INTRODUCTION: DISRUPTION

In 2002, the massive Castanhão Dam in the state of Ceará was completed, thus trapping the surface runoff of the Jaguaribe River Valley and its feeder watersheds into a vast reservoir ( Açude Castanhão ) capable of holding 6.7 billion cubic meters of water. The area that was flooded with the filling of the reservoir covered 325 square kilometers and completely inundated the city of Jaguaribara, the seat of the município with the same name.1 As impressive an engineering feat as Castanhão is considered, the process of relocation and adjustment of the population was as daunting.

Ceará is one of nine states that form the northeast region of the country. The early Portuguese colony was established in the northeast, built around a sugar plantation economy along the relatively verdant coastal region. Toward the interior of the region, the environment is harsh—semiarid, mostly poor of soils, and subject to regular droughts. This drought-prone backlands region is called the sertão (its inhabitants sertanejos ), and it evokes great meaning in the local imaginary as a place of suffering where resilience and the indomitable will of the population are the chief assets. The traditional economy of the sertão was integrated into that of the slave-based sugar plantation in that it provided food supplies, especially dried meat, draft animals, and leather to the sugar mills.
The relations of production that emerged in the sertão have been presented as “semifeudal” (Goodman and Redclift 1982) based on the social formations that emerged from a highly concentrated landownership. Large landholdings, called fazendas, were often owned by local ranching elites who maintained on their properties a skein of resident sharecropper families. Typically, a sharecropper received a residence and a plot of land (Johnson 1971) on which subsistence crops and, usually, cotton, were produced. In return for the land and residence, the sharecropper paid a proportion of production (usually one-third of food crops and one-half of cotton) to the landowner. In this system, the social relations between landowner and sharecropper were highly unequal and clientelistic, so that the sharecroppers turned to the landowner in times of crisis (e.g., drought), and the landowner could demand multiple forms of loyalty and support (Finan and Nelson 2001; Nelson and Finan 2009). In effect, the lives and livelihoods of the sharecropper and his household heavily depended on the largesse and good will of the patrão.

This background sets the context for the Castanhão Dam. Ceará has no naturally occurring surface flow, and access to water for humans and animals has always been a primary source of vulnerability. Over the last 40 years, the state has shifted from a rural society to an urban one. In 1970, approximately 65 percent of the population lived in rural areas and survived, albeit precariously, on rain-fed agriculture. Today 30 percent of the population is rural, and the state economy is based on tourism, industry, and services. One of the major concerns of statewide public policy is to guarantee urban supplies of water, especially to the city of Fortaleza, the capital and now the fourth-largest city in the country.

Begun in the early 1990s, Castanhão was key to the larger, well-planned transformation of the state—a modernization project that was premised on a reliable supply of water for an urban-based economy and the “rational” agricultural use of water to support the production of high-value crops in areas with appropriate soils. Carried out in the flush of the nascent Brazilian democracy, the Castanhão project became an example of participatory planning and public consultation, and it was widely and openly debated.

First of all, the reservoir would entirely inundate the urban center of Jaguaribara, the seat of the município of the same name. Over the course of nearly 10 years, the commission responsible for the Castanhão project brought in social scientists, architects, urban planners, and a variety of sector specialists to design the move of Jaguaribara town to higher ground and to manage the
displacement of over 10,000 people. A replica of the local church was built in the new town *praça*, graves were exhumed and moved, new housing was built, and eventually the relocation of this urban population to Nova Jaguaribara was successfully completed.

The reservoir waters also extended out to flood fazenda homes, pastures, and sharecropper plots that dotted the rural landscape, disrupting the centuries-old livelihoods that had reigned in this part of the sertão. For this sizable rural population, several livelihood options were offered. The rural displaced who had known only the life of the sharecropper or smallholder farmer, cowboy, and agricultural day laborer were given a choice. They could remain as independent rain-fed farmers on their own plots of land (elsewhere on higher ground), produce cash crops on a plot within a new irrigation perimeter, raise dairy cattle, or cultivate fish on the edge of the new reservoir. This case study examines those sharecroppers who chose to raise fish.

**A NEW LIVELIHOOD: TILAPIA**

It was recognized in the planning of Castanhão that the families displaced by Castanhão backwaters would not have the expertise or the experience to engage in new market-based livelihoods requiring significant technological sophistication. Thus a network of technical advisors was contracted to provide the assistance to get the new livelihoods operational. In the case of the households that chose aquaculture, a well-trained expert from the State of Ceará Secretariat of Agricultural Development (Secretaria do Desenvolvimento Agrário—SDA) assumed the challenge of helping transform sharecroppers into market-savvy tilapia producers. The initial group, known as the pioneers (*pioneiros*), consisted of 10 former sharecroppers, and in organizational meetings it was determined that the group would register as a cooperative—Cooperativa dos Produtores do Curupati-Peixe (CPCP). In 2003, CPCP was officially registered, and its members began to produce and sell fish—namely, tilapia—for Fortaleza and local urban markets. As of 2009, CPCP had become the only tilapia-producing cooperative in Ceará and had quickly emerged as a major regional supplier, producing 590 tons of tilapia per year to the benefit of 70 member families (SEBRAE 2009).

While the cooperative and its membership have flourished, two factors distinguish CPCP from other cooperatives in Brazil. First, instead of a group of
like-minded individuals pursuing the advantages and protections of a cooperative organization, the state, in the person of one highly committed technical expert from a government agency (SDA), convinced the pioneer members that a cooperative was the most beneficial organizational solution. The members had no previous training or experience with the Rochdale Principles, with the fundamental philosophy of cooperative action, or with the details of cooperative management and decision making.\(^4\) Not only was the state the decisive stimulus and the source of technical knowledge, it also provided the initial capital to purchase equipment and set up a working capital fund. The Castanhão project also built a small community of stuccoed homes with plumbing and electricity, lighted streets, schools, and meeting centers.

Second, the technical expert introduced a collective production system, which in a clientelistic society is a notion as distant and vague as it is challenging. While labor-sharing practices (mutirão) among households have been historically common, there are few examples of collective production per se, where the benefits (and losses) are shared by collectivity. Equally novel was the concept of individuals buying “into” a collective organization and owning a share of it, so that individual rewards would be realized only if the collectivity were successful. In traditional clientelistic society, a sharecropper had no reference points or past models to make sense of collective organization. Survival in the sertão was dependent on a dyadic, individualist relationship with a person of superior power—the patrão.

Tilapia aquaculture requires a technology that is complex and demanding. The fish are raised in cages (gaiolas) organized in lines out into protected inlets of the reservoir, where the shallow fingers of water are constantly refreshed from the larger water body.\(^5\) Production in 2003 was initiated with 15 gaiolas, a scale which has an annual yield potential of 30 tons of fish. By 2009 there were 588 gaiolas in the water. The fingerlings are purchased from a supplier located in a neighboring state, and they are placed in a certain type of cage and fed a specific ration carefully prepared in the cooperative warehouse. As the fish grow, they are placed into other cages and fed ration types and amounts consistent with this stage of the life cycle. After several months, the fish are retrieved from the cages and classified by size so that the finishing cages have fish of a uniform size and weight.\(^6\) Those fish that are under the desired weight are fed a different finishing ration. At the time of harvest (about four months), the fish are recovered from the cages, cleaned, boxed, iced, and shipped to market. The buyers are present at the harvest with their trucks ready to receive the fish so as to maintain
freshness. Small tilapia (under one kilogram) at the time of the research were processed into fillets by the member wives and sold to local schools for the school lunch program.

The collective production system defines a set of interrelated tasks—the ration managers (the “rations” team, in their parlance), who remain in the warehouse, and the boatmen (the “support/vigilance” team), who travel back and forth in small canoes, feeding the cages and handling the fish. This team is also responsible for the night watchman task. All members participate in the flurried harvest, which is an intense concatenation of activities carried out under the pressure of time. Not all tasks are equally demanding, so each member is rotated into a different role each month. The coordination of activities is critical for the entire system to function successfully. Ration types and sizes, distribution of feeding, monitoring of fish size, and maintenance of the gaiolás are all linked together into sequences and schedules, such that, if one person fails to perform a task at the scheduled time, the entire operation is put at risk.

The management of the system is equally complex. In 2009, only two of the members had a high school education, and they were responsible for the overall administration of the cooperative and for marketing. Not only are fish sold, but key inputs such as rations and fingerlings must be purchased on a regular basis. It is important to note that the transformed sharecropper never held such managerial decision-making responsibility in his previous livelihood.

Following cooperative convention, an elected board of directors is responsible for the decision making of CPCP and is composed of five members, including the president, the financial director, the marketing director, and two production directors. The president carries out the function of allocating, according to the member’s capabilities, the different production-related functions. For example, if someone shows a particular talent for organizing charts and data, he would be assigned to the cage-organizing position; if he knows math, he could be assigned the task of keeping the accounting records of each sale. The marketing director must have some basic math/accounting skills to monitor and record the amount of fish sold. The finance director pays salaries and monitors the cooperative’s net cash flow. And the two production directors manage the production activities. Regardless of administrative duties, all members belong to one of the two teams described above (rations and support/vigilance).

Board elections occur every two years with term limits set at four years (consecutive). Cooperative statute supports open membership, but in reality, the
production system (e.g., the number of cages) imposes an unspoken limit on the number of members. Individuals are allowed to join based on a skill set that is needed (e.g., accounting knowledge) or based on social and kinship ties. A current member proposes a relative as a candidate and this candidacy is considered during a co-op assembly meeting. In the assembly, voting is not secret, and close ties of kinship are usually considered an important criterion. After all, the community itself is small, and everyone is essentially a neighbor.

During 2004, 15 additional members joined the cooperative, and by 2009, membership had grown to 70. Under the collective production system, the costs and revenues are calculated monthly, a contribution is made to the capital reserve of the cooperative, and the “profits” are distributed equally as long as each member has fulfilled his task load. At the time of the research in 2009, the monthly return per member was approximately 1,100 Brazilian reais (US$500), well above the mandated national minimum wage. Members have seen the benefits of collective activity organized around the cooperative model and have expressed satisfaction with these results.

**TRANSFORMATION TO COLLECTIVE ACTION: LESSONS LEARNED**

A key question addressed in this volume focuses on the intrinsic tension of a cooperative model where economic and larger social goals seek a viable balance. In the case of Curupati-Peixe, the cooperative organization was burdened with an even greater challenge. A membership of mostly uneducated subsistence farmers whose traditional strategy of survival had been an individualistic and dependent relationship with their landowners was transformed into the owners/operators of a business enterprise that could only succeed through collective action. In effect, CPCP has thrived as an economic entity—it is profitable and has an effective business model; but the root of its success has been the acceptance of a cooperative form of production, where individual benefits are defined only by the positive outcomes for the enterprise. Through cooperative practices motivated by individual economic incentives, the membership has increasingly come to understand and embrace the Rochdale Principles that constitute the cooperative foundation. The realities of ownership, management, interdependence, and participation contributed to the transformation of the
sharecropper into someone with both decision-making power and responsibility for the well-being of the totality. The cooperative imperative provided the instrument by which this transformation was effected.

A second lesson gleaned from CPCP was that success required strong, long-term support from the state. In the larger Castanhão modernization project, the original design envisioned groups of displaced sharecropper households organized under some sort of associative model and engaged in market-based productive activity. In this sense, the cooperative was imposed on this group of neophyte fish farmers. Nonetheless, even with the significant influx of start-up capital from the larger project, it is doubtful that CPCP would have gained purchase without the constant, almost persistent assistance provided by the SDA technical expert. The transformation of sharecropper to owner/operator would not have occurred without the intense incubation provided by the state.

In most cooperatives, such as in the south of Brazil, the membership accumulates and manages its own assets and depends on the state for the enabling institutional framework and for episodic support in the form of credit lines, market opportunities, and so forth. In the case of CPCP, the state provided the capital, the collective production model, and the day-to-day technical orientation to move the group toward a sustainable business enterprise. Whereas in many places state intervention in the workings of cooperatives has been a formula for failure, here it appears to have achieved success.

CPCP faces numerous challenges as it adjusts to changing business climates and to its own growth, and these challenges will provide further lessons into the future. The first is for the cooperative to expand its share of an increasingly competitive market. The current marketing strategy follows a highly traditional structure where buyers appear at the gate to purchase fish. In 2009, two high-volume middlemen purchased four tons weekly for resale in the wholesale fish market in Fortaleza, and two mid-volume buyers purchased around one ton per week of lower-grade tilapia for resale in weekly markets around the interior of the state. This market is vulnerable to oscillation in price, and the cooperative does not have reliable access to market information. It has considered the purchase of a refrigerated truck to transport its fish to market, thus taking greater control of the marketing process and eliminating some of the middlemen.

The membership has also discussed a diversification strategy to expand its product lines, as is the case of processed fillets for the school system. There is a large amount of waste by-product in fish innards, skin and bones (from the fillets), and so forth, and proposals for the production of processed fish cakes
and the use of waste to raise hogs have been considered. The expansion of the product line is a form of spreading the market risk that concerns the membership currently.

The second and larger challenge is the need to develop management skills. While the co-op has taken advantage of technical assistance from the state, it must at some point develop its own management and administrative skill set in a sustainable and professional way. Currently, the membership does not have individuals with the professional administrative skills needed in such areas as accounting, information management, marketing, and finance. To achieve sustainability as an enterprise, the co-op must develop this talent internally or recruit it from outside. This lack of professional expertise will pose increasingly binding constraints on co-op growth.

The third challenge is to develop the social vision for the cooperative. This vision would include the projected size of membership and the strategy for new member recruitment. It is typical of the region that a father divides his assets among his children. In the case of the cooperative, a member cannot freely “bring” his children into the business because of the inherent limits of the co-op production. The intergenerational transfer of the tilapia enterprise to the next generation is a natural desire; however, the membership size is constrained by the scale of production, and it is not yet clear how the system can expand to absorb more members.

**CONCLUSION: THE POTENTIAL OF COOPERATIVE ACTION**

Curupati-Peixe is a success story for a local community of displaced families that documents the development of potential cooperative action. Its powerful message is that a model of cooperative production enabled a fundamental transformation of dependent sharecropper farmers into small-scale, empowered businessmen with new social identities and aspirations for the future. Regardless of past experience or status, each member recognizes the intrinsic value of his contribution to the collectivity and, in turn, understands how collective action enhanced the value of his labor. The membership has come to understand that working together in a coordinated way can generate a collective good in which all members participate. This will be a lasting legacy of Curupati-Peixe—cooperative and community. CPCP will face obstacles in the future as it negotiates an uncertain
capitalist system that demands complex knowledge of value chains, input and output markets, production technology, and management skills. Fortunately, the membership is aware of these challenges and has grown in its decision-making sophistication. And for now, the co-op and its membership can take pride in the great strides already recorded.

NOTES

1. In Brazil, a município is the small politico-administrative unit of government. A município typically has an urban center surrounded by a network of small settlement clusters in the rural areas. In terms of size, municípios can vary widely, from less than 100 square kilometers to more than 4,000 square kilometers, and the state of Ceará has 184 municípios.

2. Displaced households who sought other livelihoods, such as irrigated production, also formed cooperatives: Curupati-Irrigação (irrigation), Curupati-Leite (dairy), and so forth.

3. The analysis that follows is based on data from Barros’s two-month stay in the cooperative community, interviews with technical experts and fishmongers in the Fortaleza, and follow-up communication with the community.

4. Nor did they know one another for the most part. The families tended not to be related or to share much of a history.

5. The original site for the gaiolas proved inadequate and, in an environment of crisis, a new, more appropriate site was selected.

6. This selection process is called repicagem, a term that in horticulture refers to transferring selected plants from a seedbed to another site where the seedling will grow to transplant size.

7. It is also true that the market for tilapia expanded rapidly during the period throughout the state, providing the cooperative with the incentive to increase membership.

8. The Carlito Pamplona market in Fortaleza is itself iconic. It is a sprawling set of booths that operate during the early hours of the morning to sell to fish retailers. There are several varieties of fish sold in this market, mostly freshwater fish, and sellers may come from all over the northeast. It is a highly volatile market.