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Brazilian northeast semiarid region**

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Agroenergy and family agriculture in the Brazilian northeast semiarid region

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Abstract

This paper is part of the research project entitled *Agroenergy and the Public functions of familiar agriculture*, financed by the National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq) and tries to understand the social and economic formation of the Territory of Irecê, semiarid region of Bahia State, in Brazil, and compare the economic appraisals of the representative archetypes of the types of family farmers of production systems and activities. The aim of this study is to understand the impacts of the development of biodiesel politics in the region, in the research also examines the possible impacts of the Brazil without Misery Plan (Plano Brasil sem Miséria), with the payments for environmental services to some categories of small farmers, concluding that even with institutional increase in family income, of R\$ 300,00 (150.00 US\$) quaterly, the types of family farmers classified at the level of the extreme poverty (indigence) have not yet overcome the situation of extreme poverty in the short term, being necessary the amount of R\$ 2.400,00 (almost 1,200.00 US\$), destined for productive projects.

The analysis of the evolutionary trend of the activity systems and production, based on three criteria: the current situation according to consumer/worker ratio (C/UTF); the classification of the system production and activities (type) according to the reproduction level that the system is (amplified, simple and extreme poverty) and the endogenous environmental restrictions to the production/agrarian system (high, low).

Part of the CIDE (Economic Domain Intervention Contribution), the federal contribution to the fuels can be destined to the direct payments funds by the Federal Union of Brazil and the other part coming from the poverty overcome funds of State of Bahia that can be destined to pay the family farmers because of the environmental services.

Keywords: agroenergy, direct payments, environment, poverty

Introduction

The Territory of Irecê is located in the Center -North with a distance to Salvador of 400 km, capital of State of Bahia (Brazil), composed by América Dourada, Barro Alto, Barra do Mendes, Cafarnaum, Canarana, Central, Gentio do Ouro, Ibipeba, Ibititá, Ipupiara, Irecê, Itaguaçu da Bahia, João Dourado, Jussara, Lapão, Mulungu do Morro, Presidente Dutra, São Gabriel, Uibaí and Xique-Xique municipalities, in the 26.730 km², that comprehend 4,6% of the state territory.

The familiar agriculture, or small-scale agriculture, of peasant origin, is multifunction and has the sympathetic economic principles. The public function acknowledgements (or multifunctionality) of the family farmers, traditional indigenous communities and “quilombos”, slave descendants, requires the existence of the public and sympathetic financing that allows the direct payment for the rural families. Where does it possible to receive the necessary resources for this financing? Because of the biodiesel production chain formation that Petrobras, Brazilian Oil Enterprise, ensures the purchase of the crude castor-oil and other oilseeds (first transformation), which promotes the familiar agriculture and other agribusiness enterprises to change it for biodiesel.

The case studies are accomplished in the Identity Territory of Irecê¹, resultant of the family farmers of State of Bahia. This region lived an economic growing period during the 1970s and 1980s years, according to the productivist paradigm of the Green Revolution, how the intensive mechanization, the chemistry products and hybrid seeds, with the public financing and subsidiary interests. The region was characterized with the bean production in theses years and, after the regional crisis at the end of 1980s and the beginning of the 1990s, there was a process of production diversification destined into the oleraceous production, such as carrots and the sugar beets.

Which are the impacts into the family farmer incomes with an incentive policy of the biodiesel production from castor oil and how do they organize the production systems? Is there a process of food substitution by the oleraceous?

Once, in the Territory of Irecê, there are environmental impacts of the Green Revolution with the disappearance of water fountain (nascent) because of deforestation and irrigation agricultural s (“caatinga”) systems, using the underground water, and is it possible the scrub vegetation reforestation in the family units from remuneration for environmental services? These are some questions that this research aims to answer.

In this paper, the Agrarian System of Analysis-diagnostic Method is applied. The systems of activity and agricultural production are classified in the levels of indigence (extreme poverty), simple reproduction and increased reproduction, considering the agricultural and not-agricultural incomes. Are observed the evolutionary trends of the categories of the production systems and activities in the Territory of Irecê, in the

¹Since 2003, with the development policies for the rural territory in Brazil, the Territory of Irecê was structured.

sustainability perspective, not sustainability and constrained sustainability due to the combination of criteria, including environmental.

Is made the modeling of agricultural production system and the categories of producers who are in the extreme poverty level and the prediction of the values of these direct payments to these farmers, considering the Brazil without Misery Plan, of the Brazil federal government.

Methodology

From the methodological point of view, the research is developed according to its specific goals, as three fundamental guidelines: a) analysis of the biodiesel promotion policies impacts in the Territory of Irecê (agrarian system); b) estimate of the federal and the State tax incomes of the biodiesel chain and propose the creation of a state fund of familiar agriculture multifunctionality; c) estimate of the values of direct payments for the family farmers of the Territory of Irecê.

The Diagnostic-analysis in Agrarian Systems was developed at the *Institut des Sciences et Industries du Vivant et de l'Environnement (AgroParistech)*. It is a research method and for plural and systemic planning that comprises several disciplinary fields of analysis of the complexity of the agrarian reality, of the agrarian (farming) systems in the history and the different exploitation modes of the natural resources in the assorted ecosystems and combinations of the cropping systems, creation and processing that structure and characterize the types of production systems and activities.

According to Dufumier (2007), the development of a typology of the agricultural holdings in each demarcated areas aims to show how the several categories of farmers practice different production systems according to the resources that they have and with the social relationships in which context they operate. In the other words, how the production units became object of an unequal capital accumulation and how the practiced production systems differentiated themselves.

With the characterization of the agricultural system, it aims to identify the main technical and economic problems of the farmers categories. Becomes evident how the farmers associate several activities and agricultural techniques on their farms, considering the diversity of the local edaphological conditions and the more or less predictable climate variations (DUFUMIER, 2007).

The result of production is measured by the gross product (GP), which represents the total value of what is produced, either for sale, or for family consumption. The production system consumes goods, that are transformed in the process, and totalizes the intermediate consumption (IC). Also are included the rental costs of equipment or hiring services. The family provides for the production, their heritage (sort of fixed capital), which is partially transformed because they have depreciation and lose value. This cost is calculated as the annual depreciation of fixed capital (D) and added

the other costs for example taxes (T), interest (I), salaries (Sal) and land lease (LL). Finally, the subsidies (Sub) are added.

The part of gross product (GP) that stays with the farmer after the intermediate consumption deduction, equipments' depreciation, taxes, interest, salaries and land lease, added to the subsidies, comprises the agricultural income (RA), according to the following formula:

$$RA = GP - IC - D - Sal - T - I - LL + Sub$$

The final equation of family incomes is the sums of the agricultural income with the not-agricultural income and the hidden income (domestic work (DW)). This income, in fact, doesn't exist because it has no exchange value, although there is a family corporate job that interdepends from other activities (subsystems) and can be measured by the opportunity cost of the domestic employment in the studied region (MACHADO, 2011).

$$TR = AR + NAR + DW$$

TR = total income

RA = agricultural income

NAR = not-agricultural income

DW = opportunity cost of domestic work (labor) in the region

From the sample of 54 rural families and their production systems activities, interviewed in the Rodagem, Eliseu, Lagoa do Gaudêncio, Baixão de Honoratos, Lagoinha ("quilombola" community), Caroá communities, Lapão municipality, Lagoa Nova, in the São Gabriel municipality, and Baixa Verde Community, and Alto do Eujácio Town in the Presidente Dutra County, in the Territory of Irecê, it was obtained a typology of 16 types with its respective archetypes (representative cases) of these families (households) and production systems and activity.

Evolutionary Tendencies of the Activity and Agricultural Production Systems in Comparison with the Consumer/worker Ratio

According to Chayanov (1986), the possibilities an expanded reproduction of agricultural production system, considering the work productivity, are depended of the ratio between the number of family consumer (mouths to feed) and the number of family actives (UTF). The long-term perspectives of the production systems and activities of the rural families in the Territory of Irecê is presented in comparison with the consumer relationship (C) and family work unit (FWU).

In the end, the activity and production systems are classified in sustainable, constrained sustainable and not sustainable according to three criteria: current situation according to the consumer/worker (C/W) relationship; classification of the production system and activities (type) and

according to the reproduction level where the system is found (expanded, simple and extreme poverty) and the endogenous environmental restrictions for the agrarian/production system (high and low).

This third criteria was added since the Territory of Irecê presents concrete environmental problems, such as the groundwater depletion, deforestation, the soils compression, excessive utilization of the agrochemicals in the oleraceous mainly, and that can compromise the permanence of the agricultural production systems/activities in the long term.

Are considered high restrictions, the production system and activities that combines crops systems and farming which are structured with the irrigation of crops, use of machineries and agrochemicals, being that the scrub deforestation presents itself like a problem common for all production systems, once there are few farmers who keeps forest network conserved or high forest recomposition; at the most, rest or secondary growth areas.

In these systems, since the environmental risks are endogenous for the production model, typical of the productivism paradigm, of the Green Revolution, due to the set of technologies used that ensured region's economic growth and the transformations of the agrarian system, there is an uncertainty of its sustainability, but there is not certainty of its total exhaustion, once that can be widespread the management techniques for the rational use of water, in the combination of the three criteria, the system is classified as constrained sustainability perspective, ie, there are the limits about its sustainability in the long term in the face of the agrarian system tendency.

The restrictions are considered low when the production system and activity is not based on the irrigated crops, which require agrochemicals and presumably the use of intense mechanization. In this case, the system can be classified in sustainable or no sustainable. If the C/W ratio is less than 2 (< 2), the family is a favorable situation; if the C/W ratio is less than 3 (< 3), the family tends to exhibit an average situation; if the C/W ratio is equal or greater than 3 (≥ 3), the family tends to present an unfavorable situation.

The final classification of activity systems and production is obtained based on the combination of the criteria listed in Table 1. From the classification of the total family incomes in comparison to the current situation of C/W ratio, it is observed that the production systems and activities in the Territory of Irecê present a sustainable evolutionary trend, of permanence, in the region, without considering the environmental factors relative to the deforestation impacts, the soils compression and the possible decreasing of the water consumption for the crops irrigation.

The *Agriculture family with the government aid (Bolsa Família)* and *Pluri-active Family with the government aid (Bolsa Família)* types present an evolutionary not-sustainable trend. It is noted, however, that for some types that had an evolutionary sustainable trend, the not-agricultural income was essential to contribute to this result. If the families that compose these types rely solely on agricultural income, probably the evolutionary trend would be not-sustainable.

It is observed that all the production systems and activities which had presented irrigated crops were classified with the high endogenous

environmental restriction (to the own system). Thus, in the combination of three criteria, its perspective was considered constrained sustainable (uncertain and limited in time and space).

Table 1. *Criteria of Classification of the Economic Agents and (Activity) Production Systems Categories According to the Relationship Consumer/family Work Unity (UTF), Survive and Reproduction Level and Endogenous Environmental Restrictions*

Current situation of the Consumer/family worker (C/W) relationship	Classification according to the survive and reproduction level	Endogenous environmental restrictions	Perspectives of long term (tendencies)
Favorable	Extreme poverty	High	Not sustainable
Favorable	Simple reproduction	High	Not sustainable
Favorable	Expanded reproduction	High	Constrained sustainable
Average	Extreme poverty	High	Not sustainable
Average	Simple reproduction	High	Not sustainable
Average	Expanded reproduction	High	Constrained sustainable
Unfavorable	Extreme poverty	High	Not sustainable
Unfavorable	Simple reproduction	High	Not sustainable
Unfavorable	Expanded reproduction	High	Constrained Sustainable
Favorable	Extreme poverty	Low	Not sustainable
Favorable	Simple reproduction	Low	Sustainable
Favorable	Expanded reproduction	Low	Sustainable
Average	Extreme poverty	Low	Not sustainable
Average	Simple reproduction	Low	Sustainable
Average	Expanded reproduction	Low	Sustainable
Unfavorable	Extreme poverty	Low	Not sustainable
Unfavorable	Simple reproduction	Low	Not sustainable
Unfavorable	Expanded reproduction	Low	Sustainable

Source: author, 2012

The Activity and Agricultural Production System Modeling and Direct Payments to the Family Farmers

With the approval of the new Brazilian Forest Code, in 2012, the Brazilian State recognizes the public functions of the familiar agriculture from the prediction for the payment of its environmental function, through environmental services. The recognition of the educational function is transverse in these new legal rules, however, payment for the domestic work in the familiar agriculture similarly was not yet incorporated, despite of the grant of government aid (Bolsa Familia) links the family care with the

children through the assistance on health actions and children permanence in schools with the extreme poverty overcoming.

In the Territory of Irecê, semiarid of Bahia, the environmental problems increase as well as the productivist model of space exploration based on the historical scrub deforestation, high water consumption from the underground water for the oleraceous and cone irrigation, soil compression problems due to the use of heavy machines and agrochemicals intensive using in the oleraceous (carrot and beet crops, mainly).

All the environmental problems of the Territory of Irecê justify the prediction of direct payments for the family farmers as the reversal policies of current trend of the productivist model, and with consequent regional economic crisis, of a structural nature, in medium and long term, from the natural resources depletion.

Initially the values paid are allocated for the production systems and activities which are classified in the extreme poverty situation. It could be even destined for the more capitalized production systems as an alternative of technological reversion because of the excessive water using from the underground water springs.

In Brazil without Misery Plan, released in 2011 by the Brazilian Federal Government, it is expected to grant a direct payment in the amount of R\$ 300,00 quarterly for the family who is in extreme poverty situation, that earning up to R\$ 70,00 *per capita* per month. These resources comprise the Environmental Protection Aid Program.

Furthermore, in the support to productive activities program Production Activity Aid Program, family farmers, foresters, fish farmers, extractive and fishermen in the extreme poverty situation beyond other population groups defined as priorities are the target public benefited of not-reimbursable financing of R\$ 2.400,00 amount, during 2 years, for the investments in productive activities. In field research, fall into pluriative family types with *governmental aid (Bolsa Família)* and *agriculture family with governmental aid (Bolsa Família)*.

Doing the modeling of these two types of production systems and activities, *Pluri-active Family with governmental aid (Bolsa Família)* and *Agricultural Family with government aid (Bolsa Família)*, predicts the amount income from R\$ 1.200 *per year* or R\$600 per UTF - DW (2) *per year*, in the case of *Pluri-active Family with government aid (Bolsa Família)* and R\$300 (ou 120 €¹) *per UTF (4) per year*, in the case of *Agricultural Family with government aid (Bolsa Família)*.

The following to graphs show the behavior of the subsystems of production systems and activities of two family types identified in the field research, in the Territory of Irecê, who are part of the public beneficiary of the payment from the environmental services of Brazil without Misery Plan. Even with this institutional increase in the family income, the two types still do not overcome the extreme poverty situation in the short term, requiring the feature contribution of R\$ 2.400 or 960 €\$ for investments in their production systems and activity.

¹Average exchange rate in 2012, €\$1,00 = R\$2,50.

It is even possible that this type of public only with the payment for environmental services in the amount provided by the Brazil without Misery Plan does not yet overcome the extreme poverty situation, because, in the case of the *Pluri-active Family with government aid (Bolsa Família)* and environmental services, the familiar income would reach R\$ 4.830 per year and, in the case of *Agricultural Family with government aid (Bolsa Família)* and environmental services, the familiar income would be R\$5.195 per year; therefore, both are lower than R\$6.000 per year, which consists the value of an average regional food basket, as a limit of the extreme poverty level and the simple reproduction level of the production system and activities.

The 12.651 Law, 25th of May 2012, the new Forest Code, in its article 41, provides that the Federal Executive Power is authorized to institute the aid and incentive program for the environmental conservation and technologies adoption and good practices that combine the agricultural, and forest productivity with the reduction of environmental impacts, considering the following categories and action guidelines:

I – payment or incentive for the environmental services like the monetary or not retribution, to the conservation activities and improvement of the ecosystems and that generate environmental services, such as individually or cumulatively; a) sequestration, conservation, maintenance and the improvement of the stock and the decrease of carbon flux; b) conservation of the natural scenic beauty; c) biodiversity conservation; d) conservation of the water and water services; e) climate regulation; f) cultural value and traditional ecosystem knowledge; g) conservation and soil improvement; h) maintenance of the Permanent Preservation Area, and Legal Reservation and restricted using.

Tax Revenue of the Federal Union and State of Bahia and the Public Financing of the Multifunctionality of Familiar Agriculture

Besides the possibility to allocate some percentage of the federal taxes revenues for the constitution of the multifunctionality of familiar agriculture, is emphasized that the source of direct payments can come from the federal funds to overcome the poverty that already exists, and a surcharge on the ethanol production chain, according to the below table estimation, from the biodiesel, the in general agroenergies and even to the oil and gas from marginal fields.

A part of the CIDE collected can be destined for the funds of direct payments funds by the Federal Union and part of the State Fund of Poverty Overcome of State of Bahia can be destined for the familiar farmers by the provisions of environmental services in the State of Bahia.

From the percentage incidents of the legal person income tax (IRPJ) and the industrialized products tax (IPI) in the ethanol production, it could obtain a fund of public functions and environmental and educative services of the familiar agriculture according to an incident aliquot above the revenue of these taxes in this production chain.

From the total revenues of the State of Bahia, of R\$ 27 billion (US\$11,25 billion) in 2011, the Services and Goods Circulation Tax (ICMS) corresponds to a R\$12 billion (US\$5 billion) in 2011, with part of the ICMS intended to comprise the Poverty Overcome Funds, which corresponds, in 2011, R\$ 400 million (US\$ 167 million), in 2010, R\$ 373 million (US\$ 155 million), and 2009, R\$ 324 million (US\$ 135 millions¹).

The CIDE-Fuels is a federal contribution (tax) that is applied into the importation and commerce of the petroleum and their derivatives, natural gas and its derivatives, and ethanol fuel, being that, by first article and first paragraph, the product collection of the CIDE will be destined to: I – payment of allowances to the prices or transport of alcohol fuel, natural gas and their derivatives; II – financing of the environmental projects related to the oil and gas industry; and III – financing the transport infra-structure programs.

In 2011, the federal government of Brazil raised with the CIDE, almost R\$9 billions (4,5 billions of dollars). Thus, it demonstrates that this contribution by changes in the law, may help financing the environmental policies and the policies which valorize the familiar agriculture multifunctionality around the environmental, territorial, economic, social, cultural and educative public functions.

¹Average exchange rate: US\$ 1,00 = R\$2,40.

Table 2. *Evolutionary Tendency of the Several Economic Agents Categories (types) of the Territory of Irecê (State of Bahia), Brazil, 2011*

Number	Activity and production system Category	Size of the families (consumers – C)	Family Work Unity (FWU)	Relationship C/UTF	Current situation of the relationship C/UTF	Extreme poverty level (R \$)	Expanded reproduction level (R\$)	Classification of the total family incomes	Endogenous environmental restriction	Tendence (perspective of long term)
1	Agricultural, diversified, capitalized with the irrigated crops and integrated into the market with pension Family	5	5	1	Favorable	6000	15.480	Expanded	High	Sustainable and constrained
52	Pluri-active capitalized with irrigated crops and integrated into the market with pension Family	4	2	2	Favorable	6000	15.480	Expanded	High	Sustainable and constrained
2	Agricultural with pension Family	4	3	1,3	Favorable	6000	15.480	Expanded	Low	Sustainable
46	Agricultural with pension Family	2	2	1	Favorable	6000	15.480	Expanded	Low	Sustainable
21	Agricultural with pension Family	4	3	1,3	Favorable	6000	15.480	Expanded	Low	Sustainable
9	Pluri-active with government aid (Bolsa Família)	5	2	2,5	Average	6000	15.480	Extreme poverty	Low	unsustainable
43	Pluri-active Family	15	11	1,4	Favorable	6000	15.480	Expanded	Low	Sustainable

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13	Pluri-active, diversified with pension Family	4	4	1,0	Favorable	6000	15.480	Expanded	Low	Sustainable
42	Agricultural with government aid (Bolsa Família) Family	6	4	1,5	Favorable	6000	15.480	Extreme poverty	Low	unsustainable
15	Agricultural with pension and government aid (Bolsa Família) Family	5	2	2,5	Average	6000	15.480	Expanded	Low	Sustainable
18	Pluri-active with irrigated crops with pension and government aid (Bolsa Família) Family	5	3	1,7	Favorable	6000	15.480	Expanded	High	Sustainable and constrained
20	Pluri-active, diversified Family	6	2	3,0	Unfavorable	6000	15.480	Expanded	Low	Sustainable
44	Pluri-active with pension Family	3	2	1,5	Favorable	6000	15.480	Expanded	Low	Sustainable
31	Pluri-active with pension and irrigated crops Family	6	4	1,5	Favorable	6000	15.480	Expanded	High	Sustainable and constrained
47	Agricultural Family	5	4	1,3	Favorable	6000	15.480	Expanded	Low	Sustainable
48	Agricultural, capitalized and integrated into the market Family	3	2	1,5	Favorable	6000	15.480	Expanded	Low	Sustainable

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37	Agricultural with irrigated crops Family	4	3	1,3	Favorable	6000	15.480	Expanded	High	Sustainable and constrained
36	Agricultural with cattle and ships Family	4	2	2,0	Average	6000	15.480	Expanded	Low	Sustainable
41	Agricultural with pension and irrigated crops Family	5	2	2,5	Average	6000	15480	Expanded	High	Sustainable and constrained

Source: author, 2012.

Conclusion

This paper aimed to comprehend the processes of economic and social formation of the agrarian system called Policulture with oleraceous and the impacts resulting from the productivism of Green Revolution in the Territory of Irecê, semiarid of State of Bahia, Brazil, and demonstrates the plurality of the employer farmers and agricultural families of the territory, and how they combine their production systems and activities, providing elements for the actions directed for the types of agricultural farmers and production systems identified from the direct field research.

The impacts of the Biodiesel production policies in the Territory of Irecê are demonstrated and how this policies influence the local cooperatives of family farmers in their commercial relationships and technics with processors companies of biodiesel in the production chain, for example the Petrobras, Brazilian enterprise of the oil and natural gas exploration, which consist a mixed economy society (Federal Union and private investors), beneath the management of federal government of Brazil.

From this point of view, the Petrobras is within the biofuels market in the castor oil purchase, acquired from the cooperatives and promotion to the technical assistance, aiming to increase the physical income of the production systems of the family farmers. As the only enterprise that nowadays acts in the Territory of Irecê, Petrobras influence the castor oil prices negotiated in the region. Petrobras has the possibility to destine the castor oil for the biodiesel production or sell it for the cosmetic industry, much valorized in the market.

Once the regional production chain of Territory of Irecê, undertakes an articulation between a public enterprise, Petrobras, farmers local cooperatives and family farmers, in a public-sympathetic network, destined to the market, demonstrate for the entire Brazilian territory, from the estimation of the incomes, arising from ethanol production, as well as the possibility of the constitution of these incomes arising from oil marginal fields, the sources, in monetary values, where the financial resources could come the public funds, from the biodiesel production chains, that recognizes the public functions of the familiar agriculture, such as an educative, environmental, economic, social, cultural and territorial functions by the direct payments, through the governmental programs that ensures the multifunctionality of the familiar agriculture.

In Brazil, there are institutional mechanisms, in the federal government plan, as the CIDE – Economic Domain Intervention Contribution regarding to the operations accomplished with the biofuels, which could be destined to finance the direct payments, like a source of income, added with the sources of the Poverty Overcome Funds of State of Bahia.

The 10.336 Law, 19th of November 2001, instituted the CIDE, levied on the importation and commerce of gasoline and its chains, diesel and its chains, kerosene commerce for jet fuel and other kerosenes, fuel oil, liquefied petroleum gas (LPG), including that derived from the natural gas and naphtha,

is the alcohol ethanol fuel. The triggering facts are the commerce in the internal market and the imports of these biofuels.

These functions are also based on the educational function that guides the relationship between the domestic space and the production space in the familiar agriculture, and the transmission of the knowledge in the family context, function that is presented in the gender relationship about the technical division of the members of the family in the work and in the generated incomes by the production systems and activities.

The different participations of woman in the income generation is observed, emphasizing her importance in the activities of the backyard and in the domestic work, whose value is estimated in the regional work market, once it is not a paid work, that is estimated, how much could be its price, considering the regional values in the market, if it was paid.

The paper demonstrates that for the categories of the *pluri-active Family with the governmental aid (Bolsa Família) and environmental services* and the *agricultural and governmental aid (Bolsa Família) and environmental services Family*, with the institutional increasing of R\$ 300,00, or 120,00 €\$ quarterly, the two types have not yet overcome the extreme poverty in the short term, that need the resource of R\$ 2.400,00 or €\$ 960,00 during two years, for the investments in their activity and production systems in the federal government, the Brazil without Misery Plan.

Considering the sustainability of the activity and production system, the tendency to be considered sustainable, not-sustainable or with the constrained sustainability is the result of the structural and endogenous environmental problems in the agrarian system Policulture with oleraceous, that affect the reproduction of the production system in the long term, and the technologies used by them, for example, the use of the irrigation system in the oleraceous and cone cultures, mainly.

The *agricultural Family with the government aid (Bolsa Família)* and the *Pluri-active Family with the government aid (Bolsa Família)* types present a not-sustainable evolutionary trend. For those that had presented a sustainable evolutionary trend, the not-agricultural income was fundamental to contribute for this result. If the families that compose these types were depended only of the agricultural income, probably the evolutionary trend could be not-sustainable.

All the activity and production systems that presented the irrigated crops were classified with the high environmental endogenous restriction (to the own system). Thereby, in the combination of the three criteria, its perspective was considered constrained sustainable (uncertain and limited in the time and space).

The types of families whose production systems have irrigation system have constrained sustainability, due to the problems of water shortage, extracted from underground springs in the region, in the short and long terms. The following types were identified in this situation: *diversified Agricultural family, capitalized with irrigated crops and integrated into the market with the pensions Family; pluri-active capitalized with the irrigated and integrated*

crops into the market with the pensions Family; pluri-active with the irrigated crops, pensions and governmental aid (Bolsa Família) Family; pluri-active with pension and irrigated crops Family; agricultural with the irrigated crops Family and agricultural with the pension and irrigated crops Family.

The families get the incomes of the agricultural and not-agricultural activities and those families with the pensions present the agricultural income equal or higher than 50% of the family income. The types of the capitalized families that use the irrigated systems have the agricultural incomes superior than 50%, for example, the agricultural diversified, capitalized with the irrigated crops and integrated into the market with the pensions Family and *the agricultural diversified, capitalized with the irrigated crops and integrated into the market with the pensions Family.*

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