



ENVIRONMENTAL SAFEGUARDS

an analysis of the impacts of eucalyptus monoculture on waters and rural communities

Summary

Abstract

Traditional rural communities articulated in a Partnership Network - a collective that involves representatives from six rural communities, the Rural Workers Union, Emater, and the Vicente Nica Alternative Agriculture Center - demanded that a group of researchers from universities and federal institutes carry out a study to analyze the impacts of eucalyptus monoculture on land and water in Jequitinhonha

The study indicates that the Eucalyptus monoculture implementation in the tablelands (chapadas) of Alto Jequitinhonha was responsible for the land and water expropriation of family farmers in the region. Over almost five decades of exploitation, it is possible to verify the decrease in water recharge, the lowering of the groundwater table, the drought of paths and water sources, and the reduction of river flows. The drought of water sources directly affects family farming communities in the region, creating severe situations of scarcity for rural families both from the standpoint of access to water for human consumption and for food production. The current costs of water supply are incurred by the families themselves, the government, and society as a whole, while the profit for the exploitation of the economic activity is earned by the company. This executive summary summarizes the main results of this study.



1. INTRODUCTION

In the 1970s, in the context of the Green Revolution, a group of companies was granted public tax incentives, proposed by the military government and the government of Minas Gerais, to implement extensive monoculture in important flat and high areas in the Alto Jequitinhonha territory.

At the time, the region's tablelands were considered unclaimed areas and were granted to companies that produced eucalyptus, expropriating rural communities that had a common use of the land for agroextractivism. The natural biome of the territory - the Cerrado¹ of Alto Jequitinhonha - was partially transformed into vast areas covered by a single plant, causing devastating effects such as the drought of water sources and streams.

Among the companies that have occupied the territory, the study highlights the presence of Aperam BioEnergia, holder of a large amount of plateaus in the Alto Jequitinhonha, approximately 126,127.23 hectares, 76,641.65 ha monocultivated with eucalyptus (Supram, 2015); and capable of producing approximately 400,000 tons of charcoal per year. The company belongs to the Aperam group, a global player in stainless steel production, with major industrial plants based in Brazil, Belgium, and France. That way, the steel production in Brazil is made from vegetable charcoal use, as a result of the Eucalyptus monoculture at the location where this study was carried out.

To produce charcoal, the company took control over the use and regulation of land and water to guarantee its monocultures. The consequent drying up of water sources due to monoculture in important recharge areas has resulted in restricted access to water sources for domestic and productive consumption in rural communities. The urban population also felt the consequences of this environmental change with the smoke emissions over the cities, soil and water contamination by pesticides, among other negative externalities.

¹ Cerrado is a specific Brazilian tropical biome similar to savannas, but with its own characteristics.



The presented study aimed to identify the deficiencies and opportunities to strengthen the financial sector regulation, prevent investments without the proper social and environmental safeguards for the local communities, and reduce the impacts of Eucalyptus monoculture in the Jequitinhonha River Valley. The work was conducted by a partnership of institutions articulated by the Center for Alternative Agriculture Vicente Nica (CAV), which involved researchers from Universidade Federal de Minas Gerais (UFMG), Universidade Federal de Lavras (UFLA), Instituto Federal do Norte de Minas Gerais (INFMG), Universidade Federal Vales do Jequitinhonha e Mucuri (UFVJM), Instituto Federal do Leste de Minas Gerais (IFLMG), and Instituto Federal do Sudeste de Minas Gerais (IFSMG), organized mainly by Núcleo de Pesquisa e Apoio à Agricultura Familiar Justino Obers (NPPJ).

2. SCENARIO ANALYSIS

2.1. About the Eucalyptus monoculture implementation in the Alto Jequitinhonha

The monoculture of eucalyptus in the Jequitinhonha Valley was driven by tax incentives that granted individuals and companies up to 50% income tax rebates for investment in forestry projects (CALIXTO et al., 2009)

The State Forest Institute (IEF), an organ of the State of Minas Gerais, defined the forest districts, one of which was the Jequitinhonha Valley. The Cerrado was chosen as the ideal scenario for the implementation of the agricultural modernization measures, because it gathered characteristics that facilitated the management of the policies: flat lands ideal for mechanization, availability of extensive lands, a lot of labor, and the soil, which could be corrected through agricultural inputs (CALIXTO, 2006; SILVA, 2019).

In the conception of public program formulators, the customary domain of space, held by small traditional farmers in upper Jequitinhonha, was equivalent to the absence of land occupation and use. It was considered a huge "void", as conveyed at the time, and land privatization was encouraged (RIBEIRO, et al.; 2014; MOURA,



1988). Considered vacant areas, belonging to the State, were transferred to the reforestation companies attracted to the region, such as the state-owned Acesita Florestal, today called APERAM, the Companhia Agrícola e Florestal (CAF), a company of the Companhia Siderúrgica Belgo-Mineira, and the Companhia Suzano, in addition to contractors of these (SILVA, 1996; CALIXTO et al., 2009).

However, these plateaus - chapadas - were not "empty" of use, they had been occupied for generations by countless farming families, by traditional communities, who held agro-food production systems that articulated production with nature conservation (Ribeiro, 2013; Galizoni, 2007, Graziano and Graziano Neto, 1983). By disregarding this production system, policy makers and companies disregard other possibilities, more egalitarian for using and sharing nature's resources.

2.2. Impacts on groundwater recharge in the water balance

The **Alto Jequitinhonha tablelands**, traditionally inhabited by local communities for agro-extractive and productive uses, **were responsible for recharging watersheds, of which 126 thousand were occupied by the company Aperam BioEnergia (LIMA, 2013).**

The substitution of native vegetation by eucalyptus monocultures has caused major impacts on the water dynamics in the Alto Jequitinhonha and interfered with the water balance.

The tablelands with **native Cerrado vegetation allow an average use of 50% of all the water that rains** to supply the water table; while **the areas submitted to eucalyptus monocultures are able to use only 29% of the rainfall to supply the groundwater recharge** (LIMA 2013). This is due to the fact that the species, especially when planted in monoculture, requires a lot of water. The **eucalyptus evapotransports 6 liters of water/day per square meter**, while the Cerrado plants **evapotransport approximately 2.5 liters/day in the humid season, and 1.5 liters/day in the dry season**. In comparison to native vegetation, there is an



additional consumption of 218 mm yearly from the eucalyptus crop due to its high evapotranspiration, a fact that alters the local hydrological cycle (LIMA, 2013; GALIZONI, et al., 2021).

With an **average reduction of 10 centimeters per year in the water table in monoculture** areas of Eucalyptus in Alto Jequitinhonha, considering the 45 years of eucalyptus monoculture in this region (1974 - 2019), **a reduction in the water table of 4.5 meters was verified (LIMA, 2013).**

In addition to the eucalyptus monoculture itself altering the water table, the water that falls on the trails - roads used to separate the eucalyptus stands - is not absorbed by the water table, causing a loss of 36 million cubic meters per year.

This means that charcoal production and carbon sequestration in semi-arid regions through forestry should not be thought of separately from their impact on water scarcity.

2.3. Impacts in the river flows and water production in the watersheds in Alto Jequitinhonha

The water shortage resulting from eucalyptus plantations can also be detected by analyzing the rivers' flow. The removal and burning of vegetation and monocultures of forest species, on the other hand, cause an increase in direct surface runoff, decrease the presence of water in the soil, and, consequently, reduce the recharging of the water table and water sources, and may lead to a process of drying up the watercourses (TUCCI, 2001).

In the present case, the Araçuaí river, an important tributary of the Jequitinhonha basin, and its main tributaries - the Fanados and Itamarandiba rivers - are in areas affected by eucalyptus monoculture. The analysis of the hydrological behavior in the Araçuaí and Fanado rivers between 1950 and 2019 indicated that the baseflow experienced significant reductions starting in the 1980s, and in the 2000s, it reached only about 50% of the values found between 1950 and 1980. The studies found no abnormal variations in the precipitation data for Alto Jequitinhonha, indicating that the drying up of watersheds is not related to lack of rainfall (Galizoni et al., 2021). These data have indicated that even if there are good rainy



years, with precipitation close to the historical maximum values, the minimum flows will probably not return to the average values registered in the decades prior to 1980. Basin characteristics have been altered, direct surface runoff has been enhanced by conveyors, groundwater recharge has been reduced by 218 mm in the eucalyptus-planted plains, and water production potential has been reduced (Galizoni et al., 2021).

The **privatization of the tablelands has made the landscape more homogeneous, reduced the biodiversity** of the Cerrado, **destroyed fauna habitats, increased pressure on water resources, and expropriated family farmers** who have lost a large part of their common water and lands, essential for the production of their livelihoods. As a result, rural communities suffered the loss of land and much of the traditional conditions for social reproduction. Additionally, they have received the bill for the environmental and social liabilities that eucalyptus monoculture has increased directly and indirectly: the taking of land; soil erosion; and the critical reduction of water sources.

2.4. Impacts in the drying up of water source: the case study of Chapada das Veredas

The field research locus to investigate the socio-environmental impacts of eucalyptus monoculture was the Chapada das Veredas and six surrounding rural communities – Gentio, Campo Alegre, Campo Buriti, José Silva, Poço D'Água, and Cabeceira do Tanque. All these communities are located in the Chapada das Veredas surroundings, in Fanado river micro-basin, Turmalina municipality. This municipality had, in 2010, 18,055 inhabitants, 67% in urban areas and 33% in the rural areas. In the six communities, there are approximately 500 families or 2000 people.

The Chapada das Veredas suffered, at the end of the 1970s, an intense process of privatization of the land and nature resources by reforestation companies, with special emphasis at the time on Acesita (now Aperam), with State subsidy.



This **tableland** has a peculiarity that was not respected when the eucalyptus monoculture was implemented: **it was a complex of veredas² and lagoons, with an abundance of water.** These veredas have gradually lost their vitality over time, due to the native vegetation being cut down, the plowing and harrowing of the soil for the planting of eucalyptus, and the flooding of the veredas. In addition, the company has built landfills over the trails to facilitate the passage of trucks, damming the water, cutting its flow, and creating dams, from which they take water for their production processes.

A 67-year-old farmer, a resident of the rural community of Campo Buriti, located on the edges of the Chapada das Veredas, reported that before the eucalyptus monoculture companies arrived in the region, which happened around 1973, the chapadas were like a "sea of water that never dried up", there used to be a great volume of water. The water used by the families in the community was derived from streams that were originated in the tableland and flowed into the Fanado River. According to the resident, they used little of the water from the Fanado River for two reasons: it was further away than the water from the creeks and it was also muddier. The water used by the whole community was supplied by the veredas.

Besides transforming the veredas, until then abundant in water, into dry lagoons and dams of a restricted domain, the fauna and flora that inhabited the plateau were also severely impacted.

In 1973, nearly 86.1% of the areas in the Chapada das Veredas were occupied by native vegetation. In 2018, a **71.5% reduction in native vegetation was detected:** only 24.6% of Chapada das Veredas was occupied by native vegetation, with **eucalyptus now covering 61.5% of the site.**

What once was a territory with rich biodiversity and an abundance of water has been transformed, in the last 45 years, into an industrial enterprise producing mainly charcoal.

² Veredas are plant formations of the Cerrado, they are places of springs that form the streams that supply the rivers and allow clean and quality water to exist. These formations also play a fundamental role in the maintenance of the Cerrado fauna as it acts as a landing place, shelter, food source and breeding place for terrestrial and aquatic fauna.



2.5. Water scarcity for rural families

The drying up of the natural water sources, impacted by the eucalyptus monoculture, resulted in the decrease of the water sources for the communities surrounding the Chapada das Veredas and caused a range of unfair access to natural resources. The main environmental cost of the eucalyptus plantations was passed on to the rural population, increasing its water insecurity.

In the dry season in 2018, 52% of farming households had average daily water consumption per inhabitant at 43 liters; 27% reached 107 liters daily per inhabitant and 21% exceeded 200 liters per day (NPPJ, 2018). **According to the World Health Organization - WHO, the minimum human consumption of water is 110 liters per inhabitant per day.** Thus, it was observed that **52% of the families were in a vulnerable situation of water**, since, **the consumption that most people in the Chapada das Veredas communities had available was 43 liters per inhabitant per day.** Which represents for these rural families an outrage to the human right to water.

The farmers' families have no guarantee of access to the water in the long term because they depend on the water sources that are drying and the Fanado river flow which have been drastically decreasing over the last years. They also rely on the finite flow from the water wells and the tank truck, which they need to claim to the municipal government to be provided.

2.6. Family agriculture, food production, and water scarcity

Family agriculture is very important in the region because it is accountable for the food supply of the very families and the surrounding cities, generating income and food security. **Out of 18,686 establishments in the Capelinha micro-region, for example, a total of 13,526 are family agriculture, against 5,157 in the industrial agriculture sector.** This means that family agriculture is a numerical majority and fundamental for the food sovereignty of the municipalities of Alto Jequitinhonha.

All this food richness produced and collected in nature, apart from feeding the families, is commercialized through the distribution channels developed by the local family farmers: around **51% of the families exchange or sell the food within**



the own community; 34% trade in open markets, 20% in supermarkets, 14% in other communities, 9% in its producing unit, and 9% in other regional cities

With the scarcity situation, **76% of the families that of the families who used to do farming reported that their plantations were severely affected**, as they either stopped planting or reduced the planted area. In prolonged dry periods, **21% of the families stated that they are compelled to stop farming due to lack of water**. Communities must make a stark choice between "food water" (for producing food) or "drinking water" (for human consumption). **Approximately 90% of the farmers collected native fruits that enriched the family diet and supplied the urban markets with diversity. Around 70% of families gather native firewood used in wood-burning stoves** and in the rural household industry that produces the cornmeal, manioc flour, and panela (rapadura), very important for the food and sovereign security of Alto Jequitinhonha and the use in the clay handicrafts typical of this territory. The main obstacle to maintaining agroextractivism is that "both fruit and firewood are hard to find" after the land grab by monoculture companies and the homogenizing management of nature.

2.7. Water supply public cost for rural communities

The water supply costs in the scarcity situations found in the Chapada das Veredas are strongly burdened not only on the rural communities, but also on the public authorities, and society as a whole.

The study indicated that, in Turmalina, in 2018, vegetation conservation from environmental protection areas generates much more resources for the municipality than the eucalyptus monoculture, where studies indicate that the tax contribution by farming area accounts for less than half of the collection related to the conservation areas (Galizoni et al., 2021).

Analyzing the estimate of the municipality of Turmalina with public expenditures for water supply in rural communities, and considering three of the main public programs as a reference, it was observed that **the municipality**, in the year of 2018, **had on average an expenditure of almost R\$350.000,00** (three hundred thousand reais) **to be able to supply rural communities**. However, **the**



eucalyptus generated in the same year, through tax collection of the activity, R\$120.000,00 (one hundred and twenty thousand reais).

More than half of the surveyed families (59.2%) rely on the water truck weekly to fulfill the access to water. Biweekly, they are 18.4% and, monthly, 8.2% of the families. Thus, the families need to build and organize ways to minimally store the water when they can get access.

Even within the communities, there is a difference in the water storage capacity, resulting in regional inequalities. However, it is important to emphasize that storage capacity does not mean the same as actually having water.

With the drying up of natural water sources, access to water has been monetized, and companies with greater economic power dominate water tankers, water supply systems, and the exploitation of underground water. The cities of Turmalina and Chapada do Norte were obliged to invest public resources in the transposition of watersheds to supply their rural populations.

2.8. Eucalyptus plantations impacts: use of pesticides and health

Historically, eucalyptus monoculture in the Jequitinhonha valley region has made use of agrotocics, since the time of its implementation in the 1970s. One of the products widely used was Aldrin. The incorrect use and disposal of the Aldrin pesticide, with landfill of the product after the prohibition of use, caused contamination of soil, water and, consequently, of people and animals that were exposed (LAGE and GRIGORI, 2020).

Currently, Aperam claimed to use 55,160 kg of glyphosate products on 14,119 hectares per year, and 76,284 kg of sulfloramide-based products on 41,231 ha per year, according to the FSC (Forest Stewardship Council, 2020) report. These volumes represent enormous potential contamination for the eucalyptus plantation areas and the surrounding rural communities, with no care for the water quality or detailed and continuous monitoring by the company.



The continuous use of pesticides in the tablelands, since the 70s, in aquifers and water sources of Alto Jequitinhonha, represents a factual risk to the water contamination designated for human and animal consumption.

2.9. Land effects

Privatization of common areas expropriated several traditional rural communities and promoted land concentration: until 1970 in the Homogeneous Microregion of Capelinha, **the sites below 100 hectares were the majority, 97.72% of the total, and occupied 64.95% of the areas in this micro-region (CALIXTO, 2006)**. In 1995, after three decades of the monoculture implementation, studies presented that **latifundia represent only 0.21% of the sites and concentrated 48.18% of the area**. Mechanization is associated with this land concentration, which causes the number of jobs generated to be restricted (CALIXTO, 2006).

In 2022, seventy lawsuits involving the Aperam group are in course in the courts of Minas Novas, Itamarandiba, Turmalina and Capelinha

Three lawsuits are directly related to environmental discussions, that is, linked to licensing, authorization, or legal dispute regarding environmental licensing. Eight are compensatory lawsuits, most of them related to traffic accidents involving Aperam's vehicles. Fifteen are procedural issues, unfolding from other processes. Sixteen were not categorized due to insufficient information. Lastly, twenty-eight lawsuits deal with land disputes. In other words, **40% of the lawsuits concerning the Aperam group are land disputes**, in which it is possible to identify at least 6,605.87 hectares that are under litigation. With regard to the period, 52 (fifty two) lawsuits were initiated in the period from 2010 to 2019, or 72.2%.

3. POTENTIAL SAFEGUARDS

The movement carried out by the rural communities themselves was responsible for uniting a group of leaders and representatives of various organizations in this



territory in 2015, movement named by the farming families themselves as, REDE DE PARCERIAS (NETWORK OF PARTNERSHIPS).

The information that has been produced, reflected on and discussed by the set of participants (communities, support organizations from civil society, public authorities and academics) exemplify the negative impacts of the interventions by the largest enterprise operating in the Chapada das Veredas in the last five decades.

The possible safeguards necessarily include the efficient monitoring of events commonly reported by neighboring populations to the planting and processing areas of APERAM BIOENERGIA. These include the emission of large amounts of smoke that, especially in the colder periods of the year, form a horizontal chimney following the streams that enter the municipalities of Turmalina and Veredinha; the large-scale use of pesticides, especially in areas of water recharge; the planting in areas immediately next to the edges of the plateau, transition areas to the *grotas*; the use of water in large quantities, even in periods of drought, for cooling charcoal ovens or irrigating crops.

It is also necessary for the competent bodies to take action in the processes that trigger land conflicts, with potential damage to social peace and the physical integrity of those involved. In this matter, there are several cases in which the families of the region that border the eucalyptus plantations have won their cases, which demonstrates the arbitrariness and injustice in the process of occupation of this territory. Mainly they indicate that the occupation of land by the company is not peaceful; on the contrary, they indicate forms of expropriation of territory that have lasted for decades and expose families and communities to exclusion from the right to land and water. It is urgent that access to territory and natural resources be guaranteed for family farming communities affected by eucalyptus monoculture.

Environmental legislation must be enforced, as must the right to land use by their traditional populations.



It is suggested to the public administrators, in addition to carrying out enforcement for the proper compliance of environmental legislation, the adequacy of existing laws that in many cases are incompatible with what the environment requires for its effective preservation. For example, eucalyptus monocultures should not be implemented in watershed recharge areas where the production of water (baseflow) from the rivers is not guaranteed to the communities and the river itself, during the course of the year.

In Chapada das Veredas, as in other environments with such characteristics, it is necessary to rethink the use and management, restricting the monoculture of eucalyptus. It is necessary to remove the eucalyptus plantations, recompose the water recharge environment, reconstituting its capacity to regulate supply from natural sources for the farming communities; thus ensuring respect for the human right to water for the rural population of Jequitinhonha.

So, in order to achieve success in solving the socio-environmental problems identified, it is fundamental to have the committed engagement of the various players. Among them, those in charge at the governmental level for the implementation of public policies, those related to the internal scope of the company - which for almost five decades has been the occupant and user of the natural resources of the Chapada das Veredas - the severely damaged communities, and, finally, the company's investors who promote such degradation, are of special importance.

Regarding the last mentioned, the study revealed that most of the funding comes from Aperam Treasury S.C.A., a limited partnership with shares headquartered in Luxembourg that is part of the Aperam group. In the second place, the study identified the National Bank for Economic and Social Development (BNDES) as one of the main funders, providing R\$34.054.000,00 to the company between 2016 and 2017. Other investments were also identified coming from the Banco Votorantim and Banco de Desenvolvimento de Minas Gerais. It is essential that these banks rethink and repair investments that have brought exclusion and socio-environmental conflicts to thousands of people.



4. CONCLUSIONS

The main results indicate that the eucalyptus monoculture implementation in the tablelands of Alto Jequitinhonha expropriated land and water from family farmers. Over almost five decades of exploitation, there has been a decrease in water recharge, the lowering of the water table, the drying up of veredas and water sources, and a reduction in river flows. The drying of the water sources has been affecting the farmers' communities, resulting in drastic scarcity situations for the rural families. The current costs of water supply fall on the very families, the public authority, and society as a whole, while the profit facilitated by the exploitation of natural resources is seized by the company.

There is a need to resize the company's land occupation, to recover the local native vegetation, which, in turn, is capable of promoting the region's water recharge, biodiversity recovery, and mitigation of the consequent social impacts suffered by the surrounding communities.

Therefore, the centrality of the active participation of local communities - already organized around the socio-environmental problems that have been identified - can be seen, so that the pursuit of emergency and necessary solutions can reach effective results. Also, there is an emphasis on the responsibility of the financial institutions that promote the development of eucalyptus monoculture. These actors are responsible for demanding commitments and socio-environmental safeguards by the companies that undertake this type of activity, to prevent and mitigate the impacts identified in this study.