slow process that requires, above all, the education and training of potential members to understand the benefits and invest their potential and human resources in the cooperative. The clear understanding that the cooperative belongs to all its members is crucial to reach identification with and confidence in the cooperative.

### Actual situation of agricultural and livestock cooperatives in the study region

In the study region, 3 agricultural cooperatives and 4 agricultural associations could be identified with having 571 members in total, as illustrated in Table 2. All three cooperatives had been founded in the late

1990s when the irrigation schemes went into production. Their main tasks were the commercialization of agricultural and livestock products, collective purchase and cost reduction of means of production, improve-

**Table 2 – Agricultural and livestock cooperatives and associations in the study region in 2013.**

| Type of cooperation                    | Name of organization | Location                | No. of members |
|--|----------------------|-------------------------|----------------|
| Agricultural cooperative               | COOPBARREIRAS        | Barreiras Block 1 and 2 | 40             |
|  | CAPIM                | Icó-Mandantes           | ca. 260        |
|  | COOPERAGRI           | Icó-Mandantes           | 80             |
| Agricultural association               | AAFE                 | Barreiras Block 1       | 18             |
|  | ACAMP                | Apolônio Sales          | 100            |
| Association of beekeepers              | APIMA                | Icó-Mandantes           | 23             |
| Association of small ruminant breeders | ASCOPEIRO            | Petrolândia             | 50             |

ment of credit accessibility, and provision of agricultural extension. During the instruction phase, the cooperatives received financial support by CHESF and sold the agricultural products of their members, especially green coconuts and guava, at the central markets (CEASA) in Recife and Caruaru. Although they achieved higher prices than with sales directly from the field, they stopped their activities after the financial support expired. During the study period, all identified agricultural cooperatives were inactive.

In contrast to the inactive agricultural cooperatives, four smaller associations related to agricultural or livestock activities could be identified. With the exception of the ACAMP association in the irrigation scheme Apolônio Sales, these associations were founded in the period from 2000 (AAFE) to 2012 (ASCOPEIRO) resulting from the lack of organization of smallholders and livestock farmers. ACAMP, founded in 1986 by the residents of Old Barreiras, is the oldest association in the study region. Its objective was to represent its members in the conflict with CHESF to receive more irrigated land and houses directly at the lots. During the study period, around 50 of the 100 members were regularly participating at meetings. Despite formal activities like regular meetings, no association was involved in any common economic activities. Cooperative sup-

port, such as provision of seedlings, residues from crop production as fodder, or the trade of manure, existed exclusively in friendly or family relations. Only APIMA, the association of beekeepers and farmers in Icó-Mandantes, merchandized honey under a common label. This association received technical support from the city of Petrolândia. To ensure its success in the future, interested farmers undergo a trial phase before they can become regular members. During the studied period, there were 17 members on trial which was interpreted as an indicator of the success of the association. Due to its recent formation, the association of livestock farmers ASCOPEIRO was yet to organize common sales and purchases, while support for the members consisted mainly of technical consultancy and organized support by veterinarians.

Along São Francisco’s riverbank, there were eight fishery associations of which four were active and four waiting for a credit assignment. Active associations organized common sales and purchases of means of production. Each association accepted 12 members maximum. These associations were not included in the study, but served as a positive example for the successful implementation organized by the city of Petrolândia involving the potential members who had participated in workshops and seminars about cooperatives in advance.

### Constraints of agricultural and livestock unions

Interviewed experts identified six main reasons for the failed implementation of agricultural cooperatives, which are illustrated in Figure 1. The most mentioned reason,

which is lack of capital, occurred after CHESF stopped the regular payments, contextualizing its background in the history of the cooperatives’ implementation. The experts



Figure 1 – Mentioned reasons for the failure of agricultural cooperatives and associations.

even assumed that the cooperatives had been founded exclusively to receive payments without trade-off. Consequently, there was no incentive to generate its own income, and common commercialization of produced commodities was not even considered. After the expiration of the payments, common property, such as electronic devices and furniture, were sold and the cooperatives were declared inactive. Lack of access to credits, mainly due to bureaucratic reasons, had inhibited necessary structural improvements to start economic activities to continue any kind of cooperative activity. In the case of the smaller associations, common activities failed due to members' lack of capital. For example, the association AAFE had once tried to organize common purchases of means of productions, but failed because several members had no capital available.

Seven of the 24 interviewees mentioned that cooperatives in the region failed because they did not receive any governmental support. None of the interviewed members or chairpersons of cooperatives or associa-

tions knew about governmental programs like the state-run SESCOOP-PE or the "Incubadora de Cooperativas" of the Federal Rural University of Pernambuco. Such programs provide seminars and workshops to communicate the knowledge and benefits of cooperatives. Most programs are developed in the state capital Recife and do not reach communities in the semi-arid interior.

The other four reasons can be summarized as lack of human capital. Lack of organization and leadership is a consequence of the knowledge gap about cooperatives and associations, aggravated by the general lower educational level in the semi-arid region compared to the coastal areas. Four experts shared the opinion that individualism and egoism prevented any success of cooperatives or associations. This lack of successful examples or individual failures, such as the earlier mentioned common purchase issue by the association AFE, led to mistrust in such institutions, which is affirmed by the past failure of the other cooperatives.

### **Lack of market access and potentials for cooperatives and associations**

Despite the past failure and actual inactivity of agricultural cooperatives and associations in the study region, experts underlined the potentials and crucial factors for a successful implementation of such organizations. Low market power and limited access to credits represented the main constraints for small family farmers in the study region. Thus, the interviewed experts indicated the main potentials of farmer organizations lie in improved commercialization, common purchases of means of production, improved access to credits, sharing farm equipment, and purchase of high quality feed.

All experts interviewed in the study region mentioned the commercialization structure as the main constraint for farmers' income generation. Since the analysis of marketing structures in the irrigation schemes around the Itaparica reservoir by Untied (2005), only a few changes were observed. Most agricultural commodities are still sold to middlemen directly on the field because most farmers do not own the means of transportation for their products and, consequently, lack alternatives to commercialize their products. Due to the lack of commercialization opportunities, middlemen dominate the market comparable to monopolies, dictate producer prices, and even bring manipu-

lated scales when collecting yields from the farmers. They also decide the sale conditions and frequently modify them after, usually verbal, contract conclusion. The middlemen even often organize harvests, which reduces the farmers' added value and provides the middlemen additional opportunities to manipulate the yields. Promised payments after resale can be reduced and parts of the harvest rejected and left on the field. The local farmer's market does not provide sufficient demand because of the low population. Furthermore, family farmers do not have the capacity to run a sales booth. The Brazilian Food Purchase Program (PAA) and School Feeding Program (PNAE) offer higher prices, but purchase small amounts, so few farmers sell small parts of their production to these programs. A coconut water factory in Apolônio Sales is the only relevant processing facility in the study region. Despite its vicinity to irrigated plots, most farmers cannot sell directly to the factory because they lack means of transportation.

Animals are also usually sold via middlemen due to lack of alternatives. Middlemen buy animals directly at the farm and resell them at the market or directly to slaughterhouses, which sell the meat directly to the local supermarkets. Similar to the case of agricultural products, scales are ma-

nipulated to reduce producer prices. In the case of weighing at the slaughterhouse, farmers have few chances to control the weight. Few animals are sold directly at the farmers' market. Farmers slaughter solely for own consumption or sell small amounts in the neighborhood.

Due to the middlemen issue, interviewed experts identified the biggest potential of cooperatives and associations in an improved sales structure as illustrated in Figure 2. Collective commercialization could strengthen the position of farmers at the expense of middlemen and was regarded as a necessary measure to successfully establish cooperatives in the study region. In the context of commercialization, experts mentioned that cooperatives should also conduct market research to identify potential markets and analyze agricultural commodity prices. Broad acquirement of means of transportation and weighing facilities could even lead to more wholesale markets (CEASA) opening and realizing higher prices than in the study region.

Five experts mentioned that cooperatives could financially support their members by provision of credits or improving the credit availability. Family farmers often lacked capital to invest in production infrastructure or inputs, especially after years of drought. Access to credit was often restricted due to lack of collateral and high bureaucratic difficulties. The five experts also mentioned shared ownership as it could permit the acquirement of agricultural machinery, whereas during the study period most fieldwork was conducted manually. Moreover, cooperatives could provide financial support to implement more efficient irrigation technologies and replace the prevailing conventional sprinkler systems.

In the opinion of four experts, many farmers were overstrained with irrigated agriculture as it was implemented in the late 1990s. Thus, they required agricultural advisors especially for the cultivation of perennial cash crops, which had rarely been cultivated in the study region before the dam construction. Cooperatives could fill this gap since the dam operator had stopped providing agricultural advice during the study period. The state-run advisory service (IPA) was not responsible for the irrigation schemes and thus concentrated on farmers outside the schemes. Agricultural advice also played a role in the implementation of new technologies.

Joint purchase of inputs could reduce the input costs, as mentioned by four experts. During the study period, only a few shops that were well connected shared the market around Petrolândia. Similar to commercialization, farmers had the weaker position in the market, received far too low prices for their products and paid far too high prices for inputs.

Most experts commented that the coconut water factory was the only value adding facility in the study region when referring to the cooperatives' role for commercialization of agricultural commodities. Three of them had the vision that cooperatives could establish more value adding industries in the region. Production of jam and sweets made from fresh fruits already existed on a small scale. Increasing this production could keep a bigger share of the added value in the region and provide income opportunities besides primary agricultural production. Only one expert did not see any potential of agricultural and livestock cooperatives in the study region.

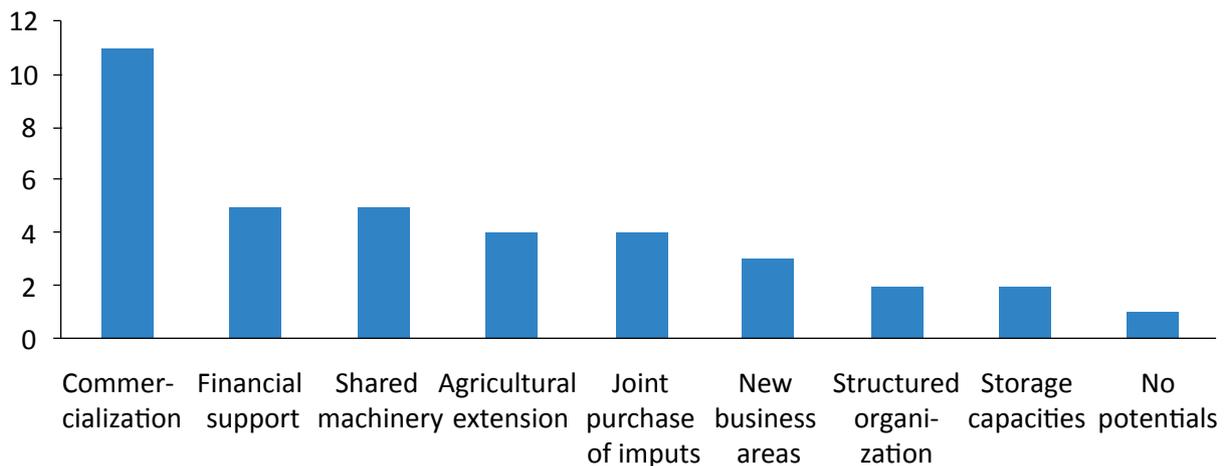


Figure 2 – Most mentioned potential of agricultural cooperatives in the study region.

## DISCUSSION

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Experts identified structural problems hindering the successful implementation of cooperatives and associations in Northeast Brazil. Mistrust against these forms of cooperation is based on their legal form and historical background (DUARTE & WEHRMANN, 2006; SABOURIN, 1999). In contrast to the South, where agricultural cooperatives are well established (RITOSSA & BULGACOV, 2009), major parts of the northeastern population have no positive experience with cooperative thinking (ALBUQUERQUE & CÂNDIDO, 2011). Pozzobon and Machado Filho (2007) underlined the need for organization and ethical behavior to successfully operate cooperatives. Considering the difficulties of the investigated cooperatives (Figure 1), it is obvious that these basic requirements were not present in the study region.

In the difficult environment, complicated by the resettlement process, CHESF did not consider the “State-ments on the Co-operative Identity” defined by the International Co-operative Alliance (ICA), which underline the importance of self-help and self-responsibility (ICA, 2005). Albuquerque and Cândido (2011) emphasized the importance of farmers’ own initiative in the foundation process of cooperatives. Financial incentives in form of regular payments by CHESF influenced the voluntariness in joining a cooperative. Consequently, cooperatives were founded exclusively to receive payments without following the fundamentals of cooperatives. Despite the farmers’ needs for commercialization alternatives, affordable means of production, and access to credits, the cooperatives did not implement any successful activity in these sectors. This conforms to findings of Untied (2005), who identified the top-down implementation of cooperatives by CHESF and the focus on technical assistance instead of economic activities, as reasons for the cooperatives’ failure. The poor situation of agricultural and livestock cooperatives in the study region is in contrast to the basic need of promoting cooperatives and farmers’ interest groups to increase bargaining power over product and input prices, as underlined in the report of The World Bank (1998) which analyzed the progress of the resettlements around the Itaparica Reservoir. Besides commercialization of agricultural commodities, food-processing cooperatives provide unexploited potentials to retain parts of the added value in the region (BIALOSKORSKI NETO, 2001; ORTMANN & KING, 2007).

Cooperatives are facing high competition with middlemen who are interested in individual commercialization by the farmers. Unlike the cooperatives, middlemen possess means of transportation and are well connected to the wholesale market. The importance of fast, direct transportation of agricultural commodities to the markets is due to lack of storage and cooling capacities and food processing facilities in the study region. However, before exploring these potentials, cooperatives or farmers’ associations have to be established successfully first.

The insufficient infrastructure also affects the cooperatives, limiting their access to information. Interviewees in the metropolises Recife and Curitiba mentioned governmental programs to support cooperatives by providing workshops and seminars educating existing and potential members. Rocha *et al.* (2012) stated that several governmental programs, such as PRONAF, PAA, and PNAE, have been established successfully in rural areas to support small subsistence family farmers and to improve food security. The interviewed experts also mentioned these programs, but many farmers do not benefit from them. Administrative barriers, lack of knowledge, and clientelism restrict access for individual farmers. Provision of required information, support in the application process, or even commonly organized participation at such programs could represent suitable services provided by agricultural cooperatives or associations.

Small associations of beekeepers or fishermen present positive examples of successfully operating unions. Before their foundation, potential members participated in several trainings and learned about ideals and benefits of associations. In this case, authorities provided the framework conditions without interfering or influencing the daily operations, following the recommendations by the FAO (2002) and PIREs (2004). During the study period, these associations successfully conducted common purchase and commercialization. More recent studies also indicated a positive development of the association of livestock breeders ASCOPETRO. Common purchase of feed supplements, mainly maize, could be established successfully, which led to significantly reduced feed costs (COSTA, 2014; SIEMANN, 2015). Moreover, members demanded common facilities for product processing and marketing (COSTA, 2014). Siemann (2015) also referred to future potentials of livestock cooperatives, as 41% of the 60 inter-

viewed livestock farmers in the area who were not members of a cooperative or association would like to participate in one. Main objectives were learning new practices, improving their production, improving credit access, and increasing marketing opportunities. These positive developments lead to the conclusion that smaller unions, encompassing only parts of their members' economic activities, have higher implementation potential before bigger and more complex cooperatives can be established. Duarte and Wehrmann (2006) also describe high potential for small associations, so-called cooperatives of resilience, which focus on diversification of rural production and serve mainly local markets. They recommend a focus on local markets due to high competition with big enterprises when trying to access the national or even the world market.

Finally, despite the failure of most of the agricultural cooperatives and associations in the study region, most interviewed experts mentioned the potentials and benefits of these forms of organizations. All interviewed farmers showed a general willingness to cooperate in commercialization and purchase. Only one interviewee did not believe in a successful implementation. To explore the open potentials, agricultural cooperatives should mentor smaller, less complex, fishery and beekeeping associations in the short-term and mid-term, and focus on the basic needs of their members to ensure their association with the union and maintain their motivation to participate actively. Restrictions due to inefficient cooperative laws were not analyzed in this study. However, considering the prosperous situation of cooperatives in Brazil's southern states, the legal framework seems to be appropriate for the successful implementation of cooperatives.

## CONCLUSIONS

The qualitative approach based on expert interviews was chosen in order to investigate the role of agricultural cooperatives and associations in three irrigation schemes at the Itaparica Reservoir in semi-arid Northeast Brazil. Large memberships did not mirror the actual situation of the identified inactive cooperatives and associations in the region. Despite financial support during the implementation phase from the dam operator and a basic willingness to cooperate among smallholders, there were no efficiently operating agricultural cooperatives in the region.

Due to the consensus of the interviewed experts with previously conducted studies, the obtained results of the study seem clear and further quantitative research on this topic would be unnecessary. Further activities should concentrate on knowledge transfer about cooperatives and increasing the awareness and familiarity of governmental programs supporting these efforts. Despite the results of this study, the farmer production structure in the study region brings high potentials for the implementation of cooperatives or associations.

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