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Abstract: *This article depicts the improvement in living conditions for those families of peasants (the “landless peasants”) who have benefited from agrarian reform (termed “assentamentos” i.e. homesteads) through the creation of farming cooperatives. The farming cooperative examined herein was supported by the Petrobras group following the guidelines of the Brazilian National Biofuels Program. This program seeks to foster biofuels production among peasant farmers in Brazil’s semi arid regions. The present research project comprises a field study which describes the aforesaid program’s evolution and, more critically, ascertains the conditions requisite for success. Several crucial conditions stand forth:*

- 1) First, convincing peasants to join the project; in this regard, a charismatic leader sharing the same social origins as the farming families has played a major role in gaining their confidence.*
- 2) Second, developing a coherent set of value-adding activities that incorporate a range of by-products and waste products (from sunflower crops grown for biofuels, a number of corollary activities have arisen: honey, animal feed and fish farming).*
- 3) Finally Petrobras’s essential role as a partially state-owned corporation which has implemented a policy of social and environmental responsibility (assigning of a full-time engineer to oversee the project, providing farm equipment rentals needed for the crops as well as paying the salaries for two agronomic technicians working for the cooperative).*

Keywords: *biofuel, family-based farming, cooperatives, social and environmental responsibility, social inclusion.*

Introduction

The present study concerns Brazil’s National Biofuel Program as provided by the Act n° 3368/03 ; the program seeks to promote Brazilian production of biofuel on family-owned homesteads situated in the semi-arid Nordeste region with the goal of facilitating social insertion for poor peasant farmers. This social legislation granted tax exemptions to industries producing biofuels should they purchase from peasant farmers. Moreover, the legislation provided for subsidized loans within the framework of the PRONAF program (Program to support Family Farming).

In the Brazilian states of Bahia, du Ceará, Rio Grande do Sul and Pernambuco, a number of biofuel production projects—all involving groups of peasant producers—have been the object of research. This paper concerns one of the aforementioned sites situated in Rio Grande do Norte. The community development program benefits from social aid offered by Petrobras, the major Brazilian Petroleum Group. The company’s social and environmental policy is clearly manifested through its participation in the community project. The present study draws upon the Triple Bottom Line concept of « economy/society/ecology » (Elkington, 1998). Within this theory, business corporations, besides merely creating shareholder value, must undertake a policy for sustainable development while striving to satisfy the broader

stakeholders' needs (Lepineux, 2005) linking economic activities to broader social and environmental actions (Savitz, 2007).

Herein we shall strive to identify both the key factors for the successful social inclusion of rural peasant farmers within a community project by means biofuel production as well as the major obstacles that could impede its implementation.

Our method is by nature inductive. The research takes its lead from real-life experiences and not from secondary sources. Theory steps in to frame and structure the fieldwork as well as to interpret and explicate empirical observations.

The present study shall provide a series of propositions conducive to the creation of agriculture cooperatives in the biofuel sector given the specific economic, cultural and political context of Brazil's Nordeste while simultaneously assuring a conscientious management for those small-scale farming communities.

Geography of the field work

The townships of João Câmara and Ceará-Mirim are located approximately 120 kilometers from the city of Natal in the Rio Grande do Norte's « *agreste* » zone, that is, a region sandwiched between the rainy coast and the semi-arid Sertão. In the Mato Grande region, some 500 families of small-scale farmers are scattered over 15 townships. Since 1994, these families have settled in the region within the framework of agrarian reform. Our present study concerns the village named "Model 1" which shelters 70 families.

Isaías Marcos, in 2006 vice president of the ARCO Association, provided us with information on the two rural communities in João Câmara. The families obtained permits to settle the land without receiving immediate ownership. Title deeds are granted several years later so as to guarantee full-fledged engagement in the community project and to hinder opportunistic behavior in which beneficiaries might resell their land rights and continue to militate for further land rights elsewhere—a behavior viewed with extreme disfavor by the general public. In the main, Brazilian social strife has its storm center over demands for a "right to land". Impoverished families belonging to the Movement of the Landless, the MST, are often seen living in precarious settlements squeezed between the barbed wire fences surrounding a large plantation and the neighboring stretch of road.

Homes have electricity and most have televisions with parabolic antennas. However, almost no families have vehicles and the few present are jalopies. At the community's inception, farming entirely depended upon draft animals; today, several tractors are in use.

Each family possesses 22 hectares of farmland, but given their limited means, the families only cultivate one or two hectares of beans, maize or sorghum, the rest lies fallow. According to Isaías Marcos, living conditions have considerably improved under Lula's presidency. The majority of families receive welfare benefits. Scarcely a handful of families do not receive welfare benefits and even the latter obtain donations in the form of such necessities as bottled gas. All the children attend school, a school bus provides the shuttle service. Mornings are reserved for home chores and extra curricular activities, classes take place in the afternoon and evenings. Two meals and two snacks are provided daily.

Purposes of the present research

The present paper seeks to determine what conditions underlie the success of the holistic project for rural development as described above. This federal program favors the manufacture of diesel fuel obtained by means of extraction from oilseed crops raised on small-scale family farms in semi-arid areas of the Nordeste.

To grasp the project's success, several interconnected domains must be taken into account. First, the conditions giving rise to agricultural cooperatives based on participative decision making by all members (Buarque, 2002). Second, the cultural dimension which explains the reluctance to change and the difficulties encountered when trying to mobilize hitherto excluded peasants into a community-based project so as to create a cooperative (Cançado et al., 2007). Third, the concept of a circular economy whose goal is to implement, within a holistic project, the production of co-products and by-products in order to maximize value

creation for the benefit of the small farmers (Sachs, 2007). In addition, the role of networks, the weight of political agents and the commitment of businesses and major industrial firms must all be taken into consideration when examining the success of such a project to favor peasant farmers (Rosé, 2003). A final aspect concerns firms' social and environmental duties; herein we have an instance of such a policy implemented by the partially-nationalized Petrobras group (d'Hurmières, 2005).

Project Background

Francisco Evangelista, engineer and researcher in renewable energy at Petrobras has been tasked with developing a sunflower-based biodiesel production program in collaboration with the local farmers.

As an introduction, let us recount several of Evangelista's observations expressed during the first interview he granted the authors. His commentary will allow us to better situate the project in the overall context.

The National Biodiesel Project is quite recent : the legislation instituting the project dates from 2004 and Petrobras, whose participation was required by the Federal Government, had no experience in either agriculture or biodiesel production.

From a strictly agricultural point of view, Petrobras underwent its trial experience in biofuels at the João Câmara site. In order to initiate the project, various formalities had to be completed : partnership contracts had to be concluded between the small farmers' association (created specifically for the occasion), the local township, and the state of Rio Grande do Norte. As the administrative formalities proved lengthier than foreseen, the sunflower was only sown at the end of the rainy season and some 150 hectares of harvest were lost. In 2007, 600 hectares of sunflower were sown, yet as a result of low rainfall, the harvest again proved disappointing. During the 2007 season, the crops received a scant 82 mm of rainfall.

In the state of Rio Grande do Norte, an initial experiment of biodiesel production from castor beans failed as there was yet no industrial production chain in operation. At harvest time, Petrobras declared it would be unable to purchase the crop due to a lack of an operational processing plant; after lengthy discussions to ascertain whom to blame for the setbacks, the processor Brasil Ecodiesel bought the crop at a much lower price than one real as had initially been foreseen.

This brief overview illustrates the necessity of laying out coherent and coordinated policies when implementing local projects as well as organizing the processing/value chains. In various cases, processing plants for oil extraction have been built without crop inputs; in other instances, crops have been sown without the industrial purchasers adhering to their earlier promises to buy.

From these unfavorable outcomes , Francisco Evangelista draws the following conclusions : first, farmers need to cooperate since it is impractical for an industrial processor to make the rounds collecting single sacks of castor beans from hundreds of small farms and, furthermore, in such a project with varied participants, a coordinator is needed for overall guidance. As we shall show in what follows, with the previous setbacks borne in mind, Petrobras urged the farmers at João Câmara to create their own sales association—known as the ARCO—and to oversee the whole project, acting as the general contractor, as it were, financing both the cultivation and ensuring harvesting. The day-to-day oversight fell onto Francisco Evangelista' shoulders.

The idea of a value network wherein each member labors harmoniously with the others scarcely coincides with our observations. Personal rivalries, political differences, conflicts of interest conspire (especially when hurdles loom) to bring about mutual accusations and finger pointing at the other institutions which are held to blame. Our interviewees often insisted on the Brazilian government's tendency to present tidy projects on paper which raise great hopes but which rapidly exasperate given the participants' lack of competence, cooperation and ethical standards.

General remarks on the present project's context

Competitivity

Regardless its production site, biodiesel cannot compete against petroleum diesel; hence political support must be forthcoming to set national policy, chaperon installation construction and grant subsidies. In Evangelista's eyes, the beneficiaries of such exonerations, the purchasers, disrespect the requirements stipulating that 50% of the raw materials must derive from family-owned farmers in the arid Nordeste. In reality, the castor bean crop in the Nordeste is much less than the quantities declared by the processors so as to ensure their receiving aid. In 2008, the shortfall in castor beans was compensated through the addition of soya oil and given the nation-wide problems surrounding peasant farmer upgrading to soybean production, over 90% of biodiesel was obtained from soybeans.

The competitive dilemma surrounding capital-intensive soybean plantations

The key issue underlying production of biodiesel fuel from soybeans arises from the fact that this crop is grown on large, highly-mechanized plantations and thus does not favor job creation. Given its cultivation requirements, soybean farming remains beyond the means of small farmers. Moreover, soybean production enhances the risk of transferal from feed uses to energy uses which could lead to a rise in soybean oil prices, a staple for both humans and animals. Therein lays a motive for seeking non comestible crops to fulfill this role. From this point of view, the cooperatives' farmers have been experimenting with other non edible oilseed crops grown in the semi arid region, namely the pinhão manso or 'jatropa'.

The Issue of Small Farmers' incomes

Small-scale family farmers occupy the earlier stages of the value chain. For a major firm such as Petrobras, before bringing social and ecological solutions to bear, a division of profits had to been shared between the various agents involved in the project.

Obviously, the oilseed farmers seek profits from the crops. A fair price must be ensured for their crops, otherwise they will not raise such plants since much less risk surrounds edible crops grown for personal consumption or sale on local markets. Petrobras's engagement with the aforesaid families narrows down to furnishing aid towards cultivating sunflowers and collecting the seeds for processing into biodiesel. Henceforth, we shall focus on the holistic project comprising merely 16 families who are involved in the farmers' cooperative, the COPEC.

The question of climatic risks

Crop yields in the non irrigated, semi-arid region of the Nordeste are highly irregular as a result of climatic vagaries: the region receives little rainfall and yields vary from year to year.

In early June 2007, during a paper presented at the seminar on Energy Diversification held at Natal, Ulysses da Costa equally a Petrobras engineer, displayed the variations in production levels of grain between the years 2004 and 2005 for Rio Grande do Norte, as shown below in Table I.

Table 1. Variation in Grain Production in the Rio Grande do Norte between 2004 and 2005.

Year	Production	Arable land
2004	160 000 metric tons	486 000 hectarres
2005	78 000 metric tons	410 000 hectares

Source: Costa Soares, Petrobras, Natal

Biodiesel producers must take into account these enormous supply variations due to weather patterns. Given these imponderables, should provision be made for large storage facilities? Continuous production of biodiesel would require such storage to ensure operations outside of harvest time.

More crucially, with an unregulated market, these supply vicissitudes in grains or oilseeds impact on prices: given the threat of price oscillations, what mechanisms might guarantee a minimum income for the family farmers?

Uncertain incomes and dependency on support agencies

Those farmers we have met are nearly destitute; with no financial wherewithal, they cannot undertake oilseed cultivation for biofuels. As an example, to plow and sow at planting season, they need both a tractor and a sowing machine. Should the municipality fail to provide the promised equipment opportunely, either no planting would occur or the crop would germinate late and lose the advantage of the first spring rains. In 2006, such an untoward situation did occur in João Câmara.

This dependency necessitates strict organization and a political pressure that can be exerted on the authorities given that during the sowing season, tractors and agricultural equipment are in strong demand. An agricultural cooperative enables the purchase of various tractors and equipment which may be shared and thus reduce climatic risks and strengthen their weight in negotiation.

Bedeviled with the small farmers' precariousness and the lack of serious coordination among the various political authorities, Petrobras chose to directly manage the project we describe herein; the company urged the farmers to form an organization and for certain members within it to unite in a cooperative.

Petrobras's crucial role

Since 2004, Petrobras has collaborated with these two rural communities to ensure sunflower crops for biodiesel production. The arguments in favor of sunflower crops rather than castor beans adduce several factors: foremost, castor beans contain ricin, a highly toxic protein which precludes the bean's use in animal feed; secondly, castor-bean oil is exceedingly viscous and cannot be directly used as engine fuel; finally, F. Evangelista has drawn attention to a further problem, the castor bean's ricin corrodes the German processing equipment which Petrobras purchased for its pilot plant. Accordingly, in early 2007, on a collective plantation, Petrobras decided to sow 600 hectares with sunflower; each member family receives a share of the global income. Petrobras rents the necessary equipment and brings to bears technical aid as well as financing the plowing and planting. The seed stock were provided by the state government of Rio Grande do Norte.

The farmers tasks included tending the crops, fertilizing the fields and harvesting. Mr. Evangelista observes that the harvest's value mostly covers operating costs and agricultural labor—however, when ascertaining the farmer's earnings, the value of co products must be factored into the equation. For instance, sunflower leaves provide excellent animal feed, and sunflowers also serve as a source of honey. Beehives are being installed to enhance community revenues. In 2007, despite a proper planting calendar, the yield was mediocre: only 750kg per hectare. This low yield was a result of below average winter rainfall (between March and August only 82 mm instead of the average 800mm of rainfall).

For the aforementioned season, the families received R\$.50 per kilo—a price set in collaboration with the association ARCO (Commercial Association of Mato Grande and Grande Natal) and Petrobras, as related by ARCO's vice president, Isaías Marcos. It was at Petrobras's behest that the ARCO was founded; Marcos states its purpose as linking communities and implementing alternative methods favorable to family agriculture.

In 2007, the decision was taken to create a true farmers' cooperative that would implement a collective project involving 16 member families. The project sought to raise cattle with sunflower leave-based feed, produce honey using sunflowers, extract biodiesel from the seeds and create fish farms. The overall aim reposes on the concept of a circular economy, expounded as follows by Louis Chaussade, chief executive officer for Suez Environment : *"we have to create an economy capable of adding value to those items which are undervalued in order to reemploy systematically and intelligently all materials"* (Barré and Chauveau, 2008).

On the scale of the cooperative, does the conscientious use of co-products and by products resulting from oilseed cultivation conform to the foregoing vision? The SEBRAE, a public organization which aids small businesses, contributed to detailing a policy for enhancing the value of the secondary products. Moreover, the cooperative concluded a commercial agreement with the state which in turn agreed to purchase part of the harvest for supplying various public institutions as schools and hospitals.

To organize the peasant farmers, Mr Evangelista observes, much time is needed. To rally the farmers requires an appealing program. Merely guaranteeing a minimum revenue does not suffice, acceptable living conditions as well as health and educational aid both come into play when seeking to garner peasant support.

On June 20th 2008, representatives from the State Agricultural Development Ministry, the National Institute for Colonization and Agricultural Reform (INCRA), Petrobras, the Bank of Brazil (Banco do Brasil), the Bank of the Northeast (Banco do Nordeste) and the government of Rio Grande do Norte visited the land distribution sites for the Mato Grosso region. During this meeting, officials announced the construction of a sunflower grain mill—a project which would be conjointly undertaken by Petrobras and the COPEC cooperative.

Summary of an interview with the President of the COPEC

Background description of the COPEC's president

Native to the state of Santa Catarina (region in Southern Brazil), Livânia Frizon has long been an activist in the Movement for the Landless (MST). Today, separated from the movement, she has settled with her family at Canudos within the framework of a federal land distribution program. While president of the ARCO association, in early 2008, she equally became president of the Canudos Producers' Cooperative (COPEC). The latter came into being at the behest of Petrobras, the cooperative status constituting a necessary legal condition so that Petrobras, as a mixed enterprise in which the Brazilian federal government holds a minority interest, might enter into a contractual arrangement to finance the local development project.

With her strong personality, Livânia Frizon had three fundamental qualities for presiding over the COPEC : that of her Italian immigrant family background with a long history of cooperation with other families. This associative culture, common to Southern and Southeastern Brazil, does not have an equivalent in the Nordeste for the latter region has been historically dominated by large landlords, organized within the system of "*coronels*". From the beginning of the Portuguese colonial period, aristocratic families received allotments of enormous expanses of land—the "hereditary captaineries"— from the monarchy. In this archaic system, some of whose elements have prevailed until the present, the richly endowed landlords control vast territories and have oppressed the small farmers who live in poverty. Despite repeated uprisings over the centuries, the penurious farmers have never managed to organize themselves.

As a second advantage, President Frizon has taken part in the Landless Peasants movement and thus has met many from the socially excluded classes. From these experiences, she has come understand their worldview and she is fully aware of the difficulties encountered when seeking to further social inclusion of the penurious families through communitarian programs.

A final and non negligible advantage for Livânia Frizon is her profession : she works for the Rio Grande do Norte's Agricultural and Fishing Administration; hence, Ms Frizon is directly involved the state's agricultural development policy and has the means to mobilize local actors in projects at Ceará-Mirim and at João Câmara.

The Holistic COPEC project

As previously mentioned, the COPEC cooperative comprises merely 16 families. A cluster of complementary activities have been implemented within the association to better the living conditions of the member families. Ms Frizon hopes that success in this case will serve as an example for other families on the site, those little inclined to change their behavior. All families engaged in the project spontaneously offered to take part in it and strongly motivated families were accepted through an on-going basis.

Ms Frizon marvels at the crafts skills of the small landowners in southern Brazil. Whether involved in producing foodstuffs, textile goods, leather goods, or wooden goods, these cottage-industry activities enable the peasants to earn extra income. As a challenge, President Frizon sought to instill a similar industrious spirit in the Canudo peasants while

heightening their awareness of the necessity for collective work required by the aforesaid cottage industries.

A 20 hectare homestead will not in itself lift a family from poverty. If these families, in Livânia's eyes, through lack of resources, merely work the soil with hoes (*enxada*), both the land under cultivation and the crop yield would not meet their most basic subsistence needs. A farm with a sufficiently large surface area requires a minimum amount of equipment that an impoverished family could not afford.

As a 600-hectare sunflower plantation requires tractors, the cooperative purchased a seeder and an oil press. As a result, rather than selling sunflower seeds, the COPEC sells unrefined oil to Petrobras, thus upgrading their position on the value chain and adding greater value on the cooperative itself as well as retaining the pressed residue for use as animal feed and fertilizer. Sunflower cultivation gives rise to honey production as a natural co-product: beekeepers taught their craft to members of the cooperative and beehives were placed near the fields.

With assistance from the EMBRAPA, the Brazilian Institute for Agronomic Research, another highly profitable culture—papayas or "*mamão*"—was introduced on a seven hectare farm. A strong demand exists for this fruit, both on local markets and for export. A papaya plantation, properly fertilized and tended, provides a high yield and a favorable income for the farmers.

Fishfarming within the framework of the holistic project.

Given the overall policy goal of maximum diversification in revenue sources and value enhancement through by-product use, one project particularly stands out: fish farming. Although rainfall is sporadic and low, there is abundant groundwater in the aquifer and this fact gave birth to the plan to raise Tilapia fish for which a strong demand exists. Financing originated from the Banco do Brasil and the EMATER of Rio Grande do Norte. Within 2 years favorable development ensued. The project's novelty lies in its collective organization: 6 ponds are used and one family is responsible for each. Hence, with 6 families a continuous annual production is possible. As the fish mature in 6 months, each of the families provides the workforce for one month. The families have shown a strong common spirit, fish farming requires daily work, should one family need leisure time, another family will pitch in and provide the temporary help. As further proof of the project's global connectedness, not only are sunflower products used to feed the fish, but 10% of the water from the ponds is used to fertilize and irrigate family gardens where, besides the traditional manioc crop, lettuce, tomatoes and onions are also grown. Finally, within the framework of value adding activities, a crafts program has taken root where leather goods are made from tilapia skin whose leather is as durable as that of crocodiles.

Since its inception, the fish farm has produced 17 metric tons of fish, and the seven year loan granted by the Bank of Brazil was reimbursed within less than two years! The fish farm has grown so that there are now 18 ponds varying in size from 25 to 75 square meters using some 1.3 million liters of water.

On average, according to Ms Frizon, each family earns 1,700 reais per month from the fish farm (somewhat less than 700 euros), three times Brazil's minimum wage. Today's monthly production exceeds 5,000 kilos of tilapia. The Bank of Brazil uses this program's success in their public relations material as an example of its social engagement policy favoring small farmers. To reward the cooperative for their initiative, the bank gave the COPEC a pick-up truck; through media coverage, the cooperative has gained a solid reputation. Through the snow-ball effect, Ms Frizon enjoys an enhanced ability to implicate local actors in the community-based projects.

In June 2008, the vice governor of Rio Grande do Norte and secretary for environment and water resources, Iberê Ferreira de Souza visited the fish farm. Mr de Souza declared "*The government has every reason to take great interest in these projects, particularly those involving the landless homesteads. Given the serious work performed at Aracati, we intend to show our commitment through an agreement by which Petrobras contractually agrees to purchase not only all the oil extracted from oilseeds and not merely that from sunflowers but from cottonseed as well in other regions in the state.*" (Gazeta, 2008).

On the same occasion, Ms Frizon asserted: "*As a result of our development, we are earning the respect from both public and private organizations with whom we can strengthen our ties.*"

The government and Petrobras have promised to purchase our sunflower crop, and no financial problems should arise since the Bank of Brazil has 30 branch offices offering loans specifically for biodiesel projects."

Cultural Aspects

In Ms Frizon's eyes, the cultural aspect is a crucial for developing the project, and for this reason during our open interview, she spoke a great deal on this point. First, she raised the issue of the poor's lack of long-term vision. Even when belonging to an organized group, once the families receive a homestead, they rarely manage to produce beyond their immediate needs. Given their concerns for survival, they insist on short term results rather long-term planning.

Some 95% of the family farmers in the region, affirms Ms Frizon, cannot obtain loans : often the funds lent for farming were used to purchase consumer goods like televisions or motorcycles. This form of embezzlement seems to be routinely condoned by movement leaders. Given the standard indictments that politicians are corrupt, should it be surprising to see the poor renege on their debts?

Moreover, the overall background of local corruption and kickbacks to authorities, practices deeply rooted in the Nordeste, all lend themselves to a cultural acceptance of swindling.

With little long term perspective and a fatalism as regards their living conditions, the small are imbued with what Ms Frizon terms "*the culture of misery*"; to her mind, "*they are convinced that the only way to survive is to take from others and to take from nature*". At the project's outset, some farmers had asked whether Petrobras would financed tree cutting; other farmers sold the fertilizer provided by the cooperative; even others, incapable of tending their crops on a daily basis only took part in the work at planting and harvesting times. A further risk is that the peasants having received homesteads sell them and thus remain in poverty. For the latter reason, the sites herein studied all have collective property rights with a long waiting period before any peasants may sell their land.

The major challenge, in Ms Frizon's mind, is to reeducate a people who feel that a better life is unattainable and that they find acceptance of any project as beyond their capacity. She forcefully affirmed that "*to get them out of poverty, their mindsets have to change, they have march in a direction opposite to the path to destitution.*" To do such, the director of a cooperative must not make a show of compassion but must exercise strong authority, impose discipline, convey her ideas and occasionally punish. If families receive financial help, they must fulfill the corresponding obligations. For instance, if a group of 18 families is responsible for a plantation, and each family must take part in the farming once every 18 days, if one member fails, the entire collective suffers and a fine must be paid by the negligent family. As a further example of aberrant behavior, Ms Frizon drew our attention to a case where members of the community took part in drug dealing between the "*favelas*" in Natal. She managed to film certain operations, informed the local police which led to the arrest of 11 culprits. Ms Frizon equally intervened when she learnt of an embezzlement by an ex-president of the ARCO association. Instead of dealing with the problem behind closed doors, as is done customarily, she convened a special general meeting where the facts were publicly divulged in presence of the accused. Since then, the individual in question has resigned and cultivates his land without contact with the other members of the association.

Ms Frizon's intends to show that the game plan and its rules have changed. Be what it may, in the Nordeste, an attempt such as hers is not without risks. Personal animosity and conflicts of interest can easily lead to violence in a region where assassinations are still commonplace. Ms Frizon expressed her lack of fear of threats or reprisals. In the given circumstances, "*Above all no sign of weakness must be exhibited*". She did admit that her chauffeur is not always at ease when they travel throughout the area.

The major wager lies on modifying the peasant culture by providing examples of successful projects. On the one hand, these projects prove to the individualistic peasants that collective actions can yield rapid results. The reluctant farmers can observe the clear improvement in living conditions of those families engaged in the collective projects. On the other hand, the participants in the collective actions have taken credit for their success and have persevered in their efforts to increase productivity and to diversify the range of activities. Today, the participants no longer receive state-paid benefits and the farmers are proud to have left the

welfare ranks, particularly those who survive only through federal government aid, the so-called "family stipend".

This family stipend (Expension, 2009) is a welfare benefit program for the poorest families with dependent children, from the newly born to those aged 16. On average benefits amount to 61 *reals* a month (about 24 euros). To receive such, families must agree to allow their children to attend school as well as to vaccinate their children. In 2008, 11 million Brazilian families, some 40 individuals out of a population of 180 million, benefited from this system. The family subsidy, affirms President Frizon, forms an essential means of improving the lives of the poorest; but she also believes it must be considered as a transitional measure to lift the poorest from the wretched condition. As one can image, the benefits could lead the recipients to consider the subsidy as a perpetual crutch, leading to a permanent relation of dependency on state aid, detrimental to social inclusion and finding a means of earning a better living through one's own work. That higher standard of living does not merely result from farm labor, it also is the fruit of education, to this end, another project is being implemented, one that provides technical and agricultural training programs for the denizens of these communities.

As to our question concerning the role of Petrobras in the development program, Ms Frizon affirmed that the company's role was crucial to success. Without the unwavering assistance from Petrobras, the project would not have been realized. Moreover, Petrobras enabled the project to find outside aid and not rely on local sources thus avoiding many inconveniences. While the first harvests, partially due to the weather, did not offer adequate yields, nor provide much earnings to either Petrobras or to the farmers, they enabled the farmers to develop an active sense of community. As Francisco Evangelista, the Petrobras engineer who oversees the program, said in a second interview granted in 2008, if the cooperatives' participants earn an income from fish farming and crops other than sunflower used for the biodiesel, this is not really a problem since the overriding goal is to improve the farmers' lives.

In February 2008, Petrobras and the government of the state of Rio Grande do Norte implemented the state program for Agri-ecology and Family Agriculture. This project plans to seed 13,000 hectares of sunflower for biodiesel production, along with 15,000 hectares of cotton. A minimum price will be fixed for the crops and some 12,000 family farmers in 32 different municipalities; the majority of the beneficiaries live in the following regions: Cidadania Açú-Mossoró, the Sertão de Apodi and Mato Grande.

Concluding remarks

This field study has enabled us to verify Petrobras's sincere intention to undertake development projects within the framework of the Brazilian National Biodiesel Project while satisfying the federal government's desire to improve the living conditions for family farmers in semi-arid regions.

During an interview conducted at Petrobras's headquarters in Rio de Janeiro, Jefferson Souza, the Petrobras consultant for social responsibility, outlined the following policy orientation. Among the options for biodiesel production, Petrobras has an overall interest in producing family agriculture-based biofuel production rather than capital intensive large-plantation soy production. This latter type of production lies totally outside the purview of Petrobras : soybean agriculture relies on the multinational purveyors of seeds (Monsanto for gene-modified seedstock) and fertilizers on the upstream end of the value chain, and international distributors (like Cargill or Bunge) on the downstream end of the value chain.

The strategic interest shown by Petrobras in the Ceará-Mirim and João Câmara sites within the framework of the firm's social and environmental policy gives cause for optimism. The company, 32% state-owned, with sales of 96 billion dollars and 74,000 employees, has both the means and the capacities for achieving its goals.

In addition, Petrobras, with its public financing, has long been tasked with ensuring Brazil's energy independence (Drouvot, 2005). Mr Evangelista confirmed the company's long-term

intention to implement a viable biodiesel production network which will promote the interests of family-based grower in the Nordeste's semi-arid regions.

Yaziji (2004) has insisted upon the importance of strategic alliances between industry and social development organizations. Firms gain a more favorable image by their social commitments and thereby obtain a competitive advantage. A firm's ability to foresee novel social requirements arising from the concept of sustainable development can be seen as an integral part of the firm's innovative capacity and as well as the ability to acquire new skills which ultimately contribute to fixing new social standards for production. Environmentally friendly, socially-oriented projects as those we have just described not only give birth to synergies between the main actors (a rural community and Petrobras) which redound to their mutual interest, but also induce a much broader range of benefits accruing to local society. All the players involved in this project (support agencies, politicians, simple citizens) are imbued with a new business vision and develop a renewed collective conscience concerned with social and ecological issues.

This field study has highlighted the varied cultural aspects of a project requiring the active engagement of farmers and the need for a strong leader who could mobilize the farmers. The president Frizon, leader of the COPEC, undoubtedly fills the role needed to ensure a holistic, community-based, value creating development project.

The economic results obtained by the cooperative, clearly demonstrate that this mode of collective action can serve as a true means to reinsert a group of family farmers in the social economy. The range of activities performed within the cooperative not only confer greater earning, but more crucially greater autonomy and sense of enterprise, all more so given that the limited number of members in the COPEC allow direct participation in the decision making.

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