FLORESTAL SANTA MARIA PROJECT (FSM-REDD PROJECT)

florestal santa maria

in association with VO2 Desenvolvimento Empresarial

Prepared by PLANT Environmental Intelligence
www.plantBR.com.br

Project Title	FLORESTAL SANTA MARIA PROJECT (hereafter referred to as FSM-REDD PROJECT)
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1 PROJECT DETAILS

1.1 Summary Description of the Project

The proponent and developer of the Project is Florestal Santa Maria S/A. PLANT Environmental Intelligence is technically responsible for this VCS-PD, which had contributions of AVIX in deforestation risk analysis and similarity analysis. All legal matters are in responsibility of Pinheiro Neto Advogados' lawyers. General Coordination for this initiative was performed by VO2 Desenvolvimento Empresarial. The electronic addresses of the companies cited above are available in item "1.4 Other Entities Involved in the Project" of this VCS-PD.

The FSM forest estate, a rural property solely dedicated to sustainable management of natural forests, is located in the Municipality of Colniza, some 30 km from the township, in the North western region of the State of Mato Grosso, approx. 1,100 km north from the State Capital of Cuiabá. The geopolitical region is within the Brazilian Legal Amazon. The municipality of Colniza has been fairly recently emancipated, in the year of 1998 and it previously belonged to the municipality of Aripuanã, founded in 1946.

The FSM-REDD Project was conceived to give the opportunity for this forest management company to take full advantage of the REDD regulatory system under development by means of the VCS System. The specific area of the Carbon Project is a section of a larger colonization initiative, initiated in 1975, by means of the legally established state effort to develop the northern region of the State of Mato Grosso.

This larger colonization initiative was developed by COLNIZA – Colonização Comércio e Indústria Ltda (Colniza Colonization Company – hereafter referred as CCC). This company was an association between ESCOL – Cia Agricola e Comércio (Esteve Irmãos Group), G. Lunardelli S.A. – Agricultura Comércio e Colonização (G. Lunardelli Colonization Company – hereafter referred as GLCC) and other minorities.

GLCC was founded by Italian immigrant Geremia Lunardelli, who became one of the most prominent rural development entrepreneurs in frontier agriculture in Brazil, having his history associated with the establishment of the coffee export market in the 1920's. For over 80 years, the GLCC has been planning and implementing land-use colonization projects in many states of Brazil (São Paulo, Paraná, Mato Grosso and others), in addition to some regions in Paraguay. After the death of entrepreneur Geremia, in the 60's, G. Lunardelli's family continued his former activities with colonization projects.

The objective of CCC was to participate in the opportunities of development in the northern region of the State of Mato Grosso (MT State). On January 9, 1975, the CCC acquired 400,000 hectares from ancient Company for Development of the State of Mato Grosso - CODEMAT (Companhia de Desenvolvimento do Estado de Mato Grosso). These 400,000 hectares were part of a State-led development effort for the northern region of the MT State. This was a much larger program involving 2,000,000 hectares, assigned by the State Government with a former participation of the Federal Government, in order to implement an Amazonian development program.

From this larger area, many municipalities were established, such as Colniza, Cotriguaçu, Juruena, Juína, and Alta Floresta. All this initiatives had the intention to take form to integrate the larger Brazilian northern region to the ongoing development of the country. At that time, the Federal Government of Brazil had publicized many concerns regarding the vulnerability of territorial integrity and sovereignty. The colonization of the north of the MT State was a very strategic component.

The following Figures (1-3) demonstrate some aspects of geographical distribution.

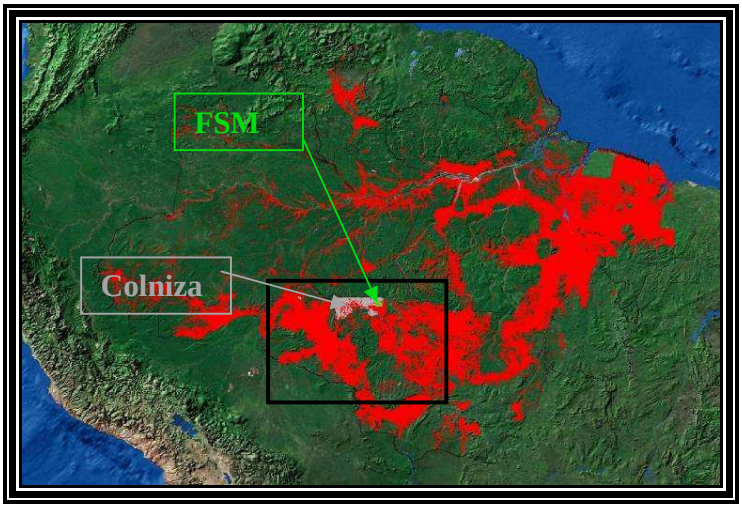


Figure 1. *Location of the FSM farm (green dot) inside the Municipality of Colniza (grey polygon), and in the context of the deforestation process in the Amazon Region (highlighted in red), according to the National Space Research Institute (INPE) (2008)*

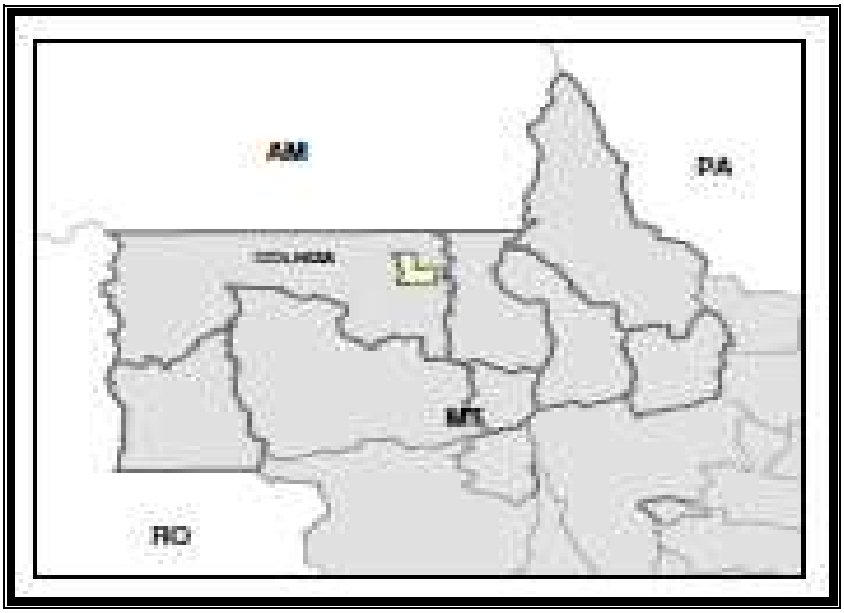


Figure 2. *Location of FSM farm, within the territory of the municipality of Colniza*

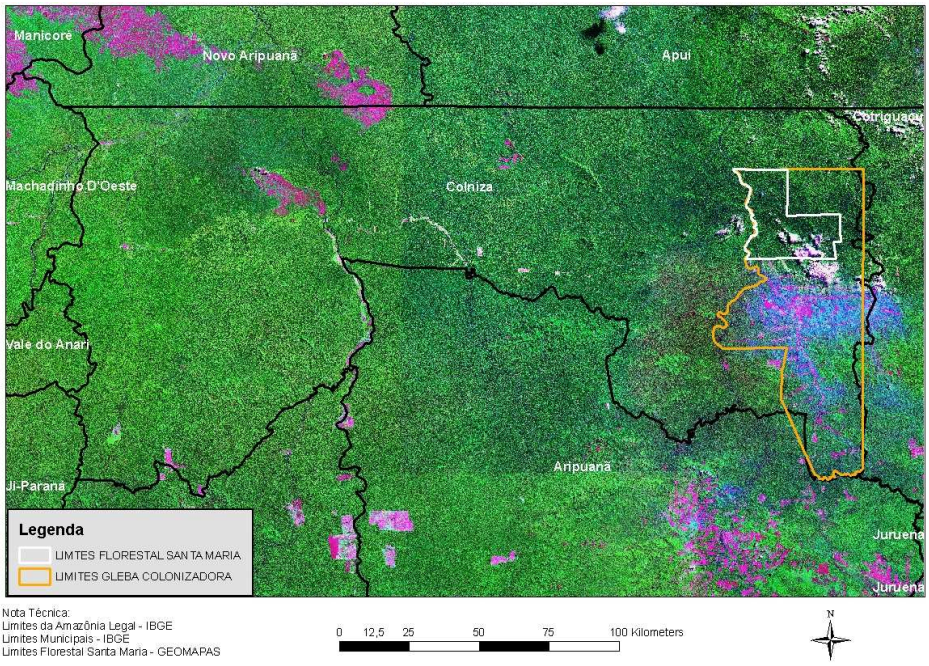


Figure 3. *Location of Reference Area and Project Area in relation to the municipality of Colniza*

Eventually, given the evolution of colonization plans, the original area of 400,000 hectares was divided in 3 zones under the following denomination:

1) South Zone

2) Central Zone

3) North Zone

The legal ownership history related to this area fractioning is demonstrated in the Ownership Succession (*Cadeia Sucessória*), illustrated in the Certificate issued by the Real Estate Registry Office (*Cartório de Registro Geral de Imóveis*), of the Sixth Office (*Sexto Ofício*), 3rd Circumscription (*3ª Circunscrição*), of the Municipalities of Aripuanã and Juina, on April 25, 1993 (see item "1.12.1 Proof of Title" of this VCS-PD). Under such zones, the Real Estate Registry recorded the following information:

1) South Zone (80,000 hectares): located at the south of the current municipality of Colniza, under ownership of G. Lunardelli (26,530 ha), ESCOL (26,530 ha), and new buyers (26,940 ha).

2) Central Zone (180,000 hectares): located at the Centre of the 400,000-hectares glebe, under ownership of COLNIZA – Colonização, Comércio e Indústria Ltda. This area was assigned to founding the current urban area of the municipality of Colniza. This zone was divided and developed in small land plots, and planned roads were built

to enable colonization. Part of this zone was subsequently settled by the National Institute for Rural Settlement and Agrarian Reform (INCRA) within the agrarian reform process of the government of Brazil.

3) North Zone (140,000 hectares): located at north of current municipality of Colniza. This zone was originally divided into 4 land registrations:

a. G. Lunardelli Noroeste – 47,500 hectares;

b. G. Lunardelli Norte – 22,500 hectares;

c. ESCOL Norte – 47,500 hectares;

d. ESCOL (Florita) Norte – 22,500 hectares.

The Florestal Santa Maria Farm (Project Area) had been formed on July 10, 2002, by merging the GLCC properties (items "a" and "b"), totalizing 70,000 hectares, according to Table 1.

Table 1. *Scheme illustrating the original division of lands, contextualizing the Project Area (FSM Farm)*

400,000 ha	South Zone	80,000 ha	G. Lunardelli	26,530 ha
			ESCOL	26,530 ha
			New buyers	26,940 ha
	Central Zone	180,000 ha	COLNIZA Colonizadora	180,000 ha
	North Zone	140,000 ha	G. Lunardelli Noroeste	47,500 ha
			G. Lunardelli Norte	22,500 ha
			ESCOL Norte	47,500 ha
			ESCOL (Florita) Norte	22,500 ha

FSM

According to INCRA Certificate issued on January 25, 2005 (see item "1.12.1 Proof of Title" of this VCS-PD), through subsequent geo-referencing, the total area of FSM farm was established in 71,713.959031 ha.

Some 20 years after the initial land purchase, CCC proposed the transfer of 17,500 hectares to INCRA. The main reason was to address the settlement of landless agricultural workers, which were selected by INCRA on April 22, 1991 as beneficiaries of a rural settlement in the northern region of Brazil. The land transfer to INCRA was motivated by the lack of infrastructure for implementing the initial colonization project, as well as uncontrolled pressure for land occupation. Thus, by showing good will, CCC intended to address this institutional handicap and create

means to attract the government to act more closely to the land occupation process underway in the region. This first settlement was established in the Central Zone (number 2 in the list) nearby the administrative urban area of Colniza (municipality and county)[1]. In other words, at that time CCC was already seeking to mitigate illegal land occupation.

Another 17,500 hectares were later part of a second transfer agreement that entered into with INTERMAT (Instituto de Terras do Estado do Mato Grosso; Institute of Lands of the State of Mato Grosso) for the settlement of families evicted from other illegally occupied lands.

Between 2000 and 2005, illegal occupation in other regions such as State of Rondônia, Pará and other states, were led by professional land-grabbers (mainly over private lands)[2], generating uncontrollable pressure over original landowners (CCC, GLCC, and ESCOL). This came to be extremely threatening, given the lack of governmental infrastructure and law enforcement to preserve privately owned lands. These factors induced the original landowners to find ways of selling the remaining lands in the Central Zone. In this context, the original colonization project was made unfeasible, owing to every sort of uncontrolled and illegal occupation of lands. In short, a failure of the colonization project, caused by social problems and lack of governmental infrastructure and law enforcement created the conditions for disorganized and illegal occupation, right on the opposite direction that the efforts of colonization were established at the outset of the enterprise, followed by a massive deforestation as a means to occupy the land with cattle and eventually agriculture.

The deforestation pressure in the State of Mato Grosso became then mostly the result of illegal land-grabbing by invasion of private lands, using to such objective logging, slash-and-burning and cattle-ranching. However, other factors contributed to deforestation in the State of Mato Grosso. According to a recent publication by the Amazon Institute for Environmental Research (IPAM), the causes of tropical deforestation are apparently the same in different regions of the planet and can directly be accounted for (a) conversion of forest areas into areas for agriculture and cattle breeding for the purpose of land possession or not; (b) timber extraction; and (c) land-clearance by fire. There also indirect causes such as (d) governmental subsidies and incentives to agriculture and cattle breeding; (e) investment policies in infrastructure projects; (f) illegality of land possession and ownership; (g) lack of state governance and law enforcement; and (h) market drivers, such as rising commodities prices[3]. All of these patterns can be found in the Brazilian Amazon and specifically in the State of Mato Grosso.

The several difficulties faced by local authorities in exercising control over public and private lands were due to the lack of support from State and Federal Jurisdictions. According to the INPE, 2009, the deforestation process in the municipality of Colniza increased from 770 km² in

[1] Note: in Brazil, a municipality is composed of both urban and rural areas, thus the different approaches of public administration of rural areas is undertaken at local level by both the township and city council.
[2] Invasion of public lands was less prone to legal settlement, whereas private lands that were not deemed "productive" could be acquired by means of adverse possession (*usucapião*) and are more easily subject to titles falsification and land grabbing.
[3] Free translation of "REDD no Brasil: um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. – Brasília, DF: Centro de Gestão e Estudos Estratégicos, 2011, page 29."

2000 to over 3,300 km² in 2007, which represents an increase of 328% in deforestation rate over a period of only 7 years.

According to local testimonials from EMPAER[4], SAM[5] and INDEA[6] (these are Municipal and State Agencies with offices in Colniza), a great amount of land-grabbers who conducted initial processes of illegal land occupation (by grabbing private farms) are still installed in the municipality. They are still organized, awaiting to take possession of unprotected private lands, taking all sorts of actions in order to find and invade "unproductive" private lands, with the primary objective of logging with no legal license. This is mainly due to the fact that lumber companies still carry out the practice of spot-purchasing of logs that are delivered at the yard every day. These land-grabbers have mechanisms to rapidly catching hold of lands and immediately exploiting local timber by means of clear-cutting the forests. The immediate timber revenues provide the necessary budget to implementing pasture and agriculture. On the other hand, some of these illegal invasions, when not contested by original land owners, can give the invader possession rights to claim such land to his/her ownership.[7]

Associated with the lack of assistance from governmental offices (e.g. INCRA) in resolving legal and documental land tenure issues in Colniza, as soon as an invasion or occupation of land takes place, the first order of business is to deforest as much land and plots as possible, far above the limits regulated by Brazilian Forest Code, which imposes the preservation of 80% of land as Legal Reserve (*Reserva Legal*). In this context, the common land-use practices are technically archaic and production scale does not reflect the real potential of land, resulting in low economic return for families, and inducing them to invade new areas in the region, as the only alternative of earning their subsistence from timber as an immediate source of income. This scenario induces the cycle of continuous land invasions and social conflicts, which causes damages to environment and communities in the region.

The current FSM farm is presently subject to risks of invasions by squatters. Since after partition of the original 400,000 hectares, the farm has undergone increasing invasions mainly facilitated by the distribution of lands promoted by INCRA, which settled hundreds of families in their land spots. This movement was further intensified after the year 2000. Once installed nearby the farm boundaries, neighbouring families lead by professional land-grabbers started to occupy and deforest new lands, to exploit timber as immediate source of earnings. These illegal occupations were fomented by some sawmills in the region, which bought the harvested timber, and further stimulated land-grabbing and logging. As the next step of land use, families implemented coffee crops and pasture on deforested sites. In the present, the municipality of Colniza is predominantly covered by pasture (250,000 hectares) and coffee cultivation (12,500 hectares) (Brazilian Geography and Statistics Institute Foundation - IBGE 2009). In Colniza, the growth rate for the bovine herd has been exponential over these last years, rising from 32,138 heads of cattle in 2001 to 217,796 heads in 2007, according to the IBGE, as shown in Table 2. This growth represents a 578% increase in the size of the bovine herd in Colniza over a period of only seven years. This growth is directly correlated to the increase in the deforestation rates in Colniza,

[4] Agency for Research, Assistance and Rural Extension of the State of Mato Grosso.
[5] Municipal Agriculture Office.
[6] Institute for Defense of Agriculture and Cattle Razing of the State of Mato Grosso.
[7] Characterizing steady land tenure, known in the Brazilian constitution as "usucapião" or "Uti Possidetis": the acquisition of property by long possession without claim by others.

which leaped from 88,720 hectares to 325,170 hectares of deforested area over the same period of time, an increase of close to 266%, as shown in Figure 5.

The FSM farm is one of the few sites in the region that still preserves all native forest. Nowadays, indeed, it is the only site that conserves a great area of continuous native vegetation (71,713 hectares) from the original 400,000 hectares of the initial colonization project.

Several illegal occupations in the FSM farm were eradicated and registered by local authorities and by the farm self-vigilance system. These invasions originated judicial prosecutions for repossession of land tenure. Thanks to an extensive self-vigilance system and landowner's investments and efforts, these invasions have not caused significant damage to original vegetation. However, it is known and documented that the FSM farm was already totally divided in lots, and several trails had been made to ultimate occupation by land-grabbers inside the whole farm. As 100% of FSM farm is reserved for Sustainable Forest Management, it is considered as a Great Productive Estate (*Grande Propriedade Produtiva*), according to categorization by INCRA (Figure 4).

SOCIAL AND HUMAN ASPECTS:

It is interesting observing that, in the original area of the 400,000 hectares, differently from the States of Amazonas and Acre, there were no populations of: (I) native Brazilian, (II) Riparians and (III) Forest People.

(I) According to research carried out by National Indian Foundation (FUNAI), villages and isolated native Brazilian were located in regions outside the Colonizing area. Reserve areas were created for this purpose. Namely:

a. T.I. Escondido;

b. T.I. Arara do Rio Branco and

c. T.I. Rio Pardo (with defined expansion Project, under discussion).

Note. : Maps and Certificates are at the auditors' disposal.

Key: T.I.: Territory of native Brazilians

(II) Due to the rather uneven condition of the water flow in this part of Aripuanã River, the main river from the region (river rapids Santa Maria – origin of the name of the farm), its navigability is rather difficult, and almost impossible during the periods of drought (Jun/Nov). Therefore, riparian population, naturally settled further to the North, in the State of Amazonas (Apuí) where the river in navigable and higher. This explains the isolation, until that date (1975), of the 400,000 hectares area.

(III) The so-called Forest People, known in Acre and in Amazonas, are mostly the remaining rubber tappers from the rubber boom occurred at the beginning of last century. The woods from this region of Colniza, do not count on Pará rubber trees in a number which is commercially

sustainable. This fact explains why there are no forest people in the place where the colonization Project was developed.

For these reasons, considering that there would not cause any cultural impact or conflict in the possession of the offered lots, during the 80's and 90's the National Institute for Colonization and Agrarian Reform (INCRA) and the Institute of Territories of the State of Mato Grosso (INTERMAT), chose part of this area to resettle new immigrants from other parts of the country.

On the other hand, exactly for these people not being used and lacking knowledge of how to live with and manage the Amazon forest, is that the rampant deforestation began. They were seeking (I) easy profit with the sale from the wood (II) to create conditions for their own subsistence through agriculture/ livestock, without exploring from the forest the benefits which it could have provided them.

This was the beginning of the invasions process and of total lack of control of the region, which resulted in the current environmental chaos.

All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

MINISTÉRIO DO DESENVOLVIMENTO AGRÁRIO - MDA
INSTITUTO NACIONAL DE COLONIZAÇÃO E REFORMA AGRÁRIA - INCRA
CERTIFICADO DE CADASTRO DE IMOVEL RURAL - CCIR
EMISSÃO 2006 / 2007 / 2008 / 2009

DADOS DO IMÓVEL RURAL — PÁG.: 1 / 1

CÓDIGO DO IMÓVEL RURAL	DENOMINAÇÃO DO IMÓVEL RURAL			
901.016.054.461-7	FAZENDA FLORESTAL SANTA MARIA			
ÁREA TOTAL(ha) 71.713,9000	CLASSIFICAÇÃO FUNDIÁRIA: GRANDE PROPRIEDADE PRODUTIVA	DATA DA ÚLTIMA ATUALIZAÇÃO: 31/03/2008	Nº CERTIFICAÇÃO PLANTA/MEMORIAL: 0	
INDICAÇÕES PARA LOCALIZAÇÃO DO IMÓVEL RURAL: MARGEM DIREITA RIO ARIPUANA NORTE		MUNICÍPIO SEDE DO IMÓVEL RURAL: COLNIZA		UF: MT

MÓDULO RURAL(ha)	Nº MÓDULOS RURAIS	MÓDULO FISCAL(ha)	Nº MÓDULOS FISCAIS	FMP(ha)
102,2149	140,32	100,0000	717,1390	4,0000

SITUAÇÃO JURÍDICA DO IMÓVEL RURAL (ÁREAS REGISTRADAS)

MUNICÍPIO DO CARTÓRIO	DATA REGISTRO	OFÍCIO	MATRÍCULA	REGISTRO	LIVRO OU FICHA	ÁREA(ha)
CUIABÁ	02/06/2005	6º	73958	R-06	L-2NQ	71.713,9590

ÁREA DO IMÓVEL RURAL(ha)

REGISTRADA	POSSE A JUSTO TÍTULO	POSSE POR SIMPLES OCUPAÇÃO	ÁREA MEDIDA
71.713,9590	0,0000	0,0000	71.713,9590

DADOS DO DETENTOR(DECLARANTE)

NOME			CPF/CNPJ
FLORESTAL SANTA MARIA S/A			06066768/0001-44
NACIONALIDADE	CÓDIGO DA PESSOA: 05.380.502-0	% DE DETENÇÃO DO IMÓVEL RURAL: 100,00	TOTAL DE CONDÔMINOS DESTE IMÓVEL: 0

DADOS DE CONTROLE

DATA DE EMISSÃO	NÚMERO DO CCIR	DATA DE GERAÇÃO DO CCIR	
14/12/2009	01849562099	10/02/2010	**DATA DE VENCIMENTO: 28/02/2010**

TAXA DE SERVIÇOS CADASTRAIS(R$)

DÉBITOS ANTERIORES	TAXA DE SERVIÇOS CADASTRAIS	VALOR COBRADO	MULTA	JUROS	VALOR TOTAL
0,00	528,62	528,62	52,86	5,29	586,77

OBSERVAÇÕES

ESCLARECIMENTOS GERAIS

1. ESTE CERTIFICADO É DOCUMENTO INDISPENSÁVEL PARA DESMEMBRAR, ARRENDAR, HIPOTECAR, VENDER OU PROMETER EM VENDA O IMÓVEL RURAL E PARA HOMOLOGAÇÃO DE PARTILHA AMIGÁVEL OU JUDICIAL "SUCESSÃO CAUSA MORTIS", DE ACORDO COM OS PARÁGRAFOS 1º e 2º DO ARTIGO 22 DA LEI 4.947/66.
2. PROCURE O INSTITUTO NACIONAL DE COLONIZAÇÃO E REFORMA AGRÁRIA – INCRA OU A UNIDADE MUNICIPAL DE CADASTRAMENTO – UMC, PARA ATUALIZAR O SEU CADASTRO RURAL, SEMPRE QUE OCORREREM ALTERAÇÕES NO SEU IMÓVEL, SEJA POR COMPRA, VENDA, PERMUTA, DOAÇÃO, ETC. OU NAS CONDIÇÕES DE UTILIZAÇÃO E EXPLORAÇÃO.
3. AS INFORMAÇÕES DESTE CERTIFICADO SÃO EXCLUSIVAMENTE CADASTRAIS, NÃO LEGITIMANDO DIREITO DE DOMÍNIO OU POSSE, CONFORME PRECEITUA O ARTIGO 1º DA LEI 5.868/72.
4. A TAXA DE SERVIÇOS CADASTRAIS FOI LANÇADA COM BASE NA LEI 8.847/94 E DECRETO LEI 1989/82 A TAXA DE SERVIÇOS CADASTRAIS FOI LANÇADA COM BASE NA LEI 4.504/64, DECRETO 55.891/65, DECRETOS LEI 57/66 E 1.989/82.
5. OS ASTERISCOS NO CAMPO "CLASSIFICAÇÃO FUNDIÁRIA" INDICAM QUE O IMÓVEL RURAL NÃO ATINGIU OS ÍNDICES QUE O CLASSIFICARIAM COMO PRODUTIVO, DE ACORDO COM O ESTABELECIDO NO ARTIGO 6º DA LEI 8.629/93.
6. FMP – FRAÇÃO MÍNIMA DE PARCELAMENTO DE ACORDO COM O ESTABELECIDO NO PARÁGRAFO 1º DO ARTIGO 8º DA LEI 5.868/72.
7. Nº CERTIFICAÇÃO PLANTA/MEMORIAL CONFORME DISPOSTO NA LEI 10.267/01 E SUAS ALTERAÇÕES.

TAXA DE SERVIÇOS CADASTRAIS

1. O PRESENTE DOCUMENTO SÓ PODERÁ SER PAGO NA CAIXA ECONÔMICA FEDERAL, LOTÉRICAS, GUICHÊS DOS PONTOS DE VENDA, INTERNET BANKING, AUTO ATENDIMENTO E CAIXA AQUI.
2. O CCIR COM A TAXA DE SERVIÇOS CADASTRAIS NÃO QUITADA ATÉ A DATA DE VENCIMENTO DEVERÁ SER REEMITIDO, PARA ATUALIZAÇÃO DOS CÁLCULOS DE MULTA E JUROS - LEIS 8.022/90, 8.847/94 E 8.383/91.
3. O CCIR SÓ É VÁLIDO COM A QUITAÇÃO DA TAXA.
4. A COBRANÇA DA TAXA DE SERVIÇOS CADASTRAIS OBEDECERÁ OS SEGUINTES CRITÉRIOS:
   A) IMÓVEIS CONSTANTES NO SNCR ANTES DE 31/12/2005 E OS INCLUÍDOS A PARTIR DE 01/01/2006, O VALOR DA TAXA REFERE-SE AOS EXERCÍCIOS DE 2006/2007/2008/2009;
   B) IMÓVEIS INCLUÍDOS A PARTIR DE 01/01/2007, O VALOR DA TAXA REFERE-SE AOS EXERCÍCIOS DE 2007/2008/2009;
   C) IMÓVEIS INCLUÍDOS A PARTIR DE 01/01/2008, O VALOR DA TAXA REFERE-SE AOS EXERCÍCIOS DE 2008/2009;
   D) IMÓVEIS INCLUÍDOS A PARTIR DE 01/01/2009, O VALOR DA TAXA REFERE-SE AO EXERCÍCIO DE 2009.
5. O VALOR DE DÉBITOS ANTERIORES REFERE-SE ÀS TAXAS DE EXERCÍCIOS ANTERIORES A 2006/2007/2008/2009, CUJA COMPROVAÇÃO DE PAGAMENTO NÃO FOI REGISTRADA ATÉ A DATA DE EMISSÃO DESTE CERTIFICADO.

CARIMBO DA RECEBEDORA

AUTENTICAÇÃO MECÂNICA

CEF2887010320101727850001957 586,77RD1001

Número de Autenticidade
07180.16830.06690.04367

VIA DO DETENTOR

RÚBRICA DO RESPONSÁVEL

Figure 4. *Certificate of Registration of Rural Real Estate (CCIR) issued by the Ministry of Agrarian Development (MDA) and INCRA*

Table 2. *The bovine cattle herd in the municipality of Colniza*

Municipality = Colniza – MT							
Variable = The herd (# of heads)							
Type of herd = Bovine							
Year							
2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
-	*32,138*	*47,013*	*81,043*	*96,960*	*152,714*	*197,001*	*217,796*

Source: IBGE – Municipal Livestock Survey

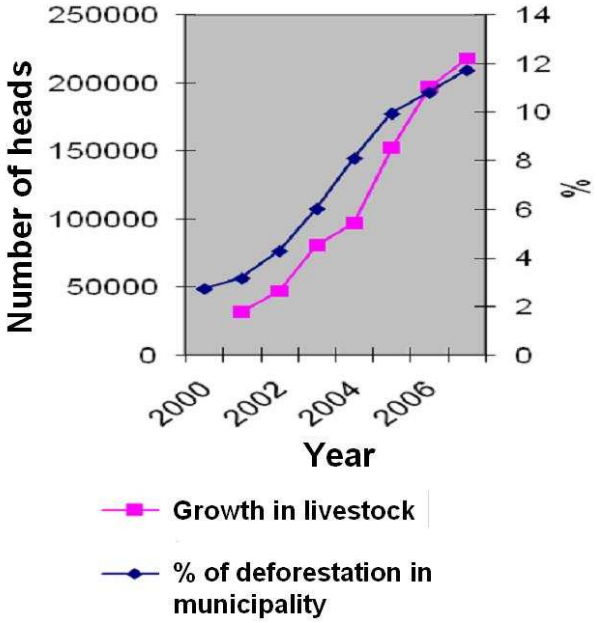


Figure 5. *Comparison of the variables growth in herd and increase in deforestation, in Colniza. Source: Adapted from IBGE/PRODES (2009)*

Among several operations from FSM administration to implement its Forest Stewardship Plan, a Public Hearing (*Audiência Pública*) was held in Colniza on August 27, 2002. In that period, at the highest pitch of invasions, land-grabbers alleged that the FSM farm was not productive for its whole area, and that the Forest Stewardship Plan was a pretext to hinder invasions. By recommendation and support from the State Public Ministry of Environment, this Hearing was organized, with participation of local, state, and federal authorities. The Forest Stewardship Plan was entirely presented to a 300-people audience, pointing out their social and environmental benefits. The Hearing caused an immediate positive impact; however, invasions and wood robbery from the FSM forest management activities did not cease. The FSM estate underwent

successive invasions that were stopped (denouncements were registered) with subsequent land reintegration. Registered evidences of this series of denouncements (B.O. – Police Reports) against land-grabbers and criminal organizations that issued adulterated land documents are available for consultation in internal FSM files.

The FSM farm has 7 fixed vigilance points distributed all along the property, which control all entrances and boundaries of the farm. The portion southeast of the farm is the most critical in terms of invasion risks, as several roads and trails have been made to access farm boundaries passing through INCRA settlements. All vigilance points are provided with lodgings for guards, where at least one guard (contracted by the FSM farm) keeps in charge of a certain area of forest.

The FSM farm has the largest stewardship plan licensed in the State of Mato Grosso, as shown in Figure 6. It is evident that the FSM property has played a fundamental role in the containment of deforestation in the course of these last years. However, the sustainable forest management conducted at the property is under great pressure from other economic activities conducted in the area bordering the property, related to land-grabbing and to extensive cattle-raising, in addition to the difficulties inherent to the development of forestry stewardship, currently undergoing a crisis in Brazil. Moreover, forest management itself poses several difficulties, which implicates in the economic viability of the operation. To take all the measures and steps to achieve a sound business operation, FSM has encountered challenges that indicate risks. These risks can be considered barriers to the continuation of the forest management project itself, and resources from the sales of carbon credits would be a very important component of the operation today and years to come.

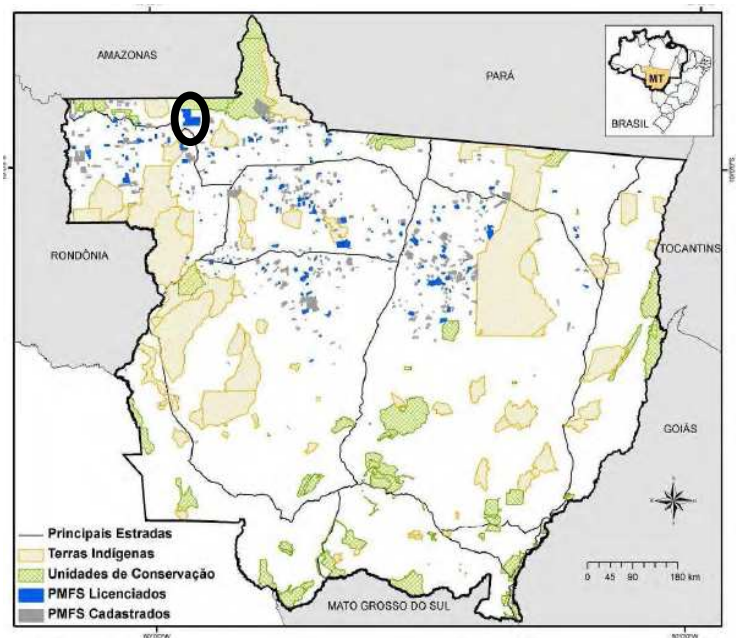


Figure 6. *Sustainable Forest Stewardship Plans registered at and licensed by the Special Environmental Office (SEMA) in MT, 2007.*

Generally speaking, the logging industry conducted within the framework of forest stewardship activities in the Brazilian Amazon region face serious difficulties in terms of funding and cash-flow, which includes different aspects such as legalization of property ownership, the slow pace of the environmental protection agencies responsible for issuing permits for such activities and the threat and risks associated with the history of land tenure in the region. To this, is added the blunt difficulty posed by competition with the sale of illegal wood originated from the deforestation in grabbed lands or from areas without logging permits.

Cattle-raising in the Amazon region, on the other hand, has become an extremely lucrative activity, particularly when carried out as a result of illegal deforestation (which comprehends the vast majority of the cases). This is a result of low cost of land, greater productivity and the generation of capital from a preliminary exploitation of wood. Cattle-ranching thrives also thanks to a good distribution of rainfall, the absence of frost and the natural fertility of soils in recent deforested areas. Furthermore, the profitability of cattle-raising is further leveraged by the abundant availability of subsidized rural credit lines, e.g. those provided by the Constitutional Fund for the Financing of the Northern Region (FNO/FCO), which become additional benefits in large operations.

Therefore, the ongoing activities of forest stewardship through logging management at FSM farm requires the supplementation of this activity with income arising from the payment for environmental services (by valuating the services for keeping the forest standing) which, at this point, is only available through mechanisms derived from the UNFCCC and Voluntary Carbon Markets, within the emerging concepts of REDD.

It is clear that the FSM farm will not be able to afford large long-term costs and efforts for vigilance of land property. In this context, the FSM farm baseline may involve the following non-excluding baseline scenarios:

Scenario 1: deforestation and logging of the area permitted by Law, to generate supplementary incomes to financially support long-term vigilance system; this would correspond to active deforestation of the property by land owner in the future;

Scenario 2: adoption of common land-use practices in the region (business as usual - BAU), including deforestation beyond limits established by Brazilian Forest Code (generalized non-compliance, typically observed in the farm region); this would be the probable scenario if no additional environmental values are attributed to the operation;

Scenario 3: unplanned deforestation caused by uncontrolled invasions, derived from the lack of ability to control borders in case of the current cash-flow scenarios with logging operations alone, which indicates the need for additional sources of income in the overall operation of FSM;

Scenario 4: farm sale to private investors (in this case, the regional BAU is probably the most plausible future scenario). In recent years, FSM owners have already been approached to sell the FSM farm (some offers are documented). According to FSM, a group of European investors, represented by a local sawmill, made a credible offer to

purchase the property. The investors propose to log and process timber from the FSM forest, whose production would be exported to the European market. Registered evidences of the interest of FSM land purchase (e.g. purchase proposals) are available for consultation by auditors. All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

1.2 Sectoral Scope and Project Type

• Sectoral Scope: 14 - Agriculture Forestry and Other Land Use

• AFOLU – REDD - Avoiding Unplanned Deforestation and Degradation (AUDD)

• This is not a Grouped project.

1.3 Project Proponent

Land Ownership:

Florestal Santa Maria S.A.

Rua Augusta, 2883, Cj. 62, 6º andar / São Paulo, SP, CEP: 01413-100

Represented by: Rubens Forbes Alves de Lima - *rubens@florestalsantamaria.com.br*

Marcelo Martins Lunardelli - *mml@florestalsantamaria.com.br*

1.4 Other Entities Involved in the Project

Technical Advisory:

PLANT Inteligência Ambiental Ltda. *plant@plantBR.com.br*

Rua Morais Barros, 1413 – Centro, CEP: 13419-240 – Piracicaba, SP

Represented by: Warwick do Amaral Manfrinato - *warwick@manfrinato.com.br*

Luiz Fernando de Moura - *luiz@plantbr.com.br*

Janaína Dallan - *janainadallan@plantbr.com.br*

Direct tel.: +55 19 3434-0849 Mobile: +55 19 9164-0284

BUNGE EMISSIONS GROUP

Bunge Emissions Group *www.bunge.com*

Av. Maria Coelho Aguiar, 215 - Bl. D, 3rd floor - Sao Paulo, SP - CEP 05804 000

Represented by: Sandro T. Marostica (Manager Brazil) - *sandro.marostica@bunge.com*

Direct tel.: +55 11 3741-3956

AVIX Geo Ambiental (Similarity Analysis and Deforestation Risk Analysis)

Praça Prof. Sérgio Bonganhi, 120 (Ed. Terras Center Office), CJ. 107 – Piracicaba, SP

Represented by: Dr. Fernando Frosini de Barros Ferraz – *fernando@avix.com.br*

Direct tel.: +55 19 3427-2438

Legal Advisory:

PINHEIRO NETO ADVOGADOS

Pinheiro Neto Advogados

Rua Hungria, 1.100; CEP: 01455-906; São Paulo – SP

Represented by: Werner Grau Neto – *wgrau@pn.com.br*

André Vivan de Souza – *avivan@pn.com.br*

Direct tel.: +55 11 3247-8594

Project Coordination and Advice to FSM:

VO2 DESENVOLVIMENTO EMPRESARIAL

VO2 Desenvolvimento Empresarial

Rua Augusta, 2883 – CJ. 31 3º Andar / CEP: 01413-100 - Bairro Cerqueira Cesar / São Paulo – SP

Represented by: André Moraes Barros - *andremb@vo2de.com.br*

Octávio de Guimarães Horta - *octavio@vo2de.com.br*

Direct tel.: +55 11 8383-6006

1.5 Project Start Date

Project start date: April 13, 2009 (Date on which first money transfer was made to K2C consultancy and the participants started to work on the project development.) This document is available for consultation by auditors. All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

1.6 Project Crediting Period

Start date: April 13, 2009

End date: April 13, 2039

Total number of years: 30 years

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project	5,000 – 1,000,000 tCO_2e per year (according to description from VCS Program Guidelines)
Mega-project	-

Years	Estimated GHG emission reductions or removals (tCO2e)
2009 (April 13 to December 31)	677,971.3
2010	994,628.8
2011	981,512.7
2012	967,543.3
2013	986,304.1
2014	986,642.9
2015	986,642.9
2016	986,642.9
2017	987,421.4
2018	987,421.4
2019	987,590.8
2020	987,590.8
2021	987,590.8
2022	987,590.8
2023	987,590.8
2024	987,590.8
2025	1,005,366.4
2026	1,025,142.4
2027	1,025,908.1
2028	1,025,908.1
2029	1,026,077.5
2030	1,026,077.5
2031	1,026,077.5
2032	1,026,077.5
2033	1,026,077.5
2034	1,026,077.5
2035	1,026,077.5
2036	1,026,077.5
2037	1,026,077.5
2038	1,026,077.5
2039 (January 1st to April 13)	111,954.4
Total estimated ERs	**29,923,331.0**
Total number of crediting years	**30**
Average annual ERs	**997,444.4**

1.8 Description of the Project Activity

The FSM-REDD PROJECT will reduce GHG emissions by stopping deforestation of degraded to mature forests at the frontier that has been expanding historically and will continue to expand in the future, as a result of improved access to forests, while regional development continues. The lifetime of the project activity is 30 years.

The FSM-REDD Project aims at assuring the continuation of ongoing activities for forest protection plus the implementation of the following actions, among others (further described in Annex 1):

(i) Qualification of the local community to engage in the activities related to forest stewardship within the FSM farm. Moreover, the FSM farm is being prepared for FSC (Forest Stewardship Council) certification, which will also provide benefits to the region;

(ii) Long-term protection of the area of the property and opposition to invasion by land grabbers;

(iii) Improvement in local security through project monitoring and public sharing of documentation;

(iv) Organization of forest fire brigades;

(v) Creation of incentives to recover degraded areas surrounding the property, in addition to

(vi) Conduction of a feasibility study to set up a small plant for processing non-wood products and organizing a technical forestry school in the municipality of Colniza.

Furthermore, efforts will be made with the SEMA-MT in order to create an environment management model highly replicable in other previously identified areas with potential to receive future REDD projects.

Another fundamental point to ensure the success of this project is the monitoring strategy to be implemented. The approach adopted by the project will involve a system combining satellite images with field visits. INPE has made available tools for monitoring the deforestation of the Amazon region, such as the PRODES and the DETER systems, to which the participants in the project will have access over the Internet. The FSM will organize a regional effort in order to train and share information with local stakeholders (Annex 1).

In addition to a regular revision by satellite images of the area covered by the project, there will be a team stationed within the property, which will conduct on-site surveillance of deforestation within and on the borders of the property, to ensure the maintenance and preservation of the forest.

In this manner, a new development model may be created in the region of Colniza, based on a new model of exploitation of forest potential in the region, associated with the preservation of

natural resources and sustainable economic activities (e.g. forest stewardship and non-wood products).

Monitoring carbon inventories within the limits of the project

The project area underwent a specific field inventory in 2010, whereby the average amount of 563.3 tCO_2/ha was determined for the local forest. The average aboveground biomass of local forest was estimated in 238.9 t/ha, which is a value comprised between the "Tropical moist deciduous forests" and "Tropical rain forest" compiled in the 2006 IPCC (Intergovernmental Panel on Climate Change) Guidelines for National Greenhouse Gas Inventories (Volume 4 - Agriculture, Forestry and Other Land Use; Table 4.12; page 4.63).

This value is also corroborated by the First National Inventory of Emissions of Greenhouse Effect Gases (MCT, 2006), as supplemented by a study conducted by Nogueira et al. (2008), which provides inventory values for the Amazon region exceeding those presented by the MCT. The Nogueira data exceed in 30% those obtained in the First National Inventory of Emissions of Greenhouse Effect Gases. By averaging these two sources, it has been possible to estimate 127 tC/ha (270 t/ha).

The field inventory methodology is described in a Standard Operating Procedure (SOP), which is available for consultation by the auditors. This SOP was specifically designed to FSM carbon inventories, to be applied in the baseline assessment, as well as in the monitoring period.

Monitoring and controlling leakage outside the limits of the project

The main leakage causes manifest as land-use changes (cattle, agriculture, wood exploitation etc.) in Project surroundings. These changes in land use became more economically attractive than sustainable management of forest resources, owing to the following factors: market pressure; colonization in borderlines and areas where law enforcement and command and control approaches are not effective; increase or decrease of investments in the area. These are the main factors, among secondary others.

Project proponents clearly comprehend the conceptual complexity and difficulties for implementing a policy for preventing potential leakage. Therefore, the Project proponents will adopt a proactive initiative for fighting leakage sources. This adoption will be based on a cooperative effort with local stakeholders to promote a new approach to forest use and land use in the region, based on the premises described in the Annex 1.

In order to mitigate leakage, the Project proponents foresee continuous monitoring and interventions on areas surrounding the Project (Leakage Belt), which were mapped by satellite. This project will hold programs within the region of its influence (based on premises of Annex 1) for education of local communities, seeking to create culture and policies for sustainable development.

Although there is a risk of leakage, the proponents believe that the Project will have positive impacts on surrounding areas. This Project might be a well-succeeded example of the following technical and economical aspects:

(i) Management of forest resources with success and profit;

(ii) Additional return to forest management, due to REDD incentives, which can compensate avoiding deforestation for other activities;

(iii) Maintenance of real estate (land acquisition and grabbing dynamics), in addition to profits with sustainable management plus REDD.

According to reasons above, the Project might probably stimulate other landowners to adhere to this Project concept. The communication with landowners might be performed by means of associative actions and environmental education, which will be part of an overall policy described in Annex 1.

As the Project will be implemented in a single sustainable management Farm (and not in a spread management area), the generation of incomes will be sustainable and permanent, creating new jobs in the whole supply chain and fixating people in the area influenced by the Project, thus decreasing the need for deforestation in new areas (Annex 1).

REDD incomes will increase economical attractiveness of sustainable management, which should become a feasible alternative to other land uses in neighbouring farms, and will also benefit the economical use of non-timber forest products.

By means of Project monitoring activities, satellite imaging, and social, local and regional cooperation for monitoring areas surrounding the Project; we believe that the well-succeeded example of this business plan will generate an increased number of sustainable managed areas, which will create ancillary benefits around the Project boundary.

Social and economic benefits

Peace and social development will only be possible by means of creation of formal employment and the legal benefits related to them. This is exactly one of the purposes of Florestal Santa Maria S/A's Sustainable Forest Management Plan, certified by FSC. Creating consistency of the wood supply through all its productive chain (total chain), from census/extraction until the final processing in the plant, this already in the city.

The whole family will have opportunities: the father employed by one position in the productive chain, the mother in non-wood forest products, and the young in professional education courses, which aims at meeting the Market requirements with their certifications.

So, the project has the potential to provide its participants with new sources of income, besides stimulating the generation of jobs linked to the forest management, generating a new demand for products originated within the boundaries of the project, and expanding the conditions for

improved education and health services to the neighbouring community, with greater access to other development centres thanks to a more adequate transportation structure.

The project will involve several inclusion actions for the neighbouring communities – by means of a partnership to be established with the Colniza Municipal Administration, in order to implement technical education programmes, communication media (telephone, internet etc.).

Technical qualification, training in forest management, community development in the form of participative workshops may increase the collective understanding of climate change and the importance of the forest. This understanding is essential for each individual in the process of a collective transformation of cultural relations and of the lifestyle of the local community.

The FSM REDD Project is committed to conduct social-environmental activities linked to the preservation of the forest stewardship and maintaining the integrity of the Santa Maria property.

Among the proposed activities is the organization of courses focusing on forestry which intend to train youngsters to apply the knowledge obtained in any sustainable forestry stewardship plan. Furthermore, fire brigade teams will be trained, a biomass inventory will be set up, and new income opportunities will be created in the Municipality of Colniza (both in terms of forest stewardship and in terms of the sustainable exploitation of non-wood products, e.g. fruits and essences).

The model proposed by this project includes its replication in areas with a potential to receive REDD projects. The central idea is to multiply preserved areas in the surrounding region adopting sustainable practices, converting the region into a model for sustainable development and with the benefits of the income arising from the reduction in emissions.

1.9 Project Location

Country: Brazil

State: Mato Grosso

Municipality: Colniza

Project boundary coordinates (meters; SAD69):

UTM 21

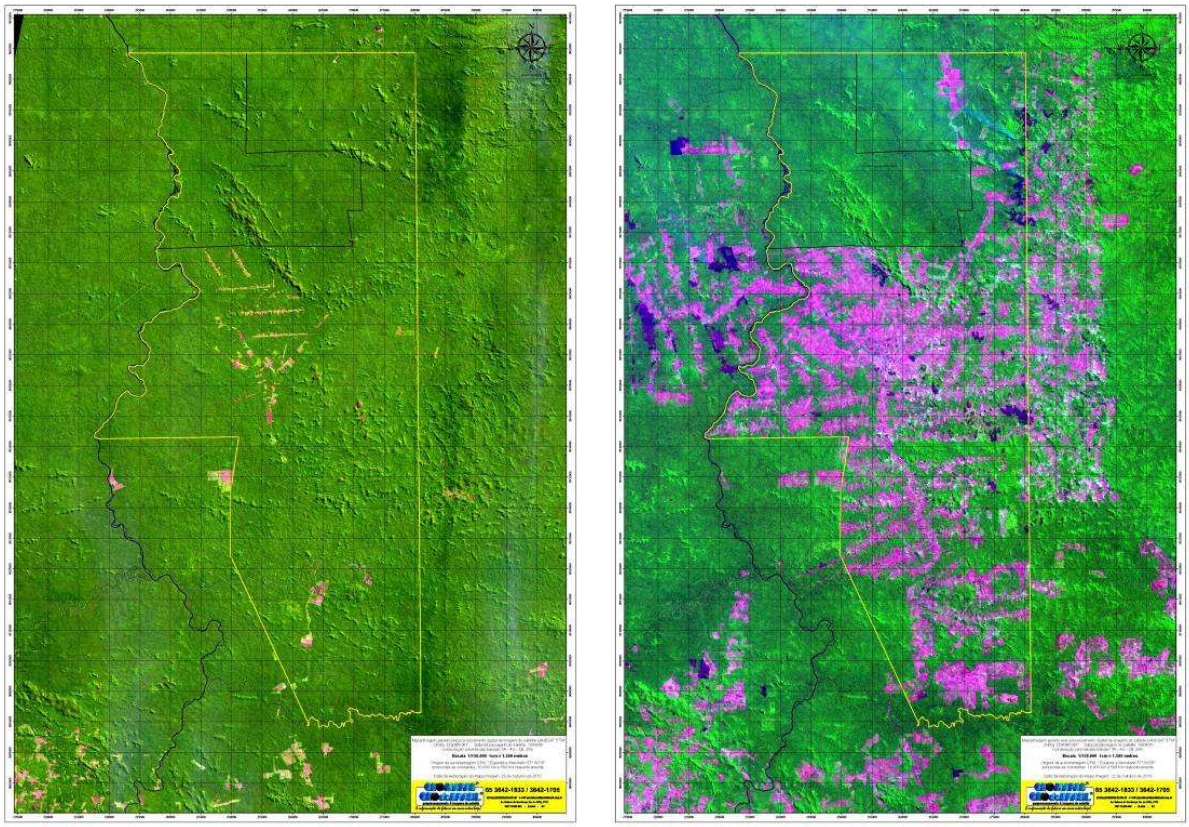
0237843	8972335
0233198	9004336
0252337	8987942
0271190	8988449

0269828 8972729

1.10 Conditions Prior to Project Initiation

This REDD project is proposed to be implemented in a region with a previous history of deforestation pressure: the landowner is requesting for carbon incentives to monitor project area and avoid unplanned deforestation.

As seen in Figure 7, the Project Area was entirely covered by native forest 15 years ago (satellite image from 1995), and this forest cover is still virtually intact (satellite image from 2010).



1995 **2010**

Figure 7. *Forest coverage in 1995 and 2010*

Forest land is expected to be converted to non-forest land in the baseline case. Landowner cannot afford efforts and costs to keep long-term vigilance of frontiers to avoid unplanned deforestation from uncontrolled invasions. In this context, the project falls within the category AFOLU – REDD - Avoiding unplanned deforestation and degradation (AUDD).

Context of deforestation in the State of Mato Grosso

The Brazilian Amazon region is under deforestation pressure. An estimated 17% of its original forest has already been lost. From 2000 to 2007, over 150,000 km² of forests have been destroyed in the region, equivalent to 3.7% of the entire Brazilian Legal Amazon (INPE, 2008).

Over these last 15 years, the State of Mato Grosso has shown high deforestation rates. This state answers for approx. 40% of the total deforestation within the Brazilian Amazon. This deforestation has generated total emissions of approx. 1 billion tons of carbon during the period (or 3.7 billion tons of CO_2), an average of 100 tons per year (or 370 million tons of CO_2), which is equivalent to some 10% of the total emissions worldwide due to deforestation from 1997 up to and including 2006 (ICV, 2008).

In the forest areas of Mato Grosso, deforestation usually represents 39% of the area of properties. Compared with the upper limit of 20% defined by Brazilian Forest Code, one finds a forest deficit of 19% over the area of properties. Pasture for cattle-raising uses approx. 233,000 km², which corresponds to 73% of the total area cleared in the State, whilst agriculture occupies approx. 88,000 km² (27% of the total) (ICV, 2008).

Characterization of deforestation drivers in Reference Area

As described in item "1.1 Summary Description of the Project" of this VCS-PD, the Reference Area is under deforestation pressure to logging as a source of budget for subsequent installation of pasture (cattle-raising) and coffee cultivation.

As the first deforestation step, forest clear-cutting and logging are carried out, and approximately 100 m^3 of merchantable timber is obtained in this initial operation. It is estimated that 30% of this timber is subsequently converted in long-term wood products, which were considered as a significant carbon pool in this project.

The non-merchantable timber that remains in the field is usually accumulated and burnt (Figure 8) prior to installation of pasture or coffee crops. Most of carbon emissions from baseline activities occur during this operation. After burning the remnant forest biomass, the land is virtually clear and ready to host agriculture and pasture.

According to IBGE (2009), the city of Colniza has 12,426 hectares occupied with coffee cultivation, which represents about 4% of total municipality area. For calculation purposes, it is conservatively assumed that 10% of the Reference Area is covered with coffee crops. The remaining 90% of land use is conservatively considered as pasture for cattle-raising.

The IPCC (2006) mentions a conservative carbon pool in pasture lands of 15 tCO_2/ha. For coffee crops, one of the most conservative carbon pool estimates registered in the literature is mentioned by DOSSA et al. (2008), which reported 84 tCO_2/ha. These post-deforestation carbon pools were considered for calculating the difference in carbon stocks between Project Scenario and Baseline Scenario in this VCS-PD.

Figure 8. *Non-merchantable timber is accumulated and burnt in the field after extraction of merchantable logs, preceding installation of pasture. Fire in the background is outside the project boundary*

For conservativeness purposes, it is considered that pasture and coffee crops are cultivated using the natural fertility of recently forested soils, without application of nitrogen fertilizers. Thus, the calculation of baseline emissions in the Reference Area does not account for N_2O emissions from nitrogen fertilization of soils. Moreover, for conservativeness purposes, project proponents decided not to account soil carbon pool and litter carbon pool in FSM-REDD Project benefits.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Brazilian Forest Code has the following definitions:

"III – Legal Reserve (LR): area located inside a rural estate, excluding the Area of Permanent Preservation, necessary to sustainable use of natural resources, to conservation and re-habilitation of ecological processes, to conservation of biodiversity and to shelter and protection of native fauna and flora.

VI – Legal Amazon: the States of Acre, Pará, Amazonas, Roraima, Rondônia, Amapá and Mato Grosso, and the regions located to the North of parallel 13^{o} S, in States of Tocantins and Goiás, and to the West of meridian 44^{o} W, of the State of Maranhão. See Figure 9.

Figure 9. *Brazilian Legal Amazon: Legal Amazon States: Acre (AC), Amapá (AP), Amazonas (AM), Maranhão (MA), Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Tocantins (TO) (ancient North of Goiás). Source: Leal et al. (1990)*

The Legal Reserve (LR) must be registered in property deed in the Real Estate Registry Office: its location must be publicly known, and future landowners must know where it is located, its boundaries and frontiers. The LR can be located anywhere inside a rural estate. Brazilian Forest Code determines that, once allocated, LR may not be changed even in cases of real estate transfer, land dismembering or area rectification.

The LR allocation is a pre-requirement to obtaining permission to exploitation of the native vegetation existing inside the rural estate. In order to obtain this Permit for Forestry Stewardship, the landowner must previously register the location of the LR in land property documents through the Real Estate Registry Office, before suppressing any kind of native vegetation.

According to Provisory Measure No. 2166-67 (*Medida Provisória* nº 2.166-67) of August 24, 2001:

> "Article 16. The forests and other types of native vegetation, excepting those located in Areas of Permanent Preservation, as well as those not subject to the politics of

> restricted use or subject to specific legislation, are susceptible to suppression, as long as a portion of vegetation is preserved, as Legal Reserve, at a minimum:
>
> I – eighty percent (80%), in rural estates located in forest zones located in the Legal Amazon."

Thus, in compliance with Brazilian Forest Code, the FSM estate has officially allocated 80% of its total area as LR, as indicated in Figure 10.

In the Reference Area, although 80% of native vegetation in land properties must be preserved as LR, there is a general non-compliance with Brazilian Forest Code, as 42.7% of native vegetation has already been suppressed (i.e. there is a deficit of 22.7% of native forest that should not have been suppressed in the Reference Area).

In spite of the legal provisions intended to preserve at least 80% of the Amazon Forest coverage, lack of law enforcement by local authorities along with public policies seeking to increase commodities production and encourage land use for agricultural, bio energy and cattle breeding purposes created a scenario of complete disregard of the mandatory provisions of the Forest Code. High rates of criminality associated with land disputes usually jeopardize efforts concerning law enforcement improvement. In addition to that, to cover vast distances of areas with low demographic density makes tracking of illegal activities and land surveillance very difficult for the authorities. Accordingly, policies implemented to address illegal deforestation only by means of command and control approaches have proven to be ineffective so far[8].

Given the permanent attempts against the Project Area, FSM uses its best efforts to prevent property invasion and to remain in compliance with Brazilian Forest Code. The FSM estate holds sustainable logging activities in LR area. These activities are carried out according to a Sustainable Forest Stewardship Plan previously approved by the SEMA/MT. This management plan was conceived in accordance with Brazilian Forest Code and local regulation (Figure 10). As previously shown in Figure 6, the FSM holds the greatest Sustainable Forest Stewardship Plan approved in the State of Mato Grosso.

[8] REDD no Brasil: um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. – Brasília, DF: Centro de Gestão e Estudos Estratégicos, 2011, pages 31 and 34-35.

A

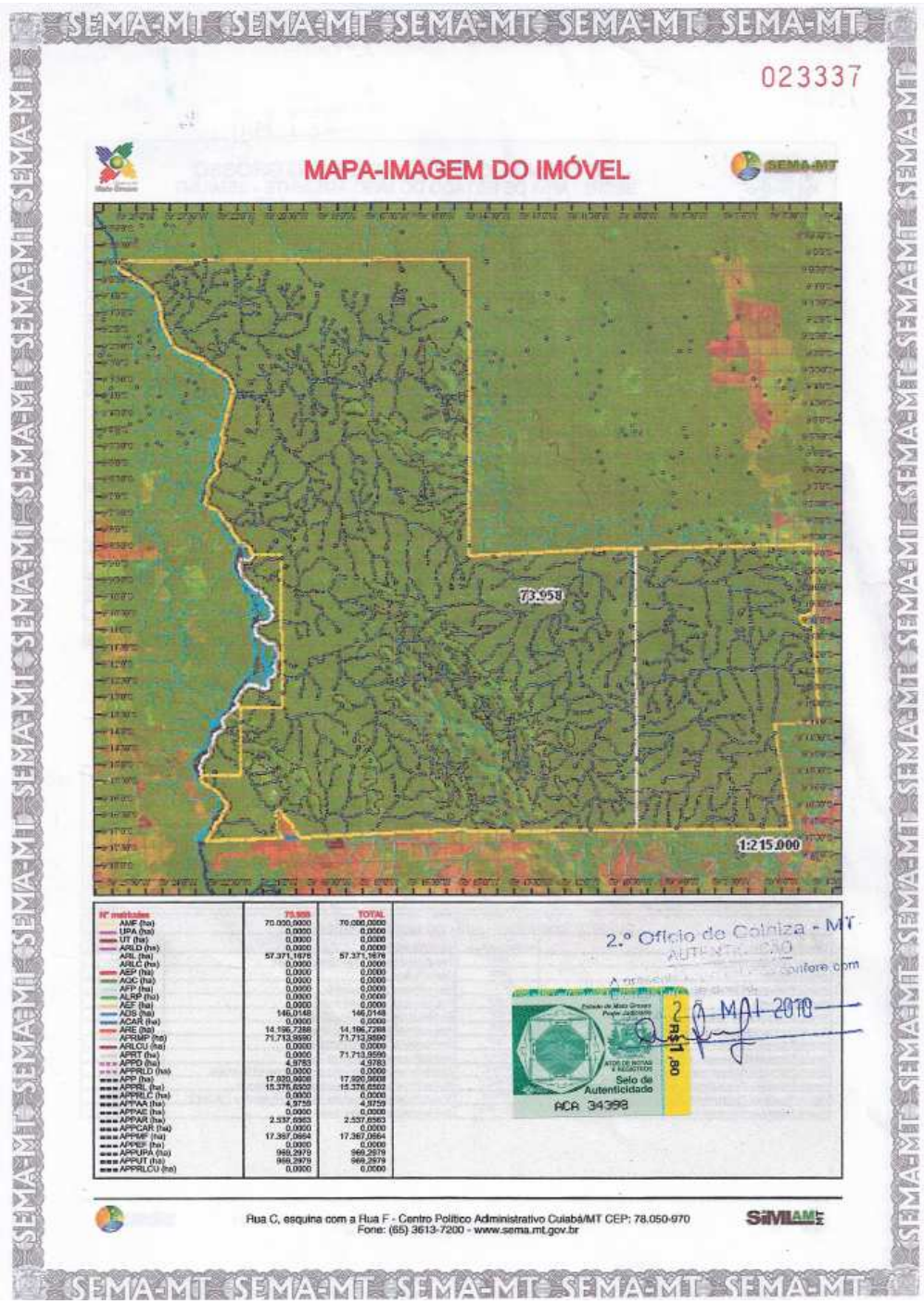
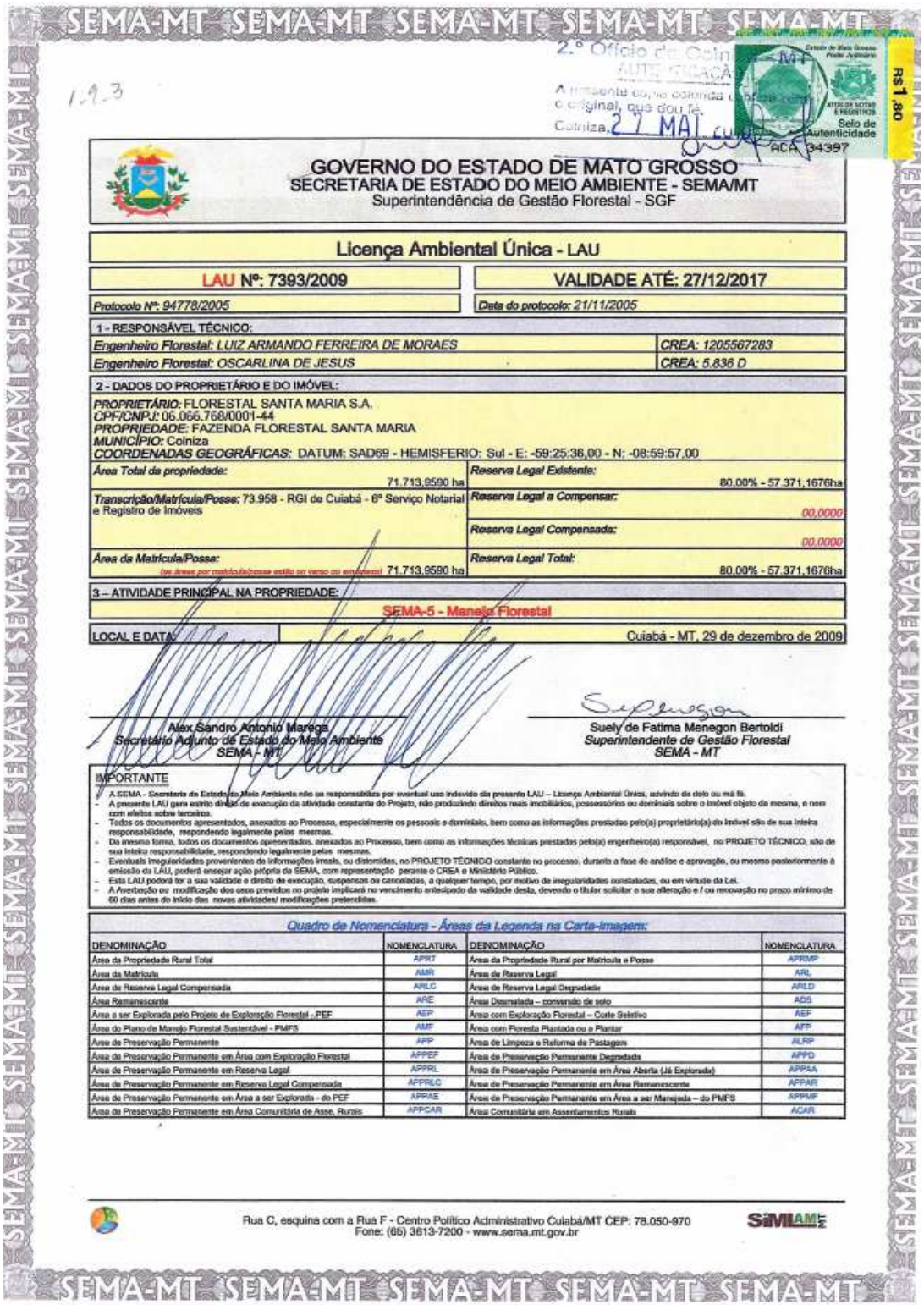


Figure 10. ***A***. *LAU (Single Environmental Licence) issued for the FSM Farm …. (part 1)*



SEMA-MT SEMA-MT SEMA-MT SEMA-MT SEMA-MT

1.9.3

2.º Ofício de Colniza - MT
AUTENTICAÇÃO
A presente cópia confere com o original, que dou fé.
Colniza, 27 MAI
ACA 34397
Selo de Autenticidade
R$ 1,80

GOVERNO DO ESTADO DE MATO GROSSO
SECRETARIA DE ESTADO DO MEIO AMBIENTE - SEMA/MT
Superintendência de Gestão Florestal - SGF

Licença Ambiental Única - LAU

LAU Nº: 7393/2009	VALIDADE ATÉ: 27/12/2017
Protocolo Nº: 94778/2005	*Data do protocolo: 21/11/2005*

1 - RESPONSÁVEL TÉCNICO:

Engenheiro Florestal: LUIZ ARMANDO FERREIRA DE MORAES	*CREA:* 1205567283
Engenheiro Florestal: OSCARLINA DE JESUS	*CREA:* 5.836 D

2 - DADOS DO PROPRIETÁRIO E DO IMÓVEL:

PROPRIETÁRIO: FLORESTAL SANTA MARIA S.A.
CPF/CNPJ: 06.066.768/0001-44
PROPRIEDADE: FAZENDA FLORESTAL SANTA MARIA
MUNICÍPIO: Colniza
COORDENADAS GEOGRÁFICAS: DATUM: SAD69 - HEMISFERIO: Sul - E: -59:25:36,00 - N: -08:59:57,00

Área Total da propriedade: 71.713,9590 ha	*Reserva Legal Existente:* 80,00% - 57.371,1676ha
Transcrição/Matrícula/Posse: 73.958 - RGI de Cuiabá - 6º Serviço Notarial e Registro de Imóveis	*Reserva Legal a Compensar:* 00,0000
	Reserva Legal Compensada: 00,0000
Área da Matrícula/Posse: (as áreas por matrícula/posse estão no verso ou em anexo) 71.713,9590 ha	*Reserva Legal Total:* 80,00% - 57.371,1676ha

3 – ATIVIDADE PRINCIPAL NA PROPRIEDADE:
SEMA-5 - Manejo Florestal

LOCAL E DATA: Cuiabá - MT, 29 de dezembro de 2009

Alex Sandro Antonio Marega
Secretário Adjunto de Estado do Meio Ambiente
SEMA - MT

Suely de Fatima Menegon Bertoldi
Superintendente de Gestão Florestal
SEMA - MT

IMPORTANTE
- A SEMA - Secretaria de Estado do Meio Ambiente não se responsabiliza por eventual uso indevido da presente LAU – Licença Ambiental Única, advindo de dolo ou má fé.
- A presente LAU gera mero direito de execução da atividade constante do Projeto, não produzindo direitos reais imobiliários, possessórios ou dominiais sobre o imóvel objeto da mesma, e nem com efeitos sobre terceiros.
- Todos os documentos apresentados, anexados ao Processo, especialmente os pessoais e dominiais, bem como as informações prestadas pelo(a) proprietário(a) do imóvel são de sua inteira responsabilidade, respondendo legalmente pelas mesmas.
- Da mesma forma, todos os documentos apresentados, anexados ao Processo, bem como as informações técnicas prestadas pelo(a) engenheiro(a) responsável, no PROJETO TÉCNICO, são de sua inteira responsabilidade, respondendo legalmente pelas mesmas.
- Eventuais irregularidades provenientes de informações inverídicas, ou distorcidas, no PROJETO TÉCNICO constante no processo, durante a fase de análise e aprovação, ou mesmo posteriormente à emissão da LAU, poderá ensejar ação própria da SEMA, com representação perante o CREA e Ministério Público.
- Esta LAU poderá ter a sua validade e direito de execução, suspensos ou cancelados, a qualquer tempo, por motivo de irregularidades constatadas, ou em virtude da Lei.
- A Averbação ou modificação dos usos previstos no projeto implicará no vencimento antecipado da validade desta, devendo o titular solicitar a sua alteração e / ou renovação no prazo mínimo de 60 dias antes do início das novas atividades/ modificações pretendidas.

Quadro de Nomenclatura - Áreas da Legenda na Carta-Imagem:

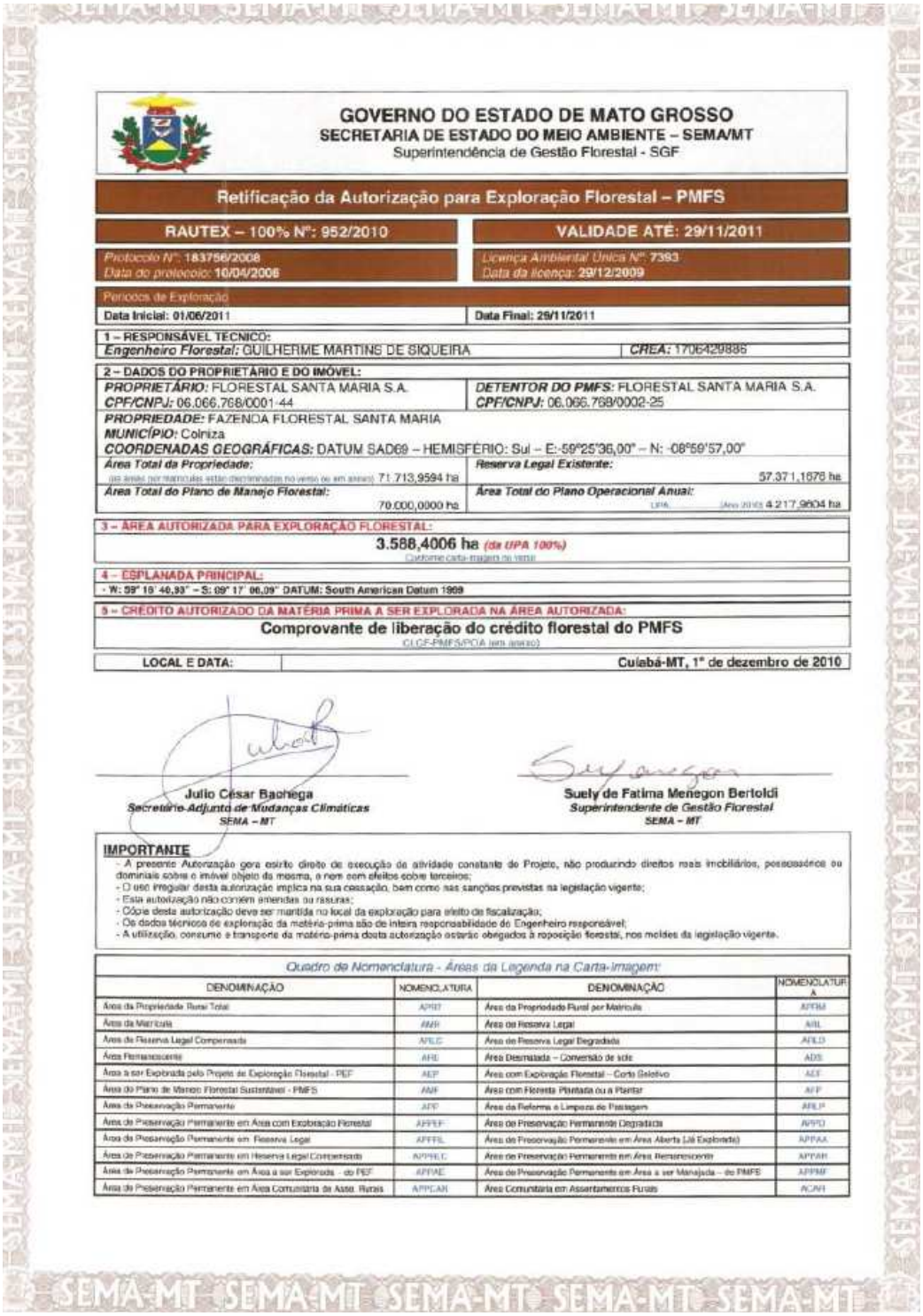
DENOMINAÇÃO	NOMENCLATURA	DENOMINAÇÃO	NOMENCLATURA
Área da Propriedade Rural Total	APRT	Área da Propriedade Rural por Matrícula e Posse	APRMP
Área da Matrícula	AMR	Área de Reserva Legal	ARL
Área de Reserva Legal Compensada	ARLC	Área de Reserva Legal Degradada	ARLD
Área Remanescente	ARE	Área Desmatada – conversão de solo	ADS
Área a ser Explorada pelo Projeto de Exploração Florestal - PEF	AEP	Área com Exploração Florestal – Corte Seletivo	AEF
Área do Plano de Manejo Florestal Sustentável - PMFS	AMF	Área com Floresta Plantada ou a Plantar	AFP
Área de Preservação Permanente	APP	Área de Limpeza e Reforma de Pastagem	ALRP
Área de Preservação Permanente em Área com Exploração Florestal	APPEF	Área de Preservação Permanente Degradada	APPD
Área de Preservação Permanente em Reserva Legal	APPRL	Área de Preservação Permanente em Área Aberta (Já Explorada)	APPAA
Área de Preservação Permanente em Reserva Legal Compensada	APPRLC	Área de Preservação Permanente em Área Remanescente	APPAR
Área de Preservação Permanente em Área a ser Explorada - do PEF	APPAE	Área de Preservação Permanente em Área a ser Manejada – do PMFS	APPMF
Área de Preservação Permanente em Área Comunitária de Asse. Rurais	APPCAR	Área Comunitária em Assentamentos Rurais	ACAR

Rua C, esquina com a Rua F - Centro Político Administrativo Cuiabá/MT CEP: 78.050-970
Fone: (65) 3613-7200 - www.sema.mt.gov.br

SEMA-MT SEMA-MT SEMA-MT SEMA-MT SEMA-MT

Figure 10. ***A***. *LAU (Single Environmental Licence) issued for the FSM Farm …. (part 2)*

B



GOVERNO DO ESTADO DE MATO GROSSO
SECRETARIA DE ESTADO DO MEIO AMBIENTE – SEMA/MT
Superintendência de Gestão Florestal - SGF

Retificação da Autorização para Exploração Florestal – PMFS

RAUTEX – 100% Nº: 952/2010	VALIDADE ATÉ: 29/11/2011
Protocolo Nº: 183756/2008 Data do protocolo: 10/04/2008	Licença Ambiental Única Nº: 7393 Data da licença: 29/12/2009

Períodos de Exploração

Data Inicial: 01/06/2011	Data Final: 29/11/2011

1 – RESPONSÁVEL TÉCNICO:
Engenheiro Florestal: GUILHERME MARTINS DE SIQUEIRA — *CREA:* 1706429886

2 – DADOS DO PROPRIETÁRIO E DO IMÓVEL:

PROPRIETÁRIO: FLORESTAL SANTA MARIA S.A. *CPF/CNPJ:* 06.066.768/0001-44	*DETENTOR DO PMFS:* FLORESTAL SANTA MARIA S.A. *CPF/CNPJ:* 06.066.768/0002-25

PROPRIEDADE: FAZENDA FLORESTAL SANTA MARIA
MUNICÍPIO: Colniza
COORDENADAS GEOGRÁFICAS: DATUM SAD69 – HEMISFÉRIO: Sul – E:-59°25'36,00" – N: -08°59'57,00"

Área Total da Propriedade: (as áreas por matrículas estão discriminadas no verso ou em anexo) 71.713,9594 ha	*Reserva Legal Existente:* 57.371,1676 ha
Área Total do Plano de Manejo Florestal: 70.000,0000 ha	*Área Total do Plano Operacional Anual:* UPA ____ (Ano 2010) 4.217,9604 ha

3 – ÁREA AUTORIZADA PARA EXPLORAÇÃO FLORESTAL:
3.588,4006 ha *(da UPA 100%)*
Conforme carta-imagem no verso

4 – ESPLANADA PRINCIPAL:
- W: 59° 19' 46,93" – S: 09° 17' 06,09" DATUM: South American Datum 1969

5 – CRÉDITO AUTORIZADO DA MATÉRIA PRIMA A SER EXPLORADA NA ÁREA AUTORIZADA:
Comprovante de liberação do crédito florestal do PMFS
CLCF-PMFS/PCA (em anexo)

LOCAL E DATA:	Cuiabá-MT, 1º de dezembro de 2010

Julio César Bachega
Secretário Adjunto de Mudanças Climáticas
SEMA – MT

Suely de Fatima Menegon Bertoldi
Superintendente de Gestão Florestal
SEMA – MT

IMPORTANTE
- A presente Autorização gera apenas direito de execução de atividade constante de Projeto, não produzindo direitos reais imobiliários, possessórios ou dominiais sobre o imóvel objeto da mesma, e nem com efeitos sobre terceiros;
- O uso irregular desta autorização implica na sua cassação, bem como nas sanções previstas na legislação vigente;
- Esta autorização não contém emendas ou rasuras;
- Cópia desta autorização deve ser mantida no local da exploração para efeito de fiscalização;
- Os dados técnicos de exploração da matéria-prima são de inteira responsabilidade do Engenheiro responsável;
- A utilização, consumo e transporte da matéria-prima desta autorização estarão obrigados à reposição florestal, nos moldes da legislação vigente.

Quadro de Nomenclatura - Áreas da Legenda na Carta-Imagem:

DENOMINAÇÃO	NOMENCLATURA	DENOMINAÇÃO	NOMENCLATURA
Área da Propriedade Rural Total	APRT	Área da Propriedade Rural per Matrícula	APRM
Área da Matrícula	AMR	Área de Reserva Legal	ARL
Área de Reserva Legal Compensada	ARLC	Área de Reserva Legal Degradada	ARLD
Área Remanescente	ARE	Área Desmatada – Conversão de solo	ADS
Área a ser Explorada pelo Projeto de Exploração Florestal - PEF	AEP	Área com Exploração Florestal - Corte Seletivo	AEF
Área do Plano de Manejo Florestal Sustentável - PMFS	AMF	Área com Floresta Plantada ou a Plantar	AFP
Área de Preservação Permanente	APP	Área de Reforma e Limpeza de Pastagem	ARLP
Área de Preservação Permanente em Área com Exploração Florestal	APPEF	Área de Preservação Permanente Degradada	APPD
Área de Preservação Permanente em Reserva Legal	APPRL	Área de Preservação Permanente em Área Aberta (Já Explorada)	APPAA
Área de Preservação Permanente em Reserva Legal Compensada	APPRLC	Área de Preservação Permanente em Área Remanescente	APPAR
Área de Preservação Permanente em Área a ser Explorada - do PEF	APPAE	Área de Preservação Permanente em Área a ser Manejada – do PMFS	APPMF
Área de Preservação Permanente em Área Comunitária de Assent. Rurais	APPCAR	Área Comunitária em Assentamentos Rurais	ACAR

SEMA-MT SEMA-MT SEMA-MT SEMA-MT SEMA-MT

Figure 10. ***B***. *Example of AUTEX (Authorization for Forest Exploitation) issued by SEMA through previous approval of a Forest Stewardship Plan in FSM estate …. (part 3)*

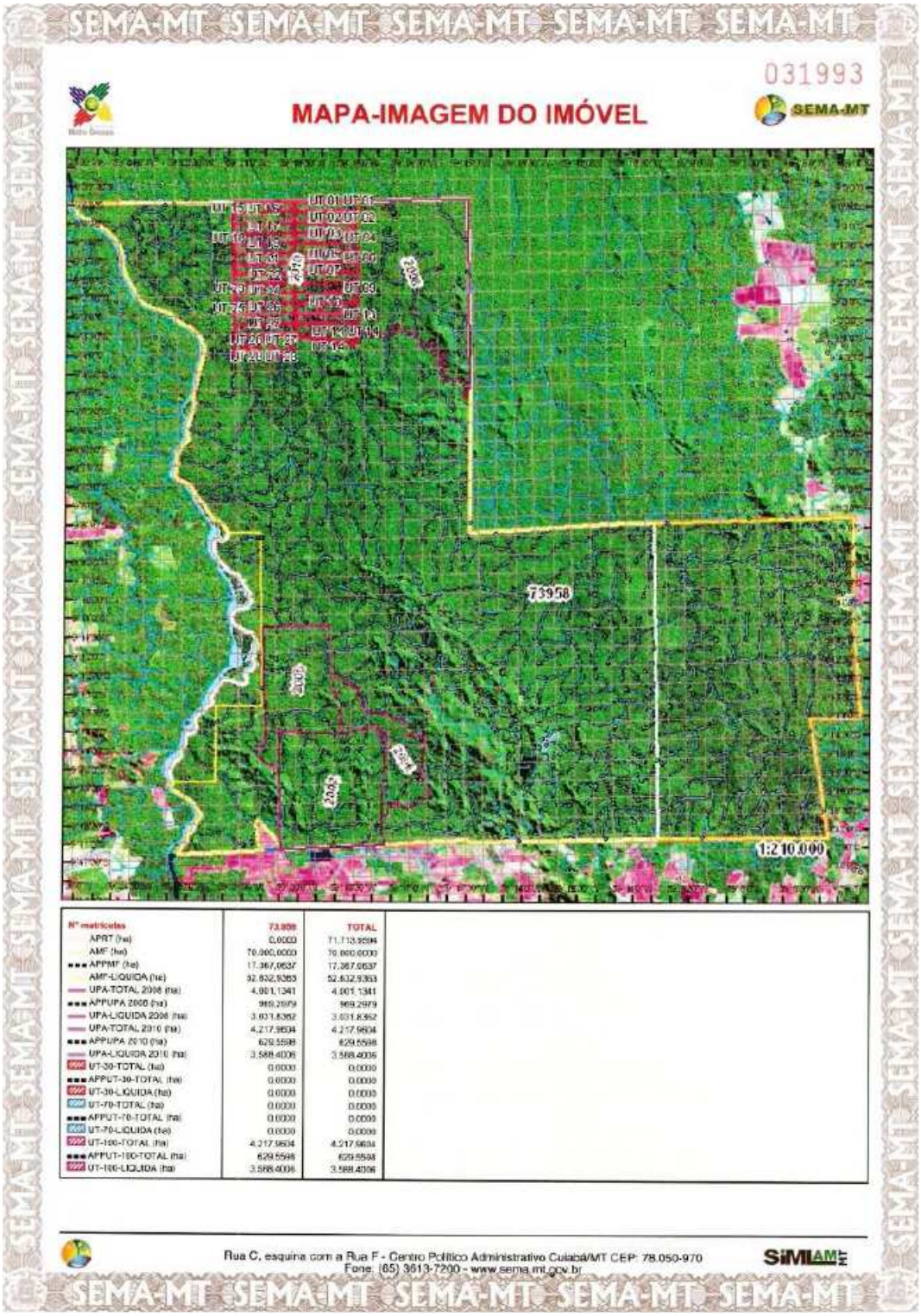


Figure 10. ***B***. *Example of AUTEX (Authorization for Forest Exploitation) issued by SEMA through previous approval of a Forest Stewardship Plan in FSM estate …. (part 4)*

2.º Ofício de Colniza
AUTENTICAÇÃO
A presente cópia confere com o original, que devolvi.
Colniza, 27 MAI 2010
Selo de Autenticidade 14195
R$1,80

GOVERNO DO ESTADO DE MATO GROSSO
SECRETARIA DE ESTADO DO MEIO AMBIENTE - SEMA/MT
Superintendência de Gestão Florestal - SGF

Comprovante de Liberação de Crédito Florestal - PMFS

AUTEX100% Nº: 952/2010 | **Referente ao PMFS**

Protocolo Nº: 183756/2008 | *Data do protocolo: 10/04/2008*

1 - RESPONSÁVEL TÉCNICO:

Engenheiro Florestal: GUILHERME MARTINS DE SIQUEIRA — ***CREA*** 1706429886

2 - DADOS DO PROPRIETÁRIO E DO IMÓVEL:

Proprietário: FLORESTAL SANTA MARIA S.A. — ***Detentor do PMFS:*** FLORESTAL SANTA MARIA S.A.

Propriedade: FAZENDA FLORESTAL SANTA MARIA.
Município: Colniza

Área Total da Propriedade: 71713,9594 ha — ***Área Líquida da UPA/POA:*** 3.588,4006 ha

3 – QUANTIFICAÇÃO DE MADEIRA PARA SERRARIA – Autorizado no POA - 100%/PMFS

Nº	ESPÉCIES FLORESTAIS DO PMFS		VOLUME (m³) por	
	NOME CIENTÍFICO	NOME POPULAR	hectare	UPA liquida
1	*Parkia sp*	Angelim-saia	0,4908	1761,2614
2	*Pouteria sp*	Abiu	1,1336	4067,6874
3	*Pouteria sp*	Abiurana	0,3441	1234,6665
4	*Chrysophyllum sp*	Amapá	1,5402	5526,7502
5	*Trattinickia sp*	Amescla	0,6264	2247,8069
6	*Hymenolobium sp*	Angelim	1,3360	4794,2076
7	*Parkia sp*	Bajão	0,6076	2180,1903
8	*Simarouba amara*	Caixeta	0,6014	2158,1905
9	*Anacardium sp*	Cajú-da-mata	0,0451	161,8022
10	*Vochysia sp*	Cambará	0,1560	559,7035
11	*Ocotea sp*	Canela	0,2610	936,5837
12	*Euplassa sp.*	Carne-de-vaca	0,2769	993,5814
13	*Jacaranda copaia*	Caroba	0,1323	474,6420
14	*Qualea sp*	Catuaba	0,0816	292,7505
15	*Castilla sp*	Caucho	0,5005	1796,1638
16	*Cedrela odorata*	Cedro-rosa	0,1561	560,1282
17	*Sterculia sp*	Chichá	0,0699	250,9203
18	*Dipteryx sp*	Cumaru	0,4607	1653,0016
19	*Goupia glabra*	Cupiúba	0,66	2368,5134
20	*Vatairea sp*	Fava-bolacha	0,3405	1221,8884
21	*Enterolobium sp*	Fava-orelha-de-macaco	0,2012	721,9207
22	*Pterodon pubescens*	Faveiro	0,6449	2314,1232
23	*Cordia goeldiana*	Freijó	0,1682	603,4391
24	*Apuleia sp*	Garapeira	0,2329	835,7342
25	*Tabebuia sp*	Ipê	2,0680	7420,8791
26	*Hymenaea sp*	Jatobá	1,3049	4682,5468
27	*Mezilaurus itauba*	Itaúba	0,2983	1070,3594
28	*Cariniana sp*	Jequitibá	3,2085	11513,2269
29	*Manilkara sp*	Maçaranduba	1,2456	4469,7543
30	*Eschweilera sp*	Mata-matá	0,6547	2349,1694
31	*Buchenavia sp*	Mirindiba	0,6966	2499,7543
32	*Trattinickia sp*	Morcegueira	0,1239	444,4281
33	*Astronium sp*	Muiracatiara	1,6373	5875,1265
34	*Clarisia racemosa*	Oiticica	0,8871	3183,2187

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SIMLAM MT
1/2

Figure 10. ***B***. *Example of AUTEX (Authorization for Forest Exploitation) issued by SEMA through previous approval of a Forest Stewardship Plan in FSM estate …. (part 5)*

GOVERNO DO ESTADO DE MATO GROSSO
SECRETARIA DE ESTADO DO MEIO AMBIENTE - SEMA/MT
Superintendência de Gestão Florestal - SGF

35	*Manilkara sp*	Parajú	0,2344	841,2362
36	*Pterocarpus sp*	Pau-sangue	0,3326	1193,4294
37	*Caryocar villosum*	Pequiá	0,7541	2706,0421
38	*Aspidosperma sp*	Peroba	0,1732	621,41
39	*Peltogyne catingae Ducke*	Roxinho	0,3387	1215,4936
40	*Couma sp*	Sorveira	0,0602	216,1877
41	*Diplotropis sp*	Sucupira	0,1457	522,7770
42	*Martiodendron sp*	Tamarindo	0,0957	343,5016
43	*Enterolobium contortisiliquum*	Tamboril	0,2763	991,5342
44	*Couratari sp*	Tauari	2,8472	10216,7237
45	*Ormosia sp*	Tento	0,1465	525,7923
46	*Virola sp*	Ucuúba	0,5736	2058,3422
		TOTAL DE VOLUME AUTORIZADO	29,1710	104676,5905

5 – OBSERVAÇÕES:
Sem informação

LOCAL E DATA: Cuiabá - MT, 28 de abril de 2010

Suely de Fatima Menegon Bertoldi
Superintendente de Gestão Florestal
SEMA - MT

IMPORTANTE
- Todos os dados neste documento foram obtidos da transcrição fiel do Plano de Manejo Florestal Sustentável – PMFS, que é de inteira responsabilidade do Responsável Técnico citado no item 1 desse documento.

2.º Ofício de Colniza - MT
AUTENTICAÇÃO
A presente cópia colorida confere com o original, que dou fé.
Colniza, 27 MAI 2010
Estado de Mato Grosso – Poder Judiciário
Selo de Autenticidade
ACD 14196
R$ 1,80

Rua C, esquina com a Rua F - Centro Político Administrativo Cuiabá/MT CEP: 78.050-970
Fone: (65) 3613-7200 - www.sema.mt.gov.br
SIMLAM MT
2/2

Figure 10. ***A***. *LAU (Single Environmental Licence) issued for the FSM Farm.* ***B***. *Example of AUTEX (Authorization for Forest Exploitation) issued by SEMA through previous approval of a Forest Stewardship Plan in FSM estate. (final part)*

1.12 Ownership and Other Programs

1.12.1 Proof of Title

Ownership Succession (*Cadeia Sucessória*) is illustrated in the Certificate issued by the Real Estate Registry Office (*Cartório de Registro Geral de Imóveis*), of the Sixth Office (*Sexto Ofício*), 3rd Circumscription (*3ª Circunscrição*), of the Municipalities of Aripuanã and Juina, on April 25, 1993 (as follows).

INSTITUTO NACIONAL DE COLONIZAÇÃO E REFORMA AGRÁRIA - INCRA
COMISSÃO ESPECIAL DE DISCRIMINAÇÃO DE TERRAS DEVOLUTAS

CSI

CADEIA SUCESSÓRIA DE IMÓVEIS

CR/CE: PROJETO FUNDIÁRIO: SR-13/R
DENOMINAÇÃO DO IMÓVEL: GLEBA COLNIZA
MUNICÍPIO: ARIPUANÃ — UF:

TRANSMITENTE	ADQUIRENTE	ÁREA (ha)	MATRÍCULA OU REGISTRO ANTERIOR Nº.	MATRÍCULA OU REGISTRO ATUAL Nº.	LIVRO	FOLHAS	DATA	FORMA DE TRANSMISSÃO	CARTÓRIO DE REGISTRO DE IMÓVEIS
ESCOL-COMPANHIA AGRÍCOLA E COMERCIAL	G.LUNARDELLI S/A AGRICULTURA,COMÉRCIO E COLONIZAÇÃO	47.500,0000	30.724 R-3	48.417 R-1	2-HF	200	19.04.93	E.P DE DIVISÃO C/EXTINÇÃO DE CONDOMÍNIO, EM, 25.03.93.	6ºOF.CUIABÁ
MAT.Nº 1.130/R-1	ESCOL-COMPANHIA AGRÍCOLA E COMERCIAL E G. LUNARDELLI S/A - AGRICULTURA,COMÉRCIO E COLONIZAÇÃO	95.000,0000	1.130	30.724	2-DE	90	25.08.87	E.P DE DIVISÃO C/EXTINÇÃO DE CONDOMÍNIO, ATRIBUIÇÕES E QUINHÕES E OUTRAS AVENÇAS.	6ºOF.CUIABÁ
COLNIZA-COLONIZAÇÃO, COM.E IND.LTDA	G.LUNARDELLI S/A -AGRICULTURA,COMÉRCIO E COLONIZAÇÃO E ESCOL COMPANHIA AGRÍCOLA E COMÉRCIO.	175.000,0000	2.355	1.130	2	-	14.10.76	ABERTURA DE MAT.	6ºOF.CUIABÁ
COMPANHIA DE DESENVOLVIMENTO DO ESTADO DE MATO GROSSO-CODEMAT	COLNIZA-COLONIZAÇÃO COM. E IND.LTDA	400.000,0000	825	2.355	3-C	119	10.01.75	EPCV,EM,09.11.75	6ºOF.CUIABÁ
O ESTADO DE MT	COMPANHIA DE DESENVOLVIMENTO DO ESTADO DE MATO GROSSO-CODEMAT	2.000.000,0000		825	3-A	172	27.06.73	ESC.PÚB.DE TRANSFERÊNCIA DE DOMÍNIO,EM,05.06.73	6ºOF.CUIABÁ

Engº. Agrônomo / INCRA
Chefe da SR - 13/R
Portaria Nº. 78/97
18-02-98

Figure 11. *Documents of proof of title for the FSM farm …. (part 1)*

TABELIONATO ASSIS 6º

COMARCA DE CUIABÁ - ESTADO DE MATO GROSSO
REGISTRO GERAL DE IMÓVEIS
3ª CIRCUNSCRIÇÃO
(Cuiabá) - Setor 03
6º Serviço Notarial e Registro de Imóveis
Av. Tancredo Neves, 250 - Bairro Jardim Kennedy - Fone: (65) 3051-5300 - Fax: (65) 3051-5333
Joani Maria de Assis Asckar
Oficial do Registro de Imóveis
José Pires Miranda de Assis
Substituto

= C E R T I D Ã O =

C E R T I F I C O a pedido verbal de pessoa interessada, que revendo neste Serviço Notarial e Registral, os livros de Registros de Imóveis desta Circunscrição, deles constatei que: **FLORESTAL SANTA MARIA S/A, é proprietária do imóvel com a área total de 71.713,959031 ha., perímetro 148.571,62m, denominada "FAZENDA FLORESTAL SANTA MARIA", na "GLEBA LUNARDELLI", no Município de COLNIZA-MT., outrora ARIPUANÃ-MT.**, (COM TERMO DO IBAMA e FEMA) havido por Integralização de Capital Social da G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO, COLONIZAÇÃO, conforme requerimento datado de 14/02/2005 e apresentação da Ata da Assembléia Geral de Constituição, juntamente com o Laudo de Avaliação (Anexo I e II), datados de 22/12/2003, registrados na Junta Comercial do Estado de São Paulo – JUCESP, sob nº 35300312627, aos 09/01/2004 e na Junta Comercial do Estado de Mato Grosso – JUCEMAT, aos 12/03/2004, sob nº 51900228964, devidamente registrado sob nº 05 da matrícula nº 73.958, do livro 2-NQ, em 02 de Junho de 2005, e requerimento da proprietária, memorial descritivo, datado de 26/07/2004, averbado à margem da referida matrícula, em 02/06/2005, ambos neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/

G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO, COLONIZAÇÃO, adquiriu o imóvel com a área total de **70.000 ha.**, denominada "FAZENDA FLORESTAL SANTA MARIA", na "GLEBA LUNARDELLI", conforme Escritura Pública de Remembramento, lavrada às fls. 076/079, do livro 555, aos 10/07/2002, nestas notas, devidamente matriculado sob nº 73.958, do livro 2-NQ, em 17 de Julho de 2002, neste RI.x/x/x/x/x/x/

G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO, COLONIZAÇÃO, adquiriu uma área de terras com **22.500 ha.**, com a denominação de "G.

Continua no verso...

E-mail: 6_oficio@terra.com.br

Figure 11. *Documents of proof of title for the FSM farm …. (part 2)*

LUNARDELLI NORTE", parte desmembrada da área maior de 45.000 ha., conforme Escritura Pública de divisão com Extinção de Condomínio, lavrada às fls. 053/056, do livro 228, em 25/03/1993, nestas notas, registrado sob nº 01 da matrícula nº 48.415, do livro 2-HF, em 19 de Abril de 1993, **e matriculado sob nº 73.958, do livro 2-NQ, aos 17 de Julho de 2002**, ambos neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/

G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO E EXPORTAÇÃO e FAZENDAS FLORITA DULCE S/A – AGRICULTURA E COMÉRCIO, adquiriram uma área de terras com **45.000 ha.**, denominada "QUINHÃO Nº 02", conforme Escritura Pública de Divisão com Extinção de Condomínio, Atribuições e Quinhões Certos e Outras Avenças, lavrada às fls. 015/019, do livro 154, em 12/08/1987, nestas notas, registrado sob nº 03 da matrícula nº 30.723, do livro 2-DE, em 25 de Agosto de 1987, neste RI.x/x/x/x/x/x/x/x/x/x/x

G. LUNARDELLI S/A - AGRICULTURA, COMÉRCIO E EXPORTAÇÃO e FAZENDAS FLORITA DULCE S/A, AGRICULTURA E COMÉRCIO, adquiriram uma fração ideal de 11,25%, do imóvel rural com 400.000 ha, constituído pelas Glebas "1-A e 1-C", equivalente, essa fração de 11,25% à 45.000 ha., da área total do dito imóvel rural; 45.000 ha, esses que na planta do projeto Colniza são localizados nos lotes 744, 745, 746, 747 e 748, 806, 809 e 812; que é de 1.000 hectares a área de cada um dos lotes 744, 745, 746, 747 e 748, é de 10.000 ha., a área de cada um dos lotes 806, 807, 809 e 812, havido da COLNIZA–COLONIZAÇÃO, COMÉRCIAL E INDÚSTRIA LTDA, conforme Escritura Pública de Venda e Compra, lavrada às fls. 52, livro nº 413, em 14/11/1975, nas notas do 26º Cartório de São Paulo, registrado sob nº 01 da matrícula nº 41, livro 02, em 29 de Janeiro de 1976, e Escritura Pública de Re-Ratificação e Transação lavrada às fls. 035/041, livro nº 08 em 02/02/1982, nestas notas e averbada à margem da referida matrícula, em 15 de Março de 1982, **e matriculado sob nº 30.723, livro 2-DE, em 25/08/1987**, todos neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/xx/x/x/x/x/x/x/x/x

G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO, COLONIZAÇÃO anteriormente denominada G. LUNARDELLI S/A., AGRICULTURA, COMERCIO E EXPORTAÇÃO, adquiriu uma área de terras com **47.500 ha.**, com a denominação de "G. LUNARDELLI NOROESTE", parte desmembrada da área maior de 95.000 ha., conforme Escritura Pública de Divisão com Extinção de Condominio, lavrada às fls. 049/052, do livro 228, em 25/03/1993, nestas notas, registrado sob nº 01 da matrícula nº 48.417, do livro 2-HF, em 19 de Abril de 1993, **e matriculado sob nº 73.958, do livro 2-NQ, aos 17 de Julho de 2002**, ambos neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x

G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO E EXPORTAÇÃO e ESCOL – COMPANHIA AGRICOLA E COMERCIAL, adquiriram a "GLEBA 1" com a área de **95.000 ha.**, conforme Escritura Pública de Divisão com Extinção de Condomínio, Atribuições e Quinhões, Certos e Outras Avenças, lavrada às fls. 015/019, do livro 154, em 12/08/1987, nestas notas, registrado sob nº 03 da matrícula nº 30.724, do livro 2-DE, em 25 de Agosto de 1987, neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/

Continua às fls. 02...

Figure 11*. Documents of proof of title for the FSM farm …. (part 3)*

ço Notarial
Circunscrição
Jardim Kennedy
JURAMENTADOS
ne: (65) 3051-5300

COMARCA DE CUIABÁ - ESTADO DE MATO GROSSO

REGISTRO GERAL DE IMÓVEIS

3ª CIRCUNSCRIÇÃO

(Cuiabá) - Setor 03

6º Serviço Notarial e Registro de Imóveis

Av. Tancredo Neves, 250 - Bairro Jardim Kennedy - Fone: (65) 3051-5300 - Fax: (65) 3051-5333

Joani Maria de Assis Asckar
Oficial do Registro de Imóveis

José Pires Miranda de Assis
Substituto

-fls.02-

G. LUNARDELLI S/A - AGRICULTURA, COMÉRCIO E EXPORTAÇÃO e ESCOL - COMPANHIA AGRÍCOLA E COMERCIAL, adquiriram uma área de terras com **175.000 hectares,** composta dos lotes nºs 816, 817, 818, 819, 820, 821, 822, 823, 804, 805, 808, 810, 811, 813, 814, 815, 749, 752, 755, 758, 761, 764, 768, 770, 774, 776, 780, 782, 786, 788 e 790, havido da COLNIZA - COMÉRCIO E INDÚSTRIA LTDA, conforme Escritura Pública de Transferência de Propriedade de Fração Ideal de Imóvel Rural em Pagamento Parcial de Dívida, lavrada às fls. 75, do livro nº 1.831, em 20/08/76, nas notas do 13º Cartório de São Paulo, registrado sob nº 01 da matrícula **1.130**, livro 02, em 14 de Outubro de 1976, e Escritura Pública de Re-Ratificação e Transação, lavrada às fls. 035/041, em 02/02/82, livro nº 81, nestas notas, averbado à margem da referida matricula, **e posteriormente foi matriculado sob nº 30.724, livro 2-DE, em 25/08/1987, a Gleba 1 com a área de 95.000 hectares e matriculado sob nº 30.725, livro 2-DE, em 25/08/1987, a Gleba 2 com a área de 80.000 hectares**, todas neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/x/

COLNIZA-COLONIZAÇÃO COMÉRCIO E INDÚSTRIA LTDA, adquiriu um imóvel de terras incultas, com a área de **400.000,00 hectares**, constituída pelas glebas "1-A" e "1-C", com a área de 200.000,00 ha., cada uma, havido da COMPANHIA DE DESENVOLVIMENTO DO ESTADO DE MATO GROSSO - CODEMAT, conforme Escritura Pública de Compra e Venda, lavrada às fls. 267/278, livro 45-A, em 09/01/1975, nestas notas, e registrado sob nº 2.355, livro 3-C, em 10 de Janeiro de 1975, neste RI.x/x/x/x/x/x/x/x/x/x/x/x/x/x/

CODEMAT - COMPANHIA DE DESENVOLVIMENTO DO ESTADO DE MATO GROSSO, adquiriu **primeira área de aproximadamente 1.600.000 ha.**, e **segunda área de aproximadamente 400.000,00 ha.**, havido do ESTADO DE MATO GROSSO conforme Escritura Pública de Transferência de domínio das notas do Cartório do 4º Ofício desta Comarca, lavrada às fls. 147 à 150, livro 34, de 05/06/1973 e registrado sob nº 825, livro 3-A, em

Continua no verso...

E-mail: 6_oficio@terra.com.br

Figure 11*. Documents of proof of title for the FSM farm …. (part 4)*

Figure 11. *Documents of proof of title for the FSM farm …. (part 5)*

TABELIONATO ASSIS 6º

ESTADO DE MATO GROSSO - COMARCA DE CUIABÁ

6º Serviço Notarial e Registro de Imóveis

Joani Maria de Assis Asckar

Tabeliã de Notas, Oficial Privativa do Registro de Imóveis da 3ª Circunscrição

José Pires Miranda de Assis

Tabelião Substituto

Livro: 555
Folhas: 076
Protocolo: 686-02

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ESCRITURA

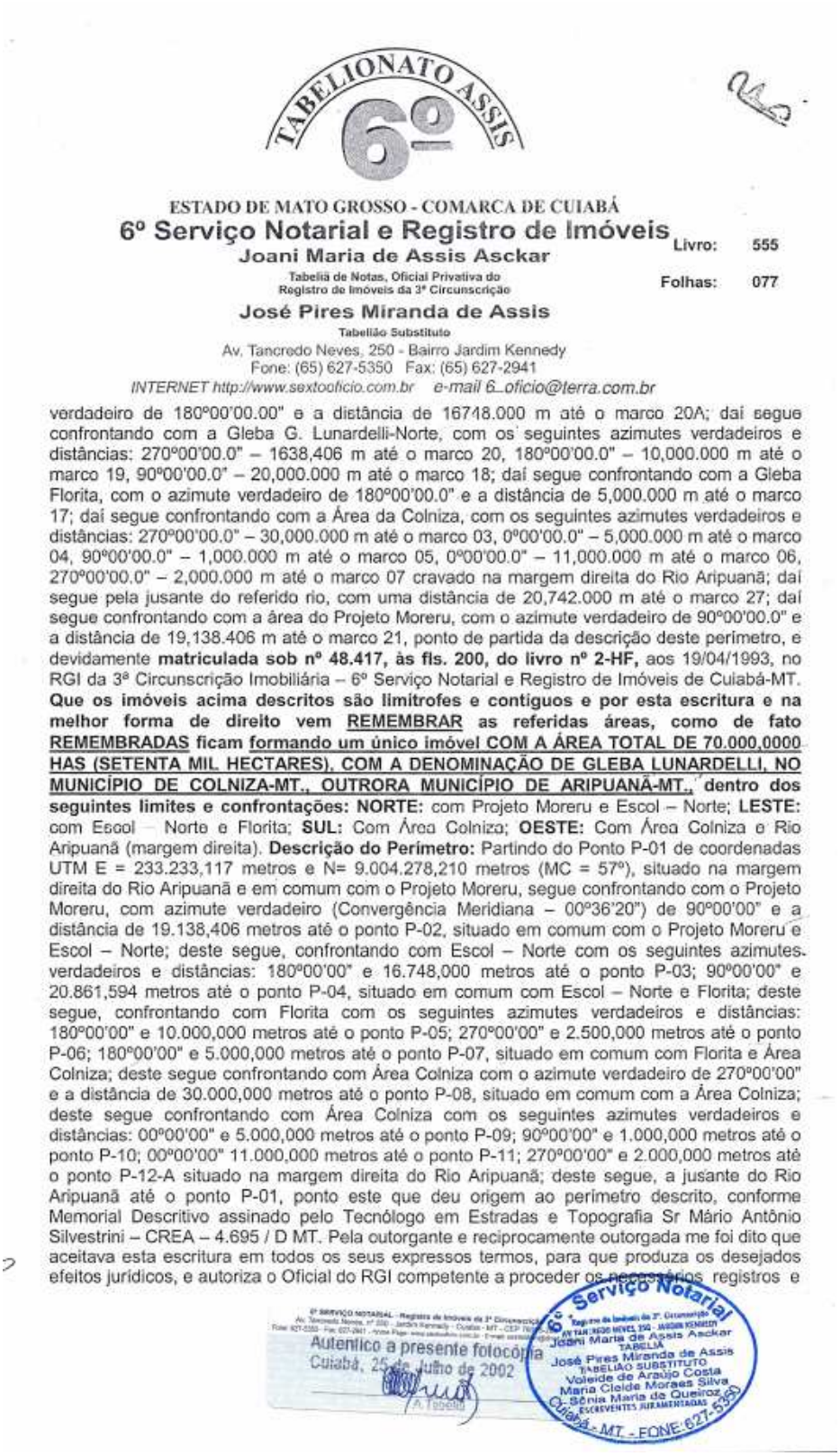
ESCRITURA PÚBLICA DE REMEMBRAMENTO, QUE FAZ E ASSINA:- G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO E COLONIZAÇÃO, NA DECLARADA FORMA ABAIXO:-

S A I B A M quantos esta pública escritura virem, que no ano do nascimento de nosso senhor Jesus Cristo, de dois mil e dois **(2002)**, aos dez **(10)** dias do mês de julho **(07)** nesta cidade de Cuiabá, Capital do Estado de Mato Grosso em meu Serviço Notarial perante mim Tabeliã, compareceram partes entre si, justas e contratadas a saber: de um lado como **OUTORGANTE E RECIPROCAMENTE OUTORGADA:- G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO E COLONIZAÇÃO,** com sede na Capital de São Paulo, na avenida Paulista, nº 1776, 16º andar, Conj. B, inscrita no CNPJ sob nº 58.133.638/0001-80, neste ato representada por seu bastante procurador **MARCELO BARBOSA TEIXEIRA DE MAGALHÃES,** brasileiro, casado, advogado, inscrito na OAB/MT., sob nº 6882, portador da C.I. RG. n.º 622.064-SSP/MT., e CIC n.º 442.557.051-00, com escritório na rua São Benedito, nº 356, bairro Lixeira, nesta cidade de Cuiabá-MT., conforme procuração, passada às fls. 081, do livro nº 2.122, aos 20/06/2002, no 14º Tabelião de Notas de São Paulo-SP., e que fica arquivada neste Cartório em pasta própria sob nº 20.287;- a pessoa presente se identificou como a própria, mediante os documentos apresentados e mencionados, do que dou fé. E pela outorgante e reciprocamente outorgada me foi dito que é senhora e legítima possuidora dos seguintes imóveis: **1º)- ÁREA DE TERRAS COM 22.500 HÁ., COM A DENOMINAÇÃO DE "G. LUNARDELLI NORTE", PARTE DESMEMBRADA DA ÁREA MAIOR DE 45.000 HÁ., SITUADA NO MUNICÍPIO DE ARIPUANÃ-MT.,** ficando a área acima de 22.500 há., dentro dos seguintes limites e confrontações: Começa no marco 17B, cravado nas confrontações da Gleba Escol-Norte e Gleba Florita, com o azimute verdadeiro de 180º00'00.0" e a distância de 10,000.000 m até o marco 17A, 270º00'00.0" – 2,500.000 m até o marco 18; daí segue confrontando com a Gleba G. Lunardelli-Noroeste, com os seguintes azimutes verdadeiros e distâncias: 270º00'00.0" – 20,000.000 m até o marco 19; 0º00'00.0" – 10.000.000 m até o marco 20, 90º00'00.0" – 1.638,406 m até o marco 20A; daí segue confrontando com a Gleba Escol-Norte, com o azimute verdadeiro de 90º00'00.0" e a distância de 20,861.594 m até o marco 17B, até o ponto de partida da descrição deste perímetro, e devidamente **matriculada sob nº 48.415, às fls. 198, do livro nº 2-HF,** aos 19/04/1993, no RGI da 3ª Circunscrição Imobiliária – 6º Serviço Notarial e Registro de Imóveis de Cuiabá-MT., e **2º) ÁREA DE TERRAS COM 47.500 HÁ., COM A DENOMINAÇÃO DE "G. LUNARDELLI NOROESTE", PARTE DESMEMBRADA DA ÁREA MAIOR DE 95.000 HÁ., SITUADA NO MUNICÍPIO DE ARIPUANÃ-MT.,** ficando a área acima de 47.500 há., dentro dos seguintes limites e confrontações: Começa no marco 21, cravado nas confrontações de Terras pertencentes a área do Projeto Moreru e Escol Norte; daí segue confrontando com Escol Norte, com o azimute

Autentico a presente fotocópia
Cuiabá, 25 de Julho de 2002
Tabeliã

6º Serviço Notarial
Joani Maria de Assis Asckar
TABELIÃ
José Pires Miranda de Assis
TABELIÃO SUBSTITUTO
Voleide de Araújo Costa
Maria Cleide Moraes Silva
Sônia Maria de Queiroz
ESCREVENTES JURAMENTADAS
Cuiabá - MT. - FONE: 627-5350

Figure 11. *Documents of proof of title for the FSM farm …. (part 6)*



TABELIONATO ASSIS 6º

ESTADO DE MATO GROSSO - COMARCA DE CUIABÁ

6º Serviço Notarial e Registro de Imóveis

Joani Maria de Assis Asckar

Tabeliã de Notas, Oficial Privativa do Registro de Imóveis da 3ª Circunscrição

Livro: 555

Folhas: 077

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verdadeiro de 180°00'00.00" e a distância de 16748.000 m até o marco 20A; daí segue confrontando com a Gleba G. Lunardelli-Norte, com os seguintes azimutes verdadeiros e distâncias: 270°00'00.0" – 1638,406 m até o marco 20, 180°00'00.0" – 10,000.000 m até o marco 19, 90°00'00.0" – 20,000.000 m até o marco 18; daí segue confrontando com a Gleba Florita, com o azimute verdadeiro de 180°00'00.0" e a distância de 5,000.000 m até o marco 17; daí segue confrontando com a Área da Colniza, com os seguintes azimutes verdadeiros e distâncias: 270°00'00.0" – 30,000.000 m até o marco 03, 0°00'00.0" – 5,000.000 m até o marco 04, 90°00'00.0" – 1,000.000 m até o marco 05, 0°00'00.0" – 11,000.000 m até o marco 06, 270°00'00.0" – 2,000.000 m até o marco 07 cravado na margem direita do Rio Aripuanã; daí segue pela jusante do referido rio, com uma distância de 20,742.000 m até o marco 27; daí segue confrontando com a área do Projeto Moreru, com o azimute verdadeiro de 90°00'00.0" e a distância de 19,138.406 m até o marco 21, ponto de partida da descrição deste perímetro, e devidamente **matriculada sob nº 48.417, às fls. 200, do livro nº 2-HF,** aos 19/04/1993, no RGI da 3ª Circunscrição Imobiliária – 6º Serviço Notarial e Registro de Imóveis de Cuiabá-MT. **Que os imóveis acima descritos são limítrofes e contíguos e por esta escritura e na melhor forma de direito vem REMEMBRAR as referidas áreas, como de fato REMEMBRADAS ficam formando um único imóvel COM A ÁREA TOTAL DE 70.000,0000 HAS (SETENTA MIL HECTARES), COM A DENOMINAÇÃO DE GLEBA LUNARDELLI, NO MUNICÍPIO DE COLNIZA-MT., OUTRORA MUNICÍPIO DE ARIPUANÃ-MT., dentro dos seguintes limites e confrontações: NORTE:** com Projeto Moreru e Escol – Norte; **LESTE:** com Escol – Norte e Florita; **SUL:** Com Área Colniza; **OESTE:** Com Área Colniza e Rio Aripuanã (margem direita). **Descrição do Perímetro:** Partindo do Ponto P-01 de coordenadas UTM E = 233.233,117 metros e N= 9.004.278,210 metros (MC = 57°), situado na margem direita do Rio Aripuanã e em comum com o Projeto Moreru, segue confrontando com o Projeto Moreru, com azimute verdadeiro (Convergência Meridiana – 00°36'20") de 90°00'00" e a distância de 19.138,406 metros até o ponto P-02, situado em comum com o Projeto Moreru e Escol – Norte; deste segue, confrontando com Escol – Norte com os seguintes azimutes verdadeiros e distâncias: 180°00'00" e 16.748,000 metros até o ponto P-03; 90°00'00" e 20.861,594 metros até o ponto P-04, situado em comum com Escol – Norte e Florita; deste segue, confrontando com Florita com os seguintes azimutes verdadeiros e distâncias: 180°00'00" e 10.000,000 metros até o ponto P-05; 270°00'00" e 2.500,000 metros até o ponto P-06; 180°00'00" e 5.000,000 metros até o ponto P-07, situado em comum com Florita e Área Colniza; deste segue confrontando com Área Colniza com o azimute verdadeiro de 270°00'00" e a distância de 30.000,000 metros até o ponto P-08, situado em comum com a Área Colniza; deste segue confrontando com Área Colniza com os seguintes azimutes verdadeiros e distâncias: 00°00'00" e 5.000,000 metros até o ponto P-09; 90°00'00" e 1.000,000 metros até o ponto P-10; 00°00'00" 11.000,000 metros até o ponto P-11; 270°00'00" e 2.000,000 metros até o ponto P-12-A situado na margem direita do Rio Aripuanã; deste segue, a jusante do Rio Aripuanã até o ponto P-01, ponto este que deu origem ao perímetro descrito, conforme Memorial Descritivo assinado pelo Tecnólogo em Estradas e Topografia Sr Mário Antônio Silvestrini – CREA – 4.695 / D MT. Pela outorgante e reciprocamente outorgada me foi dito que aceitava esta escritura em todos os seus expressos termos, para que produza os desejados efeitos jurídicos, e autoriza o Oficial do RGI competente a proceder os necessários registros e

Autentico a presente fotocópia
Cuiabá, 25 de Julho de 2002

Serviço Notarial
Joani Maria de Assis Asckar
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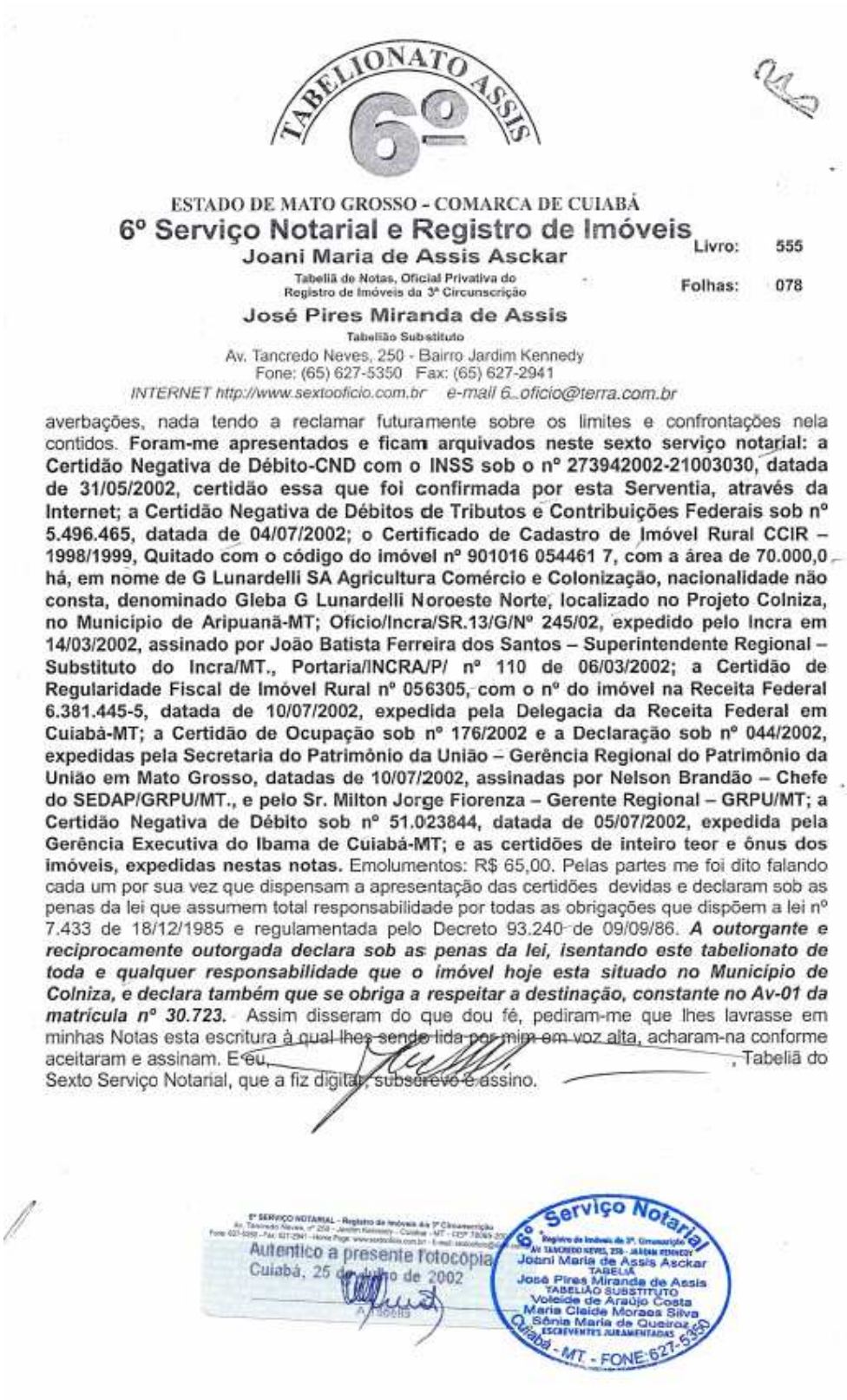
Figure 11. *Documents of proof of title for the FSM farm …. (part 7)*



TABELIONATO ASSIS 6º

ESTADO DE MATO GROSSO - COMARCA DE CUIABÁ

6º Serviço Notarial e Registro de Imóveis

Joani Maria de Assis Asckar

Tabeliã de Notas, Oficial Privativa do Registro de Imóveis da 3ª Circunscrição

Livro: 555

Folhas: 078

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averbações, nada tendo a reclamar futuramente sobre os limites e confrontações nela contidos. **Foram-me apresentados e ficam arquivados neste sexto serviço notarial: a Certidão Negativa de Débito-CND com o INSS sob o nº 273942002-21003030, datada de 31/05/2002, certidão essa que foi confirmada por esta Serventia, através da Internet; a Certidão Negativa de Débitos de Tributos e Contribuições Federais sob nº 5.496.465, datada de 04/07/2002; o Certificado de Cadastro de Imóvel Rural CCIR – 1998/1999, Quitado com o código do imóvel nº 901016 054461 7, com a área de 70.000,0 há, em nome de G Lunardelli SA Agricultura Comércio e Colonização, nacionalidade não consta, denominado Gleba G Lunardelli Noroeste Norte, localizado no Projeto Colniza, no Município de Aripuanã-MT; Ofício/Incra/SR.13/G/Nº 245/02, expedido pelo Incra em 14/03/2002, assinado por João Batista Ferreira dos Santos – Superintendente Regional – Substituto do Incra/MT., Portaria/INCRA/P/ nº 110 de 06/03/2002; a Certidão de Regularidade Fiscal de Imóvel Rural nº 056305, com o nº do imóvel na Receita Federal 6.381.445-5, datada de 10/07/2002, expedida pela Delegacia da Receita Federal em Cuiabá-MT; a Certidão de Ocupação sob nº 176/2002 e a Declaração sob nº 044/2002, expedidas pela Secretaria do Patrimônio da União – Gerência Regional do Patrimônio da União em Mato Grosso, datadas de 10/07/2002, assinadas por Nelson Brandão – Chefe do SEDAP/GRPU/MT., e pelo Sr. Milton Jorge Fiorenza – Gerente Regional – GRPU/MT; a Certidão Negativa de Débito sob nº 51.023844, datada de 05/07/2002, expedida pela Gerência Executiva do Ibama de Cuiabá-MT; e as certidões de inteiro teor e ônus dos imóveis, expedidas nestas notas.** Emolumentos: R$ 65,00. Pelas partes me foi dito falando cada um por sua vez que dispensam a apresentação das certidões devidas e declaram sob as penas da lei que assumem total responsabilidade por todas as obrigações que dispõem a lei nº 7.433 de 18/12/1985 e regulamentada pelo Decreto 93.240 de 09/09/86. ***A outorgante e reciprocamente outorgada declara sob as penas da lei, isentando este tabelionato de toda e qualquer responsabilidade que o imóvel hoje esta situado no Município de Colniza, e declara também que se obriga a respeitar a destinação, constante no Av-01 da matrícula nº 30.723.*** Assim disseram do que dou fé, pediram-me que lhes lavrasse em minhas Notas esta escritura à qual lhes sendo lida por mim em voz alta, acharam-na conforme aceitaram e assinam. E eu, , Tabeliã do Sexto Serviço Notarial, que a fiz digitar, subscrevo e assino.

Autentico a presente fotocopia
Cuiabá, 25 de julho de 2002

6º Serviço Notarial
Joani Maria de Assis Asckar
TABELIÃ
José Pires Miranda de Assis
TABELIÃO SUBSTITUTO
Voleide de Araújo Costa
Maria Cleide Moraes Silva
Sônia Maria de Queiroz
ESCREVENTES JURAMENTADAS
Cuiabá - MT. - FONE: 627-5350

Figure 11. *Documents of proof of title for the FSM farm …. (part 8)*

TABELIONATO ASSIS 6º

ESTADO DE MATO GROSSO - COMARCA DE CUIABÁ

6º Serviço Notarial e Registro de Imóveis

Joani Maria de Assis Asckar

Tabeliã de Notas, Oficial Privativa do Registro de Imóveis da 3ª Circunscrição

Livro: 555

Folhas: 079

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G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO E COLONIZAÇÃO

P.P. MARCELO BARBOSA T. DE MAGALHÃES

Em testemunho da verdade.

6º SERVIÇO NOTARIAL - Registro de Imóveis da 3ª Circunscrição
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slm

6ª SERVIÇO NOTARIAL
Registro de Imóveis da 3ª Circunscrição
Protocolado sob nº 122250 em 30/07/02
Certifico que o Imóvel Gleba da 30.000,00 hectares
Cidade Bunardelli Colniza - MT foi Matriculado
sob nº 29959 livro 2 N 0 em 31/07/02
O Oficial

6º SERVIÇO NOTARIAL
Registro de Imóveis da 3ª Circunscrição
Av. Tancredo Neves, 250 - Jardim Kennedy
Cuiabá MT Fone: 627-5350
Joani Maria de Assis Asckar
Tabeliã
José Pires Miranda de Assis
Tabelião Substituto

6º SERVIÇO NOTARIAL - Registro de Imóveis da 3ª Circunscrição
Av. Tancredo Neves, nº 250 - Jardim Kennedy
Autentico a presente fotocópia
Cuiabá, 25 de Julho de 2002
A Tabeliã

6º Serviço Notarial
Registro de Imóveis da 3ª Circunscrição
AV. TANCREDO NEVES, 250 - JARDIM KENNEDY
Joani Maria de Assis Asckar
TABELIÃ
José Pires Miranda de Assis
TABELIÃO SUBSTITUTO
Voleide de Araújo Costa
Maria Cleide Moraes Silva
Sônia Maria de Queiroz
ESCREVENTES JURAMENTADAS
Cuiabá - MT. - FONE: 627-5350

Figure 11. *Documents of proof of title for the FSM farm …. (part 9)*

MINISTÉRIO DO DESENVOLVIMENTO AGRÁRIO - MDA
INSTITUTO NACIONAL DE COLONIZAÇÃO E REFORMA AGRÁRIA - INCRA
SUPERINTENDÊNCIA REGIONAL DO MATO GROSSO - SR13(MT)

Processo nº: **54240.001583/2004-24**
Interessado: **FLORESTAL SANTA MARIA S.A**
Imóvel: **FAZENDA FLORESTAL SANTA MARIA**
Matrícula/Transcrição: **73.958**
Código INCRA: **9010160544617**
Área (ha): **71.713.959031**
Município: **COLNIZA**
Estado: **MT**

CERTIFICAÇÃO Nº 130501000018-12

Certificamos que a poligonal referente ao memorial descritivo / planta do imóvel acima mencionado, não se sobrepõe, nesta data, a nenhuma outra poligonal constante de nosso cadastro georreferenciado e que a sua execução foi efetuada em atendimento às especificações técnicas estabelecidas na Norma Técnica para Georreferenciamento de Imóveis Rurais aprovados pelo INCRA através da Portaria INCRA/P/Nº 1.101/03 de novembro de 2003, publicada do Diário Oficial da União no dia 20 de novembro de 2003.

O profissional responsável técnico pelos trabalhos, **JOSÉ ROBERTO BAPTISTA**, credenciado no INCRA sob o código **AEH**, recolheu a Anotação de Responsabilidade Técnica ART, nº **33M 232726 CREA - MT.**

Cuiabá-MT, 25 de Janeiro de 2005

GENUINO MAGALHÃES SORIANO
Engenheiro Agrimensor CREA Nº 28330/D-MG
Código de Credenciamento junto ao INCRA - ABZ
Ordem de Serviço SR-13(MT) G/Nº 206/2003 de 29 de dezembro de 2003

CÓPIA

Averbado, nesta data, sob nº. 06 fls. 13C
na Matrícula nº. 73958 do livro nº. 2 W 6L
Cuiabá, 02 / 06 / 05
O Oficial

FOI UTILIZADOS OS SEGUINTES SELOS:
AAG13403, ACA05620, AAK54198 e AAK54199
COLADOS NO REQUERIMENTO.
Cuiabá, 02/06/2005

Figure 11. *Documents of proof of title for the FSM farm …. (part 10)*

DatW
GEORREFERENCIAMENTO

São Paulo, 26 de Julho de 2004.

MEMORIAL DESCRITIVO

Imóvel: **FAZENDA FLORESTAL SANTA MARIA**
Proprietário: **FLORESTAL SANTA MARIA S.A.**
Município: **COLNIZA** U.F.:**MT**
Origem nas Matrículas: **73.958** Comarca: **CUIABÁ-MT**
CÓDIGO INCRA: **901.016.054.461-7**
C.R.I.: **3º CARTÓRIO DE REGISTRO DE IMÓVEIS**
ÁREA: **71.713,959031ha** Perímetro: **148.571,62m**

Inicia-se a descrição deste perímetro no vértice AQA-M-0008 (E=233198,473;N=9004336,287) cravado em um marco de concreto à margem direita do Rio Aripuanã em comum à divisa da Fazenda Alegria (Matrícula 73.653 e INCRA 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária onde a estrada do Paralelo 9°chega ao Rio Aripuanã. Deste segue até o ponto AEH-M-0100 (E=242021,814;N=9004296,024) cravado em um marco de concreto em comum à divisa da Fazenda Alegria (Matrícula 73.653 e INCRA 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária e a Fazenda Madrugada (Matrícula 23.696 e INCRA 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP, com azimute de 90°15'41" e distância de 8823,43m. **Do vértice AQA-M-0008 ao vértice AEH-M-0100 o imóvel confronta com a Fazenda Alegria (Matrícula 73.653 e INCRA 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária.** Deste segue até o ponto AEH-M-0101 (E=252431,312;N=9004328,554) cravado em um marco de concreto em comum à divisa da Fazenda Madrugada (Matrícula 23.696 e INCRA 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP e a Escol Norte (Matrícula 48.416 e INCRA 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial, com azimute de 89°49'15" e distância de 10409,55m. **Do vértice AEH-M-0100 ao vértice AEH-M-0101 o imóvel confronta com a Fazenda Madrugada (Matrícula 23.696 e INCRA 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP.** Deste segue até o ponto AO2-M-0089 (E=252426,188;N=8995027,431) com azimute 180°01'54" de e distância de 9301,12m, deste segue até o ponto AO2-M-0087 (E=252337,833;N=8987942,484) com azimute 180°42'52" de e distância de 7085,50m, deste segue até o ponto AO2-M-0096 (E=260046,049;N=8988289,149) com azimute 87°25'30" de e distância de 7716,01m, deste segue até o ponto AO2-M-0090 (E=268969,402;N=8988385,456) com azimute 89°22'54" de e distância de 8923,87m, deste segue até o ponto AEH-M-0111 (E=271190,718;N=8988449,308) cravado em um marco de concreto em comum à divisa de Escol Norte (Matrícula 48.416 e INCRA 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial e a Florita (Matrícula 48.414 e INCRA 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda, com azimute de 88°21'13" e distância de 2222,23m. **Do vértice AEH-M-0101 ao vértice AEH-M-0111 (passando pelos vértices A02-M-0089, A02-M-0087, A02-M-0096, A02-M-0090) o imóvel confronta com a propriedade de Escol Norte (Matrícula 48.416 e INCRA 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial.** Deste segue até o ponto AEH-M-0112 (E=271146,514;N=8983341,498) com azimute de 180°29'45" e distância de 5108,00m, deste segue até o ponto AEH-M-0113 (E=271422,002;N=8978595,059) com azimute de 176°40'42" e distância de 4754,43m, deste segue até o ponto AEH-M-0114 (E=268973,731;N=8978600,136) com azimute de 270°07'08" e distância de 2448,28m, deste segue até o ponto AEH-M-0115 (E=269828,715;N=8972729,754) cravado em um marco de concreto em comum à divisa da Florita (Matrícula 48.414 e INCRA 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda e o Remanescente da Gleba [illegible] (Matrícula 30.722 e INCRA 901.016.054.453-6) propriedade da Colniza-Colonizadora Comércio e Indústria Ltda,

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1º SUBS. VILA MADALENA PINHEIROS
AUTENTICAÇÃO: Esta cópia expedida por esta serventia confere com o original. Dou fé.
São Paulo, 04 OUT 2010
Autenticação
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Figure 11. *Documents of proof of title for the FSM farm …. (part 11)*

DatW
GEORREFERENCIAMENTO

São Paulo, 26 de Julho de 2004.

com azimute de 171°42'49" e distância de 5932,32m. **Do vértice AEH-M-0111 ao vértice AEH-M-0115 o imóvel confronta com a Florita (Matrícula 48.414 e INCRA 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda.** Deste segue até o ponto AEH-M-0116 (E=252128,761;N=8972761,352) cravado em um marco de concreto em comum à divisa do Remanescente da Gleba Colniza (Matrícula 30.722 e INCRA 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda e o P.A. Perseverança Pacutinga (INCRA 950.033.355.380-0), com azimute de 270°06'08" e distância de 17699,98m. **Do vértice AEH-M-0115 ao vértice AEH-M-0116 o imóvel confronta com o Remanescente da Gleba Colniza (Matrícula 30.722 e INCRA 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda.** Deste segue até o ponto AEH-M-0117 (E=252051,338;N=8972875,616) com azimute de 325°52'45" e distância de 138,02m, deste segue até o ponto AEH-M-0118 (E=249808,382;N=8972777,152) com azimute de 267°29'11" e distância de 2245,12m, deste segue até o ponto AEH-M-0119 (E=247535,230;N=8972677,691) com azimute de 267°29'41" e distância de 2275,33m, deste segue até o ponto AEH-M-0120 (E=245303,351;N=8972578,406) com azimute de 267°27'10" e distância de 2234,09m, deste segue até o ponto AEH-M-0121 (E=243033,386;N=8972504,459) cravado em um marco de concreto em comum à divisa do P.A. Perseverança Pacutinga (INCRA 950.033.355.380-0) e o Remanescente da Gleba Colniza (Matrícula 30.722 e INCRA 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda, com azimute de 268°08'03" e distância de 2271,17m. **Do vértice AEH-M-0116 ao vértice AEH-M-0121 o imóvel confronta com o P.A. Perseverança Pacutinga (INCRA 950.033.355.380-0).** Deste segue até o ponto AEH-M-0122 (E=241215,122;N=8972445,227) com azimute de 268°08'03" e distância de 1819,23m, deste segue até o ponto AEH-M-0128 (E=237843,054;N=8972335,378) cravado em um marco de concreto junto à Margem direita do Rio Aripuanã no alinhamento do picadão que segue do Rio Aripuanã em direção à Sede da Fazenda Florestal Santa Maria, com azimute de 268°08'03" e distância de 3373,86m. **Do vértice AEH-M-0121 ao vértice AEH-M-0128 (passando pelo vértice AEH-M-0122) o imóvel volta a confrontar com o Remanescente da Gleba Colniza (Matrícula 30.722 e INCRA 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda.** Deste segue a jusante pela margem direita do Rio Aripuanã até o vértice AEH-P-0001 (E=237875,028;N=8972414,955) com azimute de 21°53'26" e distância de 85,76m, deste segue até o ponto AEH-P-0002 (E=237998,559;N=8972576,342) com azimute de 37°25'54" e distância de 203,24m, deste segue até o ponto AEH-P-0003 (E=238021,277;N=8972678,077) com azimute de 12°35'16" e distância de 104,24m, deste segue até o ponto AEH-P-0004 (E=238239,074;N=8972900,418) com azimute de 44°24'31" e distância de 311,24m, deste segue até o ponto AEH-P-0005 (E=238309,847;N=8973095,561) com azimute de 19°56'03" e distância de 207,58m, deste segue até o ponto AEH-P-0006 (E=238348,257;N=8973323,968) com azimute de 9°32'45" e distância de 231,61m, deste segue até o ponto AEH-P-0007 (E=238571,042;N=8973416,012) com azimute de 67°33'07" e distância de 241,05m, deste segue até o ponto AEH-P-0008 (E=238779,306;N=8973895,682) com azimute de 23°28'11" e distância de 522,93m, deste segue até o ponto AEH-P-0009 (E=238952,930;N=8974063,727) com azimute de 45°56'07" e distância de 241,63m, deste segue até o ponto AEH-P-0010 (E=239005,953;N=8974354,213) com azimute de 10°20'40" e distância de 295,29m, deste segue até o ponto AEH-P-0011 (E=238518,708;N=8975022,145) com azimute de 323°53'24" e distância de 826,77m, deste segue até o ponto AEH-P-0012 (E=237757,609;N=8975468,790) com azimute de 300°24'22" e distância de 882,48m, deste segue até o ponto AEH-P-0013 (E=237520, [illegible]) com azimute de 317°59'10" e distância de 353,95m, deste segue até o ponto AEH-P-0014 (E=237630,250;N=8975887,214) com azimute de 35°10'21" e distância de 190,17m, deste segue até o ponto AEH-P-0015 (E=237516,017;N=8976444,866) com azimute de 346°25'24"

São Paulo, 04 OUT 2010

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Figure 11. *Documents of proof of title for the FSM farm …. (part 12)*

DatW
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São Paulo, 26 de Julho de 2004.

e distância de 569,23m, deste segue até o ponto AEH-P-0016 (E=237786,609;N=8976953,162) com azimute de 28°01'43" e distância de 575,83m, deste segue até o ponto AEH-P-0017 (E=238021,308;N=8977077,208) com azimute de 62°08'32" e distância de 265,46m, deste segue até o ponto AEH-P-0018 (E=238107,117;N=8977261,904) com azimute de 24°55'09" e distância de 203,66m, deste segue até o ponto AEH-P-0019 (E=238084,548;N=8977414,757) com azimute de 351°36'03" e distância de 154,51m, deste segue até o ponto AEH-P-0020 (E=238283,336;N=8977805,240) com azimute de 26°58'47" e distância de 438,17m, deste segue até o ponto AEH-P-0021 (E=238321,369;N=8978221,192) com azimute de 5°13'28" e distância de 417,69m, deste segue até o ponto AEH-P-0022 (E=238763,694;N=8978407,648) com azimute de 67°08'34" e distância de 480,02m, deste segue até o ponto AEH-P-0023 (E=238837,460;N=8978588,947) com azimute de 22°08'24" e distância de 195,73m, deste segue até o ponto AEH-P-0024 (E=238822,284;N=8978853,074) com azimute de 356°42'42" e distância de 264,56m, deste segue até o ponto AEH-P-0025 (E=238775,952;N=8978990,373) com azimute de 341°21'10" e distância de 144,91m, deste segue até o ponto AEH-P-0026 (E=239014,583;N=8979234,374) com azimute de 44°21'45" e distância de 341,29m, deste segue até o ponto AEH-P-0027 (E=239300,793;N=8979481,871) com azimute de 49°08'55" e distância de 378,38m, deste segue até o ponto AEH-P-0028 (E=239387,170;N=8979640,608) com azimute de 28°33'11" e distância de 180,72m, deste segue até o ponto AEH-P-0029 (E=239592,319;N=8979690,510) com azimute de 76°19'42" e distância de 211,13m, deste segue até o ponto AEH-P-0030 (E=239645,201;N=8979856,540) com azimute de 17°40'02" e distância de 174,25m, deste segue até o ponto AEH-P-0031 (E=239521,134;N=8980030,248) com azimute de 324°27'52" e distância de 213,47m, deste segue até o ponto AEH-P-0032 (E=239794,684;N=8980479,083) com azimute de 31°21'40" e distância de 525,63m, deste segue até o ponto AEH-P-0033 (E=240160,670;N=8980899,290) com azimute de 41°03'17" e distância de 557,24m, deste segue até o ponto AEH-P-0034 (E=240535,252;N=8980894,637) com azimute de 90°42'42" e distância de 374,61m, deste segue até o ponto AEH-P-0035 (E=241088,841;N=8980661,837) com azimute de 112°48'29" e distância de 600,55m, deste segue até o ponto AEH-P-0036 (E=241305,027;N=8980750,984) com azimute de 67°35'25" e distância de 233,85m, deste segue até o ponto AEH-P-0037 (E=241321,218;N=8980953,044) com azimute de 4°34'52" e distância de 202,71m, deste segue até o ponto AEH-P-0038 (E=241237,556;N=8981102,440) com azimute de 330°45'04" e distância de 171,23m, deste segue até o ponto AEH-P-0039 (E=241318,897;N=8981273,161) com azimute de 25°28'33" e distância de 189,11m, deste segue até o ponto AEH-P-0040 (E=241662,346;N=8981429,548) com azimute de 65°31'06" e distância de 377,38m, deste segue até o ponto AEH-P-0041 (E=241716,228;N=8981587,841) com azimute de 18°47'53" e distância de 167,21m, deste segue até o ponto AEH-P-0042 (E=241796,802;N=8981646,470) com azimute de 53°57'31" e distância de 99,65m, deste segue até o ponto AEH-P-0043 (E=241719,514;N=8981814,519) com azimute de 335°18'06" e distância de 184,97m, deste segue até o ponto AEH-P-0044 (E=241626,030;N=8981894,258) com azimute de 310°27'47" e distância de 122,87m, deste segue até o ponto AEH-P-0045 (E=241732,225;N=8982033,933) com azimute de 37°14'45" e distância de 175,46m, deste segue até o ponto AEH-P-0046 (E=241718,164;N=8982215,701) com azimute de 355°34'35" e distância de 182,31m, deste segue até o ponto AEH-P-0047 (E=241836,387;N=8982403,417) com azimute de 32°12'10" e distância de 221,84m, deste segue até o ponto AEH-P-0048 (E=241846,538;N=8982671,299) com azimute de [illegible] e distância de [illegible],08m, deste segue até o ponto AEH-P-0049 (E=241758,681;N=8982954,282) com azimute de 342°45'07" e distância de 296,31m, deste segue até o ponto AEH-P-0050 (E=241645,420;N=8983193,388) com azimute de 334°39'14" e distância de 264,57m,

39º SUBD. VILA MADALENA - PINHEIROS
AUTENTICAÇÃO: Esta cópia confere com o original. Dou fé.
São Paulo, 04 OUT 2010

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Figure 11. *Documents of proof of title for the FSM farm …. (part 13)*

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São Paulo, 26 de Julho de 2004.

deste segue até o ponto AEH-P-0051 (E=241336,030;N=8983208,534) com azimute de 272°48'10" e distância de 309,76m, deste segue até o ponto AEH-P-0052 (E=241174,458;N=8983329,409) com azimute de 306°48'03" e distância de 201,78m, deste segue até o ponto AEH-P-0053 (E=240857,411;N=8983509,833) com azimute de 299°38'36" e distância de 364,79m, deste segue até o ponto AEH-P-0054 (E=240673,511;N=8983657,933) com azimute de 308°50'43" e distância de 236,12m, deste segue até o ponto AEH-P-0055 (E=240589,070;N=8983953,171) com azimute de 344°02'20" e distância de 307,08m, deste segue até o ponto AEH-P-0056 (E=240673,300;N=8984151,424) com azimute de 23°01'08" e distância de 215,40m, deste segue até o ponto AEH-P-0057 (E=240865,774;N=8984346,420) com azimute de 44°37'37" e distância de 273,99m, deste segue até o ponto AEH-P-0058 (E=241133,732;N=8984339,443) com azimute de 91°29'29" e distância de 268,05m, deste segue até o ponto AEH-P-0059 (E=241411,114;N=8984440,413) com azimute de 69°59'53" e distância de 295,19m, deste segue até o ponto AEH-P-0060 (E=241595,836;N=8984726,836) com azimute de 32°49'08" e distância de 340,82m, deste segue até o ponto AEH-P-0061 (E=241432,146;N=8984983,113) com azimute de 327°25'58" e distância de 304,09m, deste segue até o ponto AEH-P-0062 (E=241576,165;N=8985101,250) com azimute de 50°38'18" e distância de 186,27m, deste segue até o ponto AEH-P-0063 (E=241177,185;N=8985588,894) com azimute de 320°42'38" e distância de 630,06m, deste segue até o ponto AEH-P-0064 (E=241220,261;N=8985752,998) com azimute de 14°42'28" e distância de 169,66m, deste segue até o ponto AEH-P-0065 (E=241079,650;N=8985797,098) com azimute de 287°24'47" e distância de 147,36m, deste segue até o ponto AEH-P-0066 (E=241002,686;N=8985884,002) com azimute de 318°28'15" e distância de 116,09m, deste segue até o ponto AEH-P-0067 (E=240941,022;N=8986042,715) com azimute de 338°46'05" e distância de 170,27m, deste segue até o ponto AEH-P-0068 (E=240582,267;N=8986140,286) com azimute de 285°12'53" e distância de 371,79m, deste segue até o ponto AEH-P-0069 (E=240321,894;N=8986452,348) com azimute de 320°09'35" e distância de 406,42m, deste segue até o ponto AEH-P-0070 (E=239956,172;N=8986836,719) com azimute de 316°25'27" e distância de 530,56m, deste segue até o ponto AEH-P-0071 (E=239773,313;N=8987265,697) com azimute de 336°54'47" e distância de 466,33m, deste segue até o ponto AEH-P-0072 (E=239755,468;N=8987571,376) com azimute de 356°39'32" e distância de 306,20m, deste segue até o ponto AEH-P-0073 (E=239836,685;N=8987774,435) com azimute de 21°47'59" e distância de 218,70m, deste segue até o ponto AEH-P-0074 (E=240281,554;N=8987712,417) com azimute de 97°56'11" e distância de 449,17m, deste segue até o ponto AEH-P-0075 (E=240508,694;N=8988051,361) com azimute de 33°49'40" e distância de 408,01m, deste segue até o ponto AEH-P-0076 (E=240273,288;N=8988461,316) com azimute de 330°08'05" e distância de 472,74m, deste segue até o ponto AEH-M-0127 (E=240057,864;N=8988633,461) com azimute de 308°37'41" e distância de 275,76m, deste segue até o ponto AEH-P-0077 (E=239739,092;N=8988795,394) com azimute de 296°55'49" e distância de 357,54m, deste segue até o ponto AEH-P-0078 (E=239397,437;N=8989267,335) com azimute de 324°05'52" e distância de 582,63m, deste segue até o ponto AEH-P-0079 (E=239339,703;N=8989422,665) com azimute de 339°36'38" e distância de 165,71m, deste segue até o ponto AEH-P-0080 (E=239277,466;N=8989619,078) com azimute de 342°25'06" e distância de 206,04m, deste segue até o ponto AEH-P-0081 (E=239024,169;N=8989823,256) com azimute de 308°52'17" e distância de 325,34m, deste segue até o ponto AEH-P-0082 (E=238872,542;N=8990024,454) com azimute de 322°59'51" e distância de 251,94m, deste segue até o ponto AEH-P-0083 (E=238615,807;N=8990489,097) com azimute de 317°10'17" e distância de 530,85m, deste segue até o ponto AEH-P-0084 (E=238110,256;N=8990722,086) com azimute de 295°01'23" e distância de 557,92m, deste segue até o ponto AEH-P-0085

São Paulo, 04 OUT 2010

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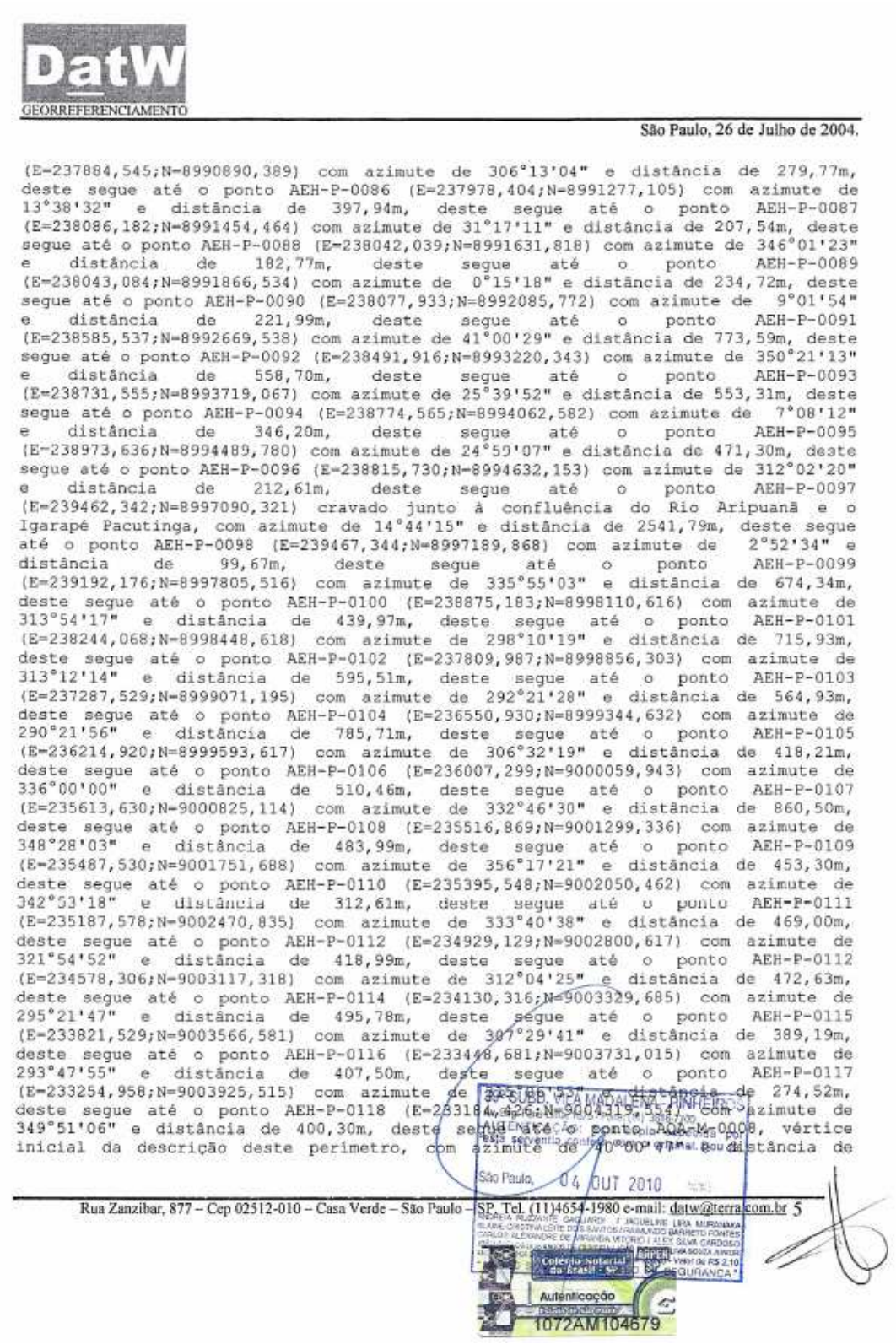
1072AM104684

Figure 11. *Documents of proof of title for the FSM farm …. (part 14)*



DatW
GEORREFERENCIAMENTO

São Paulo, 26 de Julho de 2004.

(E=237884,545;N=8990890,389) com azimute de 306°13'04" e distância de 279,77m, deste segue até o ponto AEH-P-0086 (E=237978,404;N=8991277,105) com azimute de 13°38'32" e distância de 397,94m, deste segue até o ponto AEH-P-0087 (E=238086,182;N=8991454,464) com azimute de 31°17'11" e distância de 207,54m, deste segue até o ponto AEH-P-0088 (E=238042,039;N=8991631,818) com azimute de 346°01'23" e distância de 182,77m, deste segue até o ponto AEH-P-0089 (E=238043,084;N=8991866,534) com azimute de 0°15'18" e distância de 234,72m, deste segue até o ponto AEH-P-0090 (E=238077,933;N=8992085,772) com azimute de 9°01'54" e distância de 221,99m, deste segue até o ponto AEH-P-0091 (E=238585,537;N=8992669,538) com azimute de 41°00'29" e distância de 773,59m, deste segue até o ponto AEH-P-0092 (E=238491,916;N=8993220,343) com azimute de 350°21'13" e distância de 558,70m, deste segue até o ponto AEH-P-0093 (E=238731,555;N=8993719,067) com azimute de 25°39'52" e distância de 553,31m, deste segue até o ponto AEH-P-0094 (E=238774,565;N=8994062,582) com azimute de 7°08'12" e distância de 346,20m, deste segue até o ponto AEH-P-0095 (E=238973,636;N=8994489,780) com azimute de 24°59'07" e distância de 471,30m, deste segue até o ponto AEH-P-0096 (E=238815,730;N=8994632,153) com azimute de 312°02'20" e distância de 212,61m, deste segue até o ponto AEH-P-0097 (E=239462,342;N=8997090,321) cravado junto à confluência do Rio Aripuanã e o Igarapé Pacutinga, com azimute de 14°44'15" e distância de 2541,79m, deste segue até o ponto AEH-P-0098 (E=239467,344;N=8997189,868) com azimute de 2°52'34" e distância de 99,67m, deste segue até o ponto AEH-P-0099 (E=239192,176;N=8997805,516) com azimute de 335°55'03" e distância de 674,34m, deste segue até o ponto AEH-P-0100 (E=238875,183;N=8998110,616) com azimute de 313°54'17" e distância de 439,97m, deste segue até o ponto AEH-P-0101 (E=238244,068;N=8998448,618) com azimute de 298°10'19" e distância de 715,93m, deste segue até o ponto AEH-P-0102 (E=237809,987;N=8998856,303) com azimute de 313°12'14" e distância de 595,51m, deste segue até o ponto AEH-P-0103 (E=237287,529;N=8999071,195) com azimute de 292°21'28" e distância de 564,93m, deste segue até o ponto AEH-P-0104 (E=236550,930;N=8999344,632) com azimute de 290°21'56" e distância de 785,71m, deste segue até o ponto AEH-P-0105 (E=236214,920;N=8999593,617) com azimute de 306°32'19" e distância de 418,21m, deste segue até o ponto AEH-P-0106 (E=236007,299;N=9000059,943) com azimute de 336°00'00" e distância de 510,46m, deste segue até o ponto AEH-P-0107 (E=235613,630;N=9000825,114) com azimute de 332°46'30" e distância de 860,50m, deste segue até o ponto AEH-P-0108 (E=235516,869;N=9001299,336) com azimute de 348°28'03" e distância de 483,99m, deste segue até o ponto AEH-P-0109 (E=235487,530;N=9001751,688) com azimute de 356°17'21" e distância de 453,30m, deste segue até o ponto AEH-P-0110 (E=235395,548;N=9002050,462) com azimute de 342°53'18" e distância de 312,61m, deste segue até o ponto AEH-P-0111 (E=235187,578;N=9002470,835) com azimute de 333°40'38" e distância de 469,00m, deste segue até o ponto AEH-P-0112 (E=234929,129;N=9002800,617) com azimute de 321°54'52" e distância de 418,99m, deste segue até o ponto AEH-P-0112 (E=234578,306;N=9003117,318) com azimute de 312°04'25" e distância de 472,63m, deste segue até o ponto AEH-P-0114 (E=234130,316;N=9003329,685) com azimute de 295°21'47" e distância de 495,78m, deste segue até o ponto AEH-P-0115 (E=233821,529;N=9003566,581) com azimute de 307°29'41" e distância de 389,19m, deste segue até o ponto AEH-P-0116 (E=233448,681;N=9003731,015) com azimute de 293°47'55" e distância de 407,50m, deste segue até o ponto AEH-P-0117 (E=233254,958;N=9003925,515) com azimute de [illegible] e distância de 274,52m, deste segue até o ponto AEH-P-0118 (E=233184,426;N=9004319,554) com azimute de 349°51'06" e distância de 400,30m, deste segue até o ponto AQA-M-0008, vértice inicial da descrição deste perímetro, com azimute de 40°00'[illegible] e distância de

3º SUBS. VILA MADALENA - PINHEIROS
AUTENTICAÇÃO: Para conferência acesse o site [illegible]
São Paulo, 04 OUT 2010

Rua Zanzibar, 877 – Cep 02512-010 – Casa Verde – São Paulo – SP. Tel. (11)4654-1980 e-mail: datw@terra.com.br 5

Colégio Notarial do Brasil - SP
Autenticação
1072AM104679

Figure 11. *Documents of proof of title for the FSM farm …. (part 15)*

DatW
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São Paulo, 26 de Julho de 2004.

21,85m. **Do vértice AEH-M-0128 ao vértice AQA-M-0008 (passando pelos vértices AEH-P-0001 ao AEH-P-0076, AEH-M-0127, e AEH-P-0077 ao AEH-P-0118) o imóvel segue acompanhando à margem direita a sinuosidade do Rio Aripuanã.** Todas as coordenadas aqui descritas estão georreferenciadas ao Sistema Geodésico Brasileiro (SGB), a partir das estações ativas **RBMC 92.165** de Imperatriz Estado do Maranhão (E=223346,605;N=9392439,521), **RBMC 92.538** Cuiabá Capital do Estado Mato Grosso (E=599791,608;N=8280082,107) e o **vértice 91.219** localizado no aeroporto de Colniza Estado do Mato Grosso (E=258354,328;N=8954702,632), e encontram-se representadas no sistema UTM, referenciadas ao Meridiano Central n°57WGr, tendo como datum o SAD-69. Todos os azimutes e distâncias, área e perímetro foram calculadas no plano de projeção UTM.

14º Tabelião de Notas - Dr. Paulo Tupinambá Vampré
Rua Antonio Bicudo, 64 - Pinheiros - São Paulo - S.P.
CEP: 05418-010 - Fone: (11) 3065-4500 - Fax: (11) 3081-0292

Reconheço por semelhança a(s) firma(s) de :
JOSE ROBERTO BAPTISTA
São Paulo, 24 de Janeiro de 2005 Cod.Seg.:1038381881. 13:14:03 h
Cada reconhecimento de firma: R$2,50

14º CONFERIDA

Engº José Roberto Baptista
Engenheiro Agrimensor
CREA 0600716474-SP
Código do Credenciado: AEH
VISTO NO CREA-MT: 11.079
ART.: 232726

FIRMA
1047AA273042

MINISTÉRIO DO DESENVOLVIMENTO AGRÁRIO
INSTITUTO NACIONAL DE COLONIZAÇÃO E REFORMA AGRÁRIA
SUPERINTENDÊNCIA REGIONAL DE MATO GROSSO SR-13/MT

CERTIFICAÇÃO Nº 13.05.01.0000 18-12 **/2005**

Certificamos que a poligonal objeto deste memorial descritivo/planta não se sobrepõe, nesta data, a nenhuma outra poligonal constante de nosso cadastro georreferenciado e que a sua execução foi efetuada em atendimento às especificações técnicas estabelecidas na Norma Técnica para Georreferenciamento de Imóveis Rurais aprovada pela INCRA através da Portaria INCRA/P/ Nº 1.101/03.

Geocarlo Magalhães Soriano
Engº Agrim. CREA Nº 28330/D
Visto-MT 5321
OS-SR-13/G/Nº 206/03

SUBD. VILA MADALENA - PINHEIROS
Av. Brig. Faria Lima, 1675 - Fone: (11) 3816-7700
AUTENTICAÇÃO: Esta cópia expedida por esta serventia confere com o original. Dou fé.
São Paulo, 04 OUT 2010
Autenticação
1072AM104683

Rua Zanzibar, 877 – Cep 02512-010 – Casa Verde – São Paulo – SP. Tel. (11)4654-1980 e-mail: datw@terra.com.br 6

Figure 11. *Documents of proof of title for the FSM farm …. (part 16)*

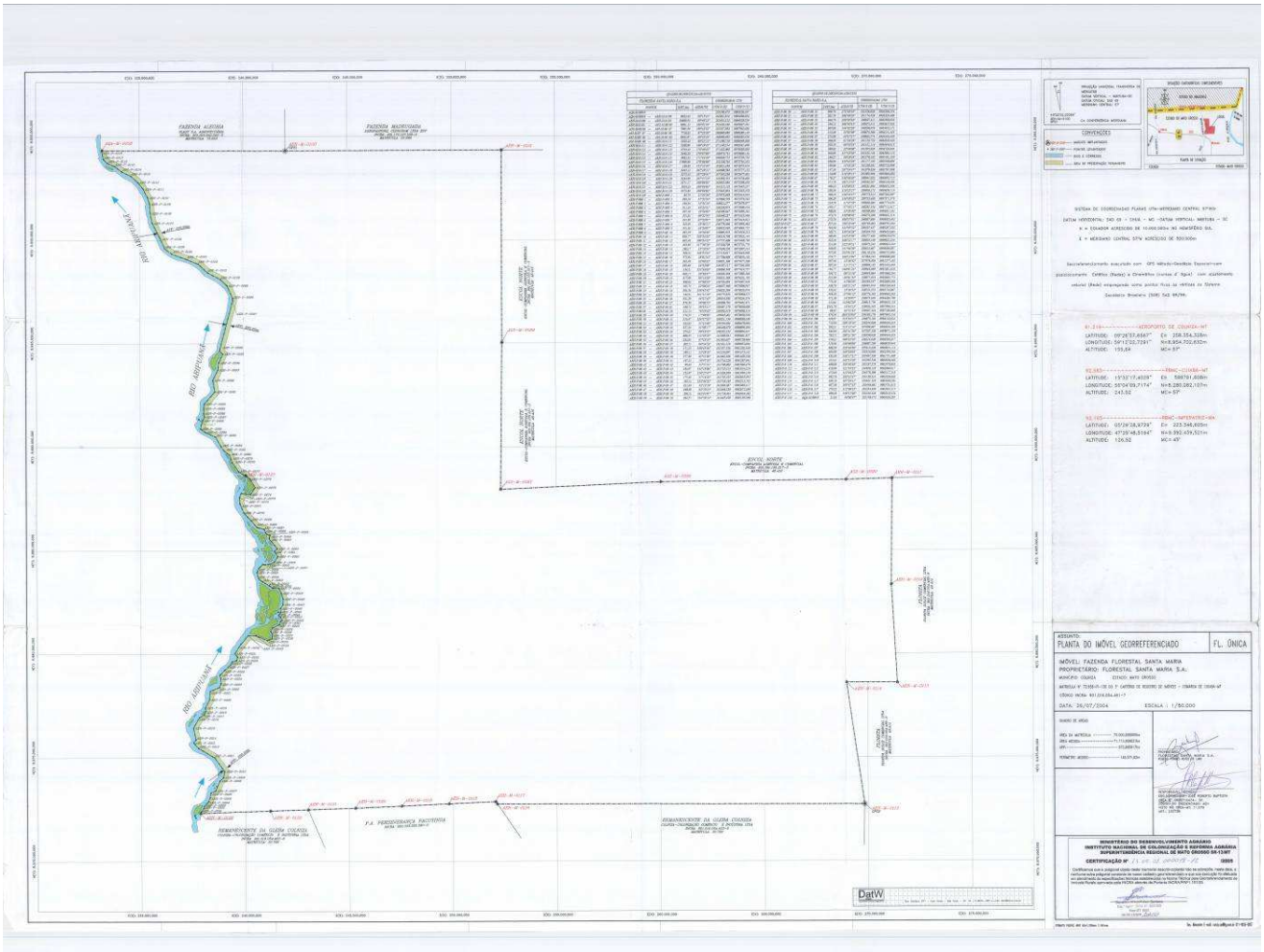
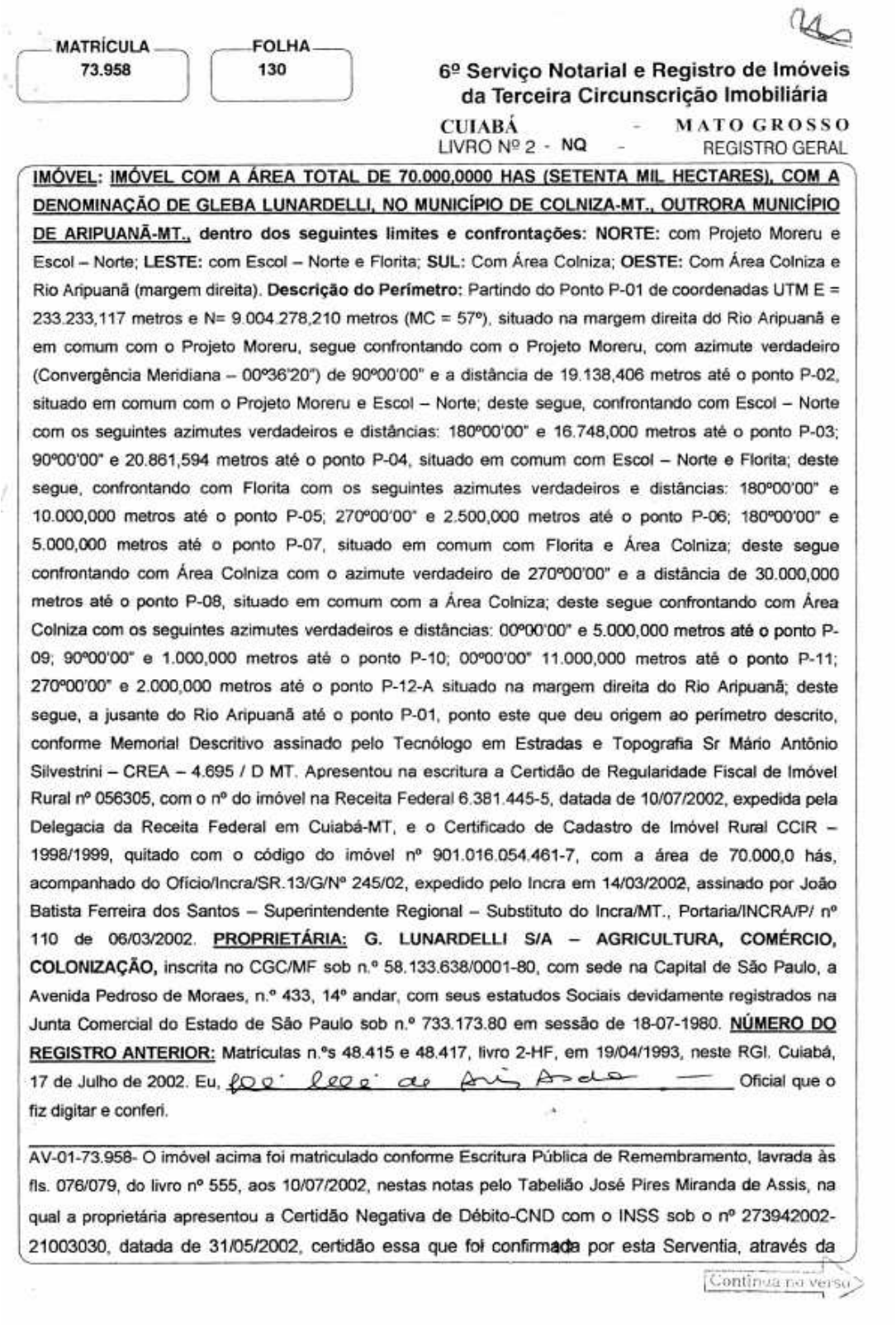


Figure 11. *Documents of proof of title for the FSM farm …. (part 17)*



MATRÍCULA 73.958 | FOLHA 130

6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária

CUIABÁ - MATO GROSSO
LIVRO Nº 2 - NQ - REGISTRO GERAL

IMÓVEL: IMÓVEL COM A ÁREA TOTAL DE 70.000,0000 HAS (SETENTA MIL HECTARES), COM A DENOMINAÇÃO DE GLEBA LUNARDELLI, NO MUNICÍPIO DE COLNIZA-MT., OUTRORA MUNICÍPIO DE ARIPUANÃ-MT., dentro dos seguintes limites e confrontações: NORTE: com Projeto Moreru e Escol – Norte; **LESTE:** com Escol – Norte e Florita; **SUL:** Com Área Colniza; **OESTE:** Com Área Colniza e Rio Aripuanã (margem direita). **Descrição do Perímetro:** Partindo do Ponto P-01 de coordenadas UTM E = 233.233,117 metros e N= 9.004.278,210 metros (MC = 57º), situado na margem direita do Rio Aripuanã e em comum com o Projeto Moreru, segue confrontando com o Projeto Moreru, com azimute verdadeiro (Convergência Meridiana – 00º36'20") de 90º00'00" e a distância de 19.138,406 metros até o ponto P-02, situado em comum com o Projeto Moreru e Escol – Norte; deste segue, confrontando com Escol – Norte com os seguintes azimutes verdadeiros e distâncias: 180º00'00" e 16.748,000 metros até o ponto P-03; 90º00'00" e 20.861,594 metros até o ponto P-04, situado em comum com Escol – Norte e Florita; deste segue, confrontando com Florita com os seguintes azimutes verdadeiros e distâncias: 180º00'00" e 10.000,000 metros até o ponto P-05; 270º00'00" e 2.500,000 metros até o ponto P-06; 180º00'00" e 5.000,000 metros até o ponto P-07, situado em comum com Florita e Área Colniza; deste segue confrontando com Área Colniza com o azimute verdadeiro de 270º00'00" e a distância de 30.000,000 metros até o ponto P-08, situado em comum com a Área Colniza; deste segue confrontando com Área Colniza com os seguintes azimutes verdadeiros e distâncias: 00º00'00" e 5.000,000 metros até o ponto P-09; 90º00'00" e 1.000,000 metros até o ponto P-10; 00º00'00" 11.000,000 metros até o ponto P-11; 270º00'00" e 2.000,000 metros até o ponto P-12-A situado na margem direita do Rio Aripuanã; deste segue, a jusante do Rio Aripuanã até o ponto P-01, ponto este que deu origem ao perímetro descrito, conforme Memorial Descritivo assinado pelo Tecnólogo em Estradas e Topografia Sr Mário Antônio Silvestrini – CREA – 4.695 / D MT. Apresentou na escritura a Certidão de Regularidade Fiscal de Imóvel Rural nº 056305, com o nº do imóvel na Receita Federal 6.381.445-5, datada de 10/07/2002, expedida pela Delegacia da Receita Federal em Cuiabá-MT, e o Certificado de Cadastro de Imóvel Rural CCIR – 1998/1999, quitado com o código do imóvel nº 901.016.054.461-7, com a área de 70.000,0 hás, acompanhado do Ofício/Incra/SR.13/G/Nº 245/02, expedido pelo Incra em 14/03/2002, assinado por João Batista Ferreira dos Santos – Superintendente Regional – Substituto do Incra/MT., Portaria/INCRA/P/ nº 110 de 06/03/2002. **PROPRIETÁRIA: G. LUNARDELLI S/A – AGRICULTURA, COMÉRCIO, COLONIZAÇÃO,** inscrita no CGC/MF sob n.º 58.133.638/0001-80, com sede na Capital de São Paulo, a Avenida Pedroso de Moraes, n.º 433, 14º andar, com seus estatudos Sociais devidamente registrados na Junta Comercial do Estado de São Paulo sob n.º 733.173.80 em sessão de 18-07-1980. **NÚMERO DO REGISTRO ANTERIOR:** Matrículas n.ºs 48.415 e 48.417, livro 2-HF, em 19/04/1993, neste RGI. Cuiabá, 17 de Julho de 2002. Eu, foo' leee' de Ass Assis Oficial que o fiz digitar e conferi.

AV-01-73.958- O imóvel acima foi matriculado conforme Escritura Pública de Remembramento, lavrada às fls. 076/079, do livro nº 555, aos 10/07/2002, nestas notas pelo Tabelião José Pires Miranda de Assis, na qual a proprietária apresentou a Certidão Negativa de Débito-CND com o INSS sob o nº 273942002-21003030, datada de 31/05/2002, certidão essa que foi confirmada por esta Serventia, através da

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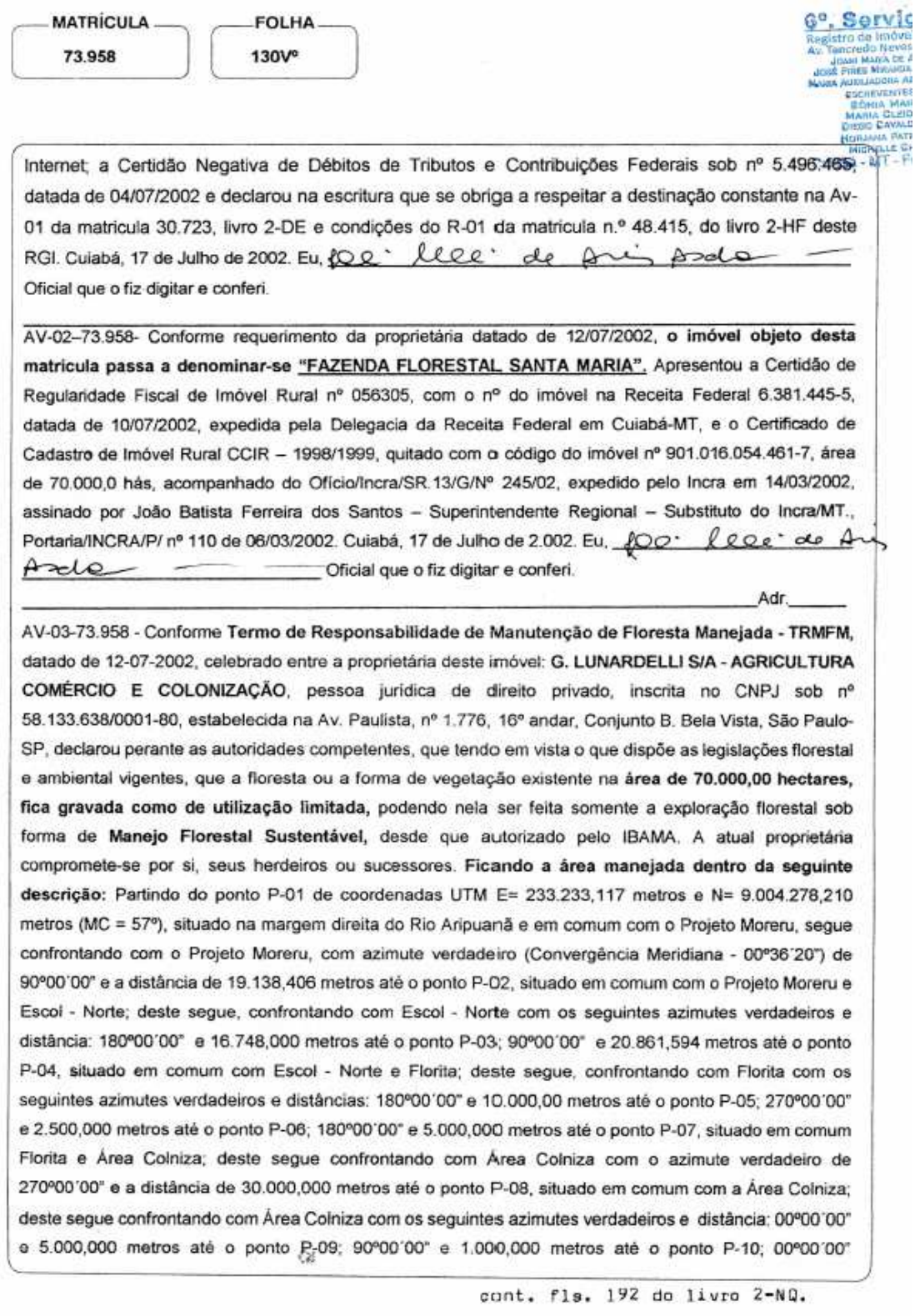
Figure 11. *Documents of proof of title for the FSM farm …. (part 18)*



MATRÍCULA 73.958 FOLHA 130V°

6°. Servic
Registro de Imóve
Av. Tancredo Neves

Internet; a Certidão Negativa de Débitos de Tributos e Contribuições Federais sob nº 5.496.465, datada de 04/07/2002 e declarou na escritura que se obriga a respeitar a destinação constante na Av-01 da matricula 30.723, livro 2-DE e condições do R-01 da matricula n.º 48.415, do livro 2-HF deste RGI. Cuiabá, 17 de Julho de 2002. Eu, [illegible] Oficial que o fiz digitar e conferi.

AV-02–73.958- Conforme requerimento da proprietária datado de 12/07/2002, **o imóvel objeto desta matricula passa a denominar-se "FAZENDA FLORESTAL SANTA MARIA".** Apresentou a Certidão de Regularidade Fiscal de Imóvel Rural nº 056305, com o nº do imóvel na Receita Federal 6.381.445-5, datada de 10/07/2002, expedida pela Delegacia da Receita Federal em Cuiabá-MT, e o Certificado de Cadastro de Imóvel Rural CCIR – 1998/1999, quitado com o código do imóvel nº 901.016.054.461-7, área de 70.000,0 hás, acompanhado do Ofício/Incra/SR.13/G/Nº 245/02, expedido pelo Incra em 14/03/2002, assinado por João Batista Ferreira dos Santos – Superintendente Regional – Substituto do Incra/MT., Portaria/INCRA/P/ nº 110 de 06/03/2002. Cuiabá, 17 de Julho de 2.002. Eu, [illegible] Oficial que o fiz digitar e conferi.

Adr.

AV-03-73.958 - Conforme **Termo de Responsabilidade de Manutenção de Floresta Manejada - TRMFM,** datado de 12-07-2002, celebrado entre a proprietária deste imóvel: **G. LUNARDELLI S/A - AGRICULTURA COMÉRCIO E COLONIZAÇÃO**, pessoa jurídica de direito privado, inscrita no CNPJ sob nº 58.133.638/0001-80, estabelecida na Av. Paulista, nº 1.776, 16º andar, Conjunto B. Bela Vista, São Paulo-SP, declarou perante as autoridades competentes, que tendo em vista o que dispõe as legislações florestal e ambiental vigentes, que a floresta ou a forma de vegetação existente na **área de 70.000,00 hectares, fica gravada como de utilização limitada,** podendo nela ser feita somente a exploração florestal sob forma de **Manejo Florestal Sustentável,** desde que autorizado pelo IBAMA. A atual proprietária compromete-se por si, seus herdeiros ou sucessores. **Ficando a área manejada dentro da seguinte descrição:** Partindo do ponto P-01 de coordenadas UTM E= 233.233,117 metros e N= 9.004.278,210 metros (MC = 57º), situado na margem direita do Rio Aripuanã e em comum com o Projeto Moreru, segue confrontando com o Projeto Moreru, com azimute verdadeiro (Convergência Meridiana - 00º36'20") de 90º00'00" e a distância de 19.138,406 metros até o ponto P-02, situado em comum com o Projeto Moreru e Escol - Norte; deste segue, confrontando com Escol - Norte com os seguintes azimutes verdadeiros e distância: 180º00'00" e 16.748,000 metros até o ponto P-03; 90º00'00" e 20.861,594 metros até o ponto P-04, situado em comum com Escol - Norte e Florita; deste segue, confrontando com Florita com os seguintes azimutes verdadeiros e distâncias: 180º00'00" e 10.000,00 metros até o ponto P-05; 270º00'00" e 2.500,000 metros até o ponto P-06; 180º00'00" e 5.000,000 metros até o ponto P-07, situado em comum Florita e Área Colniza; deste segue confrontando com Área Colniza com o azimute verdadeiro de 270º00'00" e a distância de 30.000,000 metros até o ponto P-08, situado em comum com a Área Colniza; deste segue confrontando com Área Colniza com os seguintes azimutes verdadeiros e distância: 00º00'00" e 5.000,000 metros até o ponto P-09; 90º00'00" e 1.000,000 metros até o ponto P-10; 00º00'00"

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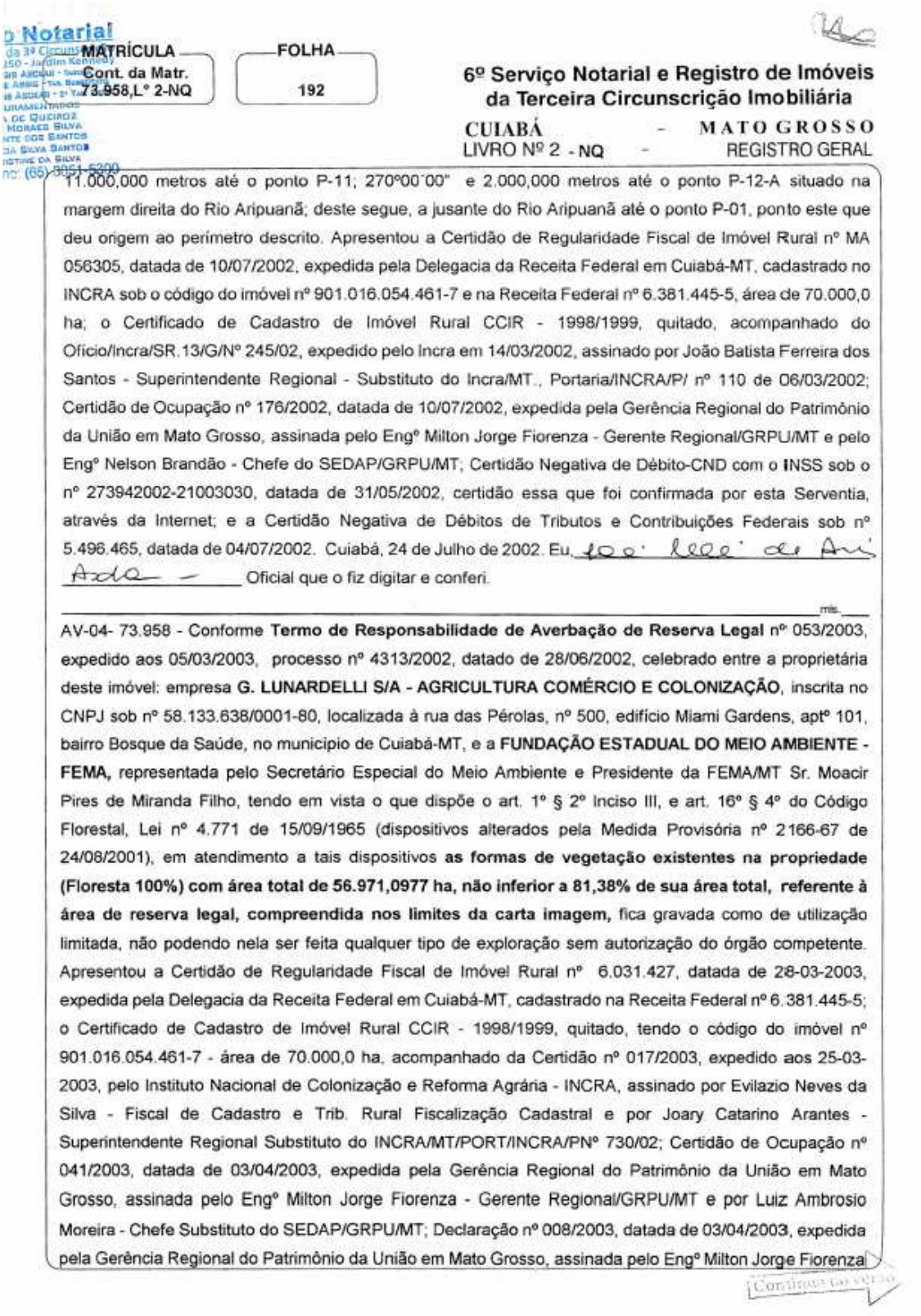
Figure 11. *Documents of proof of title for the FSM farm …. (part 19)*



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MATRÍCULA Cont. da Matr. 73.958,L° 2-NQ | FOLHA 192

6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária

CUIABÁ - MATO GROSSO
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11.000,000 metros até o ponto P-11; 270°00'00" e 2.000,000 metros até o ponto P-12-A situado na margem direita do Rio Aripuanã; deste segue, a jusante do Rio Aripuanã até o ponto P-01, ponto este que deu origem ao perímetro descrito. Apresentou a Certidão de Regularidade Fiscal de Imóvel Rural nº MA 056305, datada de 10/07/2002, expedida pela Delegacia da Receita Federal em Cuiabá-MT, cadastrado no INCRA sob o código do imóvel nº 901.016.054.461-7 e na Receita Federal nº 6.381.445-5, área de 70.000,0 ha; o Certificado de Cadastro de Imóvel Rural CCIR - 1998/1999, quitado, acompanhado do Ofício/Incra/SR.13/G/Nº 245/02, expedido pelo Incra em 14/03/2002, assinado por João Batista Ferreira dos Santos - Superintendente Regional - Substituto do Incra/MT., Portaria/INCRA/P/ nº 110 de 06/03/2002; Certidão de Ocupação nº 176/2002, datada de 10/07/2002, expedida pela Gerência Regional do Patrimônio da União em Mato Grosso, assinada pelo Engº Milton Jorge Fiorenza - Gerente Regional/GRPU/MT e pelo Engº Nelson Brandão - Chefe do SEDAP/GRPU/MT; Certidão Negativa de Débito-CND com o INSS sob o nº 273942002-21003030, datada de 31/05/2002, certidão essa que foi confirmada por esta Serventia, através da Internet; e a Certidão Negativa de Débitos de Tributos e Contribuições Federais sob nº 5.496.465, datada de 04/07/2002. Cuiabá, 24 de Julho de 2002. Eu, [illegible] Oficial que o fiz digitar e conferi.

AV-04- 73.958 - Conforme **Termo de Responsabilidade de Averbação de Reserva Legal** nº 053/2003, expedido aos 05/03/2003, processo nº 4313/2002, datado de 28/06/2002, celebrado entre a proprietária deste imóvel: empresa **G. LUNARDELLI S/A - AGRICULTURA COMÉRCIO E COLONIZAÇÃO**, inscrita no CNPJ sob nº 58.133.638/0001-80, localizada à rua das Pérolas, nº 500, edifício Miami Gardens, aptº 101, bairro Bosque da Saúde, no município de Cuiabá-MT, e a **FUNDAÇÃO ESTADUAL DO MEIO AMBIENTE - FEMA,** representada pelo Secretário Especial do Meio Ambiente e Presidente da FEMA/MT Sr. Moacir Pires de Miranda Filho, tendo em vista o que dispõe o art. 1º § 2º Inciso III, e art. 16º § 4º do Código Florestal, Lei nº 4.771 de 15/09/1965 (dispositivos alterados pela Medida Provisória nº 2166-67 de 24/08/2001), em atendimento a tais dispositivos **as formas de vegetação existentes na propriedade (Floresta 100%) com área total de 56.971,0977 ha, não inferior a 81,38% de sua área total, referente à área de reserva legal, compreendida nos limites da carta imagem,** fica gravada como de utilização limitada, não podendo nela ser feita qualquer tipo de exploração sem autorização do órgão competente. Apresentou a Certidão de Regularidade Fiscal de Imóvel Rural nº 6.031.427, datada de 28-03-2003, expedida pela Delegacia da Receita Federal em Cuiabá-MT, cadastrado na Receita Federal nº 6.381.445-5; o Certificado de Cadastro de Imóvel Rural CCIR - 1998/1999, quitado, tendo o código do imóvel nº 901.016.054.461-7 - área de 70.000,0 ha, acompanhado da Certidão nº 017/2003, expedido aos 25-03-2003, pelo Instituto Nacional de Colonização e Reforma Agrária - INCRA, assinado por Evilazio Neves da Silva - Fiscal de Cadastro e Trib. Rural Fiscalização Cadastral e por Joary Catarino Arantes - Superintendente Regional Substituto do INCRA/MT/PORT/INCRA/PNº 730/02; Certidão de Ocupação nº 041/2003, datada de 03/04/2003, expedida pela Gerência Regional do Patrimônio da União em Mato Grosso, assinada pelo Engº Milton Jorge Fiorenza - Gerente Regional/GRPU/MT e por Luiz Ambrosio Moreira - Chefe Substituto do SEDAP/GRPU/MT; Declaração nº 008/2003, datada de 03/04/2003, expedida pela Gerência Regional do Patrimônio da União em Mato Grosso, assinada pelo Engº Milton Jorge Fiorenza

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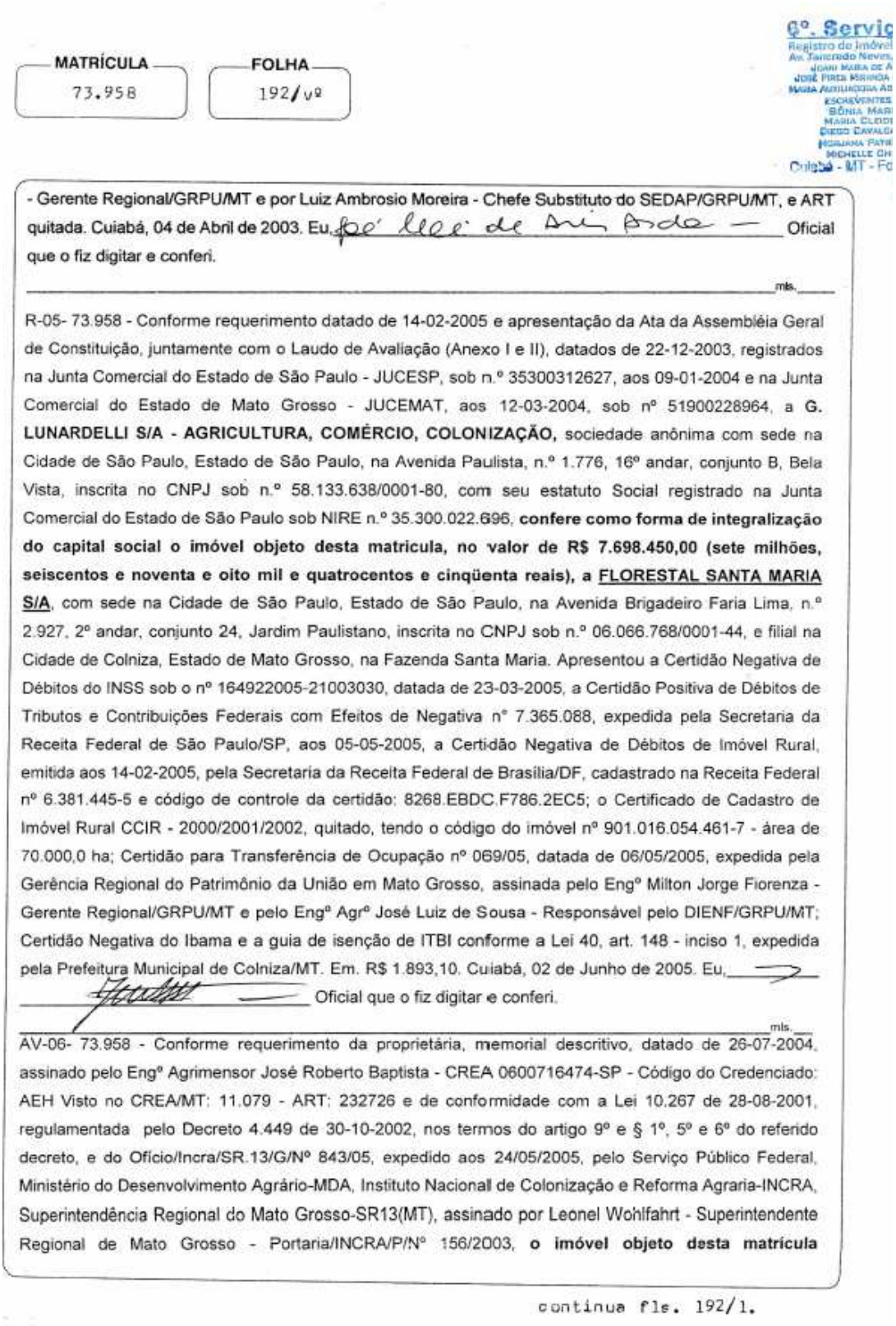
Figure 11. *Documents of proof of title for the FSM farm …. (part 20)*



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DIEGO CAVALC
MORJANA PATRI
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- Gerente Regional/GRPU/MT e por Luiz Ambrosio Moreira - Chefe Substituto do SEDAP/GRPU/MT, e ART quitada. Cuiabá, 04 de Abril de 2003. Eu, _____ Oficial que o fiz digitar e conferi.

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R-05- 73.958 - Conforme requerimento datado de 14-02-2005 e apresentação da Ata da Assembléia Geral de Constituição, juntamente com o Laudo de Avaliação (Anexo I e II), datados de 22-12-2003, registrados na Junta Comercial do Estado de São Paulo - JUCESP, sob n.º 35300312627, aos 09-01-2004 e na Junta Comercial do Estado de Mato Grosso - JUCEMAT, aos 12-03-2004, sob nº 51900228964, a **G. LUNARDELLI S/A - AGRICULTURA, COMÉRCIO, COLONIZAÇÃO,** sociedade anônima com sede na Cidade de São Paulo, Estado de São Paulo, na Avenida Paulista, n.º 1.776, 16º andar, conjunto B, Bela Vista, inscrita no CNPJ sob n.º 58.133.638/0001-80, com seu estatuto Social registrado na Junta Comercial do Estado de São Paulo sob NIRE n.º 35.300.022.696, **confere como forma de integralização do capital social o imóvel objeto desta matricula, no valor de R$ 7.698.450,00 (sete milhões, seiscentos e noventa e oito mil e quatrocentos e cinqüenta reais), a FLORESTAL SANTA MARIA S/A**, com sede na Cidade de São Paulo, Estado de São Paulo, na Avenida Brigadeiro Faria Lima, n.º 2.927, 2º andar, conjunto 24, Jardim Paulistano, inscrita no CNPJ sob n.º 06.066.768/0001-44, e filial na Cidade de Colniza, Estado de Mato Grosso, na Fazenda Santa Maria. Apresentou a Certidão Negativa de Débitos do INSS sob o nº 164922005-21003030, datada de 23-03-2005, a Certidão Positiva de Débitos de Tributos e Contribuições Federais com Efeitos de Negativa nº 7.365.088, expedida pela Secretaria da Receita Federal de São Paulo/SP, aos 05-05-2005, a Certidão Negativa de Débitos de Imóvel Rural, emitida aos 14-02-2005, pela Secretaria da Receita Federal de Brasília/DF, cadastrado na Receita Federal nº 6.381.445-5 e código de controle da certidão: 8268.EBDC.F786.2EC5; o Certificado de Cadastro de Imóvel Rural CCIR - 2000/2001/2002, quitado, tendo o código do imóvel nº 901.016.054.461-7 - área de 70.000,0 ha; Certidão para Transferência de Ocupação nº 069/05, datada de 06/05/2005, expedida pela Gerência Regional do Patrimônio da União em Mato Grosso, assinada pelo Engº Milton Jorge Fiorenza - Gerente Regional/GRPU/MT e pelo Engº Agrº José Luiz de Sousa - Responsável pelo DIENF/GRPU/MT; Certidão Negativa do Ibama e a guia de isenção de ITBI conforme a Lei 40, art. 148 - inciso 1, expedida pela Prefeitura Municipal de Colniza/MT. Em. R$ 1.893,10. Cuiabá, 02 de Junho de 2005. Eu, _____ Oficial que o fiz digitar e conferi.

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AV-06- 73.958 - Conforme requerimento da proprietária, memorial descritivo, datado de 26-07-2004, assinado pelo Engº Agrimensor José Roberto Baptista - CREA 0600716474-SP - Código do Credenciado: AEH Visto no CREA/MT: 11.079 - ART: 232726 e de conformidade com a Lei 10.267 de 28-08-2001, regulamentada pelo Decreto 4.449 de 30-10-2002, nos termos do artigo 9º e § 1º, 5º e 6º do referido decreto, e do Ofício/Incra/SR.13/G/Nº 843/05, expedido aos 24/05/2005, pelo Serviço Público Federal, Ministério do Desenvolvimento Agrário-MDA, Instituto Nacional de Colonização e Reforma Agraria-INCRA, Superintendência Regional do Mato Grosso-SR13(MT), assinado por Leonel Wohlfahrt - Superintendente Regional de Mato Grosso - Portaria/INCRA/P/Nº 156/2003, **o imóvel objeto desta matrícula**

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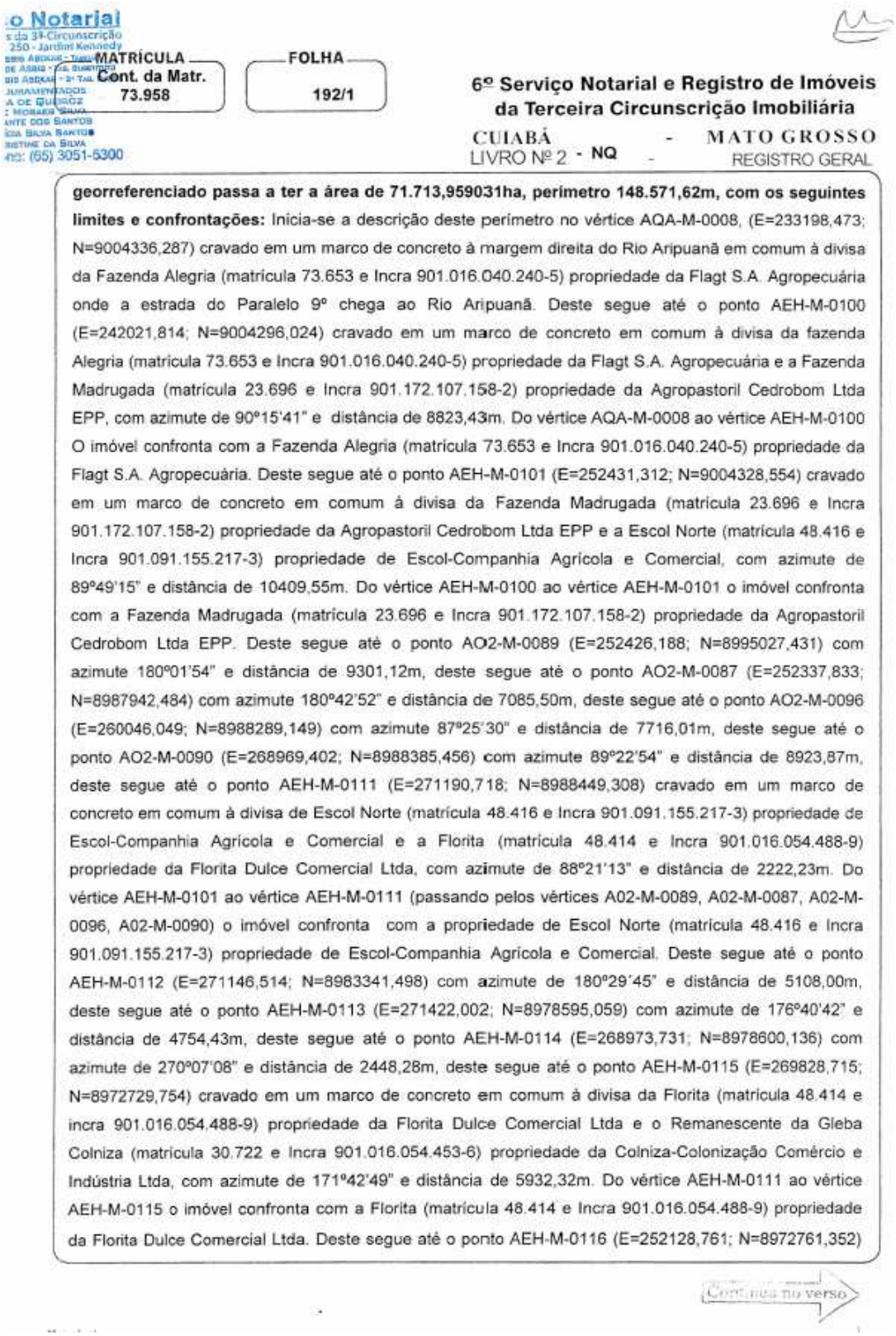
Figure 11. *Documents of proof of title for the FSM farm …. (part 21)*



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FOLHA 192/1

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georreferenciado passa a ter a área de 71.713,959031ha, perímetro 148.571,62m, com os seguintes limites e confrontações: Inicia-se a descrição deste perímetro no vértice AQA-M-0008, (E=233198,473; N=9004336,287) cravado em um marco de concreto à margem direita do Rio Aripuanã em comum à divisa da Fazenda Alegria (matrícula 73.653 e Incra 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária onde a estrada do Paralelo 9º chega ao Rio Aripuanã. Deste segue até o ponto AEH-M-0100 (E=242021,814; N=9004296,024) cravado em um marco de concreto em comum à divisa da fazenda Alegria (matrícula 73.653 e Incra 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária e a Fazenda Madrugada (matrícula 23.696 e Incra 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP, com azimute de 90º15'41" e distância de 8823,43m. Do vértice AQA-M-0008 ao vértice AEH-M-0100 O imóvel confronta com a Fazenda Alegria (matrícula 73.653 e Incra 901.016.040.240-5) propriedade da Flagt S.A. Agropecuária. Deste segue até o ponto AEH-M-0101 (E=252431,312; N=9004328,554) cravado em um marco de concreto em comum à divisa da Fazenda Madrugada (matrícula 23.696 e Incra 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP e a Escol Norte (matrícula 48.416 e Incra 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial, com azimute de 89º49'15" e distância de 10409,55m. Do vértice AEH-M-0100 ao vértice AEH-M-0101 o imóvel confronta com a Fazenda Madrugada (matrícula 23.696 e Incra 901.172.107.158-2) propriedade da Agropastoril Cedrobom Ltda EPP. Deste segue até o ponto AO2-M-0089 (E=252426,188; N=8995027,431) com azimute 180º01'54" e distância de 9301,12m, deste segue até o ponto AO2-M-0087 (E=252337,833; N=8987942,484) com azimute 180º42'52" e distância de 7085,50m, deste segue até o ponto AO2-M-0096 (E=260046,049; N=8988289,149) com azimute 87º25'30" e distância de 7716,01m, deste segue até o ponto AO2-M-0090 (E=268969,402; N=8988385,456) com azimute 89º22'54" e distância de 8923,87m, deste segue até o ponto AEH-M-0111 (E=271190,718; N=8988449,308) cravado em um marco de concreto em comum à divisa de Escol Norte (matrícula 48.416 e Incra 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial e a Florita (matrícula 48.414 e Incra 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda, com azimute de 88º21'13" e distância de 2222,23m. Do vértice AEH-M-0101 ao vértice AEH-M-0111 (passando pelos vértices A02-M-0089, A02-M-0087, A02-M-0096, A02-M-0090) o imóvel confronta com a propriedade de Escol Norte (matrícula 48.416 e Incra 901.091.155.217-3) propriedade de Escol-Companhia Agrícola e Comercial. Deste segue até o ponto AEH-M-0112 (E=271146,514; N=8983341,498) com azimute de 180º29'45" e distância de 5108,00m, deste segue até o ponto AEH-M-0113 (E=271422,002; N=8978595,059) com azimute de 176º40'42" e distância de 4754,43m, deste segue até o ponto AEH-M-0114 (E=268973,731; N=8978600,136) com azimute de 270º07'08" e distância de 2448,28m, deste segue até o ponto AEH-M-0115 (E=269828,715; N=8972729,754) cravado em um marco de concreto em comum à divisa da Florita (matrícula 48.414 e incra 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda e o Remanescente da Gleba Colniza (matrícula 30.722 e Incra 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda, com azimute de 171º42'49" e distância de 5932,32m. Do vértice AEH-M-0111 ao vértice AEH-M-0115 o imóvel confronta com a Florita (matrícula 48.414 e Incra 901.016.054.488-9) propriedade da Florita Dulce Comercial Ltda. Deste segue até o ponto AEH-M-0116 (E=252128,761; N=8972761,352)

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Figure 11. *Documents of proof of title for the FSM farm …. (part 22)*

MATRÍCULA 73.958 FOLHA 192/1/vº

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cravado em um marco de concreto em comum à divisa do Remanescente da Gleba Colniza (matrícula 30.722 e Incra 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda e o P.A. Perseverança Pacutinga (Incra 950.033.355.380-0), com azimute de 270°06'08" e distância de 17699,98m. Do vértice AEH-M-0115 ao vértice AEH-M-0116 o imóvel confronta com o Remanescente da Gleba Colniza (matrícula 30.722 e Incra 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda. Deste segue até o ponto AEH-M-0117 (E=252051,338; N=8972875,616) com azimute de 325°52'45" e distância de 138,02m, deste segue até o ponto AEH-M-0118 (E=249808,382; N=8972777,152) com azimute de 267°29'11" e distância de 2245,12m, deste segue até o ponto AEH-M-0119 (E=247535,230; N=8972677,691) com azimute de 267°29'41" e distância de 2275,33m, deste segue até o ponto AEH-M-0120 (E=245303,351; N=8972578,406) com azimute de 267°27'10" e distância de 2234,09m, deste segue até o ponto AEH-M-0121 (E=243033,386; N=8972504,459) cravado em um marco de concreto em comum à divisa do P.A. Perseverança Pacutinga (Incra 950.033.355.380-0) e o Remanescente da Gleba Colniza (matrícula 30.722 e Incra 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda, com azimute de 268°08'03" e distância de 2271,17m. Do vértice AEH-M-0116 ao vértice AEH-M-0121 o imóvel confronta com o P.A. Perseverança Pacutinga (Incra 950.033.355.380-0). Deste segue até o ponto AEH-M-0122 (E=241215,122; N=8972445,227) com azimute de 268°08'03" e distância de 1819,23m, deste segue até o ponto AEH-M-0128 (E=237843,054; N=8972335,378) cravado em um marco de concreto junto à margem direita do Rio Aripuanã no alinhamento do picadão que seque do Rio Aripuanã em direção à sede da Fazenda Florestal Santa Maria, com azimute de 268°08'03" e distância de 3373,86m. Do vértice AEH-M-0121 ao vértice AEH-M-0128 (passando pelo vértice AEH-M-0122) o imóvel volta a confrontar com o Remanescente da Gleba Colniza (matrícula 30.722 e Incra 901.016.054.453-6) propriedade da Colniza-Colonização Comércio e Indústria Ltda. Deste segue a jusante pela margem direita do Rio Aripuanã até o vértice AEH-P-0001 (E=237875,028; N=8972414,955) com azimute de 21°53'26" e distância de 85,76m, deste segue até o ponto AEH-P-0002 (E=237998,559; N=8972576,342) com azimute de 37°25'54" e distância de 203,24m, deste segue até o ponto AEH-P-0003 (E=238021,277; N=8972678,077) com azimute de 12°35'16" e distância de 104,24m, deste segue até o ponto AEH-P-0004 (E=238239,074; N=8972900,418) com azimute de 44°24'31" e distância de 311,24m, deste segue até o ponto AEH-P-0005 (E=238309,847; N=8973095,561) com azimute de 19°56'03" e distância de 207,58m, deste segue até o ponto AEH-P-0006 (E=238348,257; N=8973323,968) com azimute de 9°32'45" e distância de 231,61m, deste segue até o ponto AEH-P-0007 (E=238571,042; N=8973416,012) com azimute de 67°33'07" e distância de 241,05m, deste segue até o ponto AEH-P-0008 (E=238779,306; N=8973895,682) com azimute de 23°28'11" e distância de 522,93m, deste segue até o ponto AEH-P-0009 (E=238952,930; N=8974063,727) com azimute de 45°56'07" e distância de 241,63m, deste segue até o ponto AEH-P-0010 (E=239005,953; N=8974354,213) com azimute de 10°20'40" e distância de 295,29m, deste segue até o ponto AEH-P-0011 (E=238518,708); N=8975022,145) com azimute de 323°53'24" e distância de 826,77m, deste segue até o ponto AEH-P-0012 (E=237757,609; N=8975468,790) com azimute de 300°24'22" e distância de 882,48m, deste segue até o ponto AEH-P-0013 (E=237520,705; N=8975731,770) com azimute de 317°59'10" e

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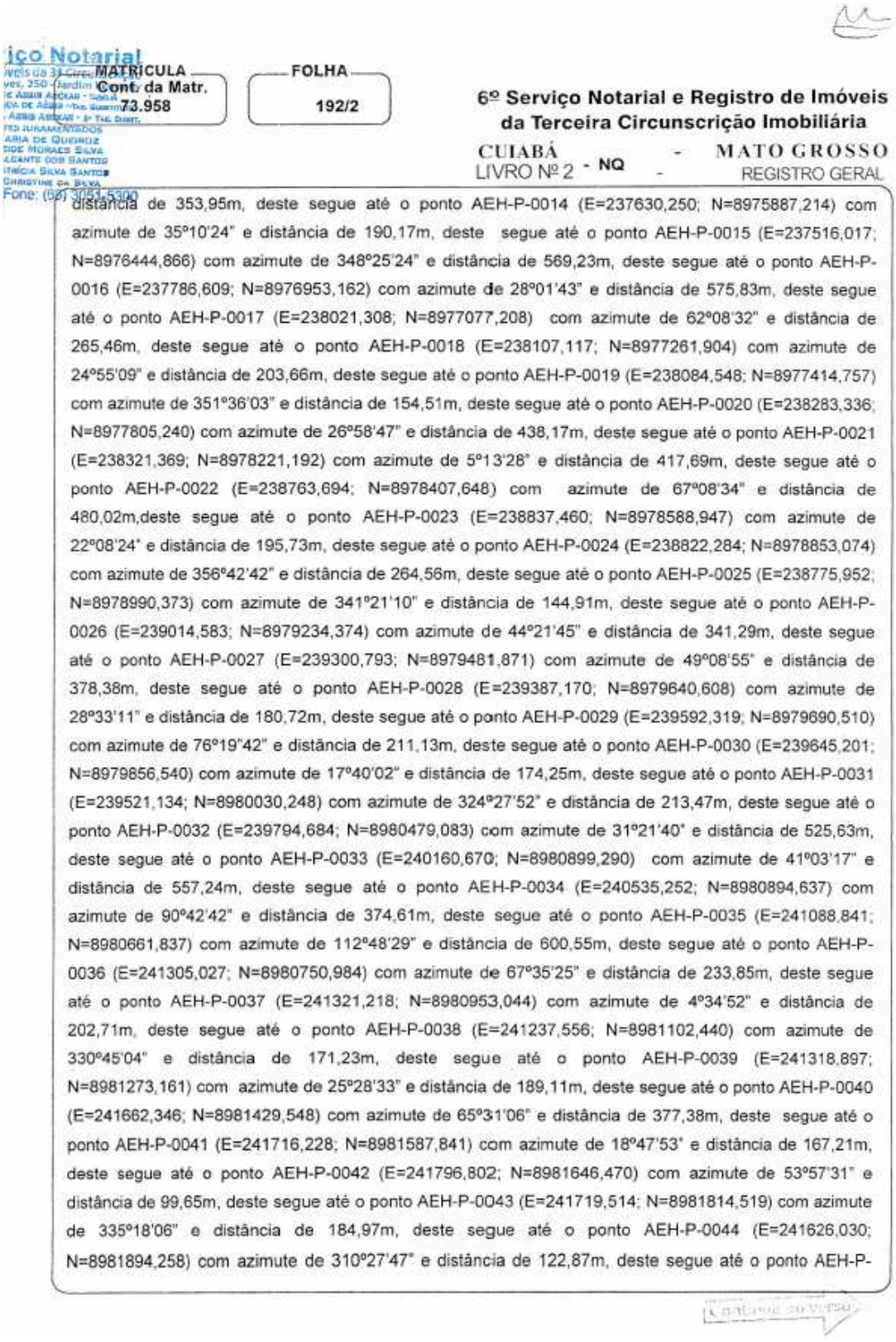
Figure 11. *Documents of proof of title for the FSM farm …. (part 23)*



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MATRÍCULA Cont. da Matr. 73.958
FOLHA 192/2
6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária
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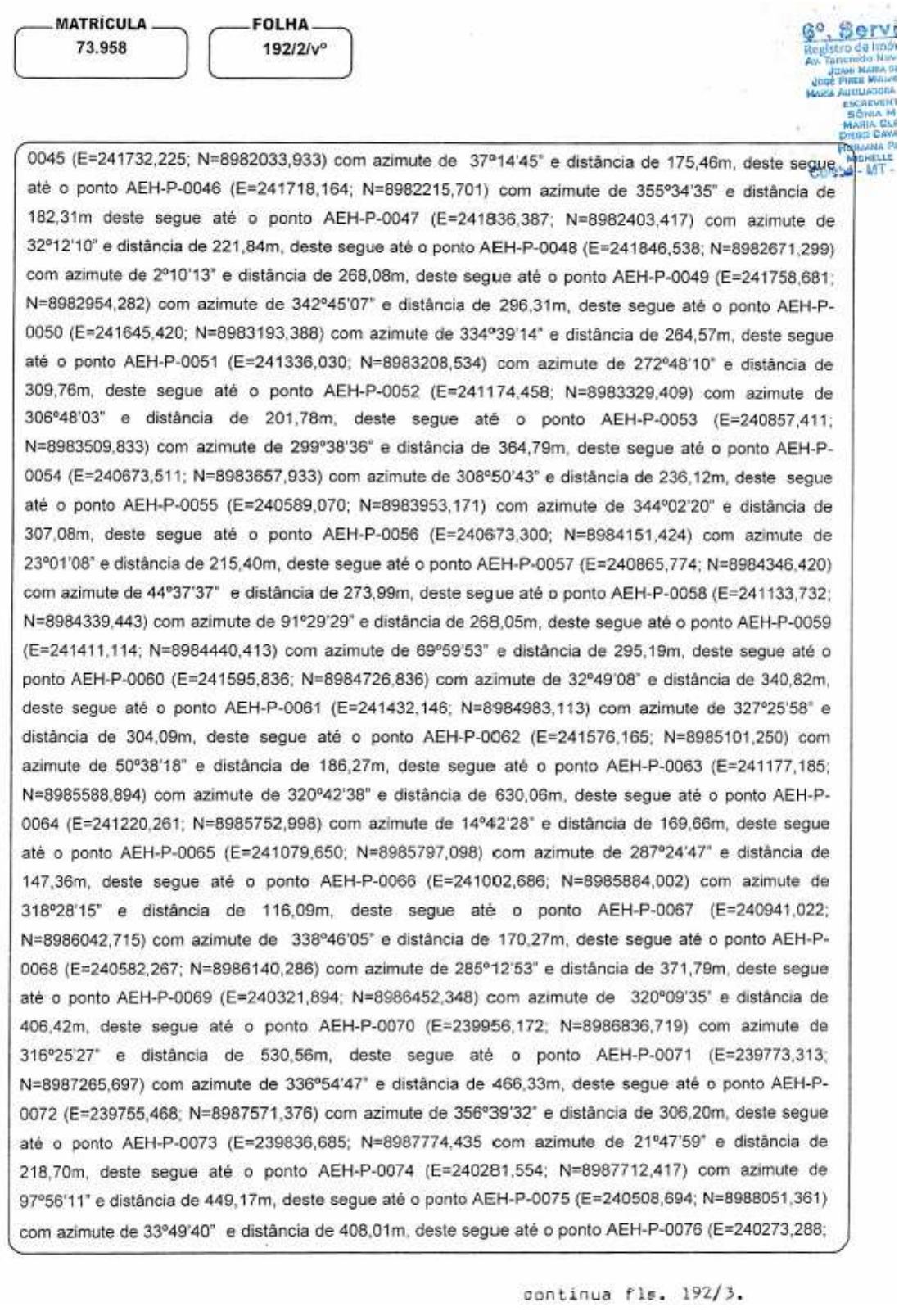
distância de 353,95m, deste segue até o ponto AEH-P-0014 (E=237630,250; N=8975887,214) com azimute de 35°10'24" e distância de 190,17m, deste segue até o ponto AEH-P-0015 (E=237516,017; N=8976444,866) com azimute de 348°25'24" e distância de 569,23m, deste segue até o ponto AEH-P-0016 (E=237786,609; N=8976953,162) com azimute de 28°01'43" e distância de 575,83m, deste segue até o ponto AEH-P-0017 (E=238021,308; N=8977077,208) com azimute de 62°08'32" e distância de 265,46m, deste segue até o ponto AEH-P-0018 (E=238107,117; N=8977261,904) com azimute de 24°55'09" e distância de 203,66m, deste segue até o ponto AEH-P-0019 (E=238084,548; N=8977414,757) com azimute de 351°36'03" e distância de 154,51m, deste segue até o ponto AEH-P-0020 (E=238283,336; N=8977805,240) com azimute de 26°58'47" e distância de 438,17m, deste segue até o ponto AEH-P-0021 (E=238321,369; N=8978221,192) com azimute de 5°13'28" e distância de 417,69m, deste segue até o ponto AEH-P-0022 (E=238763,694; N=8978407,648) com azimute de 67°08'34" e distância de 480,02m,deste segue até o ponto AEH-P-0023 (E=238837,460; N=8978588,947) com azimute de 22°08'24" e distância de 195,73m, deste segue até o ponto AEH-P-0024 (E=238822,284; N=8978853,074) com azimute de 356°42'42" e distância de 264,56m, deste segue até o ponto AEH-P-0025 (E=238775,952; N=8978990,373) com azimute de 341°21'10" e distância de 144,91m, deste segue até o ponto AEH-P-0026 (E=239014,583; N=8979234,374) com azimute de 44°21'45" e distância de 341,29m, deste segue até o ponto AEH-P-0027 (E=239300,793; N=8979481,871) com azimute de 49°08'55" e distância de 378,38m, deste segue até o ponto AEH-P-0028 (E=239387,170; N=8979640,608) com azimute de 28°33'11" e distância de 180,72m, deste segue até o ponto AEH-P-0029 (E=239592,319; N=8979690,510) com azimute de 76°19'42" e distância de 211,13m, deste segue até o ponto AEH-P-0030 (E=239645,201; N=8979856,540) com azimute de 17°40'02" e distância de 174,25m, deste segue até o ponto AEH-P-0031 (E=239521,134; N=8980030,248) com azimute de 324°27'52" e distância de 213,47m, deste segue até o ponto AEH-P-0032 (E=239794,684; N=8980479,083) com azimute de 31°21'40" e distância de 525,63m, deste segue até o ponto AEH-P-0033 (E=240160,670; N=8980899,290) com azimute de 41°03'17" e distância de 557,24m, deste segue até o ponto AEH-P-0034 (E=240535,252; N=8980894,637) com azimute de 90°42'42" e distância de 374,61m, deste segue até o ponto AEH-P-0035 (E=241088,841; N=8980661,837) com azimute de 112°48'29" e distância de 600,55m, deste segue até o ponto AEH-P-0036 (E=241305,027; N=8980750,984) com azimute de 67°35'25" e distância de 233,85m, deste segue até o ponto AEH-P-0037 (E=241321,218; N=8980953,044) com azimute de 4°34'52" e distância de 202,71m, deste segue até o ponto AEH-P-0038 (E=241237,556; N=8981102,440) com azimute de 330°45'04" e distância de 171,23m, deste segue até o ponto AEH-P-0039 (E=241318,897; N=8981273,161) com azimute de 25°28'33" e distância de 189,11m, deste segue até o ponto AEH-P-0040 (E=241662,346; N=8981429,548) com azimute de 65°31'06" e distância de 377,38m, deste segue até o ponto AEH-P-0041 (E=241716,228; N=8981587,841) com azimute de 18°47'53" e distância de 167,21m, deste segue até o ponto AEH-P-0042 (E=241796,802; N=8981646,470) com azimute de 53°57'31" e distância de 99,65m, deste segue até o ponto AEH-P-0043 (E=241719,514; N=8981814,519) com azimute de 335°18'06" e distância de 184,97m, deste segue até o ponto AEH-P-0044 (E=241626,030; N=8981894,258) com azimute de 310°27'47" e distância de 122,87m, deste segue até o ponto AEH-P-

Figure 11. *Documents of proof of title for the FSM farm …. (part 24)*



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0045 (E=241732,225; N=8982033,933) com azimute de 37º14'45" e distância de 175,46m, deste segue até o ponto AEH-P-0046 (E=241718,164; N=8982215,701) com azimute de 355º34'35" e distância de 182,31m deste segue até o ponto AEH-P-0047 (E=241836,387; N=8982403,417) com azimute de 32º12'10" e distância de 221,84m, deste segue até o ponto AEH-P-0048 (E=241846,538; N=8982671,299) com azimute de 2º10'13" e distância de 268,08m, deste segue até o ponto AEH-P-0049 (E=241758,681; N=8982954,282) com azimute de 342º45'07" e distância de 296,31m, deste segue até o ponto AEH-P-0050 (E=241645,420; N=8983193,388) com azimute de 334º39'14" e distância de 264,57m, deste segue até o ponto AEH-P-0051 (E=241336,030; N=8983208,534) com azimute de 272º48'10" e distância de 309,76m, deste segue até o ponto AEH-P-0052 (E=241174,458; N=8983329,409) com azimute de 306º48'03" e distância de 201,78m, deste segue até o ponto AEH-P-0053 (E=240857,411; N=8983509,833) com azimute de 299º38'36" e distância de 364,79m, deste segue até o ponto AEH-P-0054 (E=240673,511; N=8983657,933) com azimute de 308º50'43" e distância de 236,12m, deste segue até o ponto AEH-P-0055 (E=240589,070; N=8983953,171) com azimute de 344º02'20" e distância de 307,08m, deste segue até o ponto AEH-P-0056 (E=240673,300; N=8984151,424) com azimute de 23º01'08" e distância de 215,40m, deste segue até o ponto AEH-P-0057 (E=240865,774; N=8984346,420) com azimute de 44º37'37" e distância de 273,99m, deste segue até o ponto AEH-P-0058 (E=241133,732; N=8984339,443) com azimute de 91º29'29" e distância de 268,05m, deste segue até o ponto AEH-P-0059 (E=241411,114; N=8984440,413) com azimute de 69º59'53" e distância de 295,19m, deste segue até o ponto AEH-P-0060 (E=241595,836; N=8984726,836) com azimute de 32º49'08" e distância de 340,82m, deste segue até o ponto AEH-P-0061 (E=241432,146; N=8984983,113) com azimute de 327º25'58" e distância de 304,09m, deste segue até o ponto AEH-P-0062 (E=241576,165; N=8985101,250) com azimute de 50º38'18" e distância de 186,27m, deste segue até o ponto AEH-P-0063 (E=241177,185; N=8985588,894) com azimute de 320º42'38" e distância de 630,06m, deste segue até o ponto AEH-P-0064 (E=241220,261; N=8985752,998) com azimute de 14º42'28" e distância de 169,66m, deste segue até o ponto AEH-P-0065 (E=241079,650; N=8985797,098) com azimute de 287º24'47" e distância de 147,36m, deste segue até o ponto AEH-P-0066 (E=241002,686; N=8985884,002) com azimute de 318º28'15" e distância de 116,09m, deste segue até o ponto AEH-P-0067 (E=240941,022; N=8986042,715) com azimute de 338º46'05" e distância de 170,27m, deste segue até o ponto AEH-P-0068 (E=240582,267; N=8986140,286) com azimute de 285º12'53" e distância de 371,79m, deste segue até o ponto AEH-P-0069 (E=240321,894; N=8986452,348) com azimute de 320º09'35" e distância de 406,42m, deste segue até o ponto AEH-P-0070 (E=239956,172; N=8986836,719) com azimute de 316º25'27" e distância de 530,56m, deste segue até o ponto AEH-P-0071 (E=239773,313; N=8987265,697) com azimute de 336º54'47" e distância de 466,33m, deste segue até o ponto AEH-P-0072 (E=239755,468; N=8987571,376) com azimute de 356º39'32" e distância de 306,20m, deste segue até o ponto AEH-P-0073 (E=239836,685; N=8987774,435 com azimute de 21º47'59" e distância de 218,70m, deste segue até o ponto AEH-P-0074 (E=240281,554; N=8987712,417) com azimute de 97º56'11" e distância de 449,17m, deste segue até o ponto AEH-P-0075 (E=240508,694; N=8988051,361) com azimute de 33º49'40" e distância de 408,01m, deste segue até o ponto AEH-P-0076 (E=240273,288;

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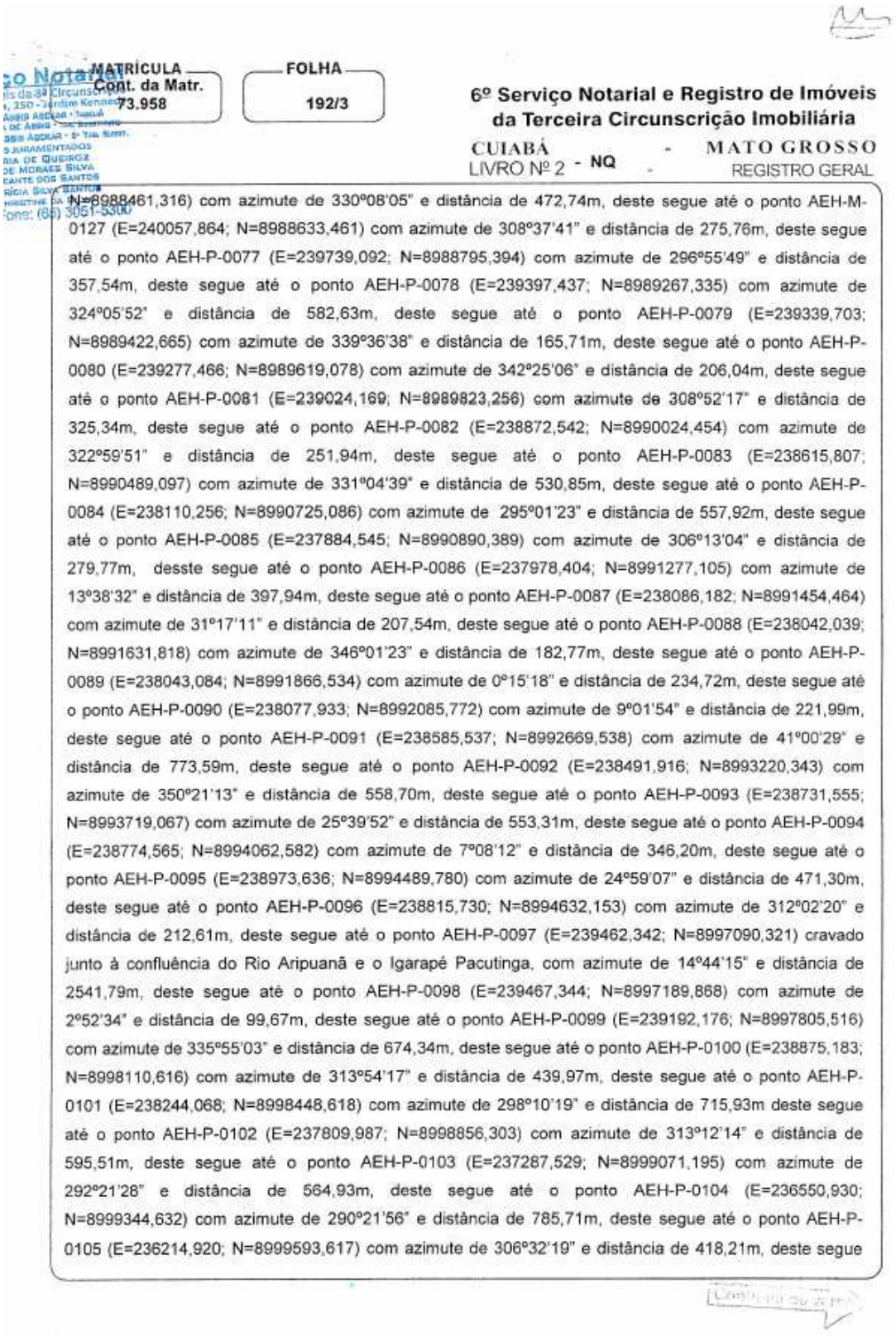
Figure 11. *Documents of proof of title for the FSM farm …. (part 25)*



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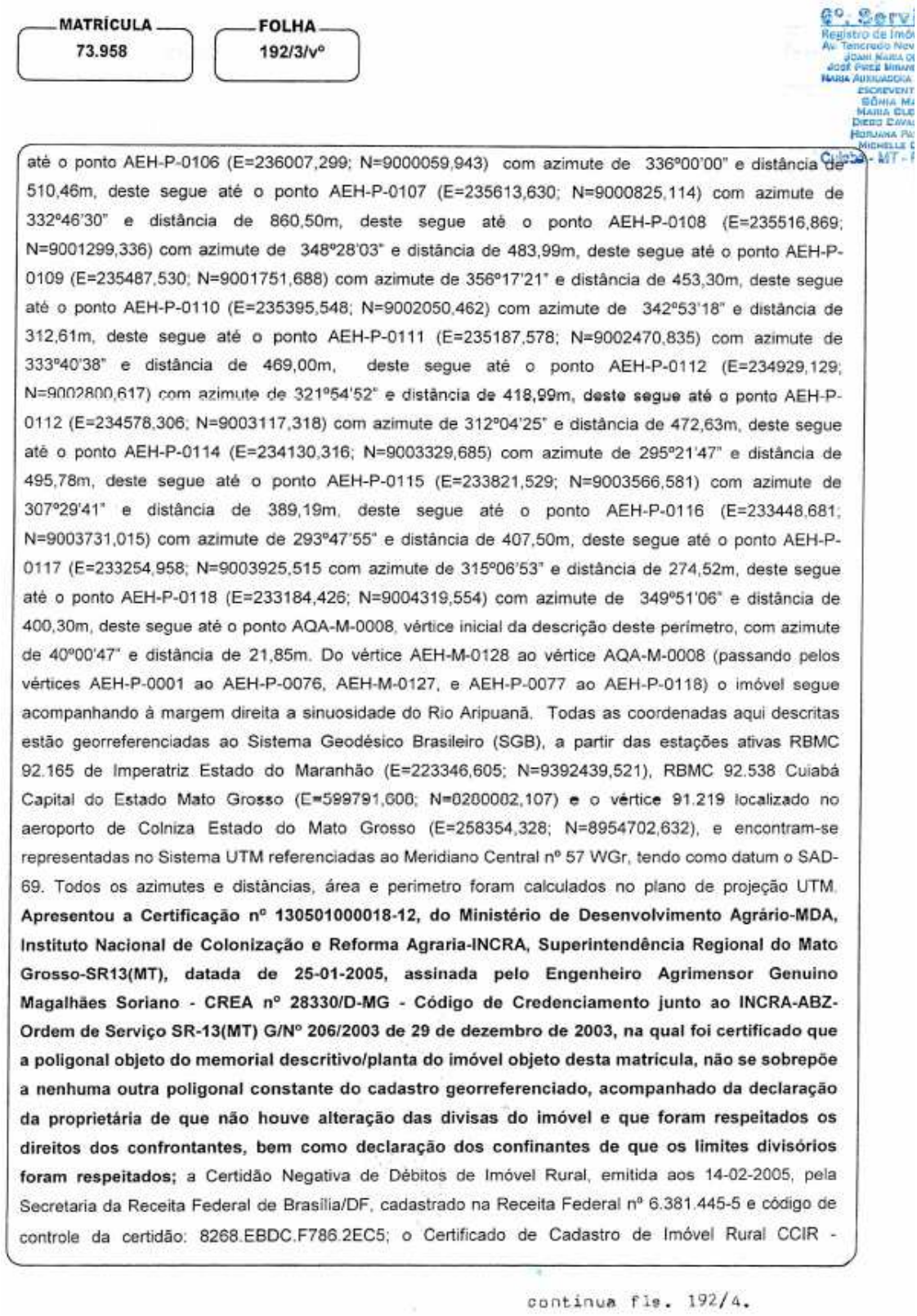
N=8988461,316) com azimute de 330°08'05" e distância de 472,74m, deste segue até o ponto AEH-M-0127 (E=240057,864; N=8988633,461) com azimute de 308°37'41" e distância de 275,76m, deste segue até o ponto AEH-P-0077 (E=239739,092; N=8988795,394) com azimute de 296°55'49" e distância de 357,54m, deste segue até o ponto AEH-P-0078 (E=239397,437; N=8989267,335) com azimute de 324°05'52" e distância de 582,63m, deste segue até o ponto AEH-P-0079 (E=239339,703; N=8989422,665) com azimute de 339°36'38" e distância de 165,71m, deste segue até o ponto AEH-P-0080 (E=239277,466; N=8989619,078) com azimute de 342°25'06" e distância de 206,04m, deste segue até o ponto AEH-P-0081 (E=239024,169; N=8989823,256) com azimute de 308°52'17" e distância de 325,34m, deste segue até o ponto AEH-P-0082 (E=238872,542; N=8990024,454) com azimute de 322°59'51" e distância de 251,94m, deste segue até o ponto AEH-P-0083 (E=238615,807; N=8990489,097) com azimute de 331°04'39" e distância de 530,85m, deste segue até o ponto AEH-P-0084 (E=238110,256; N=8990725,086) com azimute de 295°01'23" e distância de 557,92m, deste segue até o ponto AEH-P-0085 (E=237884,545; N=8990890,389) com azimute de 306°13'04" e distância de 279,77m, desste segue até o ponto AEH-P-0086 (E=237978,404; N=8991277,105) com azimute de 13°38'32" e distância de 397,94m, deste segue até o ponto AEH-P-0087 (E=238086,182; N=8991454,464) com azimute de 31°17'11" e distância de 207,54m, deste segue até o ponto AEH-P-0088 (E=238042,039; N=8991631,818) com azimute de 346°01'23" e distância de 182,77m, deste segue até o ponto AEH-P-0089 (E=238043,084; N=8991866,534) com azimute de 0°15'18" e distância de 234,72m, deste segue até o ponto AEH-P-0090 (E=238077,933; N=8992085,772) com azimute de 9°01'54" e distância de 221,99m, deste segue até o ponto AEH-P-0091 (E=238585,537; N=8992669,538) com azimute de 41°00'29" e distância de 773,59m, deste segue até o ponto AEH-P-0092 (E=238491,916; N=8993220,343) com azimute de 350°21'13" e distância de 558,70m, deste segue até o ponto AEH-P-0093 (E=238731,555; N=8993719,067) com azimute de 25°39'52" e distância de 553,31m, deste segue até o ponto AEH-P-0094 (E=238774,565; N=8994062,582) com azimute de 7°08'12" e distância de 346,20m, deste segue até o ponto AEH-P-0095 (E=238973,636; N=8994489,780) com azimute de 24°59'07" e distância de 471,30m, deste segue até o ponto AEH-P-0096 (E=238815,730; N=8994632,153) com azimute de 312°02'20" e distância de 212,61m, deste segue até o ponto AEH-P-0097 (E=239462,342; N=8997090,321) cravado junto à confluência do Rio Aripuanã e o Igarapé Pacutinga, com azimute de 14°44'15" e distância de 2541,79m, deste segue até o ponto AEH-P-0098 (E=239467,344; N=8997189,868) com azimute de 2°52'34" e distância de 99,67m, deste segue até o ponto AEH-P-0099 (E=239192,176; N=8997805,516) com azimute de 335°55'03" e distância de 674,34m, deste segue até o ponto AEH-P-0100 (E=238875,183; N=8998110,616) com azimute de 313°54'17" e distância de 439,97m, deste segue até o ponto AEH-P-0101 (E=238244,068; N=8998448,618) com azimute de 298°10'19" e distância de 715,93m deste segue até o ponto AEH-P-0102 (E=237809,987; N=8998856,303) com azimute de 313°12'14" e distância de 595,51m, deste segue até o ponto AEH-P-0103 (E=237287,529; N=8999071,195) com azimute de 292°21'28" e distância de 564,93m, deste segue até o ponto AEH-P-0104 (E=236550,930; N=8999344,632) com azimute de 290°21'56" e distância de 785,71m, deste segue até o ponto AEH-P-0105 (E=236214,920; N=8999593,617) com azimute de 306°32'19" e distância de 418,21m, deste segue

Figure 11. *Documents of proof of title for the FSM farm …. (part 26)*



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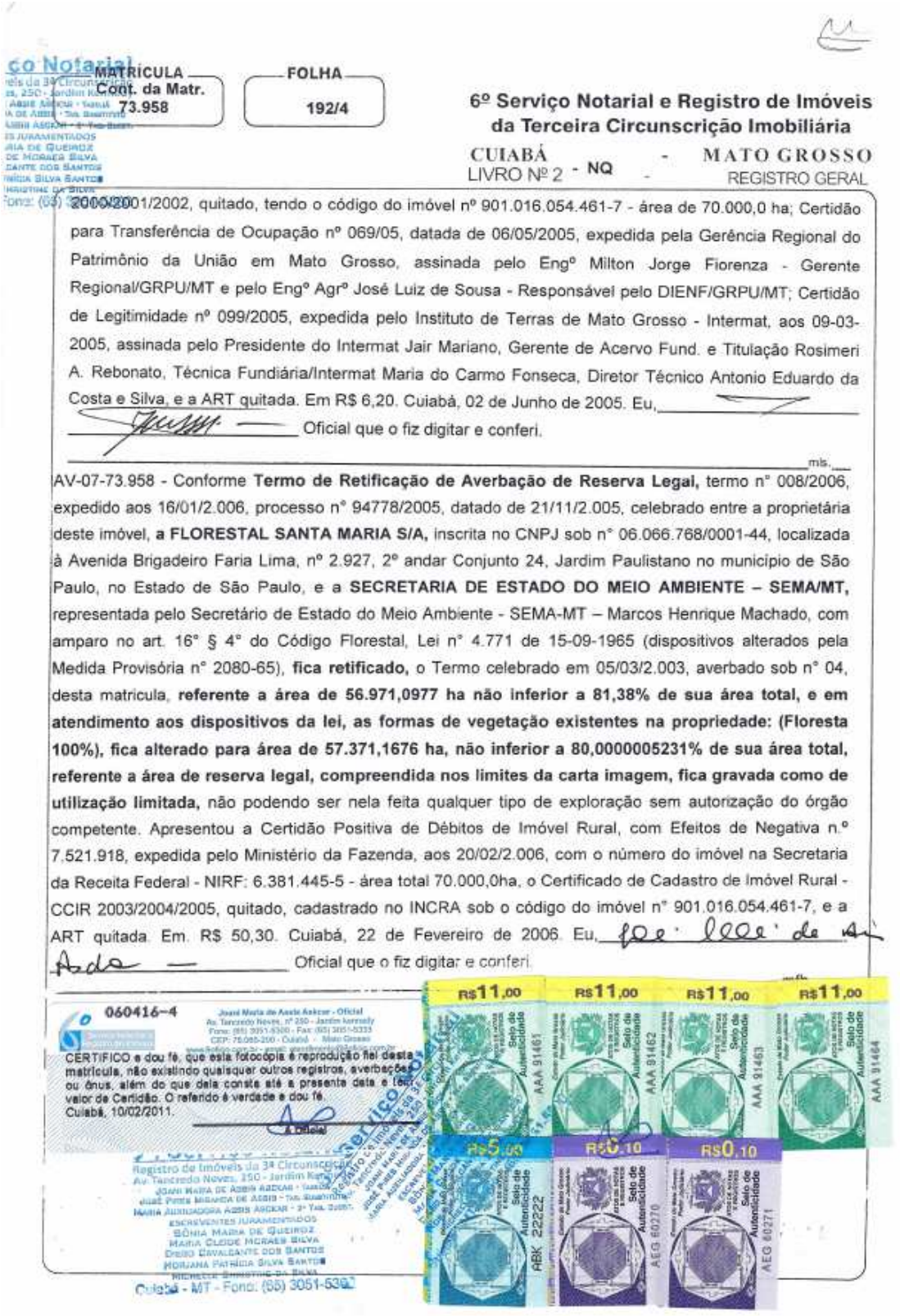
até o ponto AEH-P-0106 (E=236007,299; N=9000059,943) com azimute de 336°00'00" e distância de 510,46m, deste segue até o ponto AEH-P-0107 (E=235613,630; N=9000825,114) com azimute de 332°46'30" e distância de 860,50m, deste segue até o ponto AEH-P-0108 (E=235516,869; N=9001299,336) com azimute de 348°28'03" e distância de 483,99m, deste segue até o ponto AEH-P-0109 (E=235487,530; N=9001751,688) com azimute de 356°17'21" e distância de 453,30m, deste segue até o ponto AEH-P-0110 (E=235395,548; N=9002050,462) com azimute de 342°53'18" e distância de 312,61m, deste segue até o ponto AEH-P-0111 (E=235187,578; N=9002470,835) com azimute de 333°40'38" e distância de 469,00m, deste segue até o ponto AEH-P-0112 (E=234929,129; N=9002800,617) com azimute de 321°54'52" e distância de 418,99m, deste segue até o ponto AEH-P-0112 (E=234578,306; N=9003117,318) com azimute de 312°04'25" e distância de 472,63m, deste segue até o ponto AEH-P-0114 (E=234130,316; N=9003329,685) com azimute de 295°21'47" e distância de 495,78m, deste segue até o ponto AEH-P-0115 (E=233821,529; N=9003566,581) com azimute de 307°29'41" e distância de 389,19m, deste segue até o ponto AEH-P-0116 (E=233448,681; N=9003731,015) com azimute de 293°47'55" e distância de 407,50m, deste segue até o ponto AEH-P-0117 (E=233254,958; N=9003925,515 com azimute de 315°06'53" e distância de 274,52m, deste segue até o ponto AEH-P-0118 (E=233184,426; N=9004319,554) com azimute de 349°51'06" e distância de 400,30m, deste segue até o ponto AQA-M-0008, vértice inicial da descrição deste perímetro, com azimute de 40°00'47" e distância de 21,85m. Do vértice AEH-M-0128 ao vértice AQA-M-0008 (passando pelos vértices AEH-P-0001 ao AEH-P-0076, AEH-M-0127, e AEH-P-0077 ao AEH-P-0118) o imóvel segue acompanhando à margem direita a sinuosidade do Rio Aripuanã. Todas as coordenadas aqui descritas estão georreferenciadas ao Sistema Geodésico Brasileiro (SGB), a partir das estações ativas RBMC 92.165 de Imperatriz Estado do Maranhão (E=223346,605; N=9392439,521), RBMC 92.538 Cuiabá Capital do Estado Mato Grosso (E=599791,600; N=8200002,107) e o vértice 91.219 localizado no aeroporto de Colniza Estado do Mato Grosso (E=258354,328; N=8954702,632), e encontram-se representadas no Sistema UTM referenciadas ao Meridiano Central nº 57 WGr, tendo como datum o SAD-69. Todos os azimutes e distâncias, área e perimetro foram calculados no plano de projeção UTM. **Apresentou a Certificação nº 130501000018-12, do Ministério de Desenvolvimento Agrário-MDA, Instituto Nacional de Colonização e Reforma Agraria-INCRA, Superintendência Regional do Mato Grosso-SR13(MT), datada de 25-01-2005, assinada pelo Engenheiro Agrimensor Genuino Magalhães Soriano - CREA nº 28330/D-MG - Código de Credenciamento junto ao INCRA-ABZ-Ordem de Serviço SR-13(MT) G/Nº 206/2003 de 29 de dezembro de 2003, na qual foi certificado que a poligonal objeto do memorial descritivo/planta do imóvel objeto desta matricula, não se sobrepõe a nenhuma outra poligonal constante do cadastro georreferenciado, acompanhado da declaração da proprietária de que não houve alteração das divisas do imóvel e que foram respeitados os direitos dos confrontantes, bem como declaração dos confinantes de que os limites divisórios foram respeitados;** a Certidão Negativa de Débitos de Imóvel Rural, emitida aos 14-02-2005, pela Secretaria da Receita Federal de Brasília/DF, cadastrado na Receita Federal nº 6.381.445-5 e código de controle da certidão: 8268.EBDC.F786.2EC5; o Certificado de Cadastro de Imóvel Rural CCIR -

continua fls. 192/4.

Figure 11. *Documents of proof of title for the FSM farm …. (part 27)*



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6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária

CUIABÁ - MATO GROSSO
LIVRO Nº 2 - NQ - REGISTRO GERAL

2000/2001/2002, quitado, tendo o código do imóvel nº 901.016.054.461-7 - área de 70.000,0 ha; Certidão para Transferência de Ocupação nº 069/05, datada de 06/05/2005, expedida pela Gerência Regional do Patrimônio da União em Mato Grosso, assinada pelo Engº Milton Jorge Fiorenza - Gerente Regional/GRPU/MT e pelo Engº Agrº José Luiz de Sousa - Responsável pelo DIENF/GRPU/MT; Certidão de Legitimidade nº 099/2005, expedida pelo Instituto de Terras de Mato Grosso - Intermat, aos 09-03-2005, assinada pelo Presidente do Intermat Jair Mariano, Gerente de Acervo Fund. e Titulação Rosimeri A. Rebonato, Técnica Fundiária/Intermat Maria do Carmo Fonseca, Diretor Técnico Antonio Eduardo da Costa e Silva, e a ART quitada. Em R$ 6,20. Cuiabá, 02 de Junho de 2005. Eu, _____ Oficial que o fiz digitar e conferi.

mls.

AV-07-73.958 - Conforme **Termo de Retificação de Averbação de Reserva Legal,** termo n° 008/2006, expedido aos 16/01/2.006, processo n° 94778/2005, datado de 21/11/2.005, celebrado entre a proprietária deste imóvel, **a FLORESTAL SANTA MARIA S/A,** inscrita no CNPJ sob n° 06.066.768/0001-44, localizada à Avenida Brigadeiro Faria Lima, nº 2.927, 2º andar Conjunto 24, Jardim Paulistano no município de São Paulo, no Estado de São Paulo, e a **SECRETARIA DE ESTADO DO MEIO AMBIENTE – SEMA/MT,** representada pelo Secretário de Estado do Meio Ambiente - SEMA-MT – Marcos Henrique Machado, com amparo no art. 16° § 4° do Código Florestal, Lei n° 4.771 de 15-09-1965 (dispositivos alterados pela Medida Provisória n° 2080-65), **fica retificado,** o Termo celebrado em 05/03/2.003, averbado sob n° 04, desta matricula, **referente a área de 56.971,0977 ha não inferior a 81,38% de sua área total, e em atendimento aos dispositivos da lei, as formas de vegetação existentes na propriedade: (Floresta 100%), fica alterado para área de 57.371,1676 ha, não inferior a 80,0000005231% de sua área total, referente a área de reserva legal, compreendida nos limites da carta imagem, fica gravada como de utilização limitada,** não podendo ser nela feita qualquer tipo de exploração sem autorização do órgão competente. Apresentou a Certidão Positiva de Débitos de Imóvel Rural, com Efeitos de Negativa n.º 7.521.918, expedida pelo Ministério da Fazenda, aos 20/02/2.006, com o número do imóvel na Secretaria da Receita Federal - NIRF: 6.381.445-5 - área total 70.000,0ha, o Certificado de Cadastro de Imóvel Rural - CCIR 2003/2004/2005, quitado, cadastrado no INCRA sob o código do imóvel n° 901.016.054.461-7, e a ART quitada. Em. R$ 50,30. Cuiabá, 22 de Fevereiro de 2006. Eu, _____ Oficial que o fiz digitar e conferi.

060416-4

CERTIFICO e dou fé, que esta fotocópia é reprodução fiel desta matrícula, não existindo quaisquer outros registros, averbações ou ônus, além do que dela consta até a presente data e hora. Valor de Certidão. O referido é verdade e dou fé.
Cuiabá, 10/02/2011.

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Figure 11. *Documents of proof of title for the FSM farm …. (final part)*

1.12.2 Emissions Trading Programs and Other Binding Limits

Not applicable.

1.12.3 Participation under Other GHG Programs

This project has not been registered, and is not seeking registration under any other GHG programs.

1.12.4 Other Forms of Environmental Credit

The project area has not created another form of environmental credit. According to Voluntary Carbon Standard Program Guidelines (2007), the VCS Program has a central project database which lists each approved project. This project has not been registered in any other credited activity, and no VCUs have been assigned to the project area so far.

1.12.5 Projects Rejected by Other GHG Programs

Not applicable. This project has been neither submitted nor rejected under any other GHG program.

1.13 Additional Information Relevant to the Project

VCS Eligibility Criteria

<table>
<tr><td colspan="4">Is the forest land expected to be converted to non-forest land in the baseline case?</td></tr>
<tr><td colspan="2">YES</td><td colspan="2">NO</td></tr>
<tr><td colspan="2">Is the land legally authorized and documented to be converted to non-forest?</td><td colspan="2">Is the forest expected to degrade by fuelwood extraction or charcoal production, in the baseline case</td></tr>
<tr><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>Avoided planned deforestation</td><td>Avoided unplanned deforestation</td><td>Avoided forest degradation</td><td>Proposed project is not a VCS REDD[10] activity currently covered by the module framework</td></tr>
</table>

Thus, the relevant baseline module (BL-UP – avoided unplanned deforestation) was applied with relevant applicability conditions and criteria.

- The Project Area has been covered by forest for at least the last 15 years, as shown in Figure 7.

- The Project Area is located in a region with great deforestation pressures, as demonstrated in previous items of this VCS-PD.

- The Project Area is located in a region with enough infrastructure and accessibility to keep deforestation rates above that adopted in present calculations, as evidenced in Colniza's and Mato Grosso's Master Plans.

Leakage Management

Although there is a risk of leakage, the proponents believe that the Project will have positive impacts on surrounding areas. This Project might be a well-succeeded example of the following technical and economical aspects:

(i) Management of forest resources with success and profit;

(ii) Additional return to forest management, due to REDD incentives, which can compensate avoiding deforestation for other activities;

(iii) Maintenance of real estate (land acquisition and grabbing dynamics), in addition to profits with sustainable management plus REDD.

According to reasons above, the Project might probably stimulate other landowners to adhere to this Project concept. The communication with landowners might be performed by means of associative actions and environmental education, which will be part of an overall policy described in Annex 1.

By means of Project monitoring activities, satellite imaging, and social and governmental cooperation for monitoring areas surrounding the Project; we believe that the well-succeeded example of this business plan will generate an increased number of sustainable managed areas.

In the municipal context, there are governmental initiatives and plans for mitigating deforestation in municipalities of the State of Mato Grosso, mainly based on GIS monitoring of deforestation activities in the municipal areas.

At the State level, Mato Grosso, Amazonas and Acre have been negotiating Long-term Collaborative Action (LCA) with the State of California (USA) to mitigate deforestation. LCA initiatives were agreed under the United Nations Framework Convention on Climate Change (UNFCCC) during COP-13 (Bali Plan). Within the framework of the UNFCCC, while discussing the theme of forests and LULUCF (Land Use, Land Use Change), it was inserted in the Bali Plan that the issue of standing forest should be discussed and solutions should be proposed. REDD was for the first time mentioned and included in the perspective of solutions for the objectives of

the UNFCCC. The FSM-REDD Project is, thus, in accordance and aligned with political and legislative interests of the State of Mato Grosso, as well as with premises of the AWG-LCA (Ad-hoc Working Group – Long-term Collaborative Action) of UNFCCC.

Therefore, in addition to the measures described in other sections of this document, mitigation of Leakage is further strengthened by government initiatives and/or legislation at Federal, municipal, State and ecosystem levels, once the LCA involves neighbouring States within the Amazonia biome.

Commercially Sensitive Information

Not applicable. There is no commercially sensitive information.

Further Information

In the Reference Area, although 80% of native vegetation in land properties must be preserved as LR, there is a general non-compliance with Brazilian Forest Code, as 42.7% of native vegetation has already been suppressed (i.e. there is a deficit of 22.7% of native forest that should not have been suppressed in the Reference Area).

Therefore, all calculations were made assuming that the Reference Area has a general non-compliance with Brazilian Forest Code. Thus, the baseline scenario considers the potential of unplanned deforestation in Project Area to surpass the limits stipulated by the Law.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Approved VCS Methodology **VM0007 Version 1.1**

7 September 2011 REDD Methodology Module

"REDD Methodology Framework (REDD-MF)"

Sectoral Scope 14, from Avoided Deforestation Partners (ADP).

This REDD Methodology Framework provides guidance for constructing methodologies for REDD project activities compliant with the validation and verification requirements of the VCS. By using this document, a REDD methodology was constructed based on a set of pre-defined VCS-approved modules. The resulting methodology is VCS-approved without the requirement of a methodology validation.

2.2 Applicability of Methodology

This REDD Methodology Framework is applicable to project activities that fall within the AFOLU project category "REDD" as defined in the VCS AFOLU Guidance document. By choosing the appropriate modules on the basis of the applicability conditions mentioned in each of the modules, a project-specific methodology was constructed.

The justification of the choice of modules and why they are applicable to the proposed project activity is explained below:

VMD0001 "Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools" (CP-AB), v1.0: This module allows for ex ante estimation of carbon stocks in above- and belowground tree and non-tree woody biomass in the baseline case (for both pre- and post-deforestation stocks) and project case and for ex post estimation of change in carbon stocks in above- and belowground tree biomass in the project case. This module is applicable to all forest types and age classes. Inclusion of the aboveground tree biomass pool as part of the project boundary is mandatory as per the framework module REDD-MF.

VMD0005 "Estimation of carbon stocks in the long-term wood products pool" (CP-W), v1.0: This module allows for ex-ante estimation of carbon stocks in the long-term wood products pool in the baseline case. Carbon stocks treated here are those stocks remaining in wood products after 100 years; the bulk of emissions associated with timber harvest, processing and waste, and

eventual product retirement occur within this timeframe, and this module employs the simplifying assumption that the proportion remaining after 100 years is effectively "permanent". This module is applicable to all cases where wood is harvested for conversion to wood products for commercial markets, for all forest types and age classes. This module is applicable in the baseline, as the wood products pool is included as part of the project boundary as per applicability criteria in the framework module REDD-MF, specifically:

i) Timber harvest occurs prior to or in the process of deforestation, and timber is destined for commercial markets;

ii) The wood products pool is determined to be significant (using T-SIG).

VMD0007 "Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation" (BL-UP), v2.0: This module allows for estimating carbon stock changes and GHG emissions related to unplanned deforestation in the baseline case. The module is mandatory for the unplanned deforestation category. The module is applicable for estimating baseline emissions from unplanned deforestation (conversion of forest land to non-forest land in the baseline case). The module is applied to this project activity because the baseline agents of deforestation:

i) Clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities. Settlements and small farms located around the Project Area represent the major deforestation pressure, based on the conversion from forests to coffee plantation or grazing activities, as livelihood activities for the local population. The Brazilian Forest Code defines "small rural property" or "family-scale land tenure" as a land not larger than 150 hectares in the State of Mato Grosso[9]. According to Censo Agropecuário 2006 (IBGE, 2007[10]), the municipality of Colniza has 2,707 individual landowners, which hold 382,499 hectares of lands: this corresponds to an average of 141.3 hectares per landowner. This indicates a great concentration of small scale landowners (holding less than 150 hectares of land). Moreover, it is assumed that a great amount of family-scale land grabbers are not accounted by the IBGE, and that these land grabbers are not individually holding more than 150 hectares for deforestation and installation of the BAU activities;

ii) Have no documented and uncontested legal right to deforest the land for these purposes; and

iii) Are either resident in the region or immigrants.

[9] http://www.planalto.gov.br/ccivil_03/leis/L4771.htm "a) cento e cinqüenta hectares se localizada nos Estados do Acre, Pará, Amazonas, Roraima, Rondônia, Amapá e Mato Grosso".
[10] http://www.ibge.gov.br/cidadesat/topwindow.htm?1

VMD0010 "Estimation of emissions from activity shifting for avoided unplanned deforestation" (LK-ASU), v1.0: This Module provides methods for estimating emissions from displacement of unplanned deforestation (leakage due to activity shifting). This Module is applicable for estimating carbon stock changes and greenhouse gas emissions related to the displacement of activities that cause deforestation of lands outside the Project Area due to the avoided unplanned deforestation in the Project Area. Activities subject to potential displacement are: conversion of forest land to grazing lands, crop lands, and other land uses. The module is mandatory if BL-UP has been used to define the baseline and the applicability criteria in BL-UP must be complied with in full.

VMD0011 "Estimation of emissions from market-effects" (LK-ME), v1.0: This module is applicable for calculating market-effects leakage from REDD projects that are anticipated to reduce levels of wood harvest substantially and permanently. When REDD project activities result in reductions in wood harvest, it is likely that production could shift to other areas of the country to compensate for the reduction. The module is mandatory where the process of deforestation involves timber harvesting for commercial markets (Commercial markets are here defined as sale of products to end users and public and private companies with sales conducted distant (>50km) from the project area).

VMD0013 "Estimation of greenhouse gas emissions from biomass burning" (E-BB), v1.0: This module provides a step-wise approach for estimating greenhouse emissions from biomass burning. In the baseline scenario, fire is used to clear the land, and emissions of CO_2, N_2O and CH_4 result. Where used in the baseline, accounting must occur under both the baseline and with-project scenarios in both the project area and in the leakage belt. Where fires occur ex-post in areas that coincide with areas deforested or degraded in the baseline case, the module shall be used to account greenhouse gas emissions.

VMD0016 "Methods for stratification of the project area" (X-STR), v1.0: This module provides guidance on stratifying the project area into discrete, relatively homogeneous units to improve accuracy and precision of carbon stock and carbon stock change estimates. Any module referencing strata i shall be used in combination with this module. Strata are only used for pre-deforestation forest classes, and are the same in baseline and project cases. Post-deforestation (conversion) land-uses are not stratified, instead using average post-deforestation stock values (e.g. "Simple Conservative" or "Historical Area-weighted" approaches per BL-UP).

VT0001 "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" (T-ADD), v1.0. This tool is applicable when AFOLU activities on the land within the proposed project boundary do not lead to violation of any applicable law even if the law is not enforced. The use of this tool to determine

additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario.

VMD0017 "Estimation of uncertainty for REDD project activities" (X-UNC), v1.0. The module is mandatory. It is applicable for estimating the uncertainty of estimates of emissions and removals of CO_2-e generated from REDD project activities. The module focuses on the following sources of uncertainty: Determination of rates of deforestation and degradation; Uncertainty associated with estimation of stocks in carbon pools and changes in carbon stocks; Uncertainty in assessment of project emissions.

2.3 Project Boundary

Geographic project boundary is defined by the geographic limits of the FSM farm, as mentioned in "1.9 Project Location".

Source		Gas	Included?	Justification/Explanation
Baseline and Leakage Belt	Unplanned deforestation	CO_2	Yes	
		CH_4	No	
		N_2O	No	
		Other	-	
	Biomass Burning	CO_2	No	
		CH_4	Yes	E-BB
		N_2O	Yes	E-BB
		Other	-	
Project	Forest Management	CO_2	Yes	
		CH_4	No	
		N_2O	No	
		Other	-	
	-	CO_2		
		CH_4		
		N_2O		
		Other		

Carbon pools were elected in a conservative manner. According to module X-UNC "Estimation of uncertainty for REDD project activities", conservative numbers and approaches were adopted and an uncertainty of 0% may be used for this component. The following carbon pools were involved in quantifications:

- Aboveground biomass (Mandatory),

- Belowground biomass (Mandatory), and

- Permanent (long-term) wood products.

Deforestation emissions were estimated for 4 forest strata, whose above- and belowground carbon pools were previously determined by means of a systematic-sampling forest inventory in the Project Area. It is considered that a certain portion of logged wood is converted in long-term wood products, which serve as carbon pools after deforestation. This content of carbon fixed into long-term wood products was considered in calculation of net deforestation emissions.

The following table indicates the recommendations of carbon pool inclusion, as mentioned in REDD Methodology Framework (REDD-MF) Version 1.1:

Module	***Carbon Pool***	***VCS Recommendation***
CP-AB	*Above and below ground biomass*	***M***
CP-D	*Dead wood*	***(m)[3]***
CP-L	*Litter*	***O***
CP-S	*Soil organic carbon*	***O***
CP-W	*Long-term wood products*	***(m)[1]***

M*: Modules marked with an M are fully mandatory: the indicated modules and tools must be used;* ***O****: Modules marked with an O are fully optional: the indicated pools and sources can be included or excluded as decided by the project but if included in the baseline they must also be included in the with-project scenario;* ***(m)[1]****: Mandatory where the process of deforestation involves timber harvesting for commercial markets;* ***(m)[3]****: Mandatory if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted.*

Justification for not including soil organic carbon and litter pools

It is assumed that the Project Activity preserves soil organic carbon pool, if compared with BAU activities. Although a good pasture management might increase carbon stocks in soil surface (until 30-cm depth), in comparison with the original forest (Neill et al., 1996; cited by Fearnside), carbon stocks in deeper soil layers will certainly decrease due to pasture activities (Nepstad et al., 1994; cited by Fearnside). Isotopic assessments (Nepstad et al., 1994; cited by Fearnside) indicate that soil carbon stocks occurring in depths below 60 cm are reduced after conversion of forest to pasture, owing to occurrence of increased oxidation in this depth. Similarly, a reduction in soil carbon pool is also reported in conversion of forest to coffee crops, as indicated in Figure 12 (red bars). The reduction in carbon stock due to deforestation is even more pronounced in litter, as seen in Figure 12 (yellow bars). In this context, for conservativeness purposes, project proponents decided not to account soil carbon pool and litter carbon pool in FSM-REDD Project benefits.

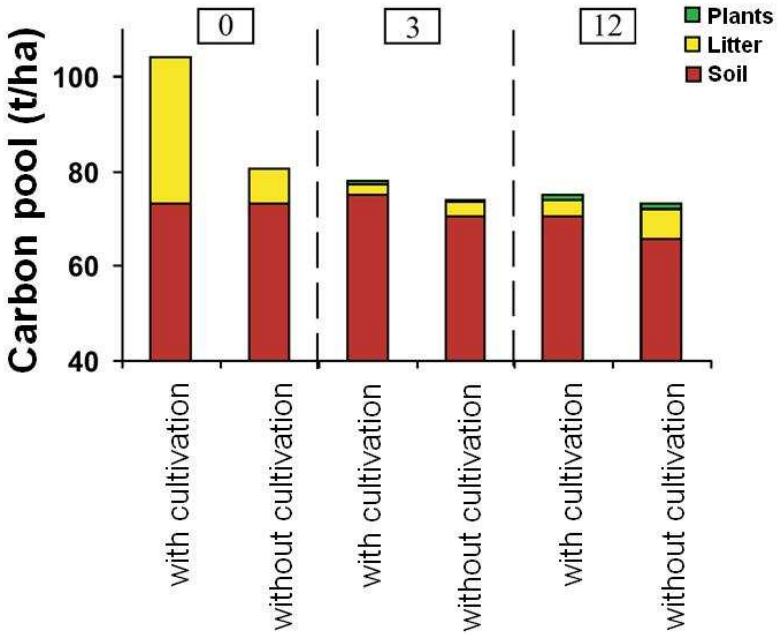


Figure 12. *Carbon stocks in soil (0-40 cm) (red bars), in litter (yellow bars) and coffee crops (green bars), before installation of coffee cultivation (0), 3 and 12 years after, using two different weeding systems. (Source: Informações Agronômicas, 2001)*

Thus, in conformity with module X-UNC "Estimation of uncertainty for REDD project activities", a conservative approach was adopted and an uncertainty of 0% may be used for the carbon pool component.

Justification for not including dead wood carbon pool

The omission of the dead wood carbon pool was determined for a matter of conservativeness, given that in the deforested baseline scenario this carbon pool is likely to be much less than the project scenario. Even if the dead wood carbon pool is significantly lower in the baseline than in the project scenario, the project proponent opted not to include this carbon pool in accounting of VCU benefits, according to "REDD Methodology Framework" (REDD-MF) Version 1.1 statement: "*Mandatory if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted.*"

2.4 Baseline Scenario

Forest land is expected to be converted to non-forest land in the baseline case. Landowner cannot afford efforts and costs to keep long-term vigilance of frontiers to avoid unplanned deforestation from uncontrolled invasions. In this context, the project falls within the category AFOLU – REDD - Avoiding unplanned deforestation and degradation (AUDD).

Selection of the most reasonable baseline scenario for the project

The FSM farm will not be able to afford large long-term costs and efforts for vigilance of land property. The company has registered a series of denouncements before the local Police Station (B.O.) and filed lawsuits against land-grabbers and criminal organizations that issued adulterated land documents.

Moreover, the sustainable forest management conducted at the property is under great pressure from other economic activities conducted in the area bordering the property, related to land-grabbing and to extensive cattle-raising, in addition to the difficulties inherent to the development of forestry stewardship, currently undergoing a crisis in Brazil.

As FSM has recently received some offers for land purchase, and considering difficulties faced with sustainable forest management and land tenure at present, land selling can also be an alternative way to alleviate FSM's expenses on land vigilance and juridical assistance. In this latter case, it is highly probable that new landowners will prioritize activities involving deforestation and installation of the most common land uses in the region (i.e. pasture and coffee cultivation).

In this context, the FSM farm baseline may involve the following non-excluding baseline scenarios:

Scenario 1: deforestation and logging of the area permitted by Law (i.e. out of the Legal Reserve), to generate supplementary incomes to financially support a long-term vigilance system. This scenario would hence involve the total clear-cut deforestation of areas out of Legal Reserve, which is operationally feasible in a period of three years. This scenario is not the most plausible, given that landowners have licensed the area for the forest stewardship purposes before the environmental agency. However, the licensing proceeding is reversible and FSM could request permits for other activities, so this scenario might become possible if landowners officially change the status of forest preservation for lands out of Legal Reserve;

Scenario 2: adoption of common land-use practices in the region (business as usual - BAU), including deforestation beyond limits established by Brazilian Forest Code (generalized non-compliance, typically observed in the farm region). This scenario would involve the deforestation inside FSM farm (Project Area) at a deforestation rate similar to that observed in the Reference Area. This scenario is not the most plausible, as landowners have officially approved a Sustainable Forest Stewardship Plan, which foresees sustainable exploitation of wood and non-wood products in FSM property.

However, landowners are free to change this status at any time, as a function of economic and technical feasibility of the originally approved plan;

Scenario 3: unplanned deforestation caused by uncontrolled invasions for wood logging and implementation of BAU activities. As described in item "1.10 Conditions Prior to Project Initiation" of this VCS-PD, coffee crops represent about 10% of land use in BAU, while pasture accounts for virtually all the remaining land occupation. The implementation of these BAU activities is usually financed by means of initial capital obtained in wood logging. It is believed that the same rate of deforestation and proportion of land uses observed in the Reference Area might be fairly replicated into the Project Area in the absence of this REDD Project. Moreover, there are strong evidences that unplanned deforestation would transgress the limits imposed by Brazilian Forest Code, by exceeding the 20% of clear-cut deforestation permitted by Law (general non-compliance observed in the Reference Area). The rate of deforestation calculated for the Reference Area is 2.94%/year, resulted from a simple arithmetic calculation of the various rates in the period. It is assumed that this same rate might be replicated into the FSM property in the absence of the REDD Project;

Scenario 4: farm sale to private investors (in this case, the BAU is probably the most plausible future scenario). In the last years, the landowners have already been approached to sell the FSM farm (some offers are documented in emails). According to FSM landowners, a group of investors from the Netherlands, represented by a local sawmill, has already deposed an official offer to purchase the property. The investors propose to log and process timber from the FSM forest, whose production would be addressed to the European market. This is a highly plausible scenario, which would result in a rate of deforestation similar to that estimated in Scenario 3 (see above). Registered evidences of the interest of FSM land purchase (e.g. purchase proposals) are available for consultation by auditors. All documents and records will be kept in a secure retrievable manner for at least two years after the end of the project crediting period.

Description of baseline scenario adopted

According to descriptions above, it is expected that unplanned deforestation is most likely to occur in the Project Area in case of absence of the REDD Project. In this context, a rate of deforestation of 2.94%/year is adopted for calculation of FSM-REDD Project benefits. Deforestation is considered to occur through clear-cutting of forests for logging followed by pasture installation (≈90%) or coffee cultivation (≈10%).

In absence of REDD project, it is assumed that FSM property would certainly undergo the same deforestation intensity as other neighbouring lands, which exhibit deforested areas far above the limits stipulated by Brazilian Forest Code.

As indicated in the VCS Program Guidelines, above- and belowground carbon pools (mandatory) were previously determined by means of a systematic-sampling forest inventory in the Project

Area. Considering that the baseline process of deforestation involves timber harvesting for commercial markets, the content of carbon fixed into long-term wood products was also considered in calculation of net deforestation emissions.

It is assumed that the Project Activity preserves soil organic carbon and litter pools, if compared with BAU activities, as demonstrated in item "2.3 Project Boundary" of this VCS-PD. In this context, for conservativeness purposes, project proponents decided not to account soil carbon pool and litter carbon pool in FSM-REDD Project benefits.

Fossil fuel emissions were not accounted for the Reference (Baseline) Area or for the Project Activity. It is assumed that the Project Activity also reduces emissions from fossil fuel burning, in comparison with BAU activities. However, this factor was not accounted for conservativeness purposes and difficulties in monitoring during the project period. In conformity with module X-UNC "Estimation of uncertainty for REDD project activities", a conservative approach was adopted and an uncertainty of 0% may be used for the Project Emissions component.

2.5 Additionality

Financial additionality is demonstrated below, based on a literature survey on cash flows and financial indexes of BAU (Business as Usual) local activities, as well as local data on FSM economic activities. Coffee cultivation and pasture (cattle-raising) were adopted for financial additionality analysis, as follows.

STEP 1. Identification of alternative land use scenarios to the AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

Unplanned deforestation caused by uncontrolled invasions for wood logging and implementation of BAU activities. As described in item "1.10 Conditions Prior to Project Initiation" of this VCS-PD, coffee crops represent about 10% of land use in BAU, while pasture accounts for virtually all the remaining land occupation. The implementation of these BAU activities is usually financed by means of initial capital obtained in wood logging. It is believed that the same rate of deforestation and proportion of land uses observed in the Reference Area might be fairly replicated into the Project Area in the absence of this REDD Project. In this context, comparative investment analysis was mainly focused on these BAU activities.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The most part of the land occupied with both coffee crops and pasture (identified as alternative land use scenarios in the sub-step 1a) are in compliance with all mandatory applicable legal and regulatory requirements. However, although 80% of native vegetation in land properties must be preserved as LR, the Reference Area has a general non-compliance with Brazilian Forest Code, as 42.7% of native vegetation has already been suppressed (i.e. there is a deficit of 22.7% of native forest that should not have been suppressed in the Reference Area). It is historically clear that this general non-compliance results from systematic lack of enforcement of applicable laws and regulations in the region.

Sub-step 1c. Selection of the baseline scenario

As provided in sub-steps 1a and 1b, the most plausible baseline scenario is logging followed by pasture and/or coffee crops, beyond the limits of deforestation stipulated by the Brazilian Forest Code.

STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios

This Step determines that the proposed project activity, without the revenue from the sale of GHG credits, is economically and financially less attractive than at least one of the other land use scenarios.

Sub-step 2a. Determine appropriate analysis method

As the FSM-REDD Project generates financial or economic benefits other than VCS related income (i.e. from Sustainable Forest Management), the investment comparison analysis (Option II) was applied.

Sub-step 2b. – Option II. Investment comparison analysis

Financial analysis on coffee cultivation

Table 3 shows a compilation of IRRs (Internal Return Rates) found in Brazilian literature on coffee cultivation, for several regions and activity conditions. According to the literature survey, the return rate from coffee cultivation can be conservatively considered as 10.4% in the worst scenario.

Table 3. *IRRs (%) for coffee cultivation, compiled from Brazilian literature, for several conditions and sites, and in local currency*

Site	IRR (%)	Source
State of Paraná	23.2	SANTOS et al. Viabilidade econômica do sistema agroflorestal grevílea x café na região norte do Paraná. CERNE, v. 6, n. 1, p. 89-100, 2000.
Formoso (State of Minas Gerais)	15.6	PIERDONÁ, R. Estudo da viabilidade econômica do sistema de produção de café, Coffea arabica, irrigado na região de Formoso – MG. UPIS, Planaltina, July, 2009.
Viçosa (State of Minas Gerais)	**10.4**	ARÊDES, A. F.; PEREIRA, M. W. G. Análise econômica da produção de café arábica: um estudo de caso com simulações de Monte Carlo para sistemas de baixa e alta produtividade. Informações Econômicas, SP, v.38, n.4, abr. 2008. (Average of two production scenarios.)
State of Espírito Santo	11.8	SIQUEIRA et al. Café convencional versus café orgânico: perspectivas de sustentabilidade socioeconômica dos agricultores familiares do Espírito Santo. Rev. Ceres, Viçosa, v. 58, n.2, p. 155-160, mar/abr, 2011.
São Sebastião do Paraíso (State of Minas Gerais)	11.5	SANTOS et al. Custo de estocagem e prêmio de risco: uma análise econômica do melhor período para comercialização do café arábica. Custos e Agronegócio, v. 3, n. 2 - Jul/Dez - 2007.
Brazilian average	18.3	TORRES et al. Gestão de custos na cafeicultura – uma experiência na implantação de projetos. TD-C / 5 – 2000. CPQ, FEARP, USP. 2000.
Coimbra (State of Minas Gerais)	19.9	FONSECA PEREIRA et al. Análise comparativa da viabilidade econômica dos sistemas de produção convencional e integrado de café. UFLA, Organizações Rurais & Agroindustriais, v. 10, n. 3, set.-dez., 2008, p. 405-419.

Financial analysis on pasture

The displacement of cattle-raising to the Legal Amazon has been stimulated by factors related to financial returns of this activity in that region, considering, for instance, that its Internal Return Rate (IRR) in some regions of the Legal Amazon can be twice as profitable as in the Southeast of the country[11]. According to studies from the University of São Paulo (USP), profitability of livestock in the Central-West region, as in Alta Floresta (State of Mato Grosso, MT), is twice-fold that observed in traditional regions, compared with the State of São Paulo, for example, in relation to typical lands and production schemes. In Alta Floresta, the activity yields a 14.5% IRR,

[11] PEDREIRA, M.S.; PRIMAVESI, O. Atuações zootécnicas para a adequação ambiental na bovinocultura. João Pessoa, PB – UFPB/ABZ, 26 a 30 de maio de 2008.

which is the highest in the region, and 30% higher than the average of the State of Pará (IRRs calculated in local currency). In Tupã, West of the State of São Paulo, for example, the IRR is estimated in 6.43%[12]. Livestock is the main land-use in deforested areas in the Amazon, accounting for 77% of the area converted in economic uses[13].

Table 4 shows a compilation of IRRs found in Brazilian literature on cattle-raising, for several regions and activity conditions. It can be noticed that the IRR is highly variable among literature sources. Therefore, the most conservative values are presented in Table 4. Figure 13 shows the histogram of frequency distribution of IRRs obtained in the municipality of Alta Floresta (MT) for the period 1995-2002. According to the literature survey, the return rate from pasture can be conservatively considered as 4.2% in the worst scenario.

Table 4. *IRRs (%) for pasture and cattle-raising, compiled from Brazilian literature, for several conditions and sites, and in local currency*

Site	IRR (%)	Source
Legal Amazon	11.5	BARRETO et al. Pecuária e Desafios para a Conservação Ambiental na Amazônia. Dezembro de 2005. n. 5. *www.imazon.org.br*
Alta Floresta (State of Mato Grosso)	14.5	SILVA, J. Alta Floresta tem retorno na pecuária 100% superior à de regiões tradicionais. *http://www.amazonia.org.br/noticias/print.cfm?id=40394* BARROS et al. Economia da pecuária de corte na região norte do Brasil. Centro de Estudos Avançados em Economia Aplicada CEPEA –ESALQ/USP. Piracicaba, August 2002. MARGULIS, S. Causas do Desmatamento da Amazônia Brasileira. Banco Mundial - Brasília, julho, 2003.
Triângulo Mineiro (State of Minas Gerais); South-west of the State of Goiás	5.1	MARTHA JR. et al. Análise econômica e de risco da pecuária extensiva no cerrado. 48th Congress SOBER, Campo Grande, 25-28 July 2010. (Average of IRR for 400-ha producers.)
Legal Amazon	**4.2**	SCHNEIDER et al. Amazônia Sustentável: limitantes e oportunidades para o desenvolvimento rural. Brasília: World Bank; Belém: Imazon, 2000. 58 pp.

[12] SILVA, J. Alta Floresta tem retorno na pecuária 100% superior à de regiões tradicionais. *http://www.amazonia.org.br/noticias/print.cfm?id=40394*

[13] SCHNEIDER, R.R.; ARIMA, E.; VERÍSSIMO, A.; BARRETO, P.; SOUZA JÚNIOR, C. Amazônia Sustentável: limitantes e oportunidades para o desenvolvimento rural. Brasília: World Bank; Belém: Imazon, 2000. 58 pp.

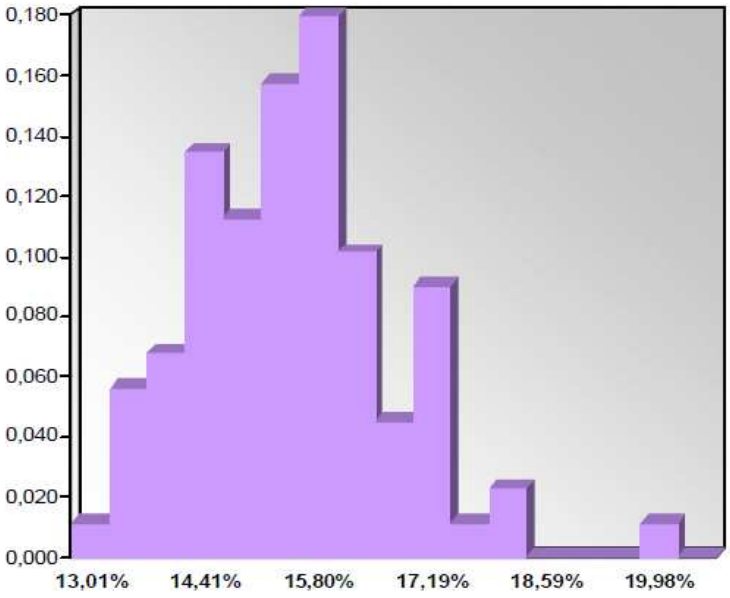


Figure 13. *Histogram of frequencies of IRR for pasture and cattle-raising in the municipality of Alta Floresta (MT) (Barros et al. 2002)*

Sub-step 2c. Calculation and comparison of financial indicators
and
Sub-step 2d. Sensitivity analysis

Financial analysis on FSM activities

The current IRRs for FSM activities are presented in Table 5 (worksheets are available for consultation by auditors). The table demonstrates the estimated return rate of FSM farm with sustainable management for timber logging (Scenario 1, CURRENT). The analysis shows that the current return rate from FSM farm activities (sustainable management; 5.94%) is comparable with that observed for the worst scenario of the less profitable alternative activity (pasture; 4.2%; Table 4). Moreover, the IRR from FSM farm activities (excluding REDD revenues) is far below that obtained in coffee cultivation (10.4%, in the worst scenario; Table 3).

The inclusion of REDD benefits into the FSM revenues would considerably increase (57.8%) the current IRR to 9.37%. A sensitivity analysis of potential IRRs, as a function of different scenarios of exchange rates and VCU prices, is also presented in Table 5. For financial simulation of these scenarios, exchange rates and VCU prices were tested with values 10% higher or 10% lower than those used in “Scenario 1 + REDD”. According to the scenarios used in this sensitivity analysis, it is concluded that the IRR could vary between 8.94% and 9.81%, depending on values applied. It is also concluded that variations in exchange rates and VCU prices have similar impacts on the overall IRR estimate.

This financial analysis shows that REDD revenues could elevate the current FSM activity (”Sustainable Forest Management” + REDD) to an attractive economic level, that might become

an example of new business model to stimulate the interest of other landowners in the region. The adhesion of further landowners to sustainable forest management models, combined with REDD revenues, stimulated by the FSM-REDD Project, could become a powerful mechanism to reduce project leakage regionally and nationally, reaching the main objective of the project effort, which is to make standing forest more valuable than logged forest.

Table 5. *Summary of financial analysis for the FSM activities, in local currency, including sensitivity analysis of IRR as a function of different scenarios of exchange rates and VCU prices*

FSM -BAU (Timber logging only)

Assets and Investments	R$
Timber Stock	46,000
Land Value	67,845
Total Assets Value	**113,845**
IRR - Scenario 1 - CURRENT (Sustainable Forest Management)	**5.94%**

		Scenarios: Exchange rates; VCU prices		
		RATE US$ X R$	VCU price (US$)	Increase in IRR (relative to SCENARIO 1)
IRR - Scenario 1 + REDD = BASIC WORKSHEET	**9.37%**	1.62	6.50	57.84%
IRR - Scenario 1 + REDD = EXCHANGE RATE REAL X US$ + 10%	**9.81%**	1.78	6.50	65.18%
IRR - Scenario 1 + REDD = EXCHANGE RATE REAL X US$ - 10%	**8.94%**	1.46	6.50	50.53%
IRR - Scenario 1 + REDD = VCU PRICE + 10%	**9.80%**	1.62	7.15	65.01%
IRR - Scenario 1 + REDD = VCU PRICE - 10%	**8.95%**	1.62	5.85	50.70%

STEP 3. Barriers analysis

This Step demonstrates that the proposed project activity faces barriers that prevent it to be implemented without the revenue from the sale of GHG credits.

Complementary considerations

Thanks to the financial benefits explained above, unplanned deforestation pressures are continuously perceived in the Reference Area, and would certainly affect the Project Area (FSM estate) in the absence of an effective vigilance system. As evidenced in Figure 14 and Figure 15, and previously described in item "1.1 Summary Description of the Project" of this VCS-PD, both Reference Area and Project Area are subject to serious risks of land-grabbing promoted by illegal

organizations (i.e. family-scale land-grabber associations, land-property documentation forgers), mostly supported by unscrupulous sawmills and political interests.

In actual fact, the FSM estate has been invaded several times, which is evidenced by a series of denouncements (B.O.) against land-grabbers and criminal organizations that issued adulterated land documents.

Thus, according to T-ADD "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities", the project activity faces the following barriers:

- Lack of enforcement of forest or land-use-related legislation;
- Barriers related to local traditional practices;
- The project activity is the "first of its kind": No project activity of this type is currently operational in the host country or region.
- Demographic pressure on the land (e.g. increased demand on land due to population growth);
- Social conflict among interest groups in the region where the project takes place;
- Widespread illegal practices (e.g. illegal grazing, non-timber product extraction and tree felling).

STEP 4. Common practice analysis

According to T-ADD, the previous steps are complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity. This test is a credibility check to demonstrate additionality that complements the barrier analysis (Step 3) and the investment analysis (Step 2).

As described in item "*1.10 Conditions Prior to Project Initiation*" of this VCS-PD, coffee crops represent about 10% of land use in BAU, while pasture accounts for virtually all the remaining land occupation. The implementation of these BAU activities is usually financed by means of initial capital obtained in wood logging. Similarly to the Reference Area and Project Area, the Leakage Belt is also subject to serious risks of land-grabbing promoted by illegal organizations (i.e. family-scale land-grabber associations, land-property documentation forgers), mostly supported by unscrupulous sawmills and political interests. As seen in "*STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios*" of this VCS-PD, the maintenance of native forest is far of being the most attractive economic scenario, giving the opportunity for land use shifting from native forest to pasture and coffee crops. In this context, the local communities have a widespread culture of deforestation, mainly led by economic factors.

Moreover, the development of forestry stewardship is currently undergoing a crisis in Brazil. Forest management itself poses several difficulties, which implicates in the economic viability of the operation. To take all the measures and steps to achieve a sound business operation, FSM has encountered challenges that indicate risks. These risks can be considered barriers to the continuation of the forest management project itself, and resources from the sales of carbon credits would be a very important component of the operation today and years to come.

DENÚNCIA

Grilagem de terras transforma Colniza num barril de pólvora

Preservação ambiental está em jogo

Líderes da invasão tinham como saber que a área é documentada

Há fortes indícios de que políticos tenham incentivado as invasões

Envolvidos podem responder criminalmente

Figure 14. *Headlines of an article published in a very important weekly newspaper from Cuiabá (MT): "Land-grabbing turns Colniza into a barrel of blasting-powder" (FSM farm in photo detail) (February 13 and 19, 2005)*

CIDADES — Folha do Estado — Cuiabá - Quarta-feira, 23 de Fevereiro de 2005 - 11

Grileiros usam táticas de guerrilha

BARRIL DE PÓLVORA - Fazendeiro que possui área em Colniza conta como invasores agem, impondo o terror e usando crianças como escudo

DANIELE DANCHURA
Redação

Grileiros profissionais podem estar utilizando táticas de guerrilha em invasões de terras na região noroeste de Mato Grosso. Armados, eles montam acampamentos durante semanas nas proximidades de onde irão ocupar para fazer pressão e, quando invadem a propriedade, utilizam mulheres e crianças como escudos. Depois, demarcam os terrenos com estacas. Enquanto os homens ficam no acampamento, mulheres e crianças voltam para a cidade. Nas reuniões de negociações com os fazendeiros, levam gravadores para, em qualquer descuido, usar a gravação contra os proprietários de terras.

Além disso, os grileiros também estão tendo o apoio, como no caso do município de Colniza, de políticos, comerciantes locais e alguns madeireiros. "Os políticos têm interesse por causa das eleições, são mais pessoas para votarem neles. Em Colniza tem dois vereadores apoiando os grileiros. Os comerciantes vendem mais e até financiam acampamentos, com a intenção de pegar uma terra mais tarde. E os madeireiros estão de olho na madeira ilegal que será retirada da área", explicou Rubens Forbes Alves de Lima, diretor presidente da empresa Florestal Santa Maria S.A., proprietária de uma área com quase 76 mil hectares em Colniza, que foi invadida por grileiros.

A área, denominada Fazenda Florestal Santa Maria, realiza um plano de manejo florestal sustentável, aprovado pelo Ibama em maio de 2002.

Rubens explicou que a área tinha uma ordem judicial de proteção contra invasões, mas apesar do apoio de vários órgãos do governo, foi invadida. "Eles [grileiros] não estão respeitando nada, nem ordem judicial, nem nada. Eles não têm medo", ressaltou.

Ele contou que em 2002, quando houve uma invasão na área, o pessoal que entrava era grileiros pequenos, "coisa doméstica". "Passados três anos, assusta a mudança de técnica dos grileiros. Eles têm apoio político, do comércio local e madeireiras. O afastamento do Estado causa isso. Essas pessoas estão invadindo área privada e não pública. A Polícia Militar age dentro dos seus limites", desabafou.

O diretor da Florestal Santa Maria contou qual foi a tática usada pelos grileiros para entrarem em sua propriedade. "Eles acamparam fora da fazenda durante uma semana. Depois entraram, colocando à frente mulheres e crianças, que logo em seguida voltaram para a cidade. Isso aconteceu no dia 25 de janeiro. Eles já roçaram a área por baixo e já demarcaram 200 lotes no local. Eles não teriam feito isso sozinhos, sem uma orientação. Alguém está por trás, daí a gente tira a desconfiança de que está havendo treinamento de guerrilha", denunciou Rubens.

Grileiros seriam apoiados por políticos

Segundo ele, "a denúncia sobre a invasão da área tem dois capítulos. O primeiro é que os grileiros profissionais daqui alguns anos se tornarão as Forças Armadas Revolucionárias da Colômbia (Farc) e o segundo é que as últimas terras de áreas de manejo vão acabar".

Para Rubens, os criminosos ambientais e grileiros profissionais estão ficando sob a sombra da reforma agrária e dos conflitos fundiários. "Não são sem-terra, não são de nenhum movimento, são, como dizem, os sem-tora", contou, salientando ainda que "pode acontecer é de ocorrer mais mortes".

De acordo com ele, não há conflito agrário na região, porque não são agricultores, são profissionais, são grileiros. "Esse mascaramento é que faz com que eles [grileiros] tirem vantagem. Eles montaram, há pouco tempo, um associação chamada Unidos para Vencer, recolheram assinaturas e se transvestiram de sem-terra", completou.

Sobre a invasão da Fazenda Florestal Santa Maria, Rubens explicou que foi pedido na Justiça a reintegração de posse. "Todos os invasores já foram notificados e a reintegração de posse deverá ser feita nos próximos dias. Algumas pessoas saíram, outras disseram que irão ficar. Só espero que não haja nenhuma tragédia", disse.

Rubens afirmou que o movimento é armado. "Nós vemos que eles possuem armas de baixo calibre, 22, 28, que eles dizem usar para caçar, mas as pessoas dizem que eles têm armamento mais pesado".

Ele contou também que os grileiros provocam os seguranças que fazem o monitoramento da área da fazenda. "Eles querem que nós reajamos. Eles fomentam o caos mesmo. Não é para arrumar as coisas e sim para desarrumar", criticou.

Para Rubens, na questão rural o país não está na democracia e sim na anarquia, apesar dos esforços dos órgãos federais. "Nunca tivemos as portas fechadas para nós nos órgãos federais, mas os grileiros estão mais rápidos e mais organizados que os próprios órgãos. Estamos contando com o apoio do Estado para resolver a questão, que é mais crítica do que as pessoas imaginam", disse.

O diretor presidente da Florestal Santa Maria alertou que o diretor operacional da empresa, que fica na fazenda, e os dois funcionários ligados diretamente a ele já receberam dezenas de ameaças de morte. "Já foram avisadas para as autoridades, que tomam conhecimento mas nada fazem. E a gente acredita também que nada possa acontecer", concluiu.

Rubens Forbes Alves de Lima, diretor presidente da empresa Florestal Santa Maria S.A.

Manejo florestal é respeitado

A Fazenda Florestal Santa Maria possui uma área total de 75.908 hectares e faz manejo florestal em 71.126 hectares. No local, a floresta é explorada de maneira racional. "São explorados aproximadamente dois mil hectares por ano. A fazenda está dividida em 25 áreas desse tamanho. No momento da exploração, são retiradas as árvores mais antigas. Nesse processo, quando a área de onde foi tirada árvore hoje chegar novamente para ser explorada, já terão se passado 25 anos. Com isso, novas árvores terão crescido. Poderemos explorar agora e futuramente. É um projeto 100% correto", explicou a engenheira florestal, responsável pela área, Oscarlina de Jesus.

Ela lembrou também que com o manejo, são abrangidas as áreas social e ambiental, pois há o emprego de pessoas, mexe com a questão econômica, pois sempre há matéria-prima e também mantém o meio ambiente.

A fazenda, em maio, começará a ser área de pesquisa e ensino por meio de um convênio entre a Florestal Santa Maria, a Universidade Federal de Mato Grosso (UFMT) e o Ibama.

O diretor-presidente da Florestal Santa Maria, Rubens Forbes Alves de Lima, salientou que o movimento é local, mas está bem forte. "Esta é a última boa região florestal do noroeste do Estado. Precisamos preservá-la e usá-la de maneira racional, senão Colniza acabará como outros municípios, que ficaram fantasmas. Os madeireiros sérios também estão preocupados com a situação, já que se área não conseguir certificação, por causa do não cumprimento do projeto de manejo, não poderá exportar", concluiu Rubens. *(DD)*

Figure 15. *Headlines of an article published in a very important daily newspaper from Cuiabá (MT): "Land-grabbers use tactics of guerrilla warfare" (FSM-farm landowner in photo detail) (February 23, 2005)*

2.6 Methodology Deviations

In the analysis of leakage outside the leakage belt, for calculating $PROP_{IMM}$, the participatory rural appraisal (PRA) approach was replaced by local data available from IBGE. This practice is justified by the fact that the IBGE has a precise approach for accounting population locally, which allows calculating the number of immigrants for a given period of time in the municipality of Colniza. According to the number of immigrants, we have inferred the proportion of deforestation attributed to immigrant agents.

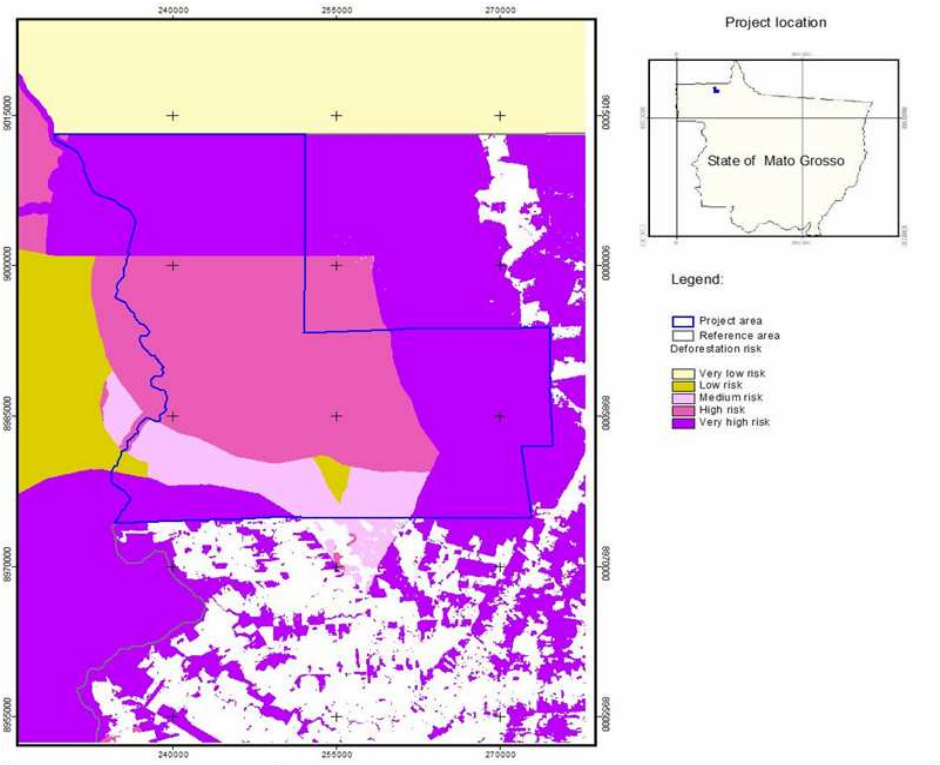
As the country has a great variety of forest biomes in all its extension, TOTFOR considered only the Amazon Rainforest biome, instead of the whole Brazilian territory. This is a conservative approach. Thus, as a representation of the total area of Amazon Rainforest in Brazilian Territory, TOTFOR consisted of multiplying the country territory by 49.29% (proportion of Amazon comprised in Brazilian Territory). As TOTFOR as considered only for the Amazon biome, PROTFOR and MANFOR were evaluated solely for Brazilian Northern and Centre-West macro-regions.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Location analysis

According to the initial configuration of the RRL landscape, location analysis was elected (Transition Configuration). Location analysis involved the preparation of deforestation risk maps. Algorithms of internationally peer-reviewed modelling tools were elected to prepare deforestation risk maps, to conform to the methodology at time of validation. The criteria used for adjustment of these algorithms were based on proximity with deforested areas, proximity with roads, proximity and dimension of water bodies, landscape characteristics, and limits of parks and indigenous reserves. The matrix of criteria used for preparation of deforestation risk maps is available for consultation by auditors. The results of deforestation risk analysis are presented in Figure 16.



		Stratum			
		Aluvial	Encosta	FOB Densa Submontana	FOB Submontana Cipós e Palmeiras
Deforestation risk class	5 (Very High)	8.230,1	1.238,0	4.897,6	19.828,0
	4 (High)	3.959,9	5.123,5	991,2	18.556,1
	3 (Medium)	926,1	2.540,7	704,2	3.721,7
	2 (Low)	0,0	386,1	75,1	458,9
	1 (Very Low)	15,4	0,0	53,0	8,4

Figure 16. *Deforestation risk map obtained for the FSM Project Area*

For conservative calculation purposes, only the areas under “Very High” and “High” deforestation risk classes were considered to be deforested in the baseline, which corresponds to a total deforestation of 87.6% of the Project Area (62,824 hectares) over 30 years.

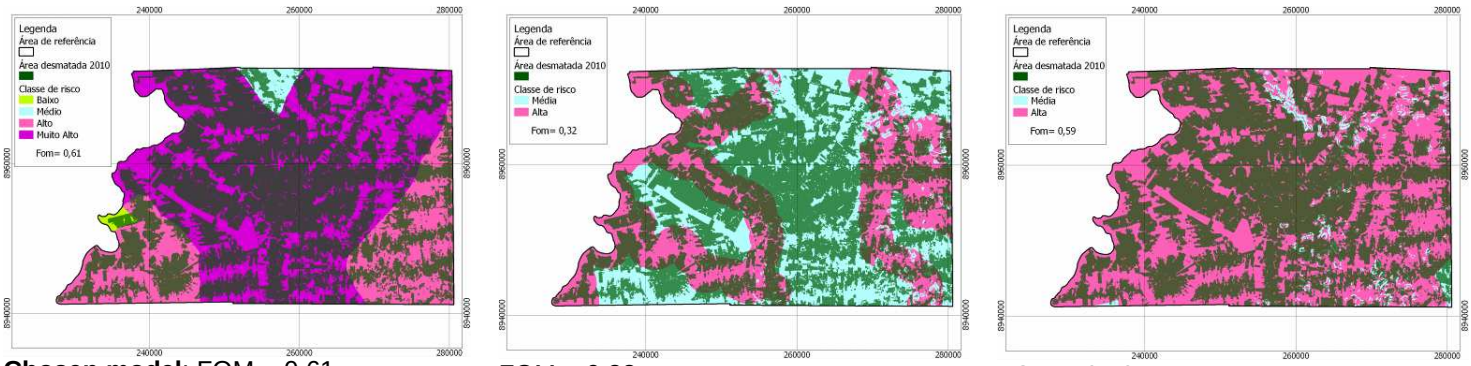
In order to validate the deforestation risk estimation, a simulation of the application of estimates was performed on a 140,000-hectare sample on the Reference Area, as show in Figure 17. It is observed that the deforestation risk model applied to the sample area fairly estimates the tendencies of historical deforestation in time. As indicated in VMD0007 “Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation” (BL-UP), v2.0, the method “Figure of Merit” (FOM) was applied to compare the different models tested. The chosen model has a FOM of 0.61 (see Figure 17), which is above the threshold stipulated by the methodology for “transition” deforestation pattern. A sensitivity analysis was also carry out to confirm validity of the deforestation risk model that was chosen. This analysis aimed at evaluating the importance and impact of each variable on the deforestation risk model. The report of sensitivity analysis is available for consultation by auditors.

The sequence of maps below clearly illustrates the role of FSM Farm in hindering the evolution of deforestation in the region. The eastern boundaries of the FSM Farm have effectively played a role in avoiding deforestation in a very high risk area. As previously mentioned in this VCS-PD, this is a result of great efforts and investments from the FSM landowner, which have strongly increased costs and reduced financial returns in FSM internal activities (forest management). This scenario demands incentives from carbon credits for long-term continuation.

It is also noticed that the presence of roads is a very determinant driver in explaining deforestation risks. As demonstrated in Figure 17, the deforestation risk model fairly indicates the high risk of deforestation nearby roads, whereby unplanned deforestation quickly expands, reaching the high deforestation risk boundaries within only three years (see 1999 thematic map). Therefore, the proximity to roads was the most important driver considered in the deforestation risk model used in this Project. This behaviour corroborates concepts and observations from previous works by IMAZON[14].

[14] SALES, M; SOUZA JR., C; HAYASHI, S.; Risco de desmatamento. 1st ed., Instituto IMAZON, January 2011

A



Chosen model: FOM = 0.61 FOM = 0.32 FOM = 0.59

B

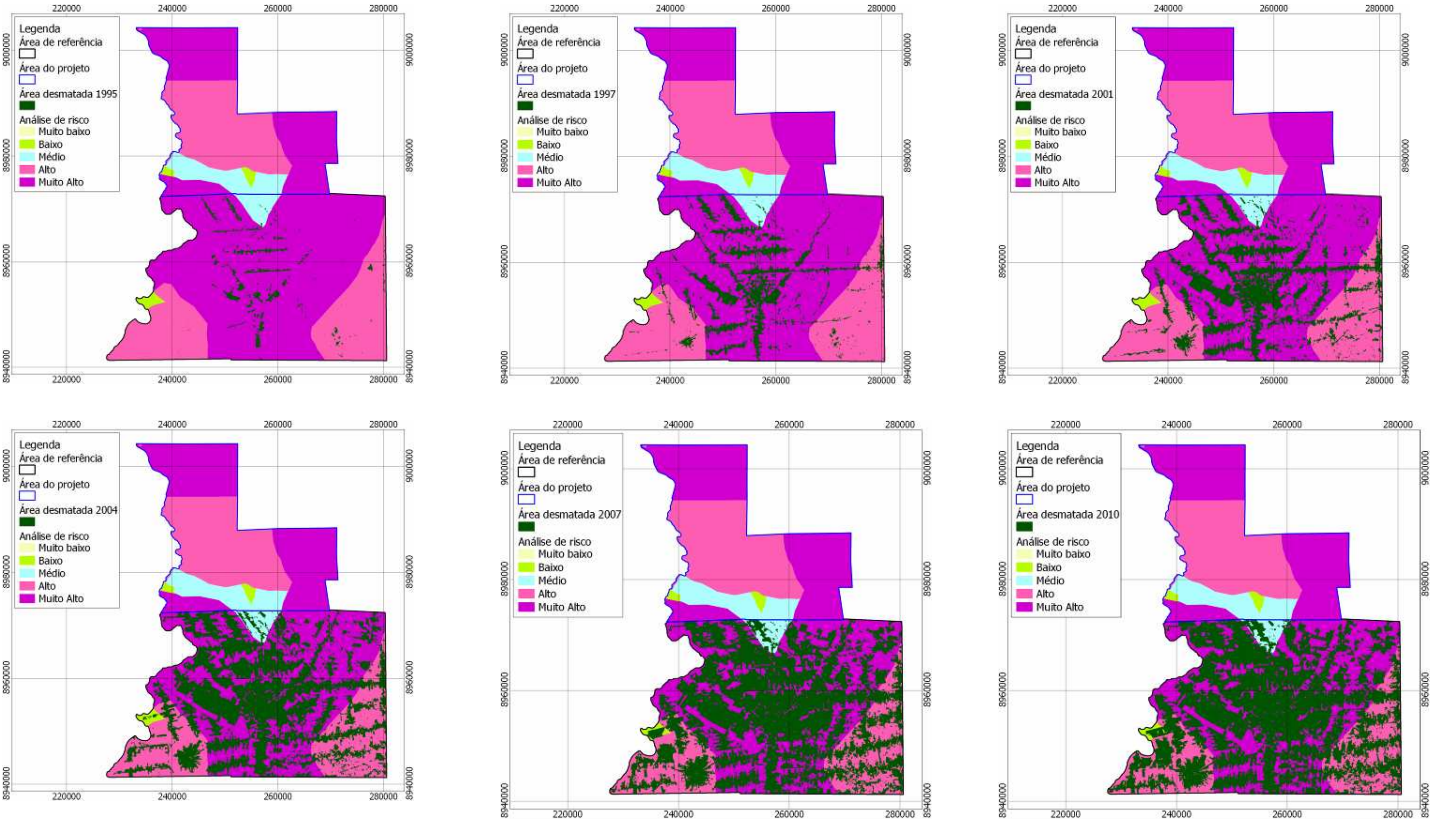
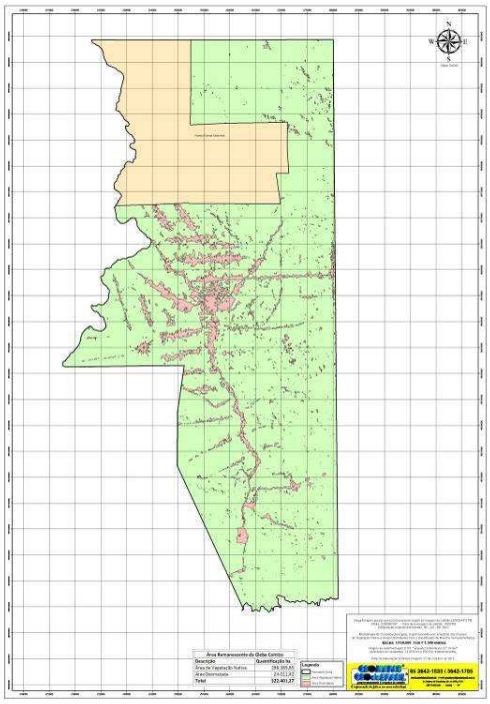


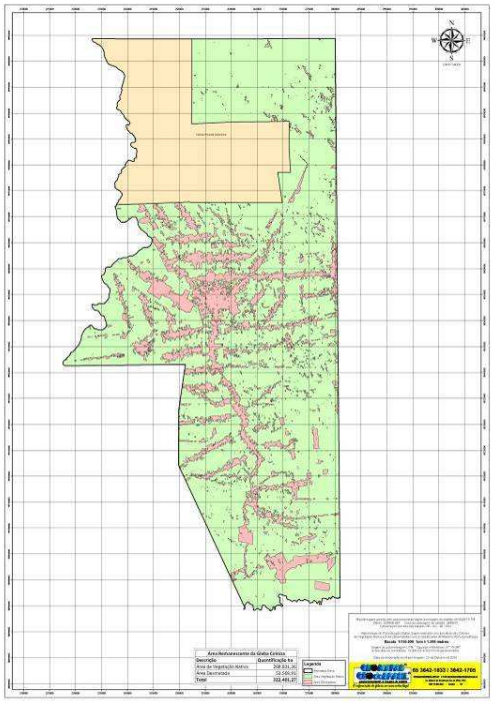
Figure 17. **A**. *Figure of Merit (FOM) calculated for three different deforestation risk models tested in a 140,000-hectare sample area (matrixes of models are available for auditors).* **B**. *Sequence of thematic maps illustrating the projection of deforestation risk over the reference period, to demonstrate the validation of the deforestation risk model used in this Project.*

Estimation of the annual areas of unplanned baseline deforestation in the RRD

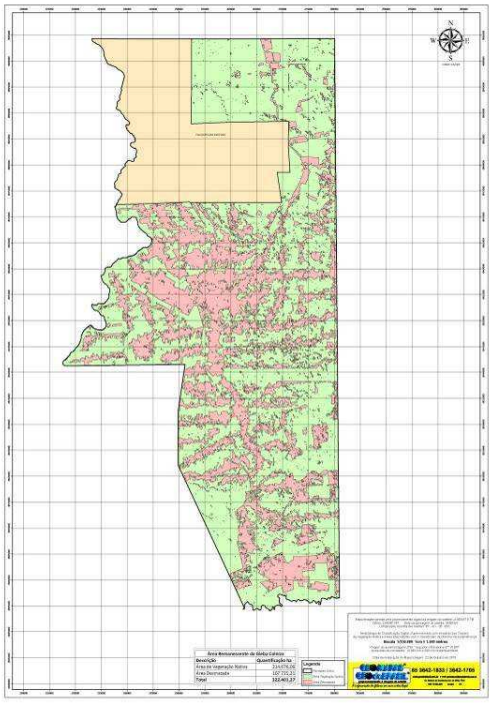
In order to establish the baseline for the FSM-REDD Project, the Reference Area was circumscribed inside the zone originally pertaining to Colonizadora Colniza (394,118.97 ha), which included the FSM property (71,713.90 ha). Thus, Reference Area is defined as the tract excluding the FSM property itself (Project Area), hence totalizing 322,405.07 ha. The deforestation rate for the last 10 years (1999-2010) has been assessed for this tract, as shown in the sequence of thematic maps presented under Figure 18. According to X-UNC "Estimation of uncertainty for REDD project activities", it is assumed that there is zero uncertainty in baseline rate of deforestation where numbers are equal to a long-term average. Moreover, in conformity with module BL-UP "Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation", the baseline rate of deforestation was assessed for the last 10 years prior to project start. Thus, it is considered that the estimate of the baseline rate of deforestation has zero uncertainty.



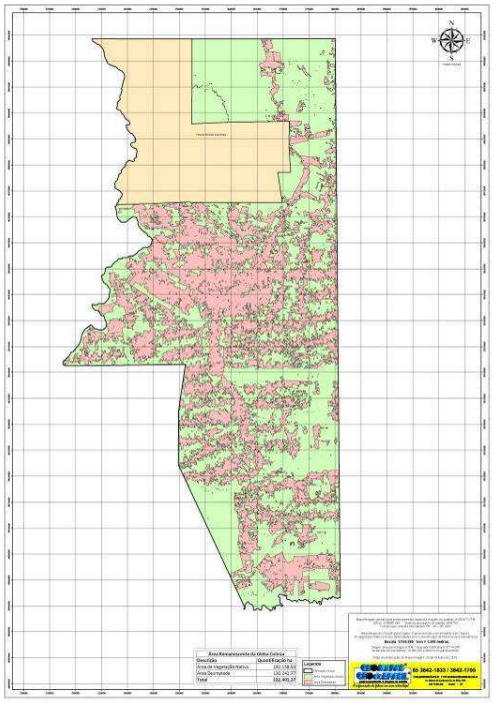
1999



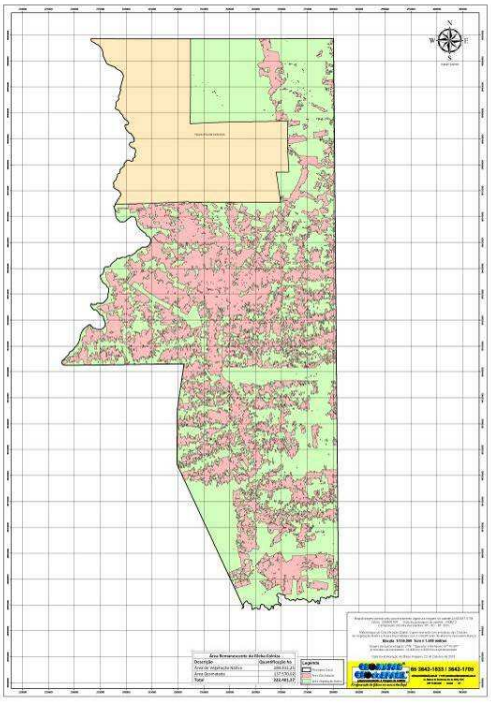
2001



2004



2007



2010

Figure 18. *Increase in deforestation within the Reference Area, assessed in 3-year intervals through satellite imaging*

Based on analysis of the deforestation that has occurred in the Reference Area over the last 10 years (Figure 19), it has been possible to determine the deforestation that would have occurred within the area pertaining to Florestal Santa Maria S.A. (Project Area) and which was avoided thanks to its conservation activities.

The deforestation in the Reference Area occurs at an average rate of 2.94%/year, and has currently accumulated a total deforestation of 42.7% of the area under analysis. This indicates that native forest area still represents the greatest part of the Reference Area. As seen in Figure 19, the annual deforestation rate has not shown a defined tendency over the last 10 years, which impairs any statistical forecast (i.e. regression analysis) of deforestation rates for the next years. Therefore, according to the methodology, the arithmetic average of annual deforestation rates, for the last 10 years, was considered for deforestation forecast. This deforestation rate corresponds to an average loss of 2,104.9 ha/year of forest within the Project Area.

	Forest area (ha)	Deforested area (ha)
Satélite LANDSAT5 TM com a seguinte data da passagem do satélite em 14/08/2010	184.831,3	137.570,0
Satélite LANDSAT5 TM com a seguinte data da passagem do satélite em 05/07/2007	192.158,5	130.242,8
Satélite LANDSAT5 TM com a seguinte data da passagem do satélite em 26/06/2004	214.676,1	107.725,2
Satélite LANDSAT7 TM com a seguinte data da passagem do satélite em 13/08/2001	268.831,4	53.569,9
Satélite LANDSAT5 TM com a seguinte data da passagem do satélite em 15/07/1999	298.389,9	24.011,4

Annual deforestation rates		Total (ha)	Average (ha/year)
	from 2007 to 2010	7.327,2	2.442,4
	from 2004 to 2007	22.517,6	7.505,9
	from 2001 to 2004	54.155,3	18.051,8
	from 1999 to 2001	29.558,5	9.852,8
	Average deforestation rate		**9.463,2 ha/year**
	Adopted deforestation rate		**9.463,2 ha/year**

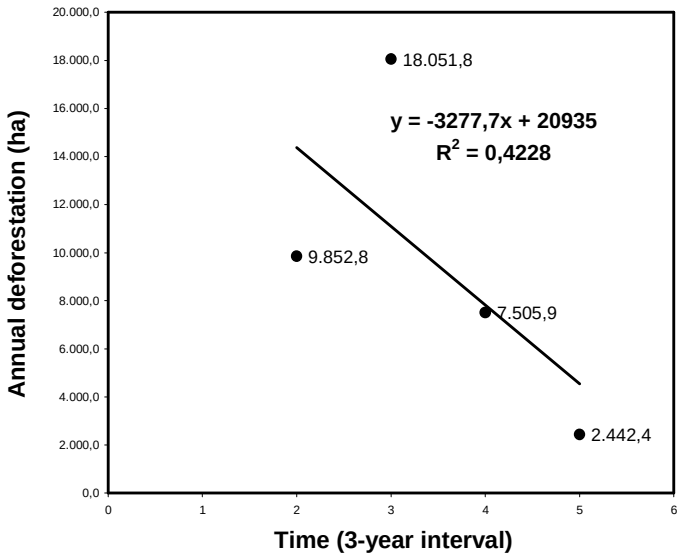


Figure 19. *Analysis of the deforestation rate over the last 10 years (1999 – 2010) within the Reference Area*

The assessment of deforestation rate (above) is totally valid, as the Reference Area (basis for baseline analysis) is very similar to the Project Area in several aspects (similarity analysis):

i) Politics and Legislation: as both tracts are located in the same Municipality (Colniza - MT), politics and legislation regarding environment and land property are identical for both areas. Moreover, the agencies of regulation, command and control referent to Brazilian Forest Code are the same throughout the State of Mato Grosso. Thus, the same difficulties to enforce the forest legislation in the Reference Area would apply to the Project Area.

ii) Soil and landscape: similarity between Project Area and Reference Area can be observed by means of satellite images (INPE, 2009) and thematic maps from the region (IBGE/Embrapa Solos, 2001; Figure 20). According to RADAM (2006), the region holds dystrophic red/yellow ultisols, dystrophic leptosols and clays. Soil pH varies from 5.5 to 7.0. These soil characteristics are suitable for implementation of the main BAU activities (i.e. coffee cultivation and pasture) in both Reference Area and Project Area. In addition, the exploitation of cassiterite has already been registered inside the Reference Area. These two latter aspects further confirm that the Project Area is certainly subjected to great pressures for invasion. According to the analysis presented in Figure 21, the Project Area, Reference Area and Leakage Belt pass the test of similarity for landscape, as their slope classes occur under similar frequencies. It is important to point out that the Project Area is even more flat than the Reference Area, given its higher proportion of lands within the 0-10% slope class (86%), compared with the Reference Area (79%). Moreover, the Reference Area possesses more areas in the 10-20% slope class (15%) than the Project Area (7%): this latter factor also indicates that the Project Area could undergo even higher deforestation pressure, compared with the Reference Area. According to Table 6, the Project Area, Reference Area and Leakage Belt are also similar regarding the density of hydrologic drainage elements. It is noticed that the maximum variation observed (difference between the lowest value, 1.29 km/km^2, and the highest value, 1.43 km/km^2) is 10.9%, which is hence in conformity with similarity range stipulated in the methodology.

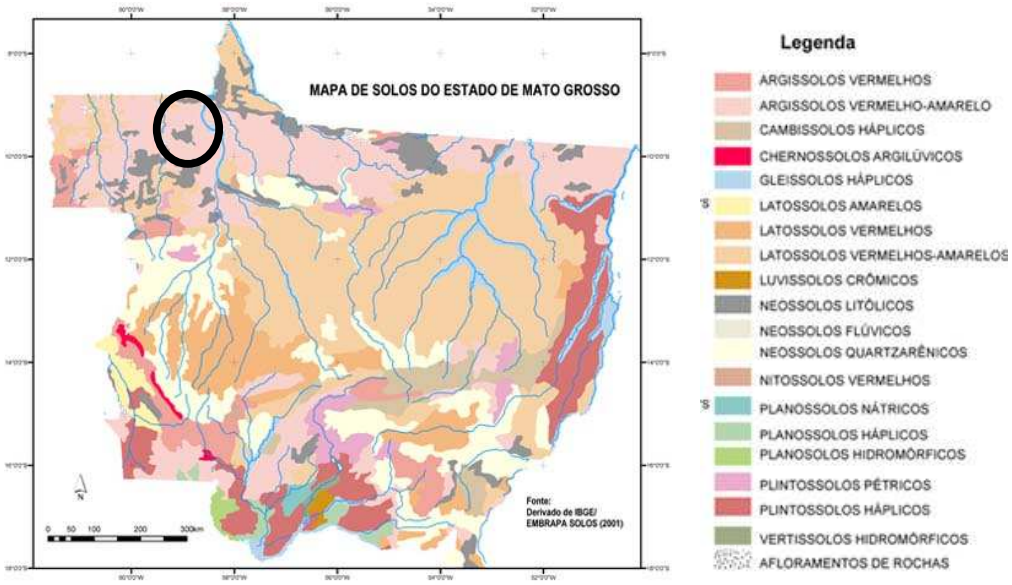
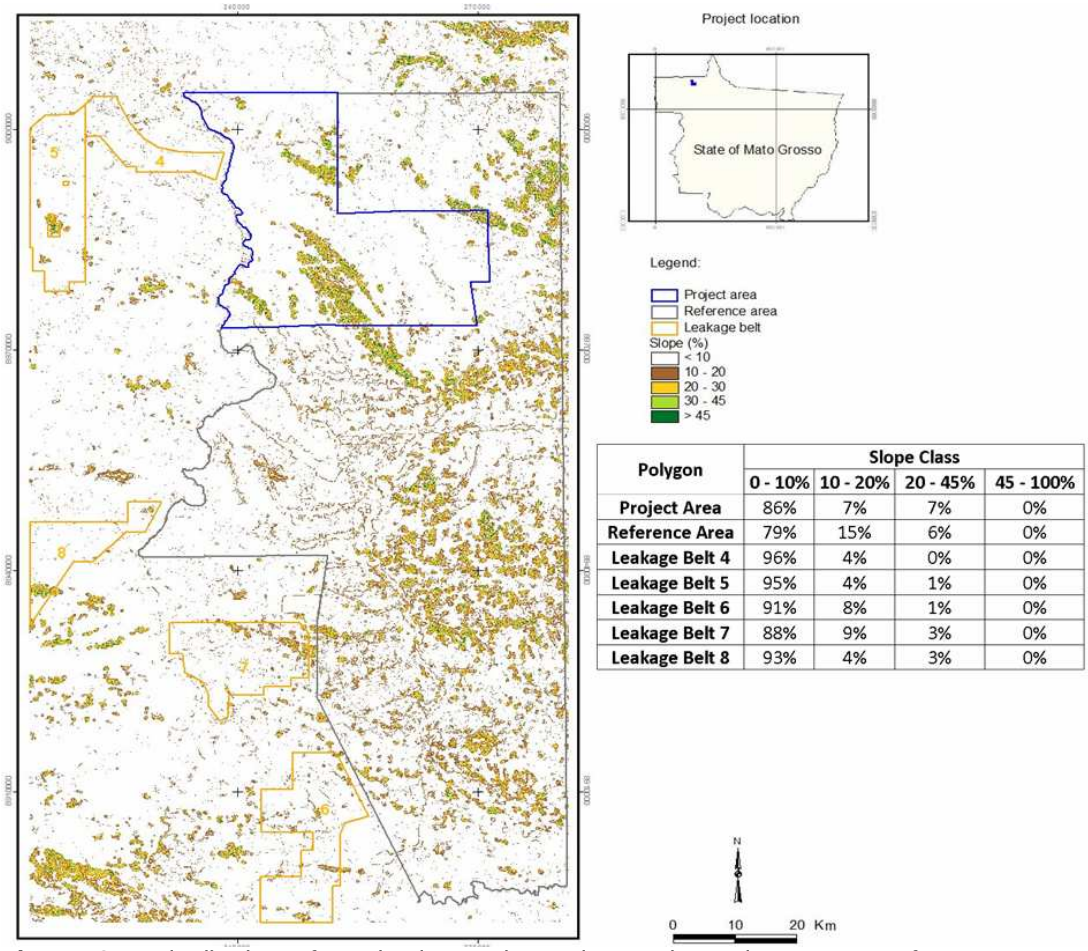


Figure 20. *Distribution of predominant soil classes in the State of Mato Grosso (Source: IBGE/Embrapa Solos, 2001): approximate location of FSM farm is indicated by the circle*



Polygon	Slope Class			
	0 - 10%	10 - 20%	20 - 45%	45 - 100%
Project Area	86%	7%	7%	0%
Reference Area	79%	15%	6%	0%
Leakage Belt 4	96%	4%	0%	0%
Leakage Belt 5	95%	4%	1%	0%
Leakage Belt 6	91%	8%	1%	0%
Leakage Belt 7	88%	9%	3%	0%
Leakage Belt 8	93%	4%	3%	0%

Figure 21. *Distribution of predominant slope classes in Project Area, Reference Area and Leakage Belt*

Polygon	Area	D_{dren}
	km^2	km/km^2
Project Area	717,1	1,43
Reference Area	3224,0	1,41
Leakage Belt 4	74,5	1,40
Leakage Belt 5	152,9	1,31
Leakage Belt 6	185,0	1,39
Leakage Belt 7	151,0	1,29
Leakage Belt 8	92,3	1,40

Table 6. *Density of hydrologic drainage elements in Project Area, Reference Area and Leakage Belt*

iii) Climate and vegetation: general climate patterns are considered as similar all over the Municipality of Colniza, which determines the occurrence of similar vegetation types inside the Project Area, Reference Area and Leakage Belt. This fact is demonstrated in Figure 22. In all areas considered in the analysis, the vegetation type classed as "As" ("Floresta Ombrófila Aberta de Submontana", IBGE 1992[15]) is predominant, which demonstrates similarity among the areas studied, in conformity with methodology requirements.

iv) Accessibility: the southern boundary of FSM property is located at 28 km from the city of Colniza. All along the eastern boundary of the property, there are several small roads called "linhas" (lines), which pass through INCRA settlements at the south and east of the property.

[15] *IBGE - Fundação Instituto Brasileiro de Geográfica e Estatística - Manual Técnico da Vegetação Brasileira. Série manuais técnicos em geociências. Rio de Janeiro, 1992.*

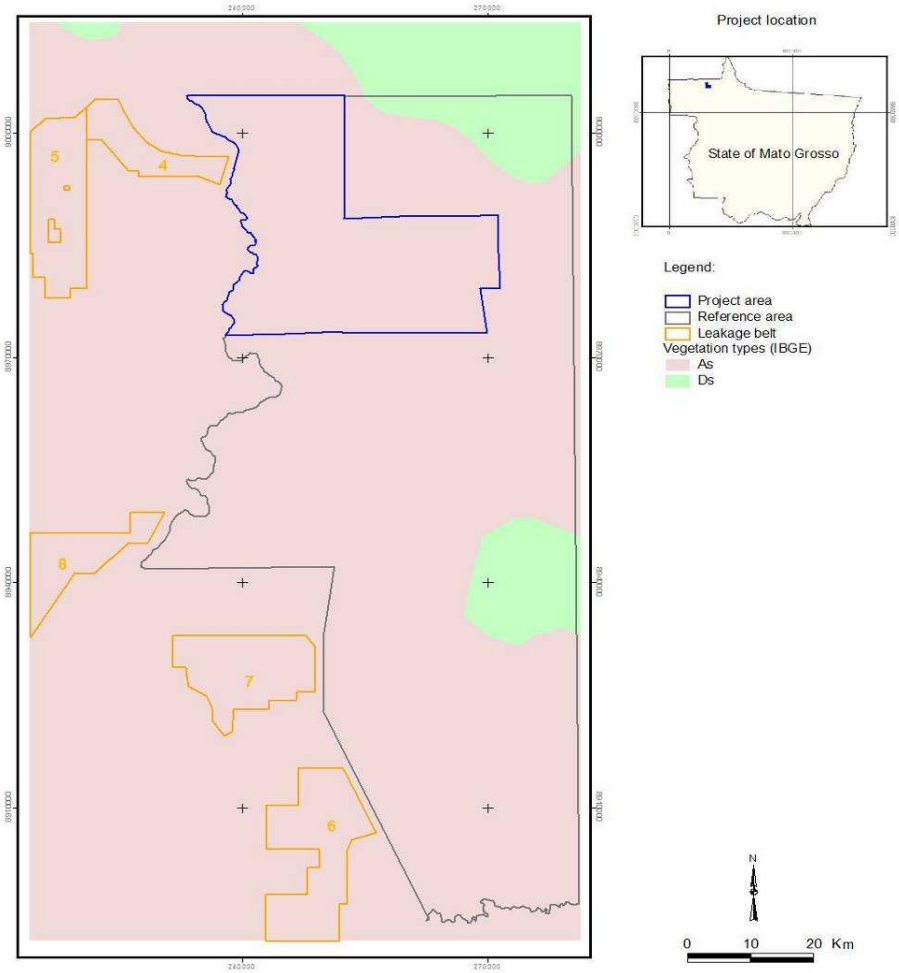


Figure 22. *Distribution of predominant vegetation classes in Project Area, Reference Area and Leakage Belt*

Estimation of annual areas of unplanned deforestation

The projected unplanned baseline deforestation in the project area is estimated as follows:

$$A_{BSL,PA,unplanned,t} = A_{BSL,RRD,unplanned,t} * P_{PA}$$

Where:

$A_{BSL,PA,unplanned,t}$	Projected area of unplanned baseline deforestation in the project area in year t; ha
$A_{BSL,RRD,unplanned,t}$	Projected area of unplanned baseline deforestation in the RRD in year t; ha
P_{PA}	Ratio of the project area to the total area of RRD; dimensionless

t	1, 2, 3, … t years elapsed since the projected start of the REDD project activity

Future deforestation is assumed to happen first at the pixel locations with the highest deforestation risk value. In the Deforestation Risk Map, the pixels with the highest risk value were successively selected whose area is equal to the area expected to be deforested in a given project year, proportionally for a given stratum occurring in the Project Area. Pixel selection procedure was repeated for each successive project year. All yearly baseline deforestation areas were compiled in one single table showing the expected Baseline Deforestation for the Project Duration (Table 7; Location Analysis). This procedure was repeated for each forest stratum occurring in the Project Area.

Table 7. *Projection of annual baseline deforestation for the Project Area (Location Analysis), during project duration, for each stratum occurring in the Project Area (the yearly sum of annual areas of all strata is equal to 2,104.9 ha, which was previously calculated as the deforestation rate in RRD)*

Annual baseline deforestation for the Project Area								Stratum FOB Densa Submontar
	Deforestation Risk Class					Total yearly area (ha/year)	Total accumulative area (ha)	
	5	4	3	2	1			
Year								
2009	216.4					216.4	216.4	
2010	301.5					301.5	517.9	
2011	301.5					301.5	819.4	
2012	301.5					301.5	1,120.9	
2013	301.5					301.5	1,422.4	
2014	301.5					301.5	1,723.9	
2015	301.5					301.5	2,025.4	
2016	301.5					301.5	2,326.9	
2017	301.5					301.5	2,628.3	
2018	301.5					301.5	2,929.8	
2019	301.5					301.5	3,231.3	
2020	301.5					301.5	3,532.8	
2021	301.5					301.5	3,834.3	
2022	301.5					301.5	4,135.8	
2023	301.5					301.5	4,437.3	
2024	301.5					301.5	4,738.8	
2025	158.8	34.5				193.3	4,932.1	
2026		72.9				72.9	5,004.9	
2027		72.9				72.9	5,077.8	
2028		72.9				72.9	5,150.7	
2029		72.9				72.9	5,223.6	
2030		72.9				72.9	5,296.4	
2031		72.9				72.9	5,369.3	
2032		72.9				72.9	5,442.2	
2033		72.9				72.9	5,515.1	
2034		72.9				72.9	5,587.9	
2035		72.9				72.9	5,660.8	
2036		72.9				72.9	5,733.7	
2037		72.9				72.9	5,806.6	
2038		72.9				72.9	5,879.4	
2039		9.4				9.4	5,888.8	

Annual baseline deforestation for the Project Area								Stratum
	Deforestation Risk Class					Total yearly area (ha/year)	Total accumulative area (ha)	Encosta
	5	4	3	2	1			
Year								
2009	54.7					54.7	54.7	
2010	76.2					76.2	130.9	
2011	76.2					76.2	207.1	
2012	76.2					76.2	283.3	
2013	76.2					76.2	359.5	
2014	76.2					76.2	435.7	
2015	76.2					76.2	512.0	
2016	76.2					76.2	588.2	
2017	76.2					76.2	664.4	
2018	76.2					76.2	740.6	
2019	76.2					76.2	816.8	
2020	76.2					76.2	893.0	
2021	76.2					76.2	969.2	
2022	76.2					76.2	1,045.4	
2023	76.2					76.2	1,121.6	
2024	76.2					76.2	1,197.8	
2025	40.1	178.3				218.4	1,416.3	
2026		376.7				376.7	1,793.0	
2027		376.7				376.7	2,169.6	
2028		376.7				376.7	2,546.3	
2029		376.7				376.7	2,923.0	
2030		376.7				376.7	3,299.7	
2031		376.7				376.7	3,676.4	
2032		376.7				376.7	4,053.0	
2033		376.7				376.7	4,429.7	
2034		376.7				376.7	4,806.4	
2035		376.7				376.7	5,183.1	
2036		376.7				376.7	5,559.8	
2037		376.7				376.7	5,936.5	
2038		376.7				376.7	6,313.1	
2039		48.3				48.3	6,361.5	

Annual baseline deforestation for the Project Area								Stratum
	Deforestation Risk Class					Total yearly area (ha/year)	Total accumulative area (ha)	Aluvial
	5	4	3	2	1			
Year								
2009	363.7					363.7	363.7	
2010	506.6					506.6	870.3	
2011	506.6					506.6	1,377.0	
2012	506.6					506.6	1,883.6	
2013	506.6					506.6	2,390.2	
2014	506.6					506.6	2,896.9	
2015	506.6					506.6	3,403.5	
2016	506.6					506.6	3,910.2	
2017	506.6					506.6	4,416.8	
2018	506.6					506.6	4,923.5	
2019	506.6					506.6	5,430.1	
2020	506.6					506.6	5,936.7	
2021	506.6					506.6	6,443.4	
2022	506.6					506.6	6,950.0	
2023	506.6					506.6	7,456.7	
2024	506.6					506.6	7,963.3	
2025	266.8	137.8				404.6	8,367.9	
2026		291.1				291.1	8,659.1	
2027		291.1				291.1	8,950.2	
2028		291.1				291.1	9,241.4	
2029		291.1				291.1	9,532.5	
2030		291.1				291.1	9,823.6	
2031		291.1				291.1	10,114.8	
2032		291.1				291.1	10,405.9	
2033		291.1				291.1	10,697.0	
2034		291.1				291.1	10,988.2	
2035		291.1				291.1	11,279.3	
2036		291.1				291.1	11,570.4	
2037		291.1				291.1	11,861.6	
2038		291.1				291.1	12,152.7	
2039		37.4				37.4	12,190.1	

Annual baseline deforestation for the Project Area								Stratum
	Deforestation Risk Class					Total yearly area (ha/year)	Total accumulative area (ha)	FOB Submontana Cipo
	5	4	3	2	1			
Year								
2009	876.2					876.2	876.2	
2010	1220.6					1,220.6	2,096.8	
2011	1220.6					1,220.6	3,317.4	
2012	1220.6					1,220.6	4,538.0	
2013	1220.6					1,220.6	5,758.6	
2014	1220.6					1,220.6	6,979.2	
2015	1220.6					1,220.6	8,199.8	
2016	1220.6					1,220.6	9,420.4	
2017	1220.6					1,220.6	10,641.0	
2018	1220.6					1,220.6	11,861.6	
2019	1220.6					1,220.6	13,082.2	
2020	1220.6					1,220.6	14,302.8	
2021	1220.6					1,220.6	15,523.4	
2022	1220.6					1,220.6	16,744.0	
2023	1220.6					1,220.6	17,964.6	
2024	1220.6					1,220.6	19,185.2	
2025	642.8	645.8				1,288.6	20,473.8	
2026		1364.2				1,364.2	21,838.0	
2027		1364.2				1,364.2	23,202.3	
2028		1364.2				1,364.2	24,566.5	
2029		1364.2				1,364.2	25,930.8	
2030		1364.2				1,364.2	27,295.0	
2031		1364.2				1,364.2	28,659.3	
2032		1364.2				1,364.2	30,023.5	
2033		1364.2				1,364.2	31,387.8	
2034		1364.2				1,364.2	32,752.0	
2035		1364.2				1,364.2	34,116.3	
2036		1364.2				1,364.2	35,480.5	
2037		1364.2				1,364.2	36,844.8	
2038		1364.2				1,364.2	38,209.0	
2039		175.1				175.1	38,384.1	

Based on the Location Analysis shown above, it was possible to project the location of deforestation inside the Project Area in the baseline scenario. Figure 23 shows the projection of deforestation location in the Project Area in the baseline scenario, for three ten-year periods.

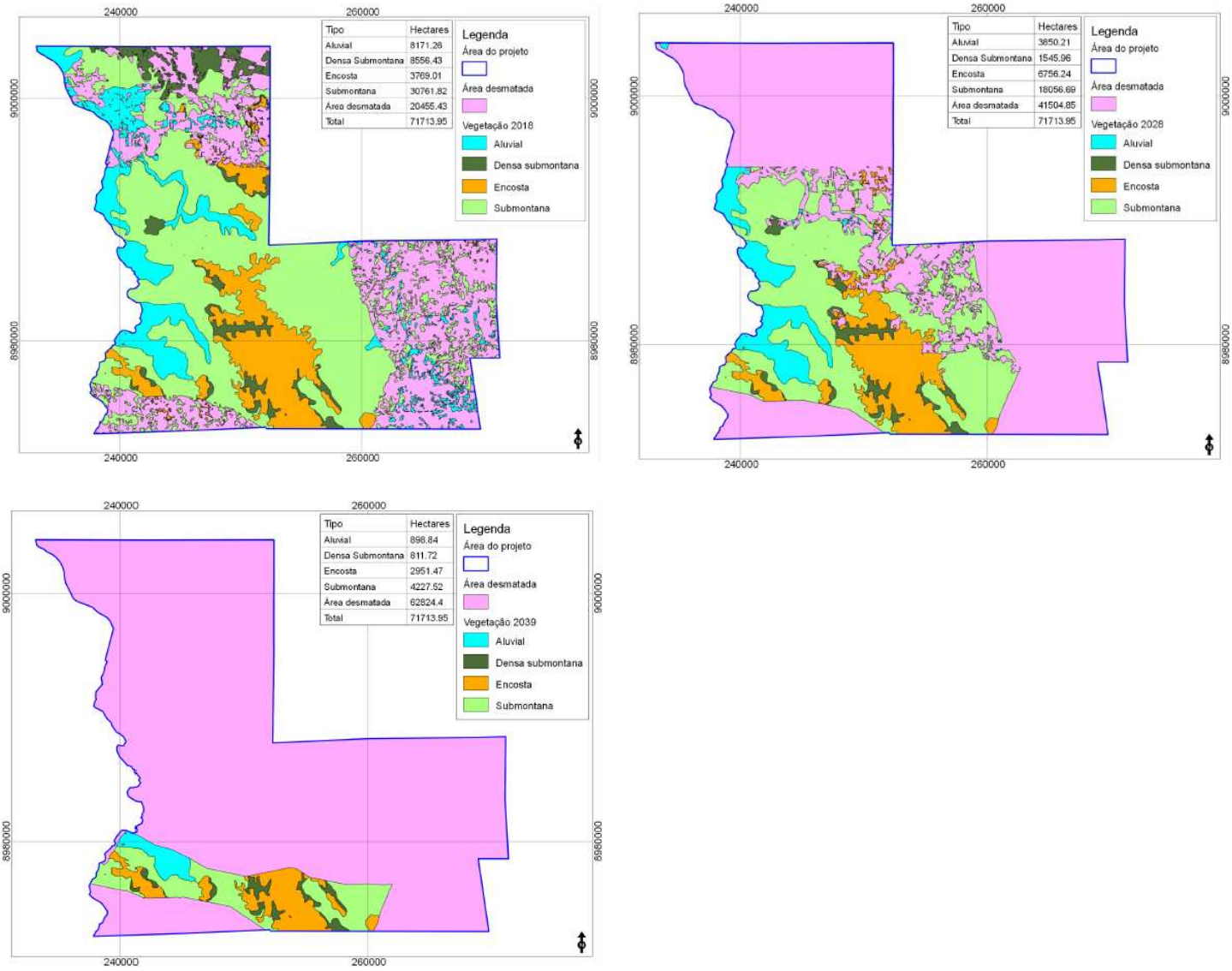


Figure 23. *Projection of deforestation location inside the Project Area, for three ten-year periods*

Characterization of biomass in Project Area

The Project Area underwent a specific field inventory in 2010. The forest inventory was preceded by a local stratification by forest sub-types, as shown in Figure 25. Permanent sampling plots were installed in the field considering the minimal sampling for each stratum, in order to obtain a representative sample with maximum of 15% error[16].

[16] According to "Approved VCS Module VMD0017 (Version 1.0) REDD Methodological Module: Estimation of uncertainty for REDD project activities (X-UNC), Sectoral Scope 14", the allowable

The field inventory methodology is described in a Standard Operating Procedure (SOP), which is available for consultation by the auditors. This SOP was specifically designed to FSM carbon inventories, to be applied in the baseline assessment, as well as in the monitoring period. The field carbon inventory involved the installation of 18 permanent transects, composed by a total of 128 permanent plots. The distribution of transects can be seen in Figure 24. The geographic coordinates of the permanent sampling plots are available for consultation by the auditors.

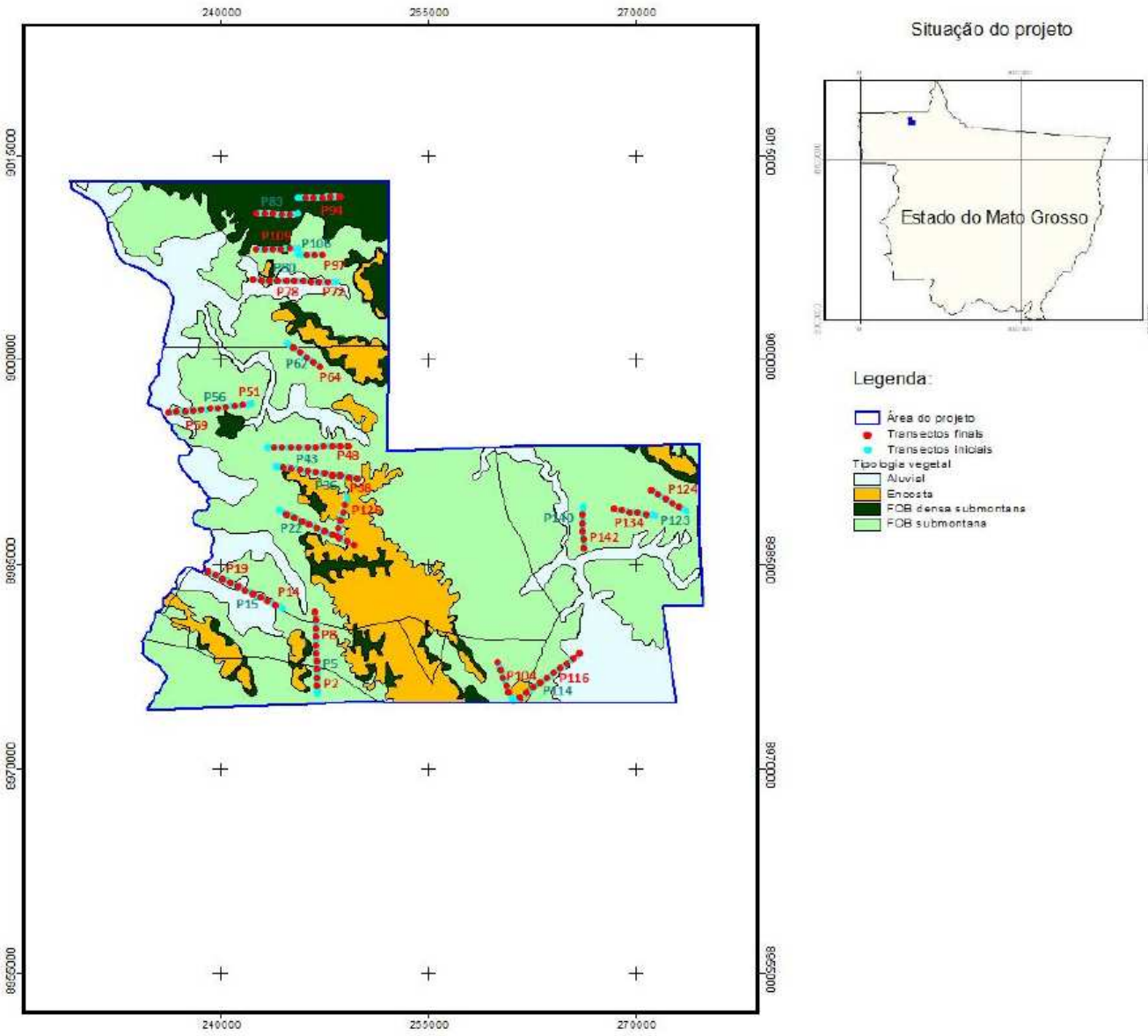


Figure 24. *Distribution of permanent transects for the biomass carbon inventory in the Project Area*

uncertainty under this methodology is +/- 15% at the 95% confidence level. Where this precision level is met then no deduction should result for uncertainty.

The merchantable volume of trees was estimated by directly measuring the circumference at breast height (CBH). The data of CBH is converted in DBH (Diameter at Breast Height) and applied to allometric equations for estimation of merchantable stem volume. For application of allometric equations, trees were divided in two classes of DBH:

- DBH ranging from 4.46 cm to 81.99 cm: application of allometric equation from NOGUEIRA et al. (2008)[17]. This equation was adjusted for estimating bole volume of trees with DBH ranging from 5 to 82 cm (excepting palm trees). This equation has been derived using DBH based on datasets that comprise more than 30 trees (i.e. 298 trees). The model was based on statistically significant regression and has an r^2 that is higher than 0.8 (i.e. $r^2 = 0.971$):

  $\ln(\text{Volume, } m^3) = -8.939 + 2.507*\ln(\text{DBH, cm})$

- DBH higher than 82.00 cm: application of allometric equation from COLPINI et al. (2009)[18]. The COLPINI et al. (2009) Kopezky – Gehrhardt allometric equation was applied for estimating the merchantable volume of trees (excepting palm trees). This equation has been derived using DBH based on datasets that comprise more than 30 trees (i.e. 91 trees). This equation was based on statistically significant regression and has an r^2 that is higher than 0.8. According to COLPINI et al. (2009), the Kopezky – Gehrhardt model showed the best performance among single-entry models for estimation of volumes with bark in the same forest type observed in the FSM region. The Kopezky – Gehrhardt model, presented below, provided an r^2 of 0.928. Given that the allometric equation has been obtained for individuals having DBH higher than 82 cm (i.e. ranging from 15-cm to 135-cm DBH), the equation was applied for trees with DBH higher than this threshold inside the FSM farm.

  $\text{Volume, } m^3 = -0.4306 + 0.0011*(\text{DBH, cm})^2$

Both equations correspond to a local forest-type specific model, whose data were collected in the same type of forest ("As", according to the official IBGE classification; Open Forest of South Amazon) at distances of about 120 km from the FSM farm.

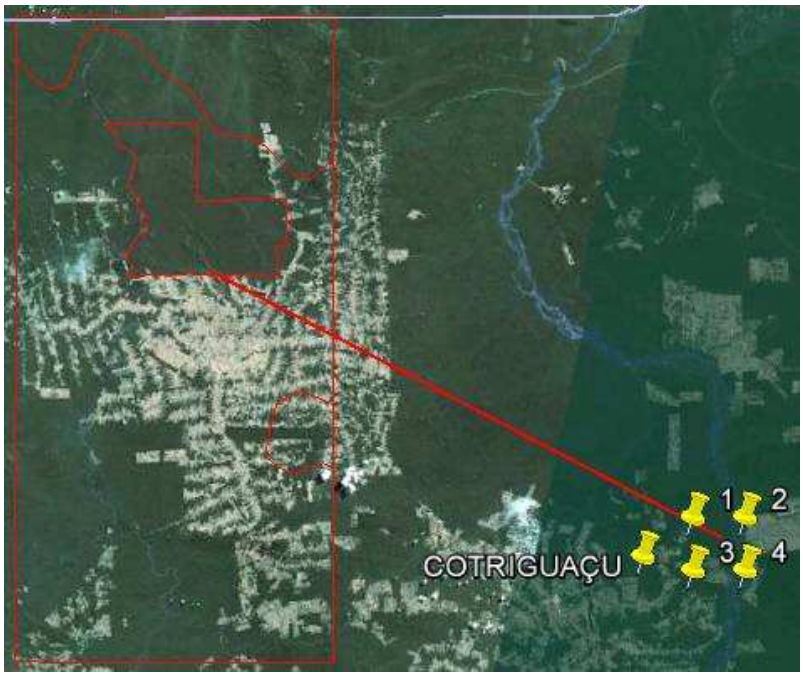
COLPINI's model was adjusted for a forest fragment located at the municipality of Cotriguaçu (north-west region of the State of Mato Grosso) between latitudes 9°47' and 9°53' S and longitudes 58°13' and 58°19' W, with altitude varying between 100 and 150 m.

For NOGUEIRA's model, data collection was performed also in the municipality of Cotriguaçu and other two municipalities: Juruena and Carlinda, State of Mato Grosso. In NOGUEIRA et al. (2008), in South Amazon sampling sites, the vegetation was described as open forest, including the Carlinda site in the northwestern portion of the State of Mato Grosso. Except for the Carlinda

[17] NOGUEIRA, E.M.; FEARNSIDE, P.M.; NELSON, B.W.; BARBOSA, R.I.; KEIZER, E.W.H., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(2008): 1853-1867.

[18] COLPINI, C.; TRAVAGIN, D.P.; SOARES, T.S.; SILVA, V.S.M. e, 2009. Determinação do volume, do fator de forma e da porcentagem de casca de árvores individuais em uma Floresta Ombrófila Aberta na região noroeste de Mato Grosso. Acta Amazonica, 39(1): 97-104.

site, where evidence of previous disturbance was observed, all other plots were in primary forest, without invasion of pioneer trees or mortality associated with edges.



Distance between Cotriguaçu-MT sampling site and Project Area (120 km): both sites possess vegetation classified as "open forest" (*floresta ombrófila aberta*)

The evaluation of both methodologies and sites (COLPINI's and NOGUEIRA's) demonstrates that data are representative of the forest type and conditions in the Project Area and covers the range of potential independent variable values.

Note that this forest type specific equation does not include palm species and so a specific equation for this growth form was used. The equation used for estimation of total aboveground biomass in palm species was that presented by SALDARRIAGA et al. (1988)[19]:

$$\ln(\text{Mass, kg}) = -6.3789 - 0.877*\ln(1/(\text{DBH, cm})^2) + 2.151*\ln(\text{Height, m})$$

This is likely to be the most suitable equation available for estimation of palm aboveground biomass in the Amazon biome. This equation was also applied by NOGUEIRA et al. (2008) as the most suitable for the Amazon biome. The SALDARRIAGA's equation has an r^2 of 0.89 (above the minimum threshold required by the methodology, 0.80).

[19] SALDARRIAGA, J.G., WEST, D.C., THARP, M.L., UHL, C., 1988. Long-term chronosequence of forest succession in the upper Rio Negro of Colombia and Venezuela. Journal of Ecology, 76: 938–958.

The results of the baseline field inventory are in conformance with the methodology accuracy requirements, as all biomass average estimations inside each stratum have an error below 15%, as shown in Table 8. The overall error of the biomass field inventory is estimated in 3.71%.

Table 8. *Summary of the number of permanent plots in each stratum (n), as well as the estimates of sampling errors (E%) and coefficients of variation (CV) for each stratum*

FOB Submontana Cipós e Palmeiras					**n**	
Plot area	2500	m2	t2	2.792241	**70**	(estimated)
Total area	425730000	m2	CV2	584.24	**70**	(measured)
N	170292		E%2	23.43		
t(69)	1.671					
E%	**4.84**					
CV	**24.17**					
Aluvial					**n**	
Plot area	2500	m2	t2	2.927521	**25**	(estimated)
Total area	131316000	m2	CV2	595.95	**25**	(measured)
N	52526.4		E%2	68.39		
t(24)	1.711					
E%	**8.27**					
CV	**24.41**					
FOB Submontana Densa					**n**	
Plot area	2500	m2	t2	3.0276	**18**	(estimated)
Total area	67210000	m2	CV2	727.25	**18**	(measured)
N	26884		E%2	119.03		
t(17)	1.740					
E%	**10.91**					
CV	**26.97**					
Encosta					**n**	
Plot area	2500	m2	t2	3.101121	**15**	(estimated)
Total area	92883000	m2	CV2	711.53	**15**	(measured)
N	37153.2		E%2	142.32		
t(14)	1.761					
E%	**11.93**					
CV	**26.67**					
TOTAL INVENTORY					**n**	
Plot area	2500	m2	t2	2.7556	**128**	(estimated)
Total area	717000000	m2	CV2	640.58	128	(measured)
N	286800		E%2	13.76		
t(127)	1.660					
E%	**3.71**					
CV	**25.31**					

The merchantable aboveground biomass of trees measured in the field ("Merchantable (trees) (t/ha)") and the total aboveground biomass of palms ("Palms (aboveground) (t/ha)") are shown in Figure 26. For total aboveground tree biomass calculation ("Aboveground"; t/ha), merchantable biomass of trees was multiplied by a BCEF (Biomass conversion and expansion factor) for conversion of merchantable volume to total aboveground tree biomass equal to 1.66[20]. The total

[20] Brown, S., A. J. R. Gillespie, and A. E. Lugo, 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science, 35:881-902. (Table 4; pg. 890; minimum value deducted from lowest limit.: 1.743 - 0.083 = 1.66)

aboveground biomass of palms ("Palms (aboveground) (t/ha)") was directly provided by the allometric equation for palms (SALDARRIAGA et al. 1988). For estimating the belowground biomass per stratum ("Belowground"; t/ha), the aboveground component ("Aboveground (total) (t/ha)") was multiplied by a root-shoot ratio of 0.37[21].

For calculating the carbon pools (above and belowground) for each stratum, the total biomass of the total area of each stratum was multiplied by a CF (Carbon Fraction) in Dry Matter equal to 0.47[22] (conversion from dry mass to tC) and by 44/12 (conversion from tC to tCO_2).

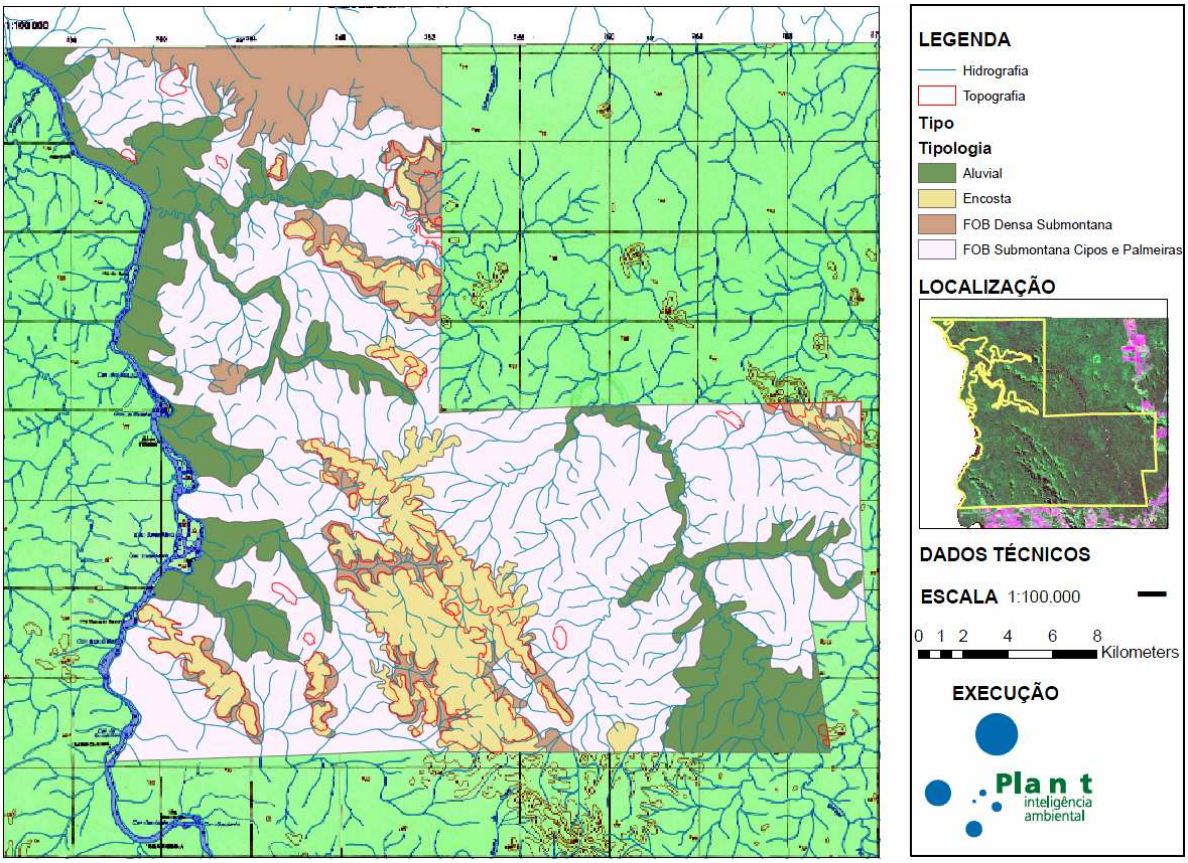


Figure 25. *Thematic map of vegetation typologies (strata) and hydrography in FSM farm*

[21] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4.
[22] Default value 0.47 tC t^{-1} d.m. (3_CP-B, pg. 9).

			Biomass					
Stratum	**Area (ha)**		**Merchantable (trees) (t/ha)**	**Palms (aboveground) (t/ha)**	**Aboveground (total) (t/ha)**	**Belowground (t/ha)**	**Total aboveground per stratum (t)**	**Total belowground per stratum (t)**
Aluvial	13,131.60	18.3%	132.4	4.9	224.7	83.1	2,950,267.4	1,091,598.9
Encosta	9,288.30	13.0%	158.0	6.0	268.3	99.3	2,491,819.6	921,973.3
FOB Densa Submontana	6,721.00	9.4%	133.4	2.4	223.9	82.8	1,504,550.3	556,683.6
FOB Submontana Cipós e Palmeiras	42,573.00	59.4%	140.0	6.3	238.7	88.3	10,162,624.7	3,760,171.1
Total	**71,713.90**	**100.0%**					**17,109,261.9**	**6,330,426.9**
Exploitable total	**53,792.94**	**75.0%**					**Carbon Pools**	
Under Deforestation Risk Analysis	**62,824.33**				**Stratum**		**Aboveground, per stratum (tCO_2)**	**Belowground, per stratum (tCO_2)**
	CF				Aluvial		5,084,294.1	1,881,188.8
	0.47				Encosta		4,294,235.8	1,588,867.2
					FOB Densa Submontana		2,592,841.6	959,351.4
					FOB Submontana Cipós e Palmeiras		17,513,589.8	6,480,028.2
						Total	29,484,961.4 C_{AB_tree}	10,909,435.7 C_{BB_tree}

Figure 26. *Characterization of above and belowground carbon stocks in Project Area (FSM estate), for different vegetation strata*

Baseline emissions from unplanned deforestation

For estimating emissions from unplanned deforestation that would occur in Project Area in the absence of project (i.e. in the baseline case), the annual estimated area to be deforested (see "Estimation of annual areas of unplanned deforestation"; Table 7) multiplied the sum of aboveground and belowground carbon stocks in forest for each biomass stratum (see "Characterization of biomass in Project Area"; Figure 26). The result of this procedure is shown in Table 9.

Table 9. *Summary of gross baseline emissions from unplanned deforestation that would occur within the Project Area in the baseline case*

Gross baseline emissions from deforestation in FSM			Stratum FOB Densa Submontana	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	216.41	216.41	114,378.90	114,378.90
2010	301.49	517.90	159,344.65	273,723.54
2011	301.49	819.40	159,344.65	433,068.19
2012	301.49	1,120.89	159,344.65	592,412.83
2013	301.49	1,422.38	159,344.65	751,757.48
2014	301.49	1,723.87	159,344.65	911,102.12
2015	301.49	2,025.36	159,344.65	1,070,446.77
2016	301.49	2,326.85	159,344.65	1,229,791.41
2017	301.49	2,628.34	159,344.65	1,389,136.06
2018	301.49	2,929.83	159,344.65	1,548,480.71
2019	301.49	3,231.33	159,344.65	1,707,825.35
2020	301.49	3,532.82	159,344.65	1,867,170.00
2021	301.49	3,834.31	159,344.65	2,026,514.64
2022	301.49	4,135.80	159,344.65	2,185,859.29
2023	301.49	4,437.29	159,344.65	2,345,203.93
2024	301.49	4,738.78	159,344.65	2,504,548.58
2025	193.27	4,932.06	102,148.72	2,606,697.30
2026	72.88	5,004.93	38,516.41	2,645,213.72
2027	72.88	5,077.81	38,516.41	2,683,730.13
2028	72.88	5,150.68	38,516.41	2,722,246.54
2029	72.88	5,223.56	38,516.41	2,760,762.96
2030	72.88	5,296.43	38,516.41	2,799,279.37
2031	72.88	5,369.31	38,516.41	2,837,795.79
2032	72.88	5,442.19	38,516.41	2,876,312.20
2033	72.88	5,515.06	38,516.41	2,914,828.62
2034	72.88	5,587.94	38,516.41	2,953,345.03
2035	72.88	5,660.81	38,516.41	2,991,861.44
2036	72.88	5,733.69	38,516.41	3,030,377.86
2037	72.88	5,806.56	38,516.41	3,068,894.27
2038	72.88	5,879.44	38,516.41	3,107,410.69
2039	9.35	5,888.79	4,942.67	3,112,353.35

Gross baseline emissions from deforestation in FSM			Stratum Encosta	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	54.70	54.70	34,648.20	34,648.20
2010	76.21	130.91	48,269.44	82,917.64
2011	76.21	207.12	48,269.44	131,187.07
2012	76.21	283.33	48,269.44	179,456.51
2013	76.21	359.54	48,269.44	227,725.95
2014	76.21	435.74	48,269.44	275,995.39
2015	76.21	511.95	48,269.44	324,264.83
2016	76.21	588.16	48,269.44	372,534.26
2017	76.21	664.37	48,269.44	420,803.70
2018	76.21	740.58	48,269.44	469,073.14
2019	76.21	816.79	48,269.44	517,342.58
2020	76.21	892.99	48,269.44	565,612.01
2021	76.21	969.20	48,269.44	613,881.45
2022	76.21	1,045.41	48,269.44	662,150.89
2023	76.21	1,121.62	48,269.44	710,420.33
2024	76.21	1,197.83	48,269.44	758,689.77
2025	218.44	1,416.27	138,358.84	897,048.60
2026	376.68	1,792.95	238,586.20	1,135,634.80
2027	376.68	2,169.63	238,586.20	1,374,221.00
2028	376.68	2,546.32	238,586.20	1,612,807.20
2029	376.68	2,923.00	238,586.20	1,851,393.40
2030	376.68	3,299.68	238,586.20	2,089,979.60
2031	376.68	3,676.36	238,586.20	2,328,565.80
2032	376.68	4,053.05	238,586.20	2,567,152.00
2033	376.68	4,429.73	238,586.20	2,805,738.20
2034	376.68	4,806.41	238,586.20	3,044,324.40
2035	376.68	5,183.09	238,586.20	3,282,910.60
2036	376.68	5,559.77	238,586.20	3,521,496.80
2037	376.68	5,936.46	238,586.20	3,760,083.00
2038	376.68	6,313.14	238,586.20	3,998,669.20
2039	48.34	6,361.48	30,616.87	4,029,286.07

Gross baseline emissions from deforestation in FSM			Stratum Aluvial	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	363.67	363.67	192,905.23	192,905.23
2010	506.64	870.32	268,742.01	461,647.24
2011	506.64	1,376.96	268,742.01	730,389.25
2012	506.64	1,883.60	268,742.01	999,131.26
2013	506.64	2,390.24	268,742.01	1,267,873.27
2014	506.64	2,896.89	268,742.01	1,536,615.29
2015	506.64	3,403.53	268,742.01	1,805,357.30
2016	506.64	3,910.17	268,742.01	2,074,099.31
2017	506.64	4,416.82	268,742.01	2,342,841.32
2018	506.64	4,923.46	268,742.01	2,611,583.34
2019	506.64	5,430.10	268,742.01	2,880,325.35
2020	506.64	5,936.74	268,742.01	3,149,067.36
2021	506.64	6,443.39	268,742.01	3,417,809.37
2022	506.64	6,950.03	268,742.01	3,686,551.39
2023	506.64	7,456.67	268,742.01	3,955,293.40
2024	506.64	7,963.32	268,742.01	4,224,035.41
2025	404.63	8,367.95	214,630.07	4,438,665.48
2026	291.14	8,659.08	154,428.78	4,593,094.26
2027	291.14	8,950.22	154,428.78	4,747,523.05
2028	291.14	9,241.35	154,428.78	4,901,951.83
2029	291.14	9,532.49	154,428.78	5,056,380.62
2030	291.14	9,823.62	154,428.78	5,210,809.40
2031	291.14	10,114.76	154,428.78	5,365,238.19
2032	291.14	10,405.89	154,428.78	5,519,666.97
2033	291.14	10,697.03	154,428.78	5,674,095.76
2034	291.14	10,988.16	154,428.78	5,828,524.54
2035	291.14	11,279.30	154,428.78	5,982,953.33
2036	291.14	11,570.43	154,428.78	6,137,382.11
2037	291.14	11,861.57	154,428.78	6,291,810.90
2038	291.14	12,152.70	154,428.78	6,446,239.68
2039	37.36	12,190.06	19,817.27	6,466,056.95

Gross baseline emissions from deforestation in FSM			Stratum FOB Submontana Cipós e Palmeiras	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	876.16	876.16	493,791.18	493,791.18
2010	1,220.60	2,096.76	687,915.19	1,181,706.37
2011	1,220.60	3,317.36	687,915.19	1,869,621.56
2012	1,220.60	4,537.96	687,915.19	2,557,536.75
2013	1,220.60	5,758.56	687,915.19	3,245,451.94
2014	1,220.60	6,979.16	687,915.19	3,933,367.13
2015	1,220.60	8,199.76	687,915.19	4,621,282.33
2016	1,220.60	9,420.36	687,915.19	5,309,197.52
2017	1,220.60	10,640.96	687,915.19	5,997,112.71
2018	1,220.60	11,861.56	687,915.19	6,685,027.90
2019	1,220.60	13,082.16	687,915.19	7,372,943.09
2020	1,220.60	14,302.76	687,915.19	8,060,858.28
2021	1,220.60	15,523.36	687,915.19	8,748,773.47
2022	1,220.60	16,743.96	687,915.19	9,436,688.66
2023	1,220.60	17,964.56	687,915.19	10,124,603.85
2024	1,220.60	19,185.16	687,915.19	10,812,519.05
2025	1,288.60	20,473.76	726,238.39	11,538,757.44
2026	1,364.25	21,838.01	768,874.19	12,307,631.63
2027	1,364.25	23,202.26	768,874.19	13,076,505.83
2028	1,364.25	24,566.51	768,874.19	13,845,380.02
2029	1,364.25	25,930.76	768,874.19	14,614,254.22
2030	1,364.25	27,295.00	768,874.19	15,383,128.41
2031	1,364.25	28,659.25	768,874.19	16,152,002.60
2032	1,364.25	30,023.50	768,874.19	16,920,876.80
2033	1,364.25	31,387.75	768,874.19	17,689,750.99
2034	1,364.25	32,752.00	768,874.19	18,458,625.19
2035	1,364.25	34,116.25	768,874.19	19,227,499.38
2036	1,364.25	35,480.50	768,874.19	19,996,373.57
2037	1,364.25	36,844.75	768,874.19	20,765,247.77
2038	1,364.25	38,209.00	768,874.19	21,534,121.96
2039	175.07	38,384.07	98,666.74	21,632,788.70

Gross baseline emissions from deforestation in FSM			Sum of Strata	
Year	**ha/year**	**ha (accumulative)**	**tCO_2/year**	**tCO_2**
2009	1,510.95	1,510.95	835,723.50	835,723.50
2010	2,104.94	3,615.89	1,164,271.29	1,999,994.79
2011	2,104.94	5,720.83	1,164,271.29	3,164,266.07
2012	2,104.94	7,825.77	1,164,271.29	4,328,537.36
2013	2,104.94	9,930.72	1,164,271.29	5,492,808.65
2014	2,104.94	12,035.66	1,164,271.29	6,657,079.93
2015	2,104.94	14,140.60	1,164,271.29	7,821,351.22
2016	2,104.94	16,245.54	1,164,271.29	8,985,622.51
2017	2,104.94	18,350.49	1,164,271.29	10,149,893.79
2018	2,104.94	20,455.43	1,164,271.29	11,314,165.08
2019	2,104.94	22,560.37	1,164,271.29	12,478,436.37
2020	2,104.94	24,665.31	1,164,271.29	13,642,707.65
2021	2,104.94	26,770.26	1,164,271.29	14,806,978.94
2022	2,104.94	28,875.20	1,164,271.29	15,971,250.23
2023	2,104.94	30,980.14	1,164,271.29	17,135,521.51
2024	2,104.94	33,085.08	1,164,271.29	18,299,792.80
2025	2,104.94	35,190.03	1,181,376.02	19,481,168.82
2026	2,104.94	37,294.97	1,200,405.59	20,681,574.41
2027	2,104.94	39,399.91	1,200,405.59	21,881,980.01
2028	2,104.94	41,504.85	1,200,405.59	23,082,385.60
2029	2,104.94	43,609.80	1,200,405.59	24,282,791.19
2030	2,104.94	45,714.74	1,200,405.59	25,483,196.79
2031	2,104.94	47,819.68	1,200,405.59	26,683,602.38
2032	2,104.94	49,924.62	1,200,405.59	27,884,007.97
2033	2,104.94	52,029.57	1,200,405.59	29,084,413.56
2034	2,104.94	54,134.51	1,200,405.59	30,284,819.16
2035	2,104.94	56,239.45	1,200,405.59	31,485,224.75
2036	2,104.94	58,344.40	1,200,405.59	32,685,630.34
2037	2,104.94	60,449.34	1,200,405.59	33,886,035.94
2038	2,104.94	62,554.28	1,200,405.59	35,086,441.53
2039	270.12	62,824.40	154,043.54	**35,240,485.07**

Emissions from biomass burning in the baseline

Based on the IPCC 2006 Inventory Guidelines, estimating greenhouse gas emissions from biomass burning was determined as:

$$E_{BiomassBurn,i,t} = \sum_{g=1}^{G} \left(\left(\left(A_{burn,i,t} * B_{i,t} * COMF_i * G_{g,i} \right) * 10^{-3} \right) * GWP_g \right)$$

Where:

$E_{BiomassBurn,i,t}$	Greenhouse emissions due to biomass burning as part of deforestation activities in stratum i in year t; tCO_2-e of each GHG (CO_2, CH_4, N_2O)
$A_{Burn,i,t}$	Area burnt for stratum i at time t; ha
$B_{i,t}$	Average aboveground biomass stock before burning stratum i, time t; tonnes d.m. ha^{-1}
$COMF_i$	Combustion factor for stratum i; dimensionless (default value derived from Table 2.6 of IPCC, 2006)[23]
$G_{g,i}$	Emission factor for stratum i for gas g; kg t^{-1} dry matter burnt (default values derived from Table 2.5 of IPCC, 2006)[24]
GWP_g	Global warming potential for gas g; t CO_2/t gas g (default values from IPCC SAR: CO_2 = 1; CH_4 = 21; N_2O = 310)
g	1, 2, 3 ... G greenhouse gases
i	1, 2, 3 …M strata
t	1, 2, 3, … t years elapsed since the start of the REDD project activity

Table 10 shows the parameters used in calculation of biomass burning for the baseline scenario, as well as results accounted for CH_4 and N_2O emissions generated as a consequence of incomplete biomass burning of non-commercial wood after logging, during a 30-years period.

[23] E-BB; ANNEX 1; Table 2.6; page 6 “All tertiary tropical forest”: 0.59
[24] E-BB; Table 2.5; page 8 “Tropical forest”: For CH_4: 6.8 - 2 = 4.8 g kg^{-1} dry matter burnt (conservative); For N_2O: 0.20 g kg^{-1} dry matter burnt (unique value proposed).

Table 10. *Summary of parameters used in calculation and results for biomass burning emissions in the baseline scenario (CH_4 and N_2O)*

COMF	0,59		
G_{CH4}	4,8	GWP_{CH4}	21
G_{N2O}	0,2	GWP_{N2O}	310

				CH_4		N_2O
Biomass Burning Emissions			**Sum of Strata**		**Sum of Strata**	
Year	**ha/year**	**ha (accumulative)**	**tCO_2/year**	**tCO_2**	**tCO_2/year**	**tCO_2**
2009	1,510.95	1,510.95	17,856.28	17,856.28	10,983.03	10,983.03
2010	2,104.94	3,615.89	24,876.11	42,732.39	15,300.78	26,283.81
2011	2,104.94	5,720.83	24,876.11	67,608.50	15,300.78	41,584.59
2012	2,104.94	7,825.77	24,876.11	92,484.61	15,300.78	56,885.37
2013	2,104.94	9,930.72	24,876.11	117,360.72	15,300.78	72,186.16
2014	2,104.94	12,035.66	24,876.11	142,236.83	15,300.78	87,486.94
2015	2,104.94	14,140.60	24,876.11	167,112.94	15,300.78	102,787.72
2016	2,104.94	16,245.54	24,876.11	191,989.05	15,300.78	118,088.50
2017	2,104.94	18,350.49	24,876.11	216,865.16	15,300.78	133,389.29
2018	2,104.94	20,455.43	24,876.11	241,741.27	15,300.78	148,690.07
2019	2,104.94	22,560.37	24,876.11	266,617.38	15,300.78	163,990.85
2020	2,104.94	24,665.31	24,876.11	291,493.49	15,300.78	179,291.63
2021	2,104.94	26,770.26	24,876.11	316,369.60	15,300.78	194,592.42
2022	2,104.94	28,875.20	24,876.11	341,245.71	15,300.78	209,893.20
2023	2,104.94	30,980.14	24,876.11	366,121.83	15,300.78	225,193.98
2024	2,104.94	33,085.08	24,876.11	390,997.94	15,300.78	240,494.76
2025	2,104.94	35,190.03	25,306.97	416,304.91	15,565.80	256,060.56
2026	2,104.94	37,294.97	25,786.32	442,091.23	15,860.63	271,921.19
2027	2,104.94	39,399.91	25,786.32	467,877.55	15,860.63	287,781.83
2028	2,104.94	41,504.85	25,786.32	493,663.88	15,860.63	303,642.46
2029	2,104.94	43,609.80	25,786.32	519,450.20	15,860.63	319,503.10
2030	2,104.94	45,714.74	25,786.32	545,236.52	15,860.63	335,363.73
2031	2,104.94	47,819.68	25,786.32	571,022.84	15,860.63	351,224.37
2032	2,104.94	49,924.62	25,786.32	596,809.17	15,860.63	367,085.00
2033	2,104.94	52,029.57	25,786.32	622,595.49	15,860.63	382,945.64
2034	2,104.94	54,134.51	25,786.32	648,381.81	15,860.63	398,806.27
2035	2,104.94	56,239.45	25,786.32	674,168.13	15,860.63	414,666.91
2036	2,104.94	58,344.40	25,786.32	699,954.45	15,860.63	430,527.54
2037	2,104.94	60,449.34	25,786.32	725,740.78	15,860.63	446,388.18
2038	2,104.94	62,554.28	25,786.32	751,527.10	15,860.63	462,248.81
2039	270.12	62,824.40	3,309.06	**754,836.16**	2,035.34	**464,284.15**

Wood products carbon pool in the baseline

For estimating the biomass carbon of the commercial volume extracted in the process of deforestation, the following equation was applied, according to "Option 2: Commercial inventory estimation", as recommended in CP-W:

$$C_{XB,i} = C_{AB\_tree,i} * \frac{1}{BCEF} * Pcom_i$$

Where:

$C_{XB,i}$	Mean stock of extracted biomass carbon from stratum i; t CO_2-e ha^{-1}
$C_{AB\_tree,i}$	Mean aboveground biomass carbon stock in stratum i; t CO_2-e ha^{-1}
BCEF	BCEF for conversion of merchantable volume to total aboveground tree biomass; dimensionless
$Pcom_i$	Commercial volume as a percent of total aboveground volume in stratum i; dimensionless (calculated as the ratio between the volume of merchantable wood in exploitation, 100 m^3/ha, and the total volume of aboveground biomass per stratum)
i	1, 2, 3, … M strata

In order to calculate the proportion of biomass carbon extracted that remains sequestered in long-term wood products after 100 years, it was simply and conservatively assumed that all extracted biomass not retained in long-term wood products after 100 years is emitted in the year harvested, instead of tracking annual emissions through retirement, burning and decomposition. All factors are derived from Winjum et al. 1998[25].

$$C_{WP,i} = \sum_{ty=s,w,oir,p,o} C_{XB,ty,i} * (1 - WW_{ty}) * (1 - SLF_{ty}) * (1 - OF_{ty})$$

Where:

$C_{WP,i}$	Carbon stock in long-term wood products pool (stock remaining in wood products after 100 years) from stratum i post deforestation; t CO_2-e ha^{-1}

[25] Winjum, J.K., Brown, S. and Schlamadinger, B. 1998. Forest harvests and wood products: sources and sinks of atmospheric carbon dioxide. Forest Science 44: 272-284

$C_{XB,ty,i}$	Mean stock of extracted biomass carbon by class of wood product ty from stratum i; t CO_2-e ha^{-1}
WW_{ty}	Wood waste. The fraction immediately emitted through mill inefficiency by class of wood product ty; dimensionless (0.24 for developing countries; Winjum et al. 1998 cited by CP-W)
SLF_{ty}	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest by class of wood product ty; dimensionless (0.2 for sawnwood; Winjum et al. 1998 cited by CP-W)
OF_{ty}	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest by class of wood product ty; dimensionless (0.84 for sawnwood in tropical forests; Winjum et al. 1998 cited by CP-W)
ty	Wood product class – defined here as sawnwood (s)
i	1, 2, 3, … M strata

The parameters used in calculation of wood products carbon pool in the baseline, as well as the results of estimates (sum of strata), are demonstrated in Table 11, for the whole project period.

Table 11. *Summary of calculations of wood products carbon pool in the baseline scenario*

Merchantable wood in exploitation (m^3/ha)	100.0
Wood average density (t/m^3)	0.59
Forest management cycle (years)	1

WW_{ty} 0.24
SLF_{ty} 0.20
OF_{ty} 0.84

Stratum	**C_{AB_tree} (t_{CO2e}/ha)**	**BCEF**	**Pcom**	**C_{XB} (t_{CO2e}/ha)**	**C_{WP} (t_{CO2e}/ha)**
Aluvial	365.73	1.66	0.27815	61.28	5.96
Encosta	488.71	1.66	0.20815	61.28	5.96
FOB Densa Submontana	359.00	1.66	0.28336	61.28	5.96
FOB Submontana Cipós e Palmeiras	380.39	1.66	0.26742	61.28	5.96
				245.1	**23.85**

Wood average density (0.59 t/m^3): Source: Brown, S., A. J. R. Gillespie, and A. E. Lugo, 1989. Biomass estimation methods for tropical forests with applications to forest inventory data. Forest Science, 35:881-902. (see pg. 890, Table 4, Moist)

Wood products carbon pool in baseline			Sum of Strata	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	1,510.95	1,510.95	9,007.34	9,007.34
2010	2,104.94	3,615.89	12,548.39	21,555.73
2011	2,104.94	5,720.83	12,548.39	34,104.11
2012	2,104.94	7,825.77	12,548.39	46,652.50
2013	2,104.94	9,930.72	12,548.39	59,200.89
2014	2,104.94	12,035.66	12,548.39	71,749.28
2015	2,104.94	14,140.60	12,548.39	84,297.67
2016	2,104.94	16,245.54	12,548.39	96,846.06
2017	2,104.94	18,350.49	12,548.39	109,394.45
2018	2,104.94	20,455.43	12,548.39	121,942.83
2019	2,104.94	22,560.37	12,548.39	134,491.22
2020	2,104.94	24,665.31	12,548.39	147,039.61
2021	2,104.94	26,770.26	12,548.39	159,588.00
2022	2,104.94	28,875.20	12,548.39	172,136.39
2023	2,104.94	30,980.14	12,548.39	184,684.78
2024	2,104.94	33,085.08	12,548.39	197,233.17
2025	2,104.94	35,190.03	12,548.39	209,781.55
2026	2,104.94	37,294.97	12,548.39	222,329.94
2027	2,104.94	39,399.91	12,548.39	234,878.33
2028	2,104.94	41,504.85	12,548.39	247,426.72
2029	2,104.94	43,609.80	12,548.39	259,975.11
2030	2,104.94	45,714.74	12,548.39	272,523.50
2031	2,104.94	47,819.68	12,548.39	285,071.89
2032	2,104.94	49,924.62	12,548.39	297,620.27
2033	2,104.94	52,029.57	12,548.39	310,168.66
2034	2,104.94	54,134.51	12,548.39	322,717.05
2035	2,104.94	56,239.45	12,548.39	335,265.44
2036	2,104.94	58,344.40	12,548.39	347,813.83
2037	2,104.94	60,449.34	12,548.39	360,362.22
2038	2,104.94	62,554.28	12,548.39	372,910.61
2039	270.12	62,824.40	1,610.29	**374,520.89**

Pasture carbon pools in the baseline

For calculation of the carbon pool remaining on pasture after deforestation, a conservative value of 15.0 tCO_2/ha was applied (2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Chapter 6: Grassland, pg. 6.27, Table 6.4). The proportion of baseline deforestation converted to pasture was considered as 90%. Table 12 summarizes the results obtained for pasture carbon pools in the baseline scenario, for 30 years of project.

Table 12. *Results obtained for calculations of pasture carbon pools in baseline scenario*

Baseline Pasture Carbon Pool			Sum of Strata	
Year	**ha/year**	**ha (accumulative)**	**tCO_2/year**	**tCO_2**
2009	1,510.95	1,510.95	20,388.24	20,388.24
2010	2,104.94	3,615.89	28,403.46	48,791.70
2011	2,104.94	5,720.83	28,403.46	77,195.17
2012	2,104.94	7,825.77	28,403.46	105,598.63
2013	2,104.94	9,930.72	28,403.46	134,002.10
2014	2,104.94	12,035.66	28,403.46	162,405.56
2015	2,104.94	14,140.60	28,403.46	190,809.03
2016	2,104.94	16,245.54	28,403.46	219,212.49
2017	2,104.94	18,350.49	28,403.46	247,615.95
2018	2,104.94	20,455.43	28,403.46	276,019.42
2019	2,104.94	22,560.37	28,403.46	304,422.88
2020	2,104.94	24,665.31	28,403.46	332,826.35
2021	2,104.94	26,770.26	28,403.46	361,229.81
2022	2,104.94	28,875.20	28,403.46	389,633.28
2023	2,104.94	30,980.14	28,403.46	418,036.74
2024	2,104.94	33,085.08	28,403.46	446,440.20
2025	2,104.94	35,190.03	28,403.46	474,843.67
2026	2,104.94	37,294.97	28,403.46	503,247.13
2027	2,104.94	39,399.91	28,403.46	531,650.60
2028	2,104.94	41,504.85	28,403.46	560,054.06
2029	2,104.94	43,609.80	28,403.46	588,457.53
2030	2,104.94	45,714.74	28,403.46	616,860.99
2031	2,104.94	47,819.68	28,403.46	645,264.45
2032	2,104.94	49,924.62	28,403.46	673,667.92
2033	2,104.94	52,029.57	28,403.46	702,071.38
2034	2,104.94	54,134.51	28,403.46	730,474.85
2035	2,104.94	56,239.45	28,403.46	758,878.31
2036	2,104.94	58,344.40	28,403.46	787,281.78
2037	2,104.94	60,449.34	28,403.46	815,685.24
2038	2,104.94	62,554.28	28,403.46	844,088.70
2039	270.12	62,824.40	3,644.91	**847,733.61**

Coffee carbon pools in the baseline

For calculation of the carbon pool remaining on coffee crops after deforestation, a conservative value of 84.0 tCO_2/ha was applied[26]. The proportion of baseline deforestation converted to coffee cultivation was conservatively considered as 10%. The results obtained for coffee cultivation carbon pools in the baseline scenario, for 30 years of project, are presented in Table 13.

Table 13. *Results obtained for calculations of coffee cultivation carbon pool in baseline scenario*

Baseline Cofee Carbon Pool			Sum of Strata	
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2
2009	1,510.95	1,510.95	12,686.90	12,686.90
2010	2,104.94	3,615.89	17,674.50	30,361.40
2011	2,104.94	5,720.83	17,674.50	48,035.91
2012	2,104.94	7,825.77	17,674.50	65,710.41
2013	2,104.94	9,930.72	17,674.50	83,384.91
2014	2,104.94	12,035.66	17,674.50	101,059.41
2015	2,104.94	14,140.60	17,674.50	118,733.91
2016	2,104.94	16,245.54	17,674.50	136,408.41
2017	2,104.94	18,350.49	17,674.50	154,082.91
2018	2,104.94	20,455.43	17,674.50	171,757.42
2019	2,104.94	22,560.37	17,674.50	189,431.92
2020	2,104.94	24,665.31	17,674.50	207,106.42
2021	2,104.94	26,770.26	17,674.50	224,780.92
2022	2,104.94	28,875.20	17,674.50	242,455.42
2023	2,104.94	30,980.14	17,674.50	260,129.92
2024	2,104.94	33,085.08	17,674.50	277,804.43
2025	2,104.94	35,190.03	17,674.50	295,478.93
2026	2,104.94	37,294.97	17,674.50	313,153.43
2027	2,104.94	39,399.91	17,674.50	330,827.93
2028	2,104.94	41,504.85	17,674.50	348,502.43
2029	2,104.94	43,609.80	17,674.50	366,176.93
2030	2,104.94	45,714.74	17,674.50	383,851.44
2031	2,104.94	47,819.68	17,674.50	401,525.94
2032	2,104.94	49,924.62	17,674.50	419,200.44
2033	2,104.94	52,029.57	17,674.50	436,874.94
2034	2,104.94	54,134.51	17,674.50	454,549.44
2035	2,104.94	56,239.45	17,674.50	472,223.94
2036	2,104.94	58,344.40	17,674.50	489,898.44
2037	2,104.94	60,449.34	17,674.50	507,572.95
2038	2,104.94	62,554.28	17,674.50	525,247.45
2039	270.12	62,824.40	2,268.10	**527,515.55**

[26] DOSSA et. al. Above- and belowground biomass, nutrient and carbon stocks contrasting an open-grown and a shaded coffee plantation. Agroforest Syst (2008) 72:103–115. DOI 10.1007/s10457-007-9075-4.

3.2 Project Emissions

The project emissions are related to forest management activities carried out inside the Project Area. The net emissions in the project case are estimated by combining:

- Emissions arising from logging gap: encompass emissions from felling timber tree and emissions from incidental damage caused by falling timber tree,

- Emissions from infrastructure: from constructing logging infrastructure for removal of timber, such as haul roads, skid trails and logging decks.

Emissions arising in the logging gap

In the project case, emissions occur as a direct result of the death of the timber tree and due to the death of trees killed when the timber tree is felled. The net emission in the project case is equal to the biomass of the wood extracted plus the logging damage factor multiplied by the extracted volume:

$$C_{LG} = \sum_{t=1}^{T} (C_{EXT,t} + (LDF * V_{EXT,t} * \frac{44}{12})) \quad (1)$$

Where:

C_{LG}	Actual net project emissions arising in the logging gap at time t; tCO_2-e
$C_{EXT,t}$	Biomass carbon stock of timber extracted within the project boundary at time t; tCO_2-e
LDF	Logging damage factor; tC m^{-3}
$V_{EXT,t}$	Volume extracted at time t; m^3
t	1, 2, 3 … t years elapsed since the start of the project activity

For ex-ante calculation of the total volume of wood extracted, it was assumed that wood extraction is always identical, independently on the type and biomass of strata. Thus, the volume of wood extracted is not dependent on strata biomass volume per hectare. Table 14 shows the total area exploited per year, as well as the volume of wood annually extracted per hectare. This calculation is conservative for the following reasons: i) FSM may opt for not conducing forest management in some years, as a function of current market factors in a given year; however, the calculation always considers full wood extraction; ii) the calculation always considers full wood extraction, independently on forest typology and carbon stock per hectare; iii) the calculation

always considers the full wood extraction volume allowed by Law, although FSM will not extract the full volume every year.

Table 14. *Panorama of projected emissions from forest management inside the Project Area (emissions from sustainable forest management for timber exploitation inside the FSM estate)*[27]

Year	Total area exploited per year (ha/year)	Extracted wood (m^3/ha)	Total extracted wood (t/year)	Damage (tCO_2/year)	Gross emission (tCO_2/year)
2009	1,495.4	12.0	10,592.8	44,085.4	62,340.3
2010	1,895.1	12.7	14,167.7	58,963.5	83,379.2
2011	2,142.9	14.0	17,708.6	73,700.0	104,217.8
2012	1,935.5	15.5	17,708.6	73,700.0	104,217.8
2013	1,764.7	17.0	17,708.6	73,700.0	104,217.8
2014	1,666.7	18.0	17,708.6	73,700.0	104,217.8
2015	1,666.7	18.0	17,708.6	73,700.0	104,217.8
2016	1,666.7	18.0	17,708.6	73,700.0	104,217.8
2017	1,666.7	18.0	17,708.6	73,700.0	104,217.8
2018	1,666.7	18.0	17,708.6	73,700.0	104,217.8
2019	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2020	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2021	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2022	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2023	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2024	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2025	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2026	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2027	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2028	1,621.6	18.5	17,708.6	73,700.0	104,217.8
2029	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2030	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2031	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2032	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2033	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2034	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2035	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2036	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2037	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2038	1,578.9	19.0	17,708.6	73,700.0	104,217.8
2039	445.6	19.0	4,997.2	20,797.5	29,409.4

The logging damage factor used (0.67 tC/m^3) is the most conservative default value proposed in M-MON v2.0, Annex 1, page 51.

[27] Data provided by FSM (Sebastiao Cavalho Vilas Boas).

Emissions arising through logging infrastructure

The emission in the project case also comprises the sum of emissions resulting from skid trails, roads, and logging decks created for selective logging operations.

The emissions from the creation of skid trails is estimated by multiplying the total length of skid trails created and a skid trail emission factor.

$$\Delta C_{SKID,t} = L_{SKID,t} * SK \quad (2)$$

Where:

$\Delta C_{SKID,t}$	Change in carbon stock resulting from skid trail creation at time t; tCO_2-e
$L_{SKID,t}$	Length of skid trails at time t; m
SK	Skid trail emissions factor (Average emissions resulting from dead wood created in the process of skid trail creation per length of skid trail); t CO_2-e m^{-1}
t	1, 2, 3 … t years elapsed since the start of the project activity

The calculation of *SK* is further explained in M-MON v2.0. For ex-ante calculations of emissions arising from creation of skid trails, roads, and logging decks, it was conservatively assumed the emission equivalent to the stratum with the highest biomass (i.e. "Encosta" stratum). It is assumed that the machinery used to create the skid trail kills all aboveground and belowground tree biomass located within the path of the skid trail. This biomass becomes deadwood and is assumed to be immediately emitted.

For conservative estimation of the mean width of skid trails (W_{SKID}, used in calculation of *SK* according to M-MON v2.0), the width edge of tires on skidder (2.6 m[28]) times 140% was used, as the skidder type is known and used to create all skid trails. The estimates of the length of skid trails (L_{SKID}) were based on data estimated from a previously explored logging gap (UPA 24). Based on UPA 24, FSM assumes 3 skid trails for each logging deck. Each skid trail would be 250-m long, according to field estimates. Table 15 shows the estimates of the number of logging decks created per year inside FSM farm. The actual length of skid trails (L_{SKID}) is then obtained by multiplying the length of a single skid trail (250 m) by the number of logging decks in a given year, multiplied by 3 (i.e. 3 skid trails for each logging deck). Table 15 shows the annual estimates of total skid trail length, as well as the total emission from creation of skid trails.

[28] Information provided by FSM: email by Marcelo Martins Lunardelli: Sat, Feb 11, 2012 at 8:17 PM

Table 15. *Annual estimates of total skid trail length and total emission from creation of skid trails*[29]

Year	L_{SKID} (m)	ΔC_{SKID} (tCO_2e)	Number of Logging Decks
2009	98,250	22,651.88	131.0
2010	88,500	20,403.98	118.0
2011	81,000	18,674.83	108.0
2012	76,500	17,637.34	102.0
2013	76,500	17,637.34	102.0
2014	76,500	17,637.34	102.0
2015	76,500	17,637.34	102.0
2016	76,500	17,637.34	102.0
2017	74,250	17,118.59	99.0
2018	74,250	17,118.59	99.0
2019	74,250	17,118.59	99.0
2020	74,250	17,118.59	99.0
2021	74,250	17,118.59	99.0
2022	74,250	17,118.59	99.0
2023	74,250	17,118.59	99.0
2024	74,250	17,118.59	99.0
2025	74,250	17,118.59	99.0
2026	74,250	17,118.59	99.0
2027	72,000	16,599.85	96.0
2028	72,000	16,599.85	96.0
2029	72,000	16,599.85	96.0
2030	72,000	16,599.85	96.0
2031	72,000	16,599.85	96.0
2032	72,000	16,599.85	96.0
2033	72,000	16,599.85	96.0
2034	72,000	16,599.85	96.0
2035	72,000	16,599.85	96.0
2036	72,000	16,599.85	96.0
2037	72,000	16,599.85	96.0
2038	72,000	16,599.85	96.0
2039	20,318	4,684.34	96.0

[29] *SK* was estimated as 0.23 $tCO_2e\ m^{-1}$, by using equation 14 in M-MON v2.0 (page 16).

The emission resulting from the creation of roads is determined by multiplying the area of roads created by the total carbon stock (i.e. aboveground and belowground). The emission from logging decks is determined by measuring the area of logging decks created in each logging gap, and the area is multiplied by the total carbon stock. By merging equations 17 and 18 of M-MON V2.0 (page 17), the following equation was created for estimating the emissions from roads and logging decks:

$$\Delta C_{ROAD,t\,+\,DECKS,t} = (A_{ROAD,t} + A_{DECKS,t}) * C_{BSL}$$

Where:

$\Delta C_{ROAD,t\,+\,DECKS,t}$	Change in carbon stock resulting from logging road and deck creation at time t; tCO_2-e
$\Delta C_{ROAD,t}$	Area of roads at time t; ha
$\Delta C_{DECKS,t}$	Area of logging decks at time t; ha
C_{BSL}	Carbon stock in aboveground and belowground tree biomass in the baseline case; tCO_2-e ha^{-1}
t	1, 2, 3 … t years elapsed since the start of the project activity

Table 16 shows the estimates of the annual area of roads and logging decks created inside the FSM farm. Primary roads created until the 31st December 2011 correspond to 89,758.75-m length, which multiplied by the average road width (6-m width) results in a total area of 53.86 hectares. FSM also foresees to build more 28.82 hectares of primary roads inside the farm until the 31st December 2012 (48,029.05-m length x 6-m width). Moreover, FSM foresees to build secondary roads annually, as informed in Table 16.

For conservativeness purposes, the biomass of the "Encosta" stratum is used in C_{BSL}, as it has the highest biomass value among all strata. Based on the overall area of roads and logging decks related to the Project Area, the values estimated for emissions from roads and decks are not significant according to T-SIG, as they represent much less than 5% of total emissions. Thus, the inclusion of these emissions in final calculations is indisputably conservative *per se*. Table 16 shows the results of calculations of emissions from creation of roads and logging decks inside the FSM farm.

Table 16. *Annual area of roads and logging decks, and emissions from creation of roads and logging decks inside the FSM farm*

Year	A_{ROAD} (ha)	A_{DECKS} (ha)	$\Delta C_{ROADS} + \Delta C_{DECKS}$ (tCO_2e)
2009	54.14	5.80	37,963.35
2010	22.47	5.24	17,548.92
2011	14.74	4.78	12,365.01
2012	39.51	4.51	27,880.12
2013	10.69	4.51	9,627.51
2014	10.69	4.51	9,627.51
2015	10.69	4.51	9,627.51
2016	10.69	4.51	9,627.51
2017	10.40	4.39	9,367.82
2018	10.40	4.39	9,367.82
2019	10.40	4.39	9,367.82
2020	10.40	4.39	9,367.82
2021	10.40	4.39	9,367.82
2022	10.40	4.39	9,367.82
2023	10.40	4.39	9,367.82
2024	10.40	4.39	9,367.82
2025	10.40	4.39	9,367.82
2026	10.40	4.39	9,367.82
2027	10.13	4.27	9,120.80
2028	10.13	4.27	9,120.80
2029	10.13	4.27	9,120.80
2030	10.13	4.27	9,120.80
2031	10.13	4.27	9,120.80
2032	10.13	4.27	9,120.80
2033	10.13	4.27	9,120.80
2034	10.13	4.27	9,120.80
2035	10.13	4.27	9,120.80
2036	10.13	4.27	9,120.80
2037	10.13	4.27	9,120.80
2038	10.13	4.27	9,120.80
2039	2.86	1.20	2,573.81

Wood products carbon pool in the Project Area

The forest management activities performed inside the Project Area result in wood products carbon pool, which must be considered in calculation of project emissions. The estimate of wood products carbon pool was carried out similarly to previous calculations for the baseline scenario. Although a timber harvest plan is approved for the FSM farm, it does not specify harvest intensity per strata in terms of volume extracted per ha. The same harvest volumes per hectare are assumed for all strata, hence wood product calculation across strata varies only as a function of strata size. Moreover, the current intensity of timber harvest is defined by quality of trees in the field. In this context, "Option 2: Commercial inventory estimation" was adopted for calculation of wood products carbon pool in the Project Area. Results are summarized in Table 17.

Table 17. *Summary of calculations of wood products carbon pool in the project scenario*

Year	Total area exploited per year (ha/year)	Extracted wood (m^3/ha)	C_{AB_tree} (t_{CO2e}/ha)	BCEF	Pcom	C_{XB} (t_{CO2e}/ha)	C_{WP} (t_{CO2e}/ha)	C_{WP} (t_{CO2e}/year)
2009	1,495.4	12.0	411.15	1.66	0.02965	7.34	0.71	1,068.43
2010	1,895.1	12.7	411.15	1.66	0.03130	7.75	0.75	1,429.01
2011	2,142.9	14.0	411.15	1.66	0.03460	8.57	0.83	1,786.16
2012	1,935.5	15.5	411.15	1.66	0.03830	9.49	0.92	1,786.16
2013	1,764.7	17.0	411.15	1.66	0.04201	10.40	1.01	1,786.16
2014	1,666.7	18.0	411.15	1.66	0.04448	11.02	1.07	1,786.16
2015	1,666.7	18.0	411.15	1.66	0.04448	11.02	1.07	1,786.16
2016	1,666.7	18.0	411.15	1.66	0.04448	11.02	1.07	1,786.16
2017	1,666.7	18.0	411.15	1.66	0.04448	11.02	1.07	1,786.16
2018	1,666.7	18.0	411.15	1.66	0.04448	11.02	1.07	1,786.16
2019	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2020	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2021	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2022	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2023	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2024	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2025	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2026	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2027	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2028	1,621.6	18.5	411.15	1.66	0.04571	11.32	1.10	1,786.16
2029	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2030	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2031	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2032	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2033	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2034	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2035	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2036	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2037	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2038	1,578.9	19.0	411.15	1.66	0.04695	11.63	1.13	1,786.16
2039	445.6	19.0	411.15	1.66	0.04695	11.63	1.13	504.04

3.3 Leakage

Market Leakage - LK-ME

As explained in previous topics, the process of deforestation in the baseline scenario involves timber harvesting for commercial markets, prior to implementation of pasture or coffee crops. As described in item "*1.10 Conditions Prior to Project Initiation*" of this VCS-PD, coffee crops represent about 10% of land use in BAU, while pasture accounts for virtually all the remaining land occupation. The implementation of these BAU activities is usually financed by means of initial capital obtained in wood logging. Similarly to the Reference Area and Project Area, the Leakage Belt is also subject to serious risks of land-grabbing promoted by illegal organizations (i.e. family-scale land-grabber associations, land-property documentation forgers), mostly supported by unscrupulous sawmills and political interests. As seen in "*STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios*" of this VCS-PD, the maintenance of native forest is far of being the most attractive economic scenario, giving the opportunity for land use shifting from native forest to pasture and coffee crops. In this context, the local communities have a widespread culture of deforestation, mainly led by economic factors. Thus, market leakage estimate is mandatory for this project. Leakage due to market effects is equal to the baseline emissions from logging multiplied by a leakage factor:

$$LK_{MarketEffects,timber} = \sum_{i=1}^{M} \left(LF_{ME} * AL_{T,i} \right)$$

Where:

$LK_{MarketEffects,timber}$	Total GHG emissions due to market- effects leakage through decreased timber harvest; t CO_2-e
LF_{ME}	Leakage factor for market-effects calculations; dimensionless
$AL_{T,i}$	Summed emissions from timber harvest in stratum i in the baseline case potentially displaced through implementation of carbon project; t CO_2-e
i	1,2,3,…M strata

In a conservative manner, the deduction factor (LF_{ME}) was adopted as 0.4, given that the forest in Project Area is similar to that observed in the Leakage Belt (according to similarity analysis, previously demonstrated). When evaluating the Leakage Belt deforestation factors and general forest characteristics (stratification, forest type, carbon stocks), the same parameters used for the Project Area are assumed to be equal in the Leakage Belt. This assumption is valid based on previous similarity analysis, which demonstrates that the Leakage Belt area and the Project Area present similarities in the following criteria: Politics and Legislation, Soil and Landscape, Climate and Vegetation, and Accessibility.

The total volume that would have been logged in the baseline in the project area, across strata and time periods, is estimated as follows:

$$AL_{T,i} = \sum_{t=1}^{t} \left(C_{BSL,XBT,i,t} \right)$$

Where:

$AL_{T,i}$	Summed emissions from timber harvest in stratum i in the baseline case potentially displaced through implementation of carbon project; t CO_2-e
$C_{BSL,XBT,i,t}$	Carbon emission due to displaced timber harvests in the baseline scenario in stratum i in time t; t CO_2-e
i	1, 2, 3, …M strata
t	1, 2, 3, … t years elapsed since the projected start of the REDD project activity

The carbon emission due to the displaced logging has two components: the biomass carbon of the extracted timber and the biomass carbon in the forest damaged in the process of timber extraction:

$$C_{BSL,XBT,i,t} = \left(\left[V_{BSL,XE,i,t} * D_{mn} * CF \right] + \left[V_{BSL,XE,i,t} * LDF \right] + \left[V_{BSL,XE,i,t} * LIF \right] \right) * \frac{44}{12}$$

Where:

$C_{BSL,XBT,i,t}$	Carbon emission due to timber harvests in the baseline scenario in stratum i at time t; t CO_2-e
$V_{BSL,EX,i,t}$	Volume of timber projected to be extracted from within the project boundary during the baseline in stratum i at time t; m^3
D_{mn}	Mean wood density of commercially harvested species; t d.m.m^{-3}
CF	Carbon fraction of biomass for commercially harvested species j; t C t d.m.$^{-1}$
LDF	Logging damage factor; t C m^{-3} (default 0.53 t C m^{-3} for broadleaf and mixed forests)
LIF	Logging infrastructure factor; t C m^{-3} (default 0.29 t C m^{-3})
i	1, 2, 3, … M strata
t	1, 2, 3, … t years elapsed since the projected start of the REDD project activity

Table 18 summarizes the calculation steps and results of market leakage estimates for the FSM-REDD Project.

Table 18. *Market Leakage: calculation steps and annual estimates, for 30-years project period*

D_{mn}	0.59 t/m^3
CF	0.47
LDF	0.53 tC/m^3
LIF	0.29 tC/m^3

Year									$C_{BSL,XBT,i,t}$
2009	(	24	+	46.64	+	25.52)	*	3.666667	=	**354.1 tCO_2/ha**
2010	(	24	+	46.28748	+	25.32711)	*	3.666667	=	**351.4 tCO_2/ha**
2011	(	24	+	45.58	+	24.94)	*	3.666667	=	**346.1 tCO_2/ha**
2012	(	23	+	44.785	+	24.505)	*	3.666667	=	**340.0 tCO_2/ha**
2013	(	23	+	43.99	+	24.07)	*	3.666667	=	**334.0 tCO_2/ha**
2014	(	23	+	43.46	+	23.78)	*	3.666667	=	**330.0 tCO_2/ha**
2015	(	23	+	43.46	+	23.78)	*	3.666667	=	**330.0 tCO_2/ha**
2016	(	23	+	43.46	+	23.78)	*	3.666667	=	**330.0 tCO_2/ha**
2017	(	23	+	43.46	+	23.78)	*	3.666667	=	**330.0 tCO_2/ha**
2018	(	23	+	43.46	+	23.78)	*	3.666667	=	**330.0 tCO_2/ha**
2019	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2020	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2021	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2022	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2023	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2024	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2025	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2026	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2027	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2028	(	23	+	43.195	+	23.635)	*	3.666667	=	**328.0 tCO_2/ha**
2029	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2030	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2031	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2032	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2033	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2034	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2035	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2036	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2037	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2038	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**
2039	(	22	+	42.93	+	23.49)	*	3.666667	=	**325.9 tCO_2/ha**

Year	V_{BSL}	
2009	88.0	m^3/ha
2010	87.3	m^3/ha
2011	86.0	m^3/ha
2012	84.5	m^3/ha
2013	83.0	m^3/ha
2014	82.0	m^3/ha
2015	82.0	m^3/ha
2016	82.0	m^3/ha
2017	82.0	m^3/ha
2018	82.0	m^3/ha
2019	81.5	m^3/ha
2020	81.5	m^3/ha
2021	81.5	m^3/ha
2022	81.5	m^3/ha
2023	81.5	m^3/ha
2024	81.5	m^3/ha
2025	81.5	m^3/ha
2026	81.5	m^3/ha
2027	81.5	m^3/ha
2028	81.5	m^3/ha
2029	81.0	m^3/ha
2030	81.0	m^3/ha
2031	81.0	m^3/ha
2032	81.0	m^3/ha
2033	81.0	m^3/ha
2034	81.0	m^3/ha
2035	81.0	m^3/ha
2036	81.0	m^3/ha
2037	81.0	m^3/ha
2038	81.0	m^3/ha
2039	81.0	m^3/ha

			$C_{BSL,XBT}$	AL_T*LF_{ME}
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2/year
2009	1,510.95	1,510.95	535,034.13	214,013.7
2010	2,104.94	3,615.89	739,738.21	295,895.3
2011	2,104.94	5,720.83	728,431.70	291,372.7
2012	2,104.94	7,825.77	715,726.49	286,290.6
2013	2,104.94	9,930.72	703,021.29	281,208.5
2014	2,104.94	12,035.66	694,551.15	277,820.5
2015	2,104.94	14,140.60	694,551.15	277,820.5
2016	2,104.94	16,245.54	694,551.15	277,820.5
2017	2,104.94	18,350.49	694,551.15	277,820.5
2018	2,104.94	20,455.43	694,551.15	277,820.5
2019	2,104.94	22,560.37	690,316.09	276,126.4
2020	2,104.94	24,665.31	690,316.09	276,126.4
2021	2,104.94	26,770.26	690,316.09	276,126.4
2022	2,104.94	28,875.20	690,316.09	276,126.4
2023	2,104.94	30,980.14	690,316.09	276,126.4
2024	2,104.94	33,085.08	690,316.09	276,126.4
2025	2,104.94	35,190.03	690,316.09	276,126.4
2026	2,104.94	37,294.97	690,316.09	276,126.4
2027	2,104.94	39,399.91	690,316.09	276,126.4
2028	2,104.94	41,504.85	690,316.09	276,126.4
2029	2,104.94	43,609.80	686,081.02	274,432.4
2030	2,104.94	45,714.74	686,081.02	274,432.4
2031	2,104.94	47,819.68	686,081.02	274,432.4
2032	2,104.94	49,924.62	686,081.02	274,432.4
2033	2,104.94	52,029.57	686,081.02	274,432.4
2034	2,104.94	54,134.51	686,081.02	274,432.4
2035	2,104.94	56,239.45	686,081.02	274,432.4
2036	2,104.94	58,344.40	686,081.02	274,432.4
2037	2,104.94	60,449.34	686,081.02	274,432.4
2038	2,104.94	62,554.28	686,081.02	274,432.4
2039	270.12	62,824.40	88,042.20	35,216.9

Leakage outside the Leakage Belt (Step 4 - LK-ASU)

Immigrants prevented from migrating into and deforesting the project area are conservatively assumed to migrate to an alternative forest area and to cause deforestation in the alternative area. The alternative forest area could be within the Leakage Belt or it could be elsewhere in the country. The proportion migrating to the Leakage Belt is calculated as the area of the Leakage Belt as a proportion of the total available forest area nationally (AVFOR). AVFOR was estimated as follows:

$$AVFOR = TOTFOR - PROTFOR - MANFOR$$

Where:

AVFOR	Total available national forest area for unplanned deforestation; ha
TOTFOR	Total available national forest area; ha
PROTFOR	Total area of fully protected forests nationally; ha
MANFOR	Total area of forests under active management nationally; ha

As the country has a great variety of forest biomes in all its extension, TOTFOR considered only the Amazon Rainforest biome. This is a conservative approach. Thus, as a representation of the total area of Amazon Rainforest in Brazilian Territory, TOTFOR consisted of multiplying the country territory by 49.29%[30] (proportion of Amazon comprised in Brazilian Territory). As a result, TOTFOR represents 418,965,000 ha.

As TOTFOR as considered only for the Amazon biome, PROTFOR and MANFOR were evaluated solely for Brazilian Northern and Centre-West macro-regions. According to the CNUC[31]; National Registry of Conservation Units, PROTFOR is estimated in 158,413,767 ha.

According to the SNUC (National System of Conservation Units) (regulated by Federal Decree No. 4340, August 22, 2002), there are two groups of Conservation Units, instituted by Federal Law No.9985/2000: 1) Integral Protection Units and 2) Sustainable Use Units (SEMA, 2011[32]). The value of PROTFOR already comprises both types of Conservation Units. Thus, PROTFOR (above) already includes data on Forest Management Lands (UCs) (MANFOR).

In this context, AVFOR is estimated in 260,551,233 ha.

[30] *http://www.cliquesemiarido.org.br/not_0110.htm*
[31] Cadastro Nacional de Unidades de Conservação - *http://www.mma.gov.br/sitio/index.php?ido=conteudo.monta&idEstrutura=119&idConteudo=10747&idMenu=11810* (Norte e Centro-Oeste; nome da UC; Descrição dos documentos)
[32] *http://www.sema.rs.gov.br/*

The proportion of Leakage Belt area related to the total available national forest area ($PROP_{LB}$) is calculated by dividing Leakage Belt area (LBFOR; 65,570 ha) by AVFOR. This procedure results in $PROP_{LB}$ equal to $2.5166.10^{-4}$ (dimensionless).

The average carbon stock across the Leakage Belt (C_{LB}; 238.6 tCO_2/ha; based on similarity analysis, data from the Project Area was applied to Leakage Belt area) and the average carbon stock for all available forest area outside the Leakage Belt (C_{OLB}; 578.1 tCO_2/ha[33]) were taken for calculation of the proportional difference in carbon stocks between areas of forest available for unplanned deforestation both inside and outside the Leakage Belt ($PROP_{CS}$). $PROP_{CS}$ is calculated by dividing the stock outside the Leakage Belt (C_{OLB}) by the stock inside the Leakage Belt (C_{LB}), which results in a value of 2.4231.

The proportion of baseline deforestation caused by immigrating population ($PROP_{IMM}$) was estimated for a period from 2005 to 2010. For calculating $PROP_{IMM}$, the participatory rural appraisal (PRA) approach was replaced by local data available from IBGE. This practice is justified by the fact that the IBGE has a precise approach for accounting population locally, which allows calculating the number of immigrants for a given period of time in the municipality of Colniza. The number of immigrants can be estimated by subtracting the number of annual births from the total annual population growth in the municipality of Colniza (IBGE, 2011[34]). It is then assumed that the total annual population growth in a given municipality is attributed to: i) births and ii) immigration. Thus, by subtracting the number of annual births from the total annual population growth, it is possible to infer the number of immigrants. This technique also assumes that the IBGE assessment is applicable to estimate population movements in both urban and rural zones (i.e. it is assumed that the residential proportion of immigrants in the urban zone was estimated with accuracy similar to that observed in the rural zone estimates). According to the number of immigrants, we have inferred the proportion of deforestation attributed to immigrant agents ($PROP_{IMM}$) as 6.59%.

The proportional leakage for areas with immigrating populations (LK_{PROP}) was then equal to the immigrating proportion multiplied by the proportion of available national forest area outside the Leakage Belt multiplied by the proportional difference in stocks between forests inside and outside the Leakage Belt.

$$LK_{PROP} = PROP_{IMM} * (1 - PROP_{LB}) * PROP_{CS}$$

Where:

LK_{PROP}	Proportional leakage for areas with immigrating populations; proportion
$PROP_{IMM}$	Estimated proportion of baseline deforestation caused by immigrating population; proportion

[33] S.S. Saatchi, R.A. Houghton, R.C. dos Santos Alvalá, J.V. Soares, and Yifan Yu. Distribution of Aboveground Live Biomass in the Amazon Basin. 2007. (157.66.tC/ha)
[34] *http://www.ibge.gov.br/cidadesat/topwindow.htm?1*

$PROP_{LB}$	Area of forest available for unplanned deforestation as a proportion of the total national forest area available for unplanned deforestation; proportion
$PROP_{CS}$	Proportional difference in stocks between areas of forest available for unplanned deforestation both inside and outside the Leakage Belt; proportion

LK_{PROP} was estimated in 0.1597.

Leakage due to the proportion of the baseline deforestation actors who are displaced to areas outside the Leakage Belt was therefore equal to the change in stocks in the baseline scenario minus the change in stocks in the project scenario multiplied by the proportional leakage factor for areas with immigrating populations:

$$\Delta C_{LK-ASU,OLB} = \left(\Delta C_{BSL,LK,unplanned} - \Delta C_{P,LB}\right) * LK_{PROP}$$

Where:

$\Delta C_{LK\text{-}ASU,OLB}$	Net CO_2 emissions due to unplanned deforestation displaced outside the Leakage Belt ; t CO_2-e
$\Delta C_{BSL,LK,unplanned}$	Net CO_2 equivalent emissions in the baseline from unplanned deforestation in the leakage belt; t CO_2-e
$\Delta C_{P,LB}$	Net CO_2 equivalent emissions within the leakage belt in the project case; t CO_2-e
LK_{PROP}	Proportional leakage for areas with immigrating populations; proportion

For the difference in emissions from unplanned deforestation within the Leakage Belt in the baseline and in the project case, a 10% factor was considered (i.e. $\Delta C_{P,LB}$ was considered to be 10% higher than $\Delta C_{BSL,LK,unplanned}$). It is assumed that this factor is valid for the FSM-REDD Project, given that the project proponent will adopt a series of activities for leakage mitigation, as previously mentioned in this VCS-PD and further explained in Annex 1.

Table 19 summarizes the results obtained for calculation of Leakage outside the Leakage Belt.

Table 19. *Estimation results for leakage outside the Leakage Belt, for 30-years project period*

Leakage Outside			Sum of Strata		
			$\Delta C_{BSL,LK,unplanned}$	$\Delta C_{P,LB}$	$\Delta C_{LK-ASU,OLB}$
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2/year	tCO_2/year
2009	1,381.49	1,381.49	764,120.42	840,532.46	-12,205.28
2010	1,924.60	3,306.09	1,064,518.91	1,170,970.80	-17,003.55
2011	1,924.60	5,230.68	1,064,518.91	1,170,970.80	-17,003.55
2012	1,924.60	7,155.28	1,064,518.91	1,170,970.80	-17,003.55
2013	1,924.60	9,079.87	1,064,518.91	1,170,970.80	-17,003.55
2014	1,924.60	11,004.47	1,064,518.91	1,170,970.80	-17,003.55
2015	1,924.60	12,929.06	1,064,518.91	1,170,970.80	-17,003.55
2016	1,924.60	14,853.66	1,064,518.91	1,170,970.80	-17,003.55
2017	1,924.60	16,778.25	1,064,518.91	1,170,970.80	-17,003.55
2018	1,924.60	18,702.85	1,064,518.91	1,170,970.80	-17,003.55
2019	1,924.60	20,627.45	1,064,518.91	1,170,970.80	-17,003.55
2020	1,924.60	22,552.04	1,064,518.91	1,170,970.80	-17,003.55
2021	1,924.60	24,476.64	1,064,518.91	1,170,970.80	-17,003.55
2022	1,924.60	26,401.23	1,064,518.91	1,170,970.80	-17,003.55
2023	1,924.60	28,325.83	1,064,518.91	1,170,970.80	-17,003.55
2024	1,924.60	30,250.42	1,064,518.91	1,170,970.80	-17,003.55
2025	1,924.60	32,175.02	1,080,158.15	1,188,173.96	-17,253.35
2026	1,924.60	34,099.61	1,097,557.30	1,207,313.03	-17,531.27
2027	1,924.60	36,024.21	1,097,557.30	1,207,313.03	-17,531.27
2028	1,924.60	37,948.80	1,097,557.30	1,207,313.03	-17,531.27
2029	1,924.60	39,873.40	1,097,557.30	1,207,313.03	-17,531.27
2030	1,924.60	41,798.00	1,097,557.30	1,207,313.03	-17,531.27
2031	1,924.60	43,722.59	1,097,557.30	1,207,313.03	-17,531.27
2032	1,924.60	45,647.19	1,097,557.30	1,207,313.03	-17,531.27
2033	1,924.60	47,571.78	1,097,557.30	1,207,313.03	-17,531.27
2034	1,924.60	49,496.38	1,097,557.30	1,207,313.03	-17,531.27
2035	1,924.60	51,420.97	1,097,557.30	1,207,313.03	-17,531.27
2036	1,924.60	53,345.57	1,097,557.30	1,207,313.03	-17,531.27
2037	1,924.60	55,270.16	1,097,557.30	1,207,313.03	-17,531.27
2038	1,924.60	57,194.76	1,097,557.30	1,207,313.03	-17,531.27
2039	246.98	57,441.74	140,845.40	154,929.94	-2,249.72

Leakage Factor (final result)

Based on the expected effectiveness of the proposed REDD project activities, the carbon stock changes and greenhouse gas emissions in the Leakage Belt that are expected to occur due to

the implementation of the REDD project activity (that would not occur in the baseline case) were conservatively estimated as being 10% higher in the project case. It is assumed that this factor is valid for the FSM-REDD Project, given that the project proponent will adopt a series of activities for leakage mitigation, as previously mentioned in this VCS-PD and further explained in Annex 1. Thus, the final results of leakage correspond to 10% of the sum of previously estimated leakage components (i.e. Market Leakage + Leakage outside the Leakage Belt), whose results are presented in Table 20.

Table 20. *Annual leakage calculated for the FSM-REDD Project, for a 30-years project period*

TOTAL LEAKAGE			Sum of Strata Total Leakage	Factored Leakage
Year	ha/year	ha (accumulative)	tCO_2/year	tCO_2/year
2009	1,510.95	1,510.95	226,218.94	22,621.9
2010	2,104.94	3,615.89	312,898.83	31,289.9
2011	2,104.94	5,720.83	308,376.22	30,837.6
2012	2,104.94	7,825.77	303,294.14	30,329.4
2013	2,104.94	9,930.72	298,212.06	29,821.2
2014	2,104.94	12,035.66	294,824.01	29,482.4
2015	2,104.94	14,140.60	294,824.01	29,482.4
2016	2,104.94	16,245.54	294,824.01	29,482.4
2017	2,104.94	18,350.49	294,824.01	29,482.4
2018	2,104.94	20,455.43	294,824.01	29,482.4
2019	2,104.94	22,560.37	293,129.98	29,313.0
2020	2,104.94	24,665.31	293,129.98	29,313.0
2021	2,104.94	26,770.26	293,129.98	29,313.0
2022	2,104.94	28,875.20	293,129.98	29,313.0
2023	2,104.94	30,980.14	293,129.98	29,313.0
2024	2,104.94	33,085.08	293,129.98	29,313.0
2025	2,104.94	35,190.03	293,379.78	29,338.0
2026	2,104.94	37,294.97	293,657.70	29,365.8
2027	2,104.94	39,399.91	293,657.70	29,365.8
2028	2,104.94	41,504.85	293,657.70	29,365.8
2029	2,104.94	43,609.80	291,963.67	29,196.4
2030	2,104.94	45,714.74	291,963.67	29,196.4
2031	2,104.94	47,819.68	291,963.67	29,196.4
2032	2,104.94	49,924.62	291,963.67	29,196.4
2033	2,104.94	52,029.57	291,963.67	29,196.4
2034	2,104.94	54,134.51	291,963.67	29,196.4
2035	2,104.94	56,239.45	291,963.67	29,196.4
2036	2,104.94	58,344.40	291,963.67	29,196.4
2037	2,104.94	60,449.34	291,963.67	29,196.4
2038	2,104.94	62,554.28	291,963.67	29,196.4
2039	270.12	62,824.40	37,466.60	3,746.7

3.4 Summary of GHG Emission Reductions and Removals

Net GHG Emission Reductions and Removals can be summarized as the "**Estimated baseline emissions**" minus the "**Estimated project emissions**" minus the "**Estimated leakage emissions**", whose components are presented below.

Estimated baseline emissions:

Baseline emissions from unplanned deforestation

(+)

Emissions from biomass burning in the baseline

(-)

Sum of Wood Products, Pasture, and Coffee Carbon Pools in the baseline case

Estimated project emissions:

Emissions arising from logging gap in Project Area

(+)

Emissions from constructing logging infrastructure for removal of timber in Project Area

(-)

Wood Products Carbon Pool in Project Area

Estimated leakage emissions

(Sum of Market Leakage and Leakage outside the Leakage Belt) * Leakage Factor

Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
2009	822,480.3	121,887.1	22,621.9	677,971.3
2010	1,145,821.8	119,903.1	31,289.9	994,628.8
2011	1,145,821.8	133,471.5	30,837.6	981,512.7
2012	1,145,821.8	147,949.1	30,329.4	967,543.3
2013	1,145,821.8	129,696.5	29,821.2	986,304.1
2014	1,145,821.8	129,696.5	29,482.4	986,642.9
2015	1,145,821.8	129,696.5	29,482.4	986,642.9
2016	1,145,821.8	129,696.5	29,482.4	986,642.9
2017	1,145,821.8	128,918.1	29,482.4	987,421.4
2018	1,145,821.8	128,918.1	29,482.4	987,421.4
2019	1,145,821.8	128,918.1	29,313.0	987,590.8
2020	1,145,821.8	128,918.1	29,313.0	987,590.8
2021	1,145,821.8	128,918.1	29,313.0	987,590.8
2022	1,145,821.8	128,918.1	29,313.0	987,590.8
2023	1,145,821.8	128,918.1	29,313.0	987,590.8
2024	1,145,821.8	128,918.1	29,313.0	987,590.8
2025	1,163,622.4	128,918.1	29,338.0	1,005,366.4
2026	1,183,426.2	128,918.1	29,365.8	1,025,142.4
2027	1,183,426.2	128,152.3	29,365.8	1,025,908.1
2028	1,183,426.2	128,152.3	29,365.8	1,025,908.1
2029	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2030	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2031	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2032	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2033	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2034	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2035	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2036	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2037	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2038	1,183,426.2	128,152.3	29,196.4	1,026,077.5
2039	151,864.6	36,163.5	3,746.7	111,954.4
Total	**34,709,835.3**	**3,905,168.7**	**881,335.6**	**29,923,331.0**

4 MONITORING

4.1 Data and Parameters Available at Validation

The tables below describe data and parameters available at validation.

LIVE BIOMASS

Data Unit / Parameter:	***CF***
Data unit:	tCt $d.m^{-1}$
Description:	Carbon fraction of dry matter in t Ct-1 d.m.
Source of data:	Values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t-1 d.m. can be used
Value applied:	0.47
Justification of choice of data or description of measurement methods and procedures applied:	The default value was used to be more conservative
Any comment:	Where new species are encountered in the course of monitoring, new carbon fraction values must be sourced from the literature or otherwise use the default value.

Data Unit / Parameter:	***R***
Data unit:	t root $d.m.t^{-1}$ shoot d.m.
Description:	Root to shoot ratio appropriate to species or forest type / biome; note that as defined here, root to shoot ratio is applied as belowground biomass per unit area: aboveground biomass per unit area (not on a per stem basis)
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, V. 4, Ch. 4, AFOLU, pg. 4.49, Table 4-4.
Value applied:	0.37
Justification of choice of data or description of measurement methods and procedures applied:	Local values are not known, and the IPCC factor is a conservative value.

Any comment:	Guidelines for Conservative Choice of Default Values: Global values may be selected from Table 4.4 (modified as given above) of the AFOLU Guidelines (IPCC 2006), by choosing a climatic zone and forest type that most closely matches the project circumstances.

Data Unit / Parameter:	ln(Volume, m^3) = -8.939 + 2.507*ln(DBH, cm)
Data unit:	$m^3.tree^{-1}$
Description:	Allometric equation to estimation of aboveground merchantable volume of trees, in the range between 4.46-cm and 81.99-cm DBH.
Source of data:	Peer-reviewed scientific article: NOGUEIRA, E.M.; FEARNSIDE, P.M.; NELSON, B.W.; BARBOSA, R.I.; KEIZER, E.W.H., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(2008): 1853-1867.
Value applied:	ln(Volume, m^3) = -8.939 + 2.507*ln(DBH, cm)
Justification of choice of data or description of measurement methods and procedures applied:	The result of such equation must be converted to mass by multiplying it by the wood density
Any comment:	Peer-reviewed work performed in the region of FSM farm, with a similar vegetation typology. The statistical quality of model is in conformance with methodology requirements.

Data Unit / Parameter:	Volume, m^3 = -0.4306 + 0.0011*(DBH, cm)^2
Data unit:	$m^3.tree^{-1}$
Description:	Allometric equation to estimation of aboveground merchantable volume of trees with DBH higher than 82 cm.
Source of data:	Peer-reviewed scientific article: COLPINI, C.; TRAVAGIN, D.P.; SOARES, T.S.; SILVA, V.S.M. e, 2009. Determinação do volume, do fator de forma e da porcentagem de casca de árvores individuais em uma Floresta Ombrófila Aberta na região noroeste de Mato Grosso. Acta Amazonica, 39(1): 97-104.
Value applied:	Volume, m^3 = -0.4306 + 0.0011*(DBH, cm)^2
Justification of choice of data or description	The result of such equation must be converted to

of measurement methods and procedures applied:	mass by multiplying it by the wood density
Any comment:	Peer-reviewed work performed in the region of FSM farm, with a similar vegetation typology. The statistical quality of model is in conformance with methodology requirements.

Data Unit / Parameter:	ln(Mass, kg) = -6.3789 – 0.877*ln(1/(DBH, cm)^2) + 2.151*ln(Height, m)
Data unit:	kg.tree^{-1}
Description:	Allometric equation to estimation of total aboveground biomass of palms.
Source of data:	Peer-reviewed scientific article: SALDARRIAGA, J.G., WEST, D.C., THARP, M.L., UHL, C., 1988. Long-term chronosequence of forest succession in the upper Rio Negro of Colombia and Venezuela. Journal of Ecology, 76: 938–958.
Value applied:	ln(Mass, kg) = -6.3789 – 0.877*ln(1/(DBH, cm)^2) + 2.151*ln(Height, m)
Justification of choice of data or description of measurement methods and procedures applied:	The result of such equation must be divided by 1000 to obtain the biomass value in t.
Any comment:	Peer-reviewed work. The statistical quality of model is in conformance with methodology requirements.

4.2 Data and Parameters Monitored

Data Unit / Parameter:	**Project Forest Cover Monitoring Map**
Data unit:	N/A
Description:	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	The measurement methods and procedures applied are described in Approved VCS Module VMD0015 (Version 2.0) REDD Methodological

	Module: Methods for monitoring of greenhouse gas emissions and removals (M-MON), Sectoral Scope 14, pages 3 to 14.
Frequency of monitoring/recording:	At least every 5 years or if verification occurs on a frequency of less than every 5 years, examination must occur prior to any verification event
Value applied:	N/A
Monitoring equipment:	Remote sensing and GPS
QA/QC procedures to be applied:	The minimum map accuracy should be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy.
Calculation method:	N/A
Any comment:	-

Data Unit / Parameter:	**Leakage Belt Forest Cover Monitoring Map**
Data unit:	N/A
Description:	Map showing the location of forest land within the leakage belt area at the beginning of each monitoring period.
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	Map accuracy is 90%
Frequency of monitoring/recording:	At least every 5 years or if verification occurs on a frequency of less than every 5 years, examination must occur prior to any verification event
Value applied:	N/A
Monitoring equipment:	Remote sensing and GPS
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Any comment:	-

Data Unit / Parameter:	$A_{burn,i,t}$
Data unit:	ha
Description:	Area burnt in stratum *i* at time *t*
Source of data:	Remote sensing data
Description of measurement methods and procedures to be applied:	It is considered that burning is a common practice in the region, and that all deforested area undergoes burning in a given moment.
Frequency of monitoring/recording:	Areas burnt will be monitored every 5 years or if verification occurs on a frequency of less than every 5 years, examination will occur prior to any verification event
Value applied:	This value varies annually, as a function of deforested area.
Monitoring equipment:	Remote sensing
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	N/A
Any comment:	As burning of biomass is common practice in the region, it was considered that all the deforested areas were burnt – deforestation cycle includes burning.

Data Unit / Parameter:	$A_{DefPA,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the project area in stratum *i* at time *t*
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Remote sensing tools
Frequency of monitoring/recording:	Monitored every 5 years or if verification occurs on a frequency of less than every 5 years, examination will occur prior to any verification event
Value applied:	Set to zero
Monitoring equipment:	Remote sensing
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	-
Any comment:	Ex-ante, an estimation of deforestation in the with-project case. The belief is that zero degradation will occur within the project

	boundaries then this parameter is set to zero, clear infrastructure, hiring and policies are in place to prevent deforestation.

Data Unit / Parameter:	$A_{DefLB,i,t}$
Data unit:	Ha
Description:	Area of recorded deforestation in the leakage belt in stratum *i* at time *t*
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Periodic analysis of remote sensing imagery
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.
Value applied:	To be determined ex-post
Monitoring equipment:	Satellite imagery
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	Periodic analysis of the progression of deforested area in Leakage belt
Any comment:	-

Data Unit / Parameter:	$A_{RRL,forest,t}$
Data unit:	Ha
Description:	Remaining area of forest in *RRL* at time *t*
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Periodic analysis of the progression of deforested area in *RRL*
Frequency of monitoring/recording:	Monitored every 5 years or if verification occurs on a frequency of less than every 5 years, examination will occur prior to any verification event
Value applied:	To be determined ex-post
Monitoring equipment:	Remote sensing imagery
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	Analysis of satellite images
Any comment:	Ex-ante, estimation shall be made of likely deforestation in the with-project case.

PARAMETERS ORIGINATING IN OTHER MODULES

Data Unit / Parameter:	$A_{BSL,PA,unplanned,t}$
Data unit:	Ha
Description:	Annual area of unplanned baseline deforestation in the Project Area at year *t*
Module parameter originates in:	BL-UP
Any comment:	Corresponding information shall be included in the VCS PD

Data Unit / Parameter:	$C_{BSL,i}$
Data unit:	tCO_2-e ha^{-1}
Description:	Carbon stock in all pools in the baseline in stratum *i*
Module parameter originates in:	BL-UP
Any comment:	Corresponding information shall be included in the VCS PD

Data Unit / Parameter:	$C_{AB,tree,i}$
Data unit:	tCO_2-e ha^{-1}
Description:	Carbon stock in aboveground biomass in trees in the project case in stratum *i*
Module parameter originates in:	CP-AB
Any comment:	Corresponding information shall be included in the VCS PD

Data Unit / Parameter:	$C_{BB,tree,i}$
Data unit:	tCO_2-e ha^{-1}
Description:	Carbon stock in belowground biomass in trees in the project case in stratum *i*
Module parameter originates in:	CP-AB
Any comment:	Corresponding information shall be included in the VCS PD

Data Unit / Parameter:	$C_{WP,i}$
Data unit:	tCO_2-e ha^{-1}
Description:	Carbon stock in wood products in the project case in stratum *i*
Module parameter originates in:	CP-W
Any comment:	Corresponding information shall be included in the VCS PD

Data Unit / Parameter:	$E_{BiomassBurn,l,t}$
Data unit:	tCO_2-e ha^{-1}
Description:	Non-CO_2 emissions due to biomass burning in stratum *i* in year *t*
Module parameter originates in:	E-BB
Any comment:	Corresponding information shall be included in the VCS PD

LIVE BIOMASS

Data Unit / Parameter:	A_{sp}
Data unit:	ha
Description:	Area of sample plots in ha
Source of data:	Recording and archiving of number and size of sample plots
Description of measurement methods and procedures to be applied:	Identify how the data/parameter is measured
Frequency of monitoring/recording:	At least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years
Value applied:	0.025 ha
Monitoring equipment:	GPS and measuring tape
QA/QC procedures to be applied:	GPS coordinates are double checked in the field
Calculation method:	N/A
Any comment:	Where carbon stock estimation occurs only for determination of the baseline this parameter shall be known *ex-ante*. Where part of project monitoring, *ex-ante* the number and area of sample plots shall be estimated based on projected sample effort relative to projections of

	growth and emissions.

Data Unit / Parameter:	**N**
Data unit:	Dimensionless
Description:	Number of sample plots
Source of data:	Recording and archiving of number of sample points
Description of measurement methods and procedures to be applied:	Calculated with formula
Frequency of monitoring/recording:	At least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years.
Value applied:	128
Monitoring equipment:	N/A
QA/QC procedures to be applied:	-
Calculation method:	Calculated using the following formula: $n = (t^2.CV^2)/(E\%^2+((t^2.CV^2)/N))$ Where n = number of parcels sampled in each stratum (variable for each stratum) t = Student "t" value (2.262) CV = coefficient of variation (%) (variable for each stratum) E% = permissible sampling error (10%) N = number of parcels in total stratum area (variable for each stratum) Figures used for each variable in each stratum are available for consultation by auditors.
Any comment:	-

Data Unit / Parameter:	**DBH**
Data unit:	Cm
Description:	Diameter at breast height of a tree in cm
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	Measured 1.3m above ground. Measure all trees above some minimum DBH in the sample plots. The minimum DBH varies depending on tree species and climate; for instance, the minimum DBH may be as small as 2.5 cm or as high as 20m. Minimum DBH employed in inventories is

	held constant for the duration of the project.
Frequency of monitoring/recording:	Monitoring must occur at least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years.
Value applied:	-
Monitoring equipment:	Measuring tape
QA/QC procedures to be applied:	Standard quality control procedures for forest inventory including field data collection and data management were applied. The procedure of DBH measurement is already applied in national forest monitoring, and is available from published handbooks, and from the IPCC GPG LULUCF 2003. An example of handbook is MacDicken, K.G. (1997) A Guide to Monitoring Carbon Storage in Forestry and Agroforestry Projects. Winrock International Institute for Agricultural Development. 91 pp.
Calculation method:	Diameter (DBH) is calculated based on circumference at breast height (CBH) measurement, by means of the basic perimeter equation: CBH = π x DBH
Any comment:	-

Data Unit / Parameter:	***H***
Data unit:	M
Description:	Total height of tree
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	Direct measurement by means of hypsometer
Frequency of monitoring/recording:	Monitoring must occur at least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years.
Value applied:	-
Monitoring equipment:	Hypsometer
QA/QC procedures to be applied:	-
Calculation method:	N/A
Any comment:	Where carbon stock estimation occurs only for determination of the baseline this parameter shall be known ex-ante. Where part of project

	monitoring, ex-ante height shall be estimated based on projections of growth. Direct measurement of height corresponding merchantable value. This parameter is only used in allometric equations of palms. For trees, this parameter is only applied for cross-checking of data obtained in the field. In this latter case, the measurement can be performed visually, after training.

Data Unit / Parameter:	$A_{DECKS,I,t}$
Data unit:	Ha
Description:	Area of logging decks in stratum i at time t
Source of data:	Reported measurements such as post-harvest assessment reports and post-harvest maps that are based on field measurements
Description of measurement methods and procedures to be applied:	Systematic sampling must take place to ensure all decks within the area logged are identified and a conservative estimate of area produced.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	*2.71 hectares of open area for each 1,000 hectares of net logging gap area*
Monitoring equipment:	Data obtained from annual FSM forest management (logging gap: UPA 24) and reports
QA/QC procedures to be applied:	The measured area of logging decks in current logging gaps will be compared with those of previous logging gaps
Calculation method:	Ex-ante, estimations of emissions from deck creation shall be based on logging management plans or average size of decks and number of decks produced due to logging in the farm
Any comment:	Data obtained from annual FSM forest management (logging gap: UPA 24)

Data Unit / Parameter:	$A_{ROAD,i,t}$
Data unit:	Ha

Description:	Area of roads in stratum i at time t
Source of data:	Reported measurements such as post-harvest assessment reports and post-harvest maps that are based on field measurements
Description of measurement methods and procedures to be applied:	The area of roads created may be based on the length of roads multiplied by the average width of roads. The length of all roads created during selective logging must be measured through systematically sampling the entire area logged to produce a conservative estimate of the length of roads created. Sufficient number of measurements of road width shall be measured to achieve a precision of equal or less than 15% of the mean at the 95% confidence interval. Where different categories of roads exist, different average road widths should be used.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	*6.42 hectares of open area for each 1,000 hectares of net logging gap area*
Monitoring equipment:	Data obtained from annual FSM forest management (logging gap: UPA 24) and reports
QA/QC procedures to be applied:	The measured area of roads in current logging gaps will be compared with those of previous logging gaps
Calculation method:	Ex-ante, estimations of emissions from road creation shall be based on logging management plans or average width of roads and length of roads produced for logging in the farm
Any comment:	Data obtained from annual FSM forest management (logging gap: UPA 24)

Data Unit / Parameter:	L_{sk}
Data unit:	m
Description:	Length of skid trail sk
Source of data:	Reported measurements such as post-harvest assessment reports and post-harvest maps that are based on field measurements

Description of measurement methods and procedures to be applied:	The length of skid trails may be estimated through using systematic sampling with a random start of the entire area logged or within a sampled known logged area within the project boundary to produce a conservative estimate of the length of skid trails created. The total length of all skid trails can be equal to the mean length of skid trails per unit area multiplied by the total area logged.
Frequency of monitoring/recording:	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	*03 skid trails for each logging deck; each skid trail is estimated to be 250-m long in average*
Monitoring equipment:	Data obtained from annual FSM forest management (logging gap: UPA 24) and reports
QA/QC procedures to be applied:	The measured length of skid trails in current logging gaps will be compared with those of previous logging gaps
Calculation method:	Ex-ante, estimations of emissions from skid trail creation shall be based on logging management plans or average length and number of skid trails produced due to logging in the farm
Any comment:	Data obtained from annual FSM forest management (logging gap: UPA 24)

Data Unit / Parameter:	W_{SKID}
Data unit:	m
Description:	Mean width of skid trails
Source of data:	Reported measurements such as post-harvest assessment reports and post-harvest maps that are based on field measurements
Description of measurement methods and procedures to be applied:	The average width of skid trails created within a stratum i can be based on reported widths; a conservative estimate based on machinery used; or additional field measurements. Conservative estimate: Width edge of tires on largest skidder type * 140% is used, as the skidder type is known and used to create all skid trails.

Frequency of monitoring/recording:	The estimated mean width of skid trails shall be monitored and updated prior to each verification report.
Value applied:	*2,6 m * 1,4*
Monitoring equipment:	Data obtained from annual FSM forest management (logging gap: UPA 24) and reports
QA/QC procedures to be applied:	The width of skid trails in current logging gaps will be compared with those of previous logging gaps
Calculation method:	Conservative estimate: Width edge of tires on largest skidder type * 140% is used, as the skidder type is known and used to create all skid trails.
Any comment:	It is assumed that all diameter trees are destroyed and therefore the aboveground and belowground tree biomass that is destroyed by the skidder conservatively equates to the maximum aboveground biomass carbon stock observed in all strata. Based on the overall area of skid trails related to the Project Area, the values estimated for emissions from skid trails are not significant according to T-SIG, as they represent much less than 5% of total emissions. Thus, the inclusion of these emissions in final calculations is indisputably conservative *per se*.

WOOD PRODUCTS

Data Unit / Parameter:	***Ai***
Data unit:	ha
Description:	Total area of stratum *i*
Source of data:	GPS delineation and remote sensing imagery
Description of measurement methods and procedures to be applied:	GPS delineation and remote sensing imagery
Frequency of monitoring/recording:	At a minimum every time the baseline is updated (at least every 10 years)
Value applied:	

Stratum	**Area (ha)**
Aluvial	13,131.60

	Encosta	9,288.30
	FOB Densa Submontana	6,721.00
	FOB Submontana Cipós e Palmeiras	42,573.00
Monitoring equipment:	GPS and satellite image	
QA/QC procedures to be applied:	GPS data is confirmed by field survey.	
Calculation method:	Satellite image analysis	
Any comment:	Ex-ante it shall be assumed that strata area will remain constant	

Data Unit / Parameter:	$V_{ex,i}$
Data unit:	m^3
Description:	The volume of timber in m^3 extracted from within the stratum (does not include slash left onsite), reported by wood product class and preferably species.
Source of data:	Timber harvest records
Description of measurement methods and procedures to be applied:	Timber inventory, performed in FSM
Frequency of monitoring/recording:	Annually
Value applied:	FSM controls all the timber extracted from the management area. Volumes are recorded annually. Data is available for auditors.
Monitoring equipment:	The same equipment applied in forest inventory
QA/QC procedures to be applied:	The same control procedures applied to forest inventory
Calculation method:	Timber inventory
Any comment:	Note that this volume does not include logging slash left onsite. Data compilers should also make sure that extracted volumes reported are gross volumes removed (i.e. reported volume does not already discount for estimated wood waste, as is often the practice in harvest records). Assignment of volume extracted to wood product class(es), will be substantiated on the basis of records of timber sales.

DATA AND PARAMETERS MONITORED FOR BASELINE RENEWAL

Data Unit / Parameter:	**Regional Forest Cover / Non-Forest Cover Benchmark Map**

Data unit:	N/A
Description:	Map showing the location of forest land within the reference region at the beginning of the crediting period
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	Map accuracy is 90 %
Frequency of monitoring/recording:	Annually
Value applied:	N/A
Monitoring equipment:	Maps and satellite images
QA/QC procedures to be applied:	Best practices in remote sensing and ground truthing
Calculation method:	Analysis of satellite images and maps
Any comment:	-

Data Unit / Parameter:	**Project Forest Cover Benchmark Map**
Data unit:	N/A
Description:	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	Map accuracy is 90%
Frequency of monitoring/recording:	Annually
Value applied:	N/A
Monitoring equipment:	Maps and satellite images
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	Analysis of satellite images and maps
Any comment:	-

Data Unit / Parameter:	**Leakage Belt Forest Cover Benchmark Map**
Data unit:	N/A
Description:	Map showing the location of forest land within the leakage belt area at the beginning of each

	monitoring period.
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Description of measurement methods and procedures to be applied:	Map accuracy is 90%
Frequency of monitoring/recording:	Annually
Value applied:	N/A
Monitoring equipment:	Maps and satellite images
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	Analysis of satellite images and maps
Any comment:	-

Data Unit / Parameter:	$A_{RRD,\ unplanned,hrp}$
Data unit:	Ha
Description:	Total area deforested during the historical reference period in the *RRD*
Source of data:	Remote sensing imagery
Description of measurement methods and procedures to be applied:	Analysis of the progression of deforestation area in RRD during the reference period
Frequency of monitoring/recording:	At a minimum every ten years prior to baseline renewal
Value applied:	113,558.60
Monitoring equipment:	Maps and satellite images
QA/QC procedures to be applied:	Best practices in remote sensing
Calculation method:	Analysis of satellite images and maps
Any comment:	Monitored for the purpose of baseline revisions

4.3 Description of the Monitoring Plan

Title and reference of the VCS methodology

Approved VCS Module VMD0015 - Version 2.0
REDD Methodological Module:
Methods for monitoring of greenhouse gas emissions and removals (M-MON)
Sectoral Scope 14

These methods aim at monitoring changes in land cover due to deforestation, forest degradation and carbon stock enhancement, and to calculate activity data for each of these categories of change. These methods are applied for monitoring Reference Area, Project Area and Leakage Belt.

Revision of the baseline

a. Technical description of the monitoring task.
The baseline scenario will be monitored through an assessment of the driver variables and assumptions assumed by the LANDSAT 5 to project deforestation expected in the baseline scenario. These parameters will be re-validated after each baseline renewal (10 years), based on the calculation of the verified post facto baseline deforestation (in hectares) of the past 10 year period – in comparison with other location not affected by the project activities. If deforestation is verified as 10% lower of 10% higher than originally predicted, the post facto carbon baseline shall be re-adjusted using the observed values of the driver variables.
The baseline of a REDD project activity is estimated ex ante. It will be monitored in a reference area (unplanned deforestation) for the purpose of periodically adjusting the baseline. Ex-ante baseline estimations are therefore used in both the ex-ante and ex-post estimation of net carbon stock changes and greenhouse gas emission reductions.
The baseline monitoring task will be done in accordance with the following module:
Approved VCS Module VMD0007
Version 1.0
REDD Methodological Module:
Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation (BL-UP)
Sectoral Scope 14

Data to be collected
The data to be collected is given on the following tables:

Data Unit / Parameter:	Any spatial feature included in the spatial model that is subject to changes over time (Factor Maps)
Data unit:	According to spatial feature selected
Description:	Factor Maps
Source of data:	Digital maps – Landsat5
Description of measurement methods and procedures to be applied:	Update of digital maps
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	Risk Maps
Data unit:	N/A

Description:	A Risk Map shows, for each pixel location, the risk, or "suitability", for deforestation as a numerical scale (e.g. from 0 = minimum risk to some upper limit representing the maximum).
Source of data:	Digital maps – Landsat5
Description of measurement methods and procedures to be applied:	Update of digital maps
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	Baseline deforestation Maps
Data unit:	N/A
Description:	Maps showing the location of deforested hectares in each year of the baseline period
Source of data:	Digital maps – Landsat5
Description of measurement methods and procedures to be applied:	Update of digital maps
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	AA_U
Data unit:	%
Description:	The accuracy assessment of the rate of unplanned deforestation (equals 90% or more)
Source of data:	Existing maps or models, expert consultation, literature
Description of measurement methods and procedures to be applied:	Multi-criteria analysis implemented in a Geographical Information System
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	*Correct*
Data unit:	Ha
Description:	Area correct due to observed change predicted as change
Source of data:	Spatial model of deforestation location
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	Err_A
Data unit:	Ha
Description:	Area of error due to observed change predicted as persistence
Source of data:	Spatial model of deforestation location
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	Err_B
Data unit:	ha
Description:	Area of error due to observed persistence predicted as change
Source of data:	Spatial model of deforestation location
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	*FOM*
Data unit:	N/A
Description:	Figure of Merit
Source of data:	Calculated using equation $FOM = CORRECT / (CORRECT + Err_A + Err_B)$
Description of measurement methods and procedures to be applied:	Described above
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	*LB*
Data unit:	Ha
Description:	Leakage belt area
Source of data:	GPS coordinates and/or remote sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Where leakage belt boundaries have not been derived using GPS on-the-ground measurements, quality control shall be carried out. A minimum of 30 locations on the leakage belt boundary, each separated by at least 1km, shall be visited. If a systematic bias is detected in the original boundaries and/or if >10% of locations differ by >50m, then the entire boundary shall be resurveyed. These directives come from the Approved VCS Module VMD0007 (Version 1.0) REDD Methodological Module: Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation (BL-UP), Sectoral Scope 14.
Any comment:	Shall be estimated at time zero, this estimate shall be used for *ex-ante* purposes

Data Unit / Parameter:	LSC_{RRL}

Data unit:	Ha
Description:	The area of *RRL* suitable for conversion from forest to an alternate land use
Source of data:	Remote sensing data
Description of measurement methods and procedures to be applied:	Calculated from the result of analysis of forest areas in the reference region for projection of location of deforestation with regard to constraints to deforestation (including elevation, climate, protected status etc). Uses parameter $A_{RRL,forest,t}$ derived from M-MON
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	Monitored at least once every 10 years (when the baseline is revisited) Shall be estimated at time zero, this estimate shall be used for *ex-ante* purposes

Data Unit / Parameter:	*PA*
Data unit:	Ha
Description:	Unplanned deforestation project area
Source of data:	GPS coordinates and/or remote sensing data
Description of measurement methods and procedures to be applied:	Where project boundaries have not been derived using GPS on-the-ground, measurements quality control shall be carried out. A minimum of 30 locations on the project boundary, each separated by at least 1km, shall be visited. If a systematic bias is detected in the original boundaries and/or if >10% of locations differ by >50m, then the entire boundary shall be resurveyed. These directives come from the Approved VCS Module VMD0007 (Version 1.0) REDD Methodological Module: Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation (BL-UP), Sectoral Scope 14.
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	Shall be estimated at time zero, this estimate shall be used for ex-ante purposes

Data Unit / Parameter:	P_{LK}
Data unit:	Dimensionless
Description:	Ratio of the area of the leakage belt to the total area of *RRD*
Source of data:	Leakage belt area and RRD area, determined by satellite imaging
Description of measurement methods and procedures to be applied:	Calculated from the result of remotely sensed data analysis
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	Shall be estimated at time zero, this estimate shall be used for ex-ante purposes

Data Unit / Parameter:	$P_{LSC,RRL}$
Data unit:	Dimensionless
Description:	Ratio of the parameter LSC_{RRL} to the area of *RRD*
Source of data:	LSC_{RRL} area and *RRD* area, determined by satellite imaging
Description of measurement methods and procedures to be applied:	Calculated from the result of remotely sensed data analysis
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	Shall be estimated at time zero, this estimate shall be used for ex-ante purposes

Data Unit / Parameter:	P_{PA}
Data unit:	Dimensionless
Description:	Ratio of the project area to the total area of *RRD*
Source of data:	Project area and *RRD* area, determined by satellite imaging
Description of measurement methods and procedures to be applied:	Calculated from the result of remotely sensed data analysis
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing

Any comment:	Monitored at least every 10 years (when the baseline is revisited) Shall be estimated at time zero, this estimate shall be used for ex-ante purposes

Data Unit / Parameter:	P_{RRL}
Data unit:	Dimensionless
Description:	Ratio of the forest area in the *RRL* at the start of the historical reference period to the total area of *RRD*
Source of data:	Forest area in the *RRL* and *RRD*, determined by satellite imaging
Description of measurement methods and procedures to be applied:	Calculated from the result of remotely sensed data analysis
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	Monitored at least every 10 years (when the baseline is revisited) Shall be estimated at time zero, this estimate shall be used for ex-ante purposes

Data Unit / Parameter:	*RRD*
Data unit:	Ha
Description:	Geographic boundaries of the reference area for projection of rate of deforestation
Source of data:	GPS coordinates and/or remote sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	*RRL*
Data unit:	Ha
Description:	Geographic boundaries of the reference area for

	projection of location of deforestation
Source of data:	GPS coordinates and/or remote sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	Best practices in remote sensing
Any comment:	-

Data Unit / Parameter:	T_{hrp}
Data unit:	Yr
Description:	Duration of the historical reference period in years
Source of data:	GPS coordinates and/or remote sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Updated every time the baseline is revisited (at least every 10 years)
QA/QC procedures to be applied:	N/A
Any comment:	Should be between 10 and 15 years

Monitoring of the actual carbon stock changes and greenhouse gas emissions

The implementation of the project activities will be monitored by the responsible group within FSM and will consist of large investments in policing the FSM, one monitoring base will be established in one of the already existing policing bases. All the bases communicate through radio every day to the main base.

The bases will be positioned in strategic points within the FSM and continuous monitoring activities with advanced remote sensing techniques will be implemented also satellite images and field studies will be used. The land use area monitoring will be done with remote sensing methods, using images of medium resolution, generated by INPE. Associated with this, the Environmental Monitoring Programme aims at involving the communities in mapping the threatened areas; identifying the risks and threats to which these areas are subjected. The large scale monitoring will be done through satellite images made available by INPE (PRODES)." INPE monitoring systems.

All of this reliable data that is collected and documented will be used as a technical support tool for decision making in order to improve project outcomes, and to adapt the project according to the current needs and reality. These decisions will be made during the periodic meetings to review the Activity Plan. On these occasions, the design of the Monitoring Plan will be analyzed according to its efficiency in generating reliable feedback and all the necessary information. If any changes in the Monitoring Plan or management actions are identified, a corrective action will be designed and implemented.

According to Figure 27, the red dots represent the 7 bases already established by the project owner to work as monitoring points at FSM. All the bases have radio communication and they communicate at least once a day. They are all equipped with motorcycles so they can easily move to other areas if needed.

The property management is in place and uses ABSOLUT system from SINOP applied to FSM. *www.absolutsistemas.com.br*

The Forestry Census is inserted into the system and it monitors every tree of the project area. The program gives support to the sustainable management plan in accordance with FSC procedures. It also complies with federal and state law.

As strategy for looking after the property and assure the project it was considered the following assumptions:

1-Avoid entry of outsiders:
1.1 Hunters
1.2 Fishermen
1.3 Intrusion
1.4 Prevention of invasion
1.5 Fire Prevention
1.6 Support the Work of Forest Stewardship Management Plan
2 - Consolidation of calm and peaceful possession
3-Cleaning of frontiers and its milestones
4-Internal organization of communication

On top of these issues, there is strategic plan with seven fixed bases located in strategic locations to meet the above assumptions, namely:

BASE 1 - SEDE
This base possesses the administrative office of the farm, main house (residence for Directors, Officers and invited guests), kitchen and dining hall.
This base is equipped with electricity (including a generator), satellite internet, fixed and mobile telephone (both by means of an external aerial) and a motorcycle.

BASE 2 – LINHA 12
This base possesses lodgement for collaborators, dining hall, toilets, one house for the fixed employee, building for storage and maintenance of machinery, and logging deck.
This base is equipped with electricity, mobile telephone (by means of an external aerial), and a motorcycle.

BASE 3 - ARIPUANÃ
This base possesses one house for the fixed employee, dining hall and kitchen for visitors.
This base is equipped with electricity (by means of a generator), mobile telephone (by means of an external aerial), and a motorcycle.

BASE 4 - ACAMPAMENTO
This operational base possesses three houses: two houses are lodgements with toilets and one house has a kitchen, dinning hall, storage room, office, toilets and two bedrooms.
This base is equipped with electricity (by means of a generator), and a motorcycle.

BASE 6 – LINHA 6
This base possesses a house for the fixed employee.
This base is equipped with solar electricity, and mobile telephone (by means of an external aerial).

BASE 7 - PACUTINGA
This base possesses a house for the fixed employee.
This base is equipped with solar electricity, and mobile telephone (by means of an external aerial).

BASE 8 - MORERU
This base possesses a house for the fixed employee, with accommodation for 3 people. This base is in charge of the gate to the road Colniza / Moreru.
This base is equipped with solar electricity, mobile telephone (by means of an external aerial), and a motorcycle.

All bases communicate 24 hours, the Manager of BASE 1 is authorized for any decision making and action.
BASES 2, 3 and 4 report to BASE 1
BASES 6 and 7 report to BASE 8

To be able to receive the authorization to perform a sustainable management of the forest (so called AUTEX) the property was obligated to have a sustainable management plan in place and present it to the competent environmental agency SEMA / MT. The Management Plan is fully available to auditors.

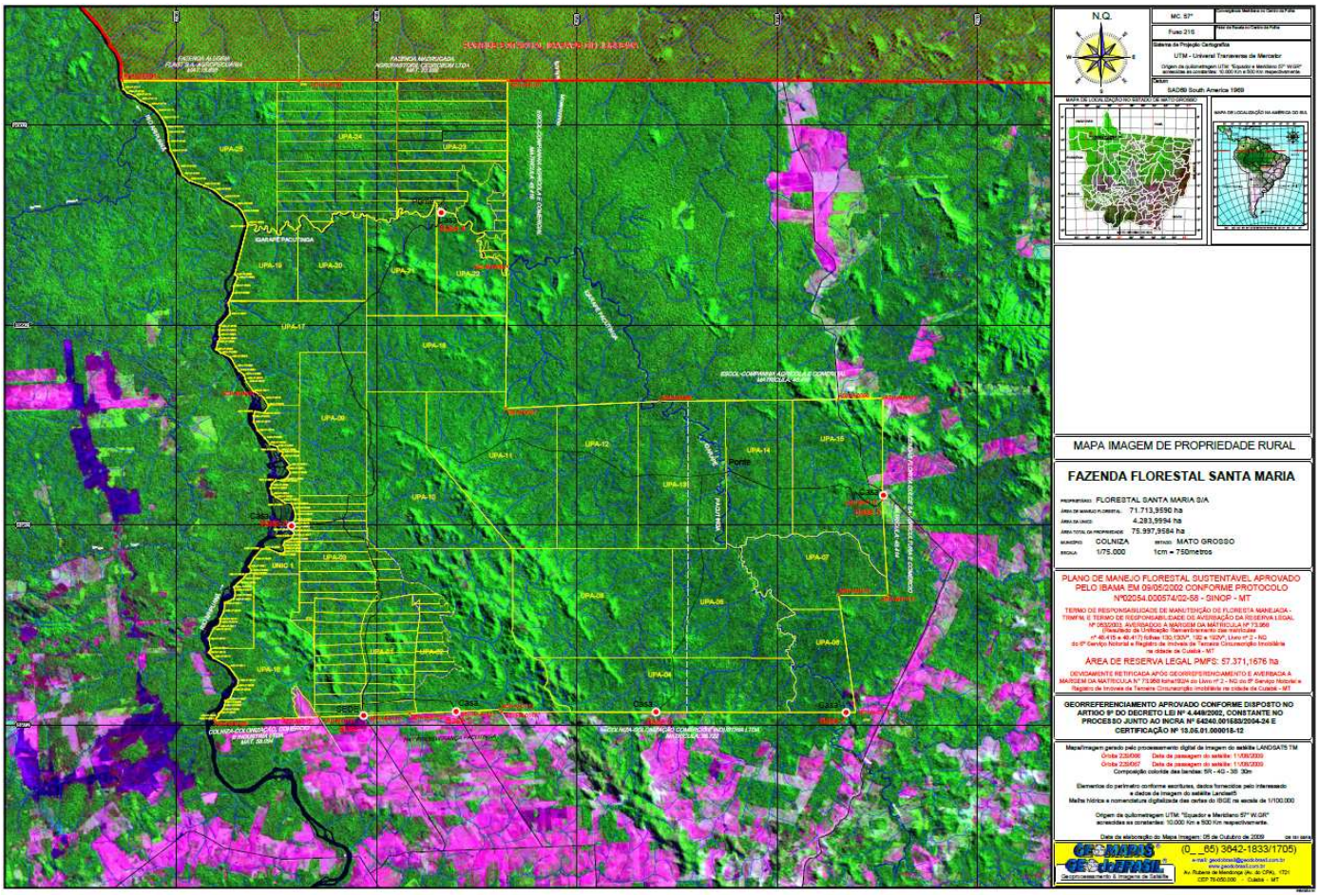


Figure 27. *Distribution of the infrastructure for the project monitoring*

All the parameters to be monitored are described on item 4.2 above.

Monitoring degradation due to selective logging of forest management areas

The calculation procedure for estimating net ex post emissions and removals related to selective logging activities in the project case will be equal to the summed emissions arising from selective logging operations.

The net emissions in the project case are estimated by combining:

- Emissions arising from logging gap: encompass emissions from felling timber tree and emissions from incidental damage caused by falling timber tree,
- Emissions from infrastructure: from constructing logging infrastructure for removal of timber, such as haul roads, skid trails and logging decks.

Emissions arising in the logging gap

In the project case, emissions occur as a direct result of the death of the timber tree and due to the death of trees killed when the timber tree is felled. The net emission in the project case is equal to the biomass of the wood extracted plus the logging damage factor multiplied by the extracted volume:

$$C_{LG} = \sum_{t=1}^{T} (C_{EXT,t} + (LDF * V_{EXT,t} * \frac{44}{12})) \quad (1)$$

Where:

C_{LG}	Actual net project emissions arising in the logging gap at time t; tCO_2-e
$C_{EXT,t}$	Biomass carbon stock of timber extracted within the project boundary at time t; tCO_2-e
LDF	Logging damage factor; tC m^{-3}
$V_{EXT,t}$	Volume extracted at time t; m^3
t	1, 2, 3 … t years elapsed since the start of the project activity

For ex-ante calculation of the total volume of wood extracted, it was assumed that wood extraction is always identical, independently on the type and biomass of strata. Thus, the volume of wood extracted is not dependent on strata biomass volume per hectare.

Emissions arising through logging infrastructure

The net emission in the project case is equal to the sum of emissions resulting from skid trails, roads, and logging decks created for selective logging operations.

The emissions from the creation of skid trails is estimated by multiplying the total length of skid trails created and a skid trail emission factor.

$$\Delta C_{SKID,t} = L_{SKID,t} * SK \quad (2)$$

Where:

$\Delta C_{SKID,t}$	Change in carbon stock resulting from skid trail creation at time t; tCO_2-e
$L_{SKID,t}$	Length of skid trails at time t; m
SK	Skid trail emissions factor (Average emissions resulting from dead wood created in the process of skid trail creation per length of skid trail); t CO_2-e m^{-1}
t	1, 2, 3 … t years elapsed since the start of the project activity

The calculation of *SK* is further explained in M-MON v2.0. For ex-ante calculations of emissions arising from creation of skid trails, roads, and logging decks, it was conservatively assumed the emission equivalent to the stratum with the highest biomass (i.e. "Encosta" stratum). It is assumed that the machinery used to create the skid trail kills all aboveground and belowground tree biomass located within the path of the skid trail. This biomass becomes deadwood and is assumed to be immediately emitted.

The emission resulting from the creation of roads is determined by multiplying the area of roads created by the carbon stock. The emission from logging decks is determined by measuring the area of logging decks created in each logging gap, and the area is multiplied by the carbon stock. By merging equations 17 and 18 of M-MON V2.0 (page 17), the following equation was created for estimating the emissions from roads and logging decks:

$$\Delta C_{ROAD,t\,+\,DECKS,t} = (A_{ROAD,t} + A_{DECKS,t}) * C_{BSL}$$

Where:

$\Delta C_{ROAD,t\,+\,DECKS,t}$	Change in carbon stock resulting from logging road and deck creation at time t; tCO_2-e
$\Delta C_{ROAD,t}$	Area of roads at time t; ha
$\Delta C_{DECKS,t}$	Area of logging decks at time t; ha
C_{BSL}	Carbon stock in aboveground and belowground tree biomass in the baseline case; tCO_2-e ha^{-1}
t	1, 2, 3 … t years elapsed since the start of the project activity

For conservativeness purposes, the biomass of the "Encosta" stratum is used in C_{BSL}, as it has the highest biomass value among all strata.

Based on the overall area of roads and logging decks related to the Project Area, the values estimated for emissions from roads and decks are not significant according to T-SIG, as they represent much less than 5% of total emissions. Thus, the inclusion of these emissions in final calculations is indisputably conservative *per se*.

Field inventory of biomass

The field inventory methodology is described in a Standard Operating Procedure (SOP), which is available for consultation by the auditors. This SOP was specifically designed to FSM carbon inventories, to be applied in the baseline assessment, as well as in the monitoring period. The field carbon inventory involved the installation of 18 permanent transects, composed by a total of 128 permanent plots. These permanent plots will be periodically assessed throughout the project duration.

The merchantable volume of trees is estimated by directly measuring the circumference at breast height (CBH). The data of CBH is converted in DBH (Diameter at Breast Height) and applied to allometric equations for estimation of merchantable stem volume. For application of allometric equations, trees were divided in two classes of DBH:

- DBH ranging from 4.46 cm to 81.99 cm: application of allometric equation from NOGUEIRA et al. (2008);
- DBH higher than 82.00 cm: application of allometric equation from COLPINI et al. (2009);

The total aboveground tree biomass was estimated by using a default biomass expansion factor (BEF). Palm tree data underwent application of a specific allometric equation by SALDARRIAGA et al. (1988) for direct estimation of total aboveground biomass. For estimation of belowground biomass, the aboveground sum of trees and palms biomass was multiplied by a default root-shoot ratio.

The field inventory SOP (available for consultation by the auditors) describes the guidelines for the following aspects:

- Procedures for allocation of transects and plots in the field;
- Documentation of coordinates of transects and plots;
- Standards for identification and signalization of transects and plots;
- Description of field inventory team;
- Standards for measurement of tree diameters under several conditions;
- Standards for measurement dynamics of the field inventory team;
- QA/QC procedures to guarantee the application of correct field procedures (annual training, evaluation and performance reporting);
- Items for annual evaluation of field inventory team;
- QA/QC procedures to guarantee that field data are within the range of tree dimensions required in the field inventory;
- QA/QC procedures to guarantee that there was no misunderstanding in data notation in the field;
- QA/QC procedures to guarantee reliability of data transfer;
- Model of data transfer error quantification and report;
- List of equipment and materials to be used in the field inventory.

After the annual evaluation of field inventory team, the team coordinator must produce an annual Evaluation Report for each field inventory technician. This Evaluation Report will be printed in two hardcopies: one for FSM records and other for the field inventory technician that was evaluated. This document will be the evidence of the annual evaluation of field inventory team.

Monitoring of leakage carbon stock changes and greenhouse gas emissions

For the leakage belt the net greenhouse gas emissions in the project case is equal to the sum of stock changes due to deforestation in the leakage belt:

$$\Delta C_{P,LB} = \sum_{t=1}^{t} \sum_{i=1}^{M} \Delta C_{P,DefLB,i,t} \quad (4)$$

Where:

$\Delta C_{P,LB}$	Net greenhouse gas emissions in the leakage belt in the project case; t $CO_{2\text{-}e}$
$\Delta C_{P,DefLB,i,t}$	Net carbon stock change as a result of deforestation in the leakage belt the project case in stratum *i* at time *t*; t $CO_{2\text{-}e}$
i	1, 2, 3 …M strata in the project scenario
t	1, 3, 3, …*t** years elapsed since the projected start of the REDD project activity

Estimation of *ex-post* net carbon stock changes and greenhouse gas emissions

For the project area the net greenhouse gas emissions in the project case is equal to the sum of stock changes due to deforestation and degradation plus the total greenhouse gas emissions minus any eligible forest carbon stock enhancement:

$$\Delta C_P = \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t} \right) \quad (5)$$

Where:

ΔC_P	Net greenhouse gas emissions within the project area under the project scenario; t CO_{2-e}
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum *i* at time *t*; t CO_{2-e}
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum *i* at time *t*; t CO_{2-e}
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum *i* at time *t*; t CO_{2-e}
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline in stratum *i* at time *t*; t CO_{2-e}
i	1, 2, 3 …M strata in the project scenario
t	1, 3, 3, …*t** years elapsed since the projected start of the REDD project activity

The net carbon stock change as a result of deforestation is equal to the area deforested multiplied by the emission per unit area.

$$\Delta C_{P,DefPA,i,t} = \sum_{n-1}^{U} \left(\Delta C_{DefPA,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right) \quad (6)$$

$$\Delta C_{P,DefLB,i,t} = \sum_{n-1}^{U} \left(\Delta C_{DefLB,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right) \quad (7)$$

Where:

$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project case in the project area in stratum *i* at time *t*; t CO_{2-e}
$\Delta C_{P,DefLB,i,t}$	Net carbon stock change as a result of deforestation in the project case in the leakage belt in stratum *i* at time *t*; t CO_{2-e}
$\Delta_{DefPA,u,i,t}$	Area of recorded deforestation in the project area stratum *i* converted to land use *u* at time *t*; ha
$\Delta_{DefLB,u,i,t}$	Area of recorded deforestation in the leakage belt stratum *i* converted to land use *u* at time *t*; ha
$\Delta C_{pools,Def,u,i,t}$	Net carbon stock changes in all pools in the project case in land use *u*, in stratum *i* at time *t*; t CO_{2-e}
u	1, 2, 3 …*U* post-deforestation land uses
i	1, 2, 3 …*M* strata
t	1, 3, 3, …*t** years elapsed since the projected start of the REDD project activity

The emission per unit area is equal to the difference between the stocks before and after deforestation minus any wood products created from timber extraction in the process of deforestation:

$$\Delta C_{pools,Def,i,t} = C_{BSL,i} - C_{P,post,i} - C_{wp,i} \quad (8)$$

Where:

$\Delta C_{pools,Def,i,t}$	Net carbon stock changes in all pools as a result of deforestation in the project case in land use *u* in stratum *i* at time *t*; t $CO_{2\text{-}e}$
$C_{BSL,i}$	Carbon stock in all pools in the baseline case in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{P,post,i}$	Carbon stock in all pools in post deforestation land use *u* in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{wp,i}$	Carbon stock sequestered in wood products from harvests in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
u	1, 2, 3 …*U* post-deforestation land uses
i	1, 2, 3 …*M* strata in the project scenario
t	1, 3, 3, …*t** years elapsed since the projected start of the REDD project activity

For calculation of carbon stock sequestered in wood products, see the module "Estimation of carbon stocks and changes in carbon stocks in the harvested wood products carbon pool in REDD project activities" (CP-W). It is conservative in the project case to assume no wood products are produced.

Instead of tracking annual emissions through burning and/or decomposition, this methodology employs the simplifying assumption that all carbon stocks are emitted in the year deforested and that no stocks are permanently sequestered (beyond 100 years after deforestation). This assumption applies regardless of whether burning is employed as part of the forest conversion process or as part of post conversion land use activities.

For each post-deforestation land use (u) estimate the long-term carbon stock. Carbon stocks in the selected pools (must be the same as those used in the baseline modules) must be measured and estimated using the methods given in module CP-AB.

$$C_{post,u,i} = C_{AB\_tree,i} + C_{BB\_tree,i} + C_{AB\_non-tree,i} + C_{BB\_non-tree,i} + C_{DW,i} + C_{LI,i} + C_{SOC,PD-BSL,i} \quad (9)$$

Where:

$C_{post,u,i}$	Carbon stock in all pools in post-deforestation land use *u* in stratum *i* at time *t*; t $CO_{2\text{-}e}$
$C_{AB\_tree,i}$	Carbon stock in aboveground tree biomass in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{BB\_tree,i}$	Carbon stock in belowground tree biomass in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{AB\_non-tree,i}$	Carbon stock in aboveground non-tree vegetation in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{BB\_non-tree,i}$	Carbon stock in belowground non-tree vegetation in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{DW,i}$	Carbon stock in dead wood in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{LI,i}$	Carbon stock in litter in stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
$C_{SOC,PD-BSL,i}$	Mean post-deforestation stock in soil organic carbon in the post deforestation stratum *i* ; t $CO_{2\text{-}e}$ ha^{-1}
u	1, 2, 3 …*U* post-deforestation land uses

i 1, 2, 3 …*M* strata in the project scenario

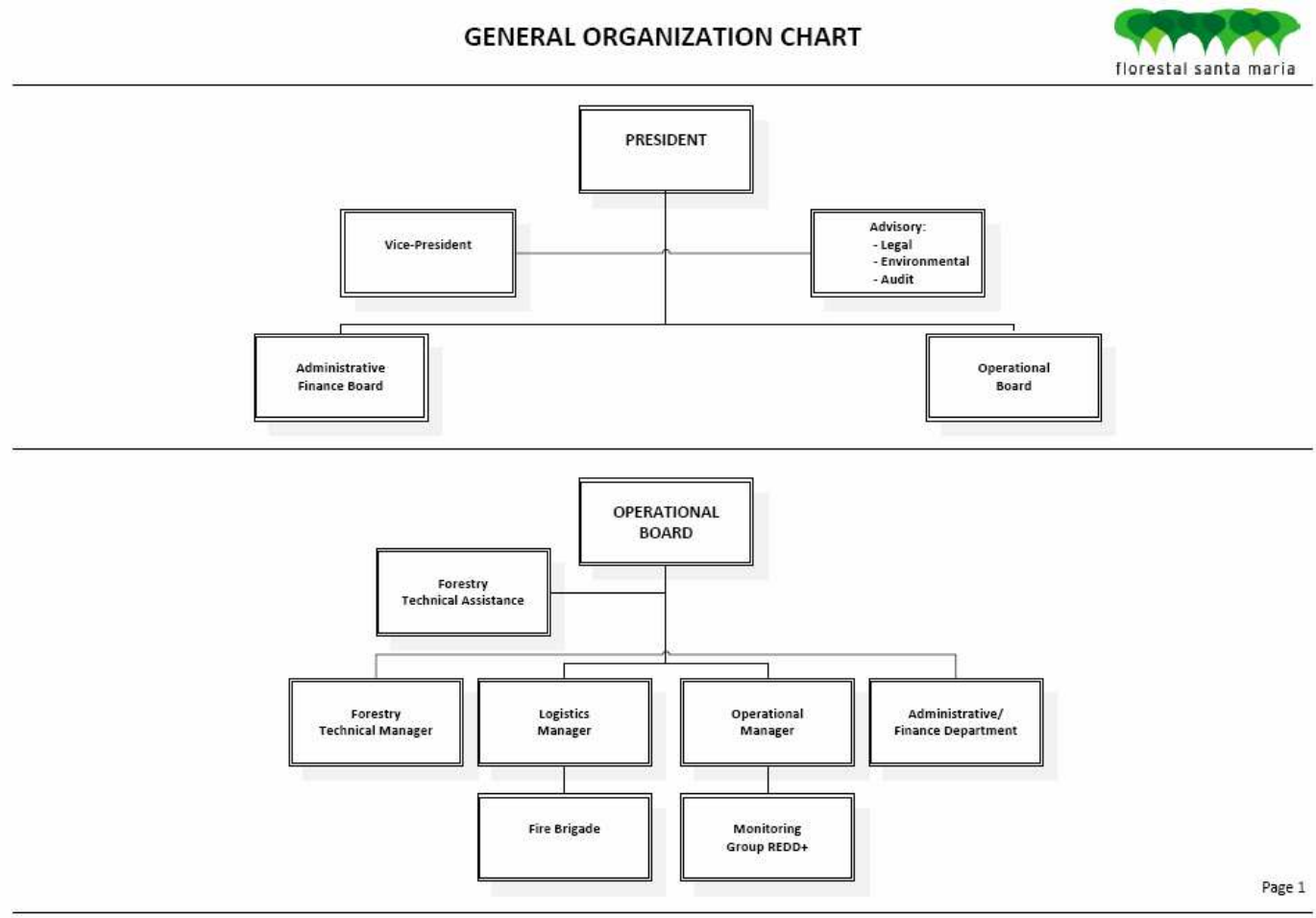
Carbon pools excluded from the project can be accounted as zero. Herbaceous non-tree vegetation is considered to be de *minimis* in all instances. For the determination which carbon pools must be included in the calculations as a minimum, use Tool T-SIG.

Monitoring areas undergoing carbon stock enhancement

It is conservative to assume that no carbon stock enhancement is occurring. The project elected to set $\Delta C_{P,Enh,l,t} = 0$ for the whole project area

Organizational structure, responsibilities and competencies

To ensure the operation of the monitoring activities, the operational and managerial structure will be established according to the chart below, to determine the organization and related persons in charge of data collection and archiving.



Below the respective functions:

President: Rubens F. Alves de Lima
Vice - President: Irene Elizabeth Lenci
Advisory
Legal: LACAZ MARTINS ADVOGADOS
Environmental: PINHEIRO NETO ADVOGADOS
Audit: Moore Stephens Brasil
Administrative Finance Board: Sebastião Carvalho Vilas Boas

==========
Operational Board: Antonio Martins
Forestry Technical Assistance: SAVANA :-(savanaprojetos.com.br)
Forestry Technical Manager: Jonathan Borella
Logistics Manager: Paulo Sergio Dias
Operations Manager: Marcelo Eduardo Lopes Pereira.
Administrative Finance Department: Regiane Meira da Silva
Fire Brigade: Isaque Bueno de Campos
Monitoring Group Manager: Magnon Lopes Pereira

Methods for generating, recording, aggregating, collating and reporting data on monitored parameters

The parameters monitored on the project will be generated, recorded, aggregated and collated using the system that it is already in place at FSM, "ABSOLUT Sistemas". To ensure quality control e quality assurance FSM has implemented a controlling system where the complete forestry census is inserted into the system and it monitors every single tree. The system is already in accordance with the federal and local legislation.

Procedures for handling internal auditing and non-conformities

The procedures for handling internal auditing and non-conformities are going to be established by the Operational Board of FSM under the approval of the President. All the necessary task-force and procedures will be in place to meet the highest levels of governance.

5 ENVIRONMENTAL IMPACT

Environmental impact assessments are not required by applicable legislation or regulation. The FSM property has a Sustainable Forest Stewardship Plan previously approved by SEMA (Environment Secretariat of the State of Mato Grosso). This management plan was conceived in compliance with Brazilian Forest Code and local regulation.

Local benefits

The property is located on the right-hand bank of the Aripuanã River, the main water collector of the drainage systems of the region, and is a tributary of the Madeira River. The preservation of the natural cycles within the area of the project is therefore of a major importance for the preservation of the water resources of the area.

Biodiversity

In Brazil, research on biodiversity gained importance and financial incentives from the 80's. At that point, an intensive research effort was started, mainly focused on the biomes of Amazon, Pantanal and Mata Atlântica. In 1999, FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo; Foundation for Support of Research in the State of São Paulo) created the Biota-FAPESP Program, aimed at knowing, mapping, and continuously analyzing biodiversity in the State of São Paulo. This program has been replicated in several regions of Brazil, including in the State of Mato Grosso do Sul, financed by the State Government Research Agencies, aiming to promote conservation and sustainable use of biodiversity in Mato Grosso. Therefore, the context in which this REDD project is being conceived is fully in line with what the local and regional authorities envision. Moreover, this REDD project is very unique, thus becoming a great example, generating local expediencies, with a great potential for replication.

The proponents believe that the FSM-REDD Project will benefit and enhance the conditions in which the theme of biodiversity has been locally regarded by avoiding deforestation, as well as by prohibiting any type of hunting inside the Project Area, based on the legal framework of the State and that of Brazil. Furthermore, this REDD project might represent an incentive for Mato Grosso State Government to implement a new "Biota Program[35]" at State level, following the example of São Paulo and Mato Grosso do Sul States. This is plausible, as the FSM forestry operation has the largest forest under a management plan already approved in the State of Mato Grosso, and would be the first productive rural property to hold a REDD initiative in the whole State.

In the FSM case, forest biodiversity (flora biodiversity) information exists as legal requirements for approvals (e.g. for any Plan of Forest Management, the knowledge of local floristic composition is mandatory). The main fauna policy in FSM is the prohibition of hunting inside the farm, according to Federal Law. Moreover, the FSM is available to prospect possibilities of supporting any type of protection plan or research plan inside its land, as well as in the whole neighboring region.

The FSM is available to study possibilities of supporting fauna monitoring activities and assessments inside its land by any interested entity, including, whenever possible, partnerships with Universities, NGOs, Research Funding Agencies (e.g. CNPq, CAPES), as well as any national or international organism that might be interested in performing research on local fauna. In this context, FSM is available to study possibilities of receiving in its facilities postdoctoral

[35] The Program of Research on Characterization, Conservation and Sustainable Use of Biodiversity in the State of São Paulo, named BIOTA-FAPESP, is the result of articulations by scientific community in the State of São Paulo, based on premises mentioned in the Convention on Biological Diversity, assigned in ECO-92 and ratified by Brazilian National Congress in 1994.

researchers and any other researcher financed by governmental or private funding agencies, including the possibility of providing free lodgment, respecting the actual infrastructure of the farm without hindering the operational activities of the forest management plan. FSM has always been and will be always opened to prospect possibilities to establish agreements with any interested entity, to facilitate research, protection and monitoring of flora and fauna inside the project boundary.

For all these aspects, it is believed that the FSM-REDD Project can represent an example of sustainable management and conservation of biodiversity.

The following paragraphs of this VCS-PD show further details on fauna composition in the FSM region.

Fauna (according to the Management Plan of "Parque Estadual Igarapés do Juruena", in the FSM surroundings)

Avifauna

Literature registers about birds in the FSM region indicates a list of 526 species of birds distributed in 68 families. The patterns of endemism and conservation were similar to those reported in Birdlife International (2000)[36] and IBAMA (2003)[37]. The distribution of migratory or resident species follows Stotz et al. (1996)[38]; Sick (1997)[39] and CBRO (2007)[40]. This means that the region has one of the highest diversities of birds throughout the State of Mato Grosso.

The FSM region shelters a very rare bird species, which is considered at risk of extinction: the *Clytoctantes atrogularis* (choca-de-garganta-preta). This species has been recently described and was known from two female specimens found in the State of Rondônia (Lanyon et al., 1990[41]). At present, its status is considered as "vulnerable" according to IUCN (2006)[42]. This species was registered in two regions: Cachoeira de Nazaré, State of Rondônia, and Rio Sucunduri, in the State of Amazonas. Both areas are threatened by migration and deforestation along BR-230 and BR 364 public roads.

[36] BIRDLIFE INTERNATIONAL., 2000. Threaterned birds of the World. Barcelona/Cambridge: Lynx edicions. 852p.il
[37] IBAMA – INSTITUTO BRASILEIRO DO MEIO AMBIENTE E RECURSOS NATURAIS, 2003. Lista da fauna brasileira ameaçada de extinção. Available in http://www.ibama.gov.br
[38] STOTZ, D. F.; FITZPATRICK, J. W.; PARKER, T. A. & MOSKOVITS, D. K., 1996. Neotropical Birds: Ecology and Conservation. Chicago: Univ. Chicago Press
[39] SICK, H., 1997. Ornitologia Brasileira, uma introdução. Rio de Janeiro: Nova Fronteira. 912p.il.
[40] CBRO – COMITÊ BRASILEIRO DE REGISTROS ORNITOLÓGICOS, 2007. Lista das aves do Brasil. 6th Version 21/08/2007. Available in http://www.ib.usp.br/crbo
[41] LANYON, S. M., STOTZ, D. F. & Willard, D. E., 1990. Clytoctantes atrogularis, a new species of antbird from western Brazil. Wilson Bulletin 102: 571-580.
[42] IUCN – INTERNATIONAL UNION FOR CONSERVATION OF NATURE, 2006. IUCN Red List of Threaterned Species. Available in http://www.iucnredlist.org

Figure 28. *Clytoctantes atrogularis (choca-de-garganta-preta)*

Herpetofauna (amphibians and reptiles)

The evaluation of herpetofauna in the region of "Parque Estadual Igarapés do Juruena" (FSM surroundings) registered 695 species, whose 499 where amphibians and 196 were reptiles.

Concerning the impact that these species can undergo, only the frog *Adelphobates quinquevittatus* is included in the list of species that can become at risk by commercial activities if no protection activities take place. The land turtle *Chelonoidis denticulata* is characterized as "vulnerable" in the IUCN (2006) list. The exploitation by commercial activities and hunting might be a major impact driver on this local reptile species. However, alterations in environment might become an even more important impact driver.

In this context, in might be inferred that the richness of herpetofauna registered in the region is still similar to that registered in other Amazon sites, although deforestation pressures are very prominent. The abundance and composition of species in this area indicate that current deforestation pressure is not likely to cause visible changes in the structure of local herpetofauna. However, further long-term monitoring programs are needed to provide important information on the situation and dynamics of amphibian and reptile populations in the region.

Mammals

The population of mammals in the region is mainly composed by species widely dispersed throughout the State of Mato Grosso, excepting the primates (monkeys), principally the *Mico* genus. Bats and primates are the main groups of reference bio-indicators in this area, as they

attest the “sanity” of habitats. Moreover, these groups are easily susceptible to population reductions as a function of pressures from deforestation and other human activities.

The conservation of areas under influence of Aripuanã River is mandatory, as this river provides feeding resources and shelter for several species, including flooded areas.

The occurrence of high number of endemic, rare, at risk of extinction, or vulnerable species in the FSM region indicates its great importance for conservation of mammals.

Table 21. Some endemic and rare species of mammals at risk of extinction in the FSM region

Species	**Popular name**
Cebus paella	Macaco prego
Leopardus pardalis	Jaguatirica
Mazama gouazoubira	Veado catingueiro
Mico argentata	Sagui
Panthera onca	Onça pintada
Pteronura brasiliensis	Ariranha
Puma concolor	Onça Parda
Saguinus fuscicolis	Sauim
Saimiri ustus	Mão dourada
Tapirus terrestris	Anta
Tayassu pecari	Queixada

The fauna living within the area of the project has also an enormous ecological importance, since in controls crucial processes such as pollination, seed dispersion, population balance, etc. For the purposes hereof, the fauna of the region under consideration shall be divided into: fishes, amphibians, reptiles, birds and mammals.

Fishes are found in practically all aquatic habitats, and are of essential importance in the aquatic food chain. Fishes also represent an important source of protein for the population of the Amazon Region.

Amphibians are also highly important for the food chain balance, and may be considered as pertaining to a group between fishes and reptiles, allowing for a more thorough analysis of the evolution of living beings.

Reptiles are an important factor for the diagnosis of the environments in a given region, in view of their endemic nature, scarcity, diversity of species, and, specially, since in several patterns of environmental change reptiles are excellent indicators of environmental quality.

The birds and mammals are also of great importance for human beings and for the preservation of natural cycles. Without a balance among the different species of animal and plant life, some individuals may become plagues, causing damage to the natural vegetation and becoming carriers of diseases that afflict human beings.

Flora

The area of the FSM property also comprises several rare plant species under risk of extinction, as listed in Table 22.

Table 22. *Threatened Vegetal Species existing within the Project Area*

Popular name	Scientific name	Family	IBAMA Category
Gonçalo	*Astronium fraxinifolium*	*Anacardiaceae*	Vulnerable
Sucupira Amarela	*Bowdichianitida Spruce.*	*Fabaceae*	Vulnerable
Brazil Nut	*Bertholettiaexcelsa HBK.*	*Lecythidadeae*	Vulnerable
Louro-Cravo	*Dicypellium caryophilatum Ness.*	*Lauraceae*	Vulnerable
Mahogany	*Swietenia macrophyla King.*	*Meliaceae*	Endangered
Virola	*Virola surinamensis Warb.*	*Myristicaceae*	Vulnerable

Source: FSM Stewardship Plan

The FSM property has an enormous importance for the balance of the different populations and the preservation of natural resources, thanks to the preservation of a major fragment of native forests. Should the forest stewardship give way to other more profitable activities, this would directly affect the quality of the waters of the several minor drainage systems and of the Aripuanã River, in addition to the current biodiversity of the region.

Global benefits

The region were the FSM property is located is part of the so-called “deforestation arch”, the gateway to the largest extent of tropical forest in the world and which, if preserved, will act as a barrier against forest loss and against the associated emissions of greenhouse effect gases.

The region has been identified as an unmapped area in terms of botanic and zoological knowledge, with still undiscovered species and with a potential to provide substances of medical use for human beings.

Consistency between the project and the Brazilian environmental priorities

The FSM REDD Project complies with the logic of the environmental priorities defined by the Brazilian Federal Administration, which, in the course of the recent COP 14 Conference held in Poznan, Poland, in December, 2008, declared a deforestation reduction goal of 70% up to year

2018. In order to attain this goal, it will be necessary to join government initiatives with independent actions (such as that proposed under the FSM REDD Project).

Furthermore, the structuring of the Pact for the Valuation of the Forest and for the End of Deforestation in the Brazilian Amazon Region, proposed by a group of NGOs active in the Region of the project aims at implementing a Mato Grosso State REDD program. The attainment of the proposed goals will require independent initiatives that will provide models and information for replicating REDD projects throughout the state. The implementation of the Pact in the State of Mato Grosso is set at a high priority level and may serve as a model and a field experimentation for a nationwide REDD strategy.

This project has therefore an enormous potential to assist the Federal Administration and state agencies to attain these goals and leverage pilot REDD projects on the municipal level, ensuring priority for the municipalities facing a critical deforestation process, as in the case of Colniza.

6 STAKEHOLDER COMMENTS

A website (*www.florestalsantamaria.com.br*) has been created for the local stakeholder assessment, with an interface to receive emails or comments online. The website will be active during validation period. The contents of the site are presented below:

"FLORESTAL SANTA MARIA – AVOIDED DEFORESTATION PROJECT – 'REDD'

FAZENDA FLORESTAL SANTA MARIA AND THE MANAGEMENT PROJECT

Fazenda Florestal Santa Maria, located in Colniza, Mato Grosso State, with an area of 71,713.9590 hectares, is owned by Florestal Santa Maria S/A (CNPJ: 06.066.768/0001-44), a 100% Brazilian company whose shares (99%) belong to FSM Participações S/A (CNPJ: 07.804.142/0001-50), which is controlled by Bela Aliança Agronegócios S/A (CNPJ: 02.653.927/0001-56).

The 'REDD' avoided deforestation project and the FSC (Forest Stewardship Council) Sustainable Management Certification are under implementation at Fazenda Florestal Santa Maria, and the area covered by the Amazon forest is being protected and exploited solely through a Sustainable Forest Management Plan (PMFS). This activity was initially approved by IBAMA on May 9th, 2002 (proceeding No. 02054.000574/2002-58). On September 2nd, 2005 the Mato Grosso State Environment Office (SEMA/MT) took the responsibility for licensing forest management in the State, through a Technical Cooperation Agreement for Shared Forest Management by the Ministry for the Environment, the Sustainable Development Policy Office, the Brazilian Environment and Renewable Natural Resources Institute (IBAMA) and the Mato Grosso State through SEMA/MT, which resulted in the transfer of the Sustainable Forest Management Project to the authority of SEMA/MT on June 29th, 2006. The PMFS licensing proceeding was first granted the number 142354/2006. Currently, the proceeding number is 183756/2008. Fazenda Florestal Santa Maria also obtained Unified Environmental License (*Licença Ambiental Única* – LAU) No. 7393/2009, which is valid up to December 27, 2017. All information may be consulted directly at the SEMA/MT website www.sema.mt.gov.br.

FSM REDD PROJECT PARTICIPANTS AND COLLABORATORS

To develop the REDD – FSM Project, Florestal Santa Maria S/A gathered to group below, which is composed of its team members and other collaborators, namely:

FLORESTAL SANTA MARIA S/A: *fsm@florestalsantamaria.com.br*
Owner, developer and proponent of the project.

florestal santa maria

VO2 Desenvolvimento Empresarial *andremb@vo2de.com.br* e *octavio@vo2de.com.br*
Deviser and general coordinator.

VO2 DESENVOLVIMENTO EMPRESARIAL

PLANT Inteligência Ambiental Ltda. *plant@plantbr.com.br*
Party technically in charge of development of the project.

Plant inteligência ambiental

Pinheiro Neto Advogados *avivan@pn.com.br*

Legal advice.

PINHEIRONETO ADVOGADOS

Bunge Emissions Group *www.bunge.com* ; sandro.marostica@bunge.com
Collaborator and member of the project steering committee.

BUNGE EMISSIONS GROUP

FOREST PRESERVATION THROUGH A REDD MECHANISM

In the 1980s, evidence of changes in the global climate system was reported by the UN World Meteorological Organization. Such report generated great interest of the countries in trying to understand environmental issues, concluding that such climate changes were caused by the generation and intensive use of energies derived from the burning of oil, coal, natural gas and their derivatives. Moreover, a significant part of the issue has been attributed to intensive use of lands to produce food, which triggered a large deforestation process in all continents. The outcome of replacing forests with grazing lands/pastures and farming lands was a large quantity of Greenhouse Effect Gases, originated from the burning of forests and thus leading to greater concentration of such gases in the atmosphere and, consequently, global warming.

By means of diplomatic methods set by UN, a Framework Convention on Climate Change has been set. Such convention sought to establish some actions to reduce the impact of economic activities on the atmosphere by lessening the harmful effect of climate changes.

Among the actions discussed, the scope of the UN Framework Convention on Climate Change

included the International Community establishing the reduction in the deforestation areas as one of its main issues.

Through the Framework Convention on Climate Change, the majority of the International Community has treated the Reduction of Greenhouse Effect Gases Emission originated from Deforestation and Forest Degradation as its priority. Known by the acronym REDD, to date the project seeks to implement mechanisms to prevent deforestation through incentives to preservation projects and sustainable forest management.

The REDD Project at Florestal Santa Maria aims at consolidating and enabling a company commitment in keeping 100% of its area as forest by means of sustainable management. Such commitment also creates jobs and generates income for a significant number of people in the region, at the same time it offers to the wood processing industry in Colniza a socially and environmentally friendly high-quality product.

REDD PROJECT: FSM COMMITMENT IN CONSTRUCTING A SOLID RELATIONSHIP WITH ALL THE STAKEHOLDERS IN THE COLNIZA REGION AND FROM OTHER REGIONS

The FSM REDD Project is subject to a detailed and careful analysis of its validity, carried out by experts and internationally certified auditors. Its validation certifies that the Project fulfills an internationally validated methodology developed for forest projects, the environmental legislation in force, which sets forth environmental and social benefits and which meets the requirements set by international technical entities, which, in turn, approve the standards and methodologies to which such projects must be subject.

As part of this validation process, FSM opens a communication channel so that stakeholders can contribute with their opinions on the impact of the project on the communities involved, the environment, the government, the carbon credits market, the regulating authorities/entities, among others. The consultation to stakeholders is also important to guarantee transparency to the validation process. FSM hired independently certified auditors accredited under an international certification system for carbon credits of the forest scope. It is an international organization called Rainforest Alliance (www.rainforestalliance.com), which in Brazil, is jointly engaged with the Institute for Agricultural and Forest Management and Certification (IMAFLORA) (www.imaflora.org).

To learn more about the project, download its Design Document at REDD - FSM

If you wish to learn more about the methodology used for the development and validation of the project, download: *Padrão VCS v.3* [(Standard VCS v.3)]

Comments on the project can be submitted by the FSM – REDD Project Form for Comments

FORM FOR COMMENTS – PROJECT FSM – REDD

Name:
Occupation:
E-mail:
Phone:
City/State:
Company/Legal Entity:

Find below some questions we would like you to comment on:

1) How and when did you learn about the Project?

2) What do you know about the Project?

3) Do you know the areas involved in the Project?

4) Do you have any information you believe to be important about the Project?

5) Is there any relevant issue that you know of about the Project? What is it?

6) Do you believe the Project has any negative or positive aspect worth commenting? What is it?

7) Would you like us to contact you?

8) Is there any further comments you would like to make? What are they?

9) We would be very pleased if you appointed us some people who you believe could comment on the Project.

We thank you for participating. You are contributing to preserve the Amazon.

"

Figure 29. *General layout of the website used for stakeholders' survey*

Furthermore, letters were posted to the major stakeholders, according to directives from auditors. These letters must be returned with comments and criticisms in 30 days from postage date. If no answer is obtained in 30 days, it will be assumed that stakeholders have no objections to project activities. In case presentations to local stakeholders are necessary in order to abide by validation procedures, such presentations will be arranged in due time, and after confirmation of their need by the auditors.

Annex 1

The project will include the implementation of certain activities with a view to obtaining the necessary instruments and institutional support to ensure that forest management continues in the property and that leakage will be mitigated. Among 7 activities listed below, three activities (Fire brigades, Technical School and Non-wood product processing plant) are already quantified in the Project budget available to auditors. For these three activities, FSM will be formally engaged as implementer and funder. The other four activities will depend on agreements with governmental entities (Municipal, State and Federal) and/or NGOs. For these latter activities, FSM will make its best efforts to convince these entities to collaborate in the Project, but cannot participate in direct funding. The budget and schedule of all activities is available to auditors.

- Fire brigades: Fire brigades will be organized from local labour. Those in favour of the objectives put forward by the project (preservation of natural resources and the continuation of forest management) will be included in training courses and may become a source of income for the local community. FSM has three types of neighbors: 1) The Igarapés do Juruena State Park (*Parque Estadual Igarapés do Juruena*), which already has an institutional relationship with FSM (private initiative x State government (SEMA-MT)). The Project budget foresees investments in vehicles and monitoring agreements of park frontiers nearby FSM farm limits, as a partnership for covering these monitoring costs; 2) Landowners with lands greater than 100 hectares that keep at least one local worker permanently living and monitoring their farms; 3) INCRA settlement neighbors that live in farms and are steady in terms of relationship and training. All these types of neighbors will be invited to participate in these training sessions promoted by FSM, will costs covered by FSM. It is expected that these training sessions will involve from 15 to 20 neighbors.

- New Technical School: Project participants, in partnership with the local city hall, will structure a new technical school to qualify those who have finished high-school to become spotters, choppers, and forestry equipment operators. FSM will be a case study for this effort, the objective of which will be to qualify labour that finds little opportunity to work in the region and ends up taking part in illegal settlements and land occupation. It is expected that this initiative will benefit 30 students every year. As the whole training course lasts 3 years, the Technical School will have capacity for 90 students. Students of both sexes will be eligible for registrations, with the previous requirement of having finished the basic studies (*Oitava Série*). This activity involves an agreement with the Municipal Secretariat of Education (*Secretaria Municipal de Educação*), with all costs covered by FSM, including practical classes and training inside the Farm.

- Forest management: Courses on forest management methods will be offered to the local community. This may lead to the qualification of people who can work in the proposed project. Moreover, the FSM farm is being prepared for FSC (Forest Stewardship Council) certification, which will provide several benefits to the region, as it stimulates improvements in social and environmental aspects. The FSC practices can be taken as a benchmark for other landowners/investors, also creating awareness for all categories of stakeholders in the region, by means of meetings, trainings etc.

- Support to SEMA-MT: SEMAT/MT will benefit from having, under its jurisdiction, an innovative model that can be replicated in other properties. It will provide the current administration with more visibility and methodological advances in environmental preservation. Two surveillance posts will also be placed around the FSM farm and new

cars will be purchased, with a view to ensuring security at the project site and surrounding areas. The main objective of FSM support is mitigating illegal logging and land occupation in the region, by promoting incentives to increase the number of sustainable forest management plans authorized, as well as promoting an increase in the number of REDD Projects in the region, whenever feasible. This process will only be feasible by means of a combination of efforts with private and governmental entities, and NGOs. In this context, FSM will be in charge of political mobilization of forest sector in the region and, in the long term, the establishment of solid bases for engagement of all sectors involved in deforestation issues. The main condition for execution of this activity is the approval and validation of the FSM-REDD Project, which will be the most important benchmark for engagement of all potential stakeholders.

- Potential Roll-out to Other Areas: Other areas with the potential to be included in REDD projects have already been identified around the project site, which will favour and encourage forest conservation by means of financial incentives obtained from reduced emission sales and provide social and environmental benefits to neighbouring communities.

- Fight against illegal land occupation: The local community will be strategic in monitoring illegal land occupation and potential illegal logging. Those who are favourable to being trained and conducting local monitoring will be included in the project and may also become a new source of income for the communities.

- Feasibility study for a small non-wood product processing plant: This initiative will measure the property's potential to produce non-wood products (such as fruit, oils and essences). If this activity is proven to be feasible, additional labour will be added, creating new income opportunities for the local population and developing new forest-use methods. After FSM approval of the business plan, the company will be formally engaged to implement the commercial exploitation of these non-wood products by using local labor. It is expected that this activity will involve the following labor: 10 men in forest exploitation inside the farm; 20 to 30 women in the processing plant in Colniza. The implementation of this business also comprises selection, recruitment, training of personnel etc.

Annex 2

NON-PERMANENCE RISK REPORT FSM

Document Prepared by PLANT Environmental Intelligence
According to VCS "AFOLU Non-Permanence Risk Tool"
Version 3, Procedural Document, 8 March 2011

1 INTERNAL RISK

Project Management		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable: the project does not involve plantations.	0
b)	Not applicable: GHG credits have not been previously issued.	0
c)	Management team includes individuals with significant experience in all skills necessary to successfully undertake all project activities.	0
d)	Management team maintains a presence in the country and is located less than a day of travel from the project site, considering all parcels or polygons in the project area.	0
e)	Mitigation: Management team includes individuals with experience in AFOLU project design and implementation, carbon accounting and reporting under the VCS Program or other approved GHG programs. The Management team is composed among others by some experienced people in the field of Carbon Markets and forestry. PLANT Environmental Intelligence has prepared the Monitoring Plan and Guidelines for the Management Team to follow during the implementation of the project. This will serve as a framework to be followed by the Project Proponent's technical team throughout the project period. The FSM management team is composed of **Rubens Forbes Alves de Lima (CEO)** • Shareholder in the company Bela Aliança S.A.; • Major shareholder in Florestal Santa Maria Participações S.A.; • Former owner of company Transportadora Translor, leading transport and logistics solutions company in Brazil, Sold to Ryder System Inc; • Works with cattle genetics: Bonsmara (South African Breed) in Mato Grosso do Sul; • CEO of Florestal Santa Maria SA, working with sustainable forest management	0

since 2002.

Marcelo Martins Lunardelli

• Currently working in the company of family G. Lunardelli;
• Minor shareholder in Florestal Santa Maria Participações S.A.;
• Manager of Logistics in company Ryder System Inc in Brazil, in the operation of supply chain of General Motors plants in Brazil and Argentina;
• Administrative Director of Florestal Santa Maria SA, also responsible for the area of Governmental Relations with environmental agencies since 2002.

Sebastião Carvalho Vilas Boas (CFO)

He holds an Accounting and Business Administration degree, a MBA for Project Management at FGV and a MBA for Business Management (Trevisan). Has over 20 years of experience in High Management Controlling, experience in National and Multinational companies in high positions, focused on Management and Business Drivers.

Antonio Martins Lima Filho (COO)

Economist with post-graduation in administration and a master degree in Transport Engineering. Experience of more than 20 years in the Supply field, working as General Manager in multinational company in the metal recycling industry; extensive experience in design, construction and implementation of industrial and logistics. 18-year experience as a consultant and manager in the field of large-scale logistics and transportation. Large experience in design, construction and implementation of industries and logistic systems.

The technical aspects of the FSM project activity will be supported by the following team:

Warwick Manfrinato is an agronomist and engineer, graduated at the University of São Paulo 1989 (*www.esalq.usp.br*), and achieved a M.Sc. at the Center for Nuclear Energy in Agriculture 1999 (CENA, University of São Paulo), where he studied isotope ecology applied to soil carbon in forest dynamics. He is currently leading an environmental consultancy company, Plant Environmental Intelligence (*www.plantBR.com.br*). In 1999-2000 was a staff member of Winrock International in Brazil as the country manager for the Natural Resources Management Division. From the years 2000 to 2005 he was an associate researcher at the Laboratory for Chemistry, Cellulose and Energy (LQCE - *www.lqce.esalq.usp.br*), as well as a member of the Climate Change group at the Center for Advanced Studies on Applied Economics (CEPEA - *www.cepea.esalq.usp.br*), both at the University of Sao Paulo (*www.esalq.usp.br*).

He is also a founding member of the "Amazonia in Transformation" initiative, a network of information built at the Institute for Advanced Studies at the University of São Paulo (IEA - *www.iea.usp.br/amazoniea.htm*).

As a consultant he has assisted, among other organizations, the World Bank, UN Earth Council, the government of Costa Rica and companies such as SGS-Forestry, EcoSecurities, Natsource and CantorFitzgerald. In Brazil he has provided advisory to the Ministry of Environment, State Governments of Amazonas, Bahia and Sao Paulo. In recent years he developed strategic projects for CVRD-Headquarters, Dedine S/A, The Gilberto Freire Foundation, The Coca-Cola Company (USA), Instituto Coca-Cola Brasil and Brazilian Forum on Climate Change. Since 2003 he has been an invited member to the official Brazilian Delegation to the UNFCCC-COP/MOP.

Janaina Dallan MBA.- Carbon markets specialist. Working in the coordination of projects related to sustainability strategy and projects to the Clean Development Mechanism. Has a Bachelor degree in Forestry Engineer and a Masters in Business of the environment. Carbon markets specialist based in São Paulo working specifically in the carbon credit development department being responsible of managing the Brazilian projects and participating as a reviewer of projects in

	other countries, was part of the international Carbon Assets Team of Ecofys. Working with Carbon Market issues since 2002 when she worked with the Center for Advanced Studies on Applied Economics at the University of São Paulo while participating in two projects directed by the Ministry of the Environment. Ms. Dallan later managed CDM projects and Carbon market activities at the company Golder Associates São Paulo and provided support to other Golder offices throughout Latin American countries and North America. She has also worked as a Carbon Markets consultant for an Energy company being responsible for the implementation of the CDM department including staff training, project advisor and staff coordination. **Luiz Fernando de Moura.** – Forestry Engineer, M.Sc. and Ph.D. in Wood technology by the Université Laval (Quebec, Canadá). He is responsible to coordinate the technical group at PLANT Environmental Intelligence, working with projects for the Carbon Markets including Forestry projects. Dr. de Moura had participation in the preparation of "Energia Verde Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of Grupo Queiroz Galvão, Maranhão, Brazil", registered on March 21, 2011. Complete CVs are available to auditors.	
f)	Mitigation: Adaptative management plan in place Management plan includes strategic bases in place equipped via mobile phone and motorcycle, daily report from teams with daily extraction reports, The property management is in place and uses ABSOLUT system from SINOP applied to FSM. *www.absolutsistemas.com.br* The Forestry Census is inserted into the system and it has a registry of every tree of the project area. The program gives support to the sustainable management plan in accordance with FSC procedures. It also complies with federal and state law. As a strategy for looking after the property and assure the project, it was considered the following assumptions: 1-Avoid entry of outsiders: 1.1 Hunters 1.2 Fishermen 1.3 Intrusion 1.4 Prevention of invasion 1.5 Fire Prevention 1.6 Support the Work of Sustainable Forest Management Plan 2 - Consolidation of calm and peaceful possession 3-Cleaning of frontiers and its milestones 4-Internal organization of communication On top of these issues, there is strategic plan with seven fixed bases located in strategic locations to meet the above assumptions, namely: BASE 1 - SEDE This base possesses the administrative office of the farm, main house (residence for Directors, Officers and invited guests), kitchen and dining hall. This base is equipped with electricity (including a generator), satellite internet, fixed and mobile telephone (both by means of an external aerial) and a motorcycle. BASE 2 – LINHA 12 This base possesses lodgement for collaborators, dining hall, toilets, one house for the fixed employee, building for storage and maintenance of machinery, and logging deck.	-2

	This base is equipped with electricity, mobile telephone (by means of an external aerial), and a motorcycle. BASE 3 - ARIPUANÃ This base possesses one house for the fixed employee, dining hall and kitchen for visitors. This base is equipped with electricity (by means of a generator), mobile telephone (by means of an external aerial), and a motorcycle. BASE 4 - ACAMPAMENTO This operational base possesses three houses: two houses are lodgements with toilets and one house has a kitchen, dinning hall, storage room, office, toilets and two bedrooms. This base is equipped with electricity (by means of a generator), and a motorcycle. BASE 6 – LINHA 6 This base possesses a house for the fixed employee. This base is equipped with solar electricity, and mobile telephone (by means of an external aerial). BASE 7 - PACUTINGA This base possesses a house for the fixed employee. This base is equipped with solar electricity, and mobile telephone (by means of an external aerial). BASE 8 - MORERU This base possesses a house for the fixed employee, with accommodation for 3 people. This base is in charge of the gate to the road Colniza / Moreru. This base is equipped with solar electricity, mobile telephone (by means of an external aerial), and a motorcycle. All bases communicate 24 hours, the Manager of BASE 1 is authorized for any decision making and action. BASES 2, 3 and 4 report to BASE 1 BASES 6 and 7 report to BASE 8 To be able to receive the authorization to perform a sustainable management of the forest (so called AUTEX) the property was obligated to have a sustainable management plan in place and present it to the competent environmental agency – Secretary of State for the Environment of the State of Mato Grosso – SEMA / MT. The Management Plan is fully available to auditors.	
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		**-2**

Financial Viability		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project.	0
d)	Project cash flow breakeven point is less than 4 years from the current risk assessment. Financial spreadsheet available to auditors. Financial healthy evidence is available to auditors.	0

e)	This is not the case in the present project.	0
f)	This is not the case in the present project.	0
g)	This is not the case in the present project.	0
h)	Project has secured 80% or more of funding needed to cover the total cash out before the project reaches breakeven. The project owner is already in conversations to establish a VERPA (Voluntary Emissions Reductions Purchase) of the 2009-2010 carbon project credits. It means that around 1.568.760 VCUs are already under negotiations at a price not less than US$ 4.00. The other next two to three years of the credits are in negotiation with a multinational company to buy the credits at a price not less than US$ 5.00. Moreover, the proponent has independent wealth and alternative means to generate income from his property. This will provide a buffer if the carbon market performs poorly. These confidential documents – VERPA and Memorandum of Intention are available to auditors. Risk of technical failure Very low, as the project has limited technical requirements from this point. No advancements in technologies or maintenance of technical systems are required for the project's success.	0
i)	This is not the case in the present project.	0
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)] Total may not be less than zero.		**0**

Opportunity Cost		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project.	0
d)	This is not the case in the present project.	0
e)	This is not the case in the present project.	0
f)	"*NPV from project activities is expected to be at least 50% more profitable than the most profitable alternative land use activity*": The NPVs calculated for the Project Case are **R$ 130.52 / hectare**, and **R$ 126.93 / hectare** (the former value refers to a VCU price of US$ 5.85 / tCO_2; the latter value refers to a conservative exchange rate of R$ 1.46 / US$). Both NPVs estimated for the Project Case, based on a discount rate of 12.7 %, are much more profitable than those observed for the BAU activities: i) The most profitable alternative land use activity, coffee cultivation, has a negative NPV estimated in **-R$ 1,500.36** (average value of two production scenarios; obtained for a 12.7 % discount rate by linear interpolation of values presented in "Table A 1.5", page 30 of	-4

	ARÊDES and PEREIRA, 2008). According to the Additionality Analysis of this VCS-PD, the coffee cultivation provided the highest IRRs among all land uses assessed. However, the discount rate of 12.7 % (used for NPV calculation of the Project Case) makes this BAU activity financially unfeasible (i.e. negative NPV). ii) The activity of pasture, as demonstrated in the Additionality Analysis of this VCS-PD, is usually less profitable than coffee cultivation. For this activity, SCHNEIDER et al. (2000) reports negative NPV for a discount rate of 6 %, based on data presented in Table 7, page 44. Thus, for the discount rate adopted for comparisons in this analysis (12.7 %), the NPV of pasture would be even more negative. iii) For the combined alternative land use (90% of pasture and 10% of coffee cultivation), the NPV, calculated with the 12.7 % discount rate, would also be negative, given that both BAU activities (pasture and coffee cultivation) have negative NPVs for this discount rate. In the context explained above, it is concluded that the NPV from Project Case can be at least 50% more profitable than the most profitable alternative land use activity. (Coffee cultivation NPV) ARÊDES, A. F.; PEREIRA, M. W. G. Análise econômica da produção de café arábica: um estudo de caso com simulações de Monte Carlo para sistemas de baixa e alta produtividade. Informações Econômicas, SP, v.38, n.4, abr. 2008. (Average of two production scenarios.) (Pasture NPV) SCHNEIDER et al. Amazônia Sustentável: limitantes e oportunidades para o desenvolvimento rural. Brasília: World Bank; Belém: Imazon, 2000. 58 pp.	
g)	This is not the case in the present project.	0
h)	This is not the case in the present project.	0
i)	*Mitigation: Project is protected by legally binding commitment to continue management practices that protect the credited carbon stocks over at least 100 years.* Legal document registered at 6th Notary Service and Real Estate Registry[43]. Book 2, enrolment number 73.958, sheet 130. Full version Available to auditors. This document contains the official disclaimer dated of July 24, 2001 when: AV-03-73958 – According to the Responsibility Term of Maintenance of Management Forest - TRMFM [44] dated December/07/2002, between the owners of this property: G.	0

[43] 6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária
[44] Termo de Responsabilidade de Manutenção de Floresta Manejada

	Lunardelli S / A-AGRICULTURE TRADE AND COLONIZATION, legal entity of private law, registered under CNPJ No. 58.133.638/0001-80, established at Avenida Paulista, No. 1.776, 16th Floor, Suite B. Bela Vista, São Paulo-SP, testified before the competent authorities, which relies on the forest laws and environmental regulations, that the forest or the existing vegetation in the area of 70,000.00 hectares, becomes as an area of restricted use, where, in this area, it can only have interference as forestry in the form of Sustainable Forest Management, as authorized by IBAMA[45]. The current owner undertakes for himself, his heirs or successors. Thus, the Project is protected by a legally binding agreement, however the agreement is not found to be sufficient to demonstrate legally binding commitment for a 100 year period.	
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g or h)] Total may not be less than 0.		**0**

Project Longevity		
a)	This is not the case in the present project.	0
b)	With legal agreement or requirement to continue the management practice Legal document registered at 6th Notary Service and Real State Registry[46]. Book 2, enrolment number 73.958, sheet 130. Full version Available to auditors. This document contains the official disclaimer dated of July 24, 2001 when: AV-03-73958 – According to the Responsibility Term of Maintenance of Management Forest - TRMFM [47], dated December/07/2002, between the owner of this property: G. Lunardelli S / A-AGRICULTURE TRADE AND COLONIZATION, legal entity of private law, registered under CNPJ No 58.133.638/0001-80, established at Avenida	30 – (30/2)

[45] IBAMA - Brazilian Institute of Environmental and Renewable Resources
[46] 6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária
[47] Termo de Responsabilidade de Manutenção de Floresta Manejada

	Paulista, No. 1.776, 16th Floor, Suite B. Bela Vista, São Paulo-SP, testified before the competent authorities, which relies on the forest laws and environmental regulations, that the forest or the existing vegetation in the area of 70,000.00 hectares, becomes as an area of restricted use, where, in this area, it can only have interference as forestry in the form of Sustainable Forest Management, as authorized by IBAMA[48]. The current owner undertakes for himself, his heirs or successors.	
Total Project Longevity (PL) May not be less than zero		**15.0**

Internal Risk	
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.	**((-2)+(0)+(0)+(15.0)) = 13.0**

2 EXTERNAL RISKS

Document and substantiate the risk and/or mitigation for each risk factor applicable to the project. Include any relevant documentary evidence. Where a risk or mitigation is not relevant to the project, please write "Not applicable".

Land Ownership and Resource Access/Use Rights		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Ownership and resource / use rights are held by the same entity(s) Florestal Santa Maria S/A (FSM) is the only owner of the property and it holds all the legal rights, including rights for using property resources. Ownership documentation is available to auditors.	0
b)	This is not the case in the present project.	0
c)	This is not the case in the present project. Documents from FUNAI are available for consultation by the auditors.	0
d)	This is not the case in the present project. Documents from FUNAI are available for consultation by the auditors.	0
e)	Mitigation: Project area is protected by legally binding commitment to continue management practices that protect carbon stocks over the length of the project	-2

[48] IBAMA
[49] 6º Serviço Notarial e Registro de Imóveis da Terceira Circunscrição Imobiliária

	crediting period – Legal document registered at 6th Notary Service and Real Estate Registry[49]. Book 2, enrolment number 73.958, sheet 130. Full version Available to auditors. This document contains the official disclaimer dated of July 24, 2001 when: AV-03-73958 – According to the Responsibility Term of Maintenance of Management Forest - TRMFM [50] dated December/07/2002, between the owners of this property: G. Lunardelli S / A-AGRICULTURE TRADE AND COLONIZATION, legal entity of private law, registered under CNPJ No. 58.133.638/0001-80, established at Avenida Paulista, No. 1.776, 16th Floor, Suite B. Bela Vista, São Paulo-SP, testified before the competent authorities, which relies on the forest laws and environmental regulations, that the forest or the existing vegetation in the area of 70,000.00 hectares, becomes as an area of restricted use, where, in this area, it can only interfere as forestry in the form of Sustainable Forest Management, as authorized by IBAMA[51]. The current owner undertakes for himself, his heirs or successors.	
f)	Not applicable: disputes over land tenure, ownership or access/use rights do not exist inside the project area.	0
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e+ f)] Total may not be less than zero.		**0**

Community Engagement		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	Less than 20 percent of households living within 20 km of the project boundary outside the project area, and who are reliant on the project area, have been consulted. Given the lack of a more complex and detailed analysis on this topic, the project proponent attributed the maximum score for this item. FSM has informed the farm workers about the project and about its relevant importance to keep the forest, jobs, natural resources etc.	5
c)	Mitigation: The project generates net positive impacts on the social and	-5

[50] Termo de Responsabilidade de Manutenção de Floresta Manejada
[51] IBAMA

	economic well-being of the local communities who derive livelihoods from the project area. FSM has on its south frontier a rural community, from this community 19 people work at FSM directly, these people have 4 to 6 members in the family, so many families are benefiting from the farm and when the project is implemented more people will be needed as work force. The project will include the implementation of certain activities with a view to obtaining the necessary instruments and institutional support to ensure that forest management continues in the property and that leakage will be mitigated: Fire brigades: Fire brigades will be organized from local labour. Those in favour of the objectives put forward by the project (preservation of natural resources and the continuation of forest management) will be included in training courses and may become a source of income for the local community. New Technical School: Project participants, in partnership with the local city hall, will structure a new technical school to qualify those who have finished high-school to become spotters, choppers, and forestry equipment operators. Florestal Santa Maria will be a case study for this effort, the objective of which will be to qualify labour that finds little opportunity to work in the region and ends up taking part in illegal settlements and land occupation. Forest management: Courses on forest management methods will be offered to the local community. This may lead to the qualification of people who can work in the proposed project. Support to SEMA-MT: SEMAT/MT will benefit from having, under its jurisdiction, an innovative model that can be replicated in other properties. It will provide the current administration with more visibility and methodological advances in environmental preservation. Two surveillance posts will also be placed around Florestal Santa Maria and new cars will be purchased, with a view to ensuring security at the project site and surrounding areas. Potential Roll-out to Other Areas: Other areas with the potential to be included in REDD projects have already been identified around the project site, which will favour and encourage forest conservation by means of financial incentives obtained from reduced emission sales and provide social and environmental benefits to neighbouring communities. Fight against illegal land occupation: The local community will be paramount in monitoring illegal land occupation and potential illegal logging. Those who are favourable to being trained and conducting local monitoring will be included in the project and may also become a new source of income for the communities. Feasibility study for a small non-wood product processing plant: This initiative will measure the property's potential to produce non-wood products (such as fruit, oils and essences). If this activity is proven to be feasible, additional labour may be added, creating new income opportunities for the local population and developing new forest-use methods.	
Total Community Engagement (CE) [where applicable, (a+b+c)] Total may be less than zero.		**0**

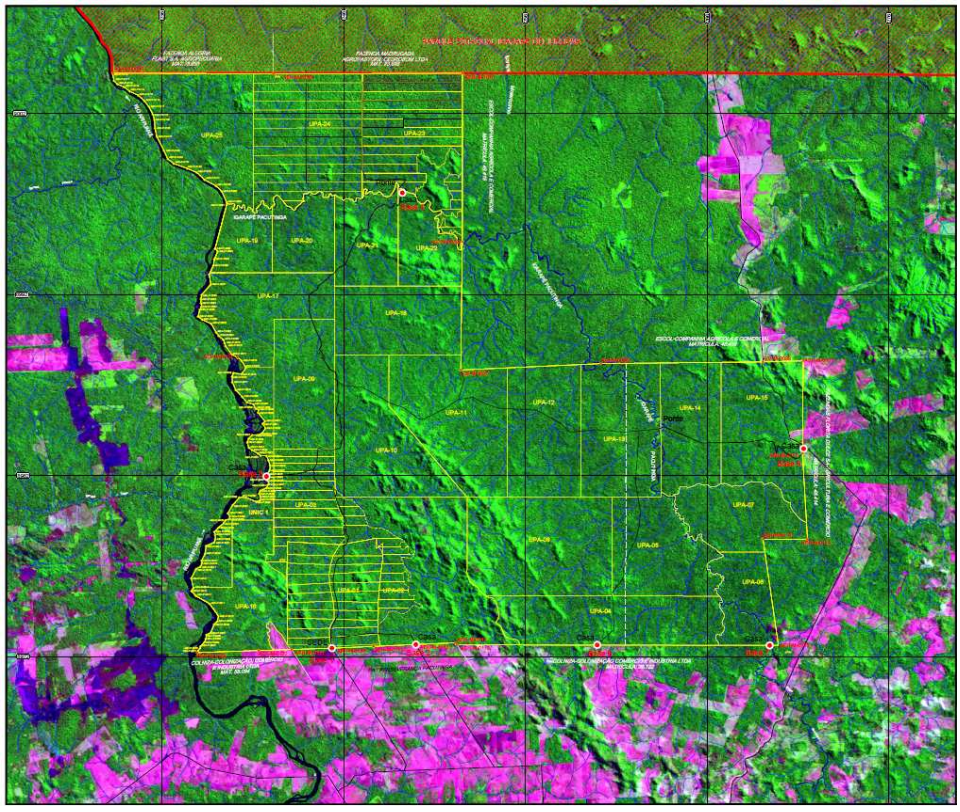
Political Risk		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	This is not the case in the present project.	0
b)	This is not the case in the present project.	0
c)	Governance score of -0.32 to less than 0.19 (0.01)	2
d)	This is not the case in the present project.	0
e)	This is not the case in the present project.	0
f)	Mitigation: The country has an established Designated National Authority under the CDM and has at least one registered CDM Afforestation/Reforestation project See: *http://www.mct.gov.br/index.php/content/view/317381.html* Moreover, Brazil has been a leader in the establishment of the REDD framework at international level.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)] Total may not be less than zero.		**0**

External Risk	
Total External Risk (LT + CE + PC) Total may not be less than zero.	**((0)+(0)+(0)) = 0**

3 NATURAL RISKS

Explain the significance and likelihood of the natural risk and any mitigation activities implemented, (copy table for each natural risk).

Fire (F)	
Significance	According to the risk map of burning areas in the state of Mato Grosso, the municipality of Colniza, where the project area is inserted, the risk of natural fire is classified as “minimum” and In the project area there is a record for the whole project area for more than 40 years, and, according to it, there have been only 6 events of natural fire resulting in less than 5% loss of carbon stocks. **Floresta Amazônica: Dinâmica, Regeneração e Manejo.** Claude Gascon e Paulo Moutinho. Ministério da Ciência e Tecnologia, Manaus, 1998. *http://sigma.cptec.inpe.br/queimadas/risco_est.html*
Likelihood	The likelihood of fire in the project area is every 10 to less than 25 years, according

	to the area history.
Score (LS)	1
Mitigation	To mitigate the project owner keeps fire-control bases in strategic places and since 1940 has implemented firebreaks also in strategic places. There are 7 bases, all bases communicate 24 hours, the Manager of BASE 1 is authorized for any decision making and action. BASES 2, 3 and 4 report to BASE 1 BASES 6 and 7 report to BASE 8 The bases are located in the following coordinates: Base 1 X = 245233.4261 Y = 8972576.1083 Base 2 X = 249878.2857 Y = 8972780.2206 Base 3 X = 241654.8488 Y = 8982064.1489 Base 4 X = 249131.9247 Y = 8997734.9982 Base 6 X = 259855.0000 Y = 8972764.0000 Base 7 X = 269348.0000 Y = 8972730.0000 Base 8 X = 271211.0000 Y = 8983602.0000 On the following map it can be shown the locations of the bases (red dots) 

Pest and Disease Outbreaks (PD)	
Significance	**No loss**
Likelihood	Risk is not applicable to the project area There is no record of Pest and Disease outbreaks in the area since the area is a natural forest in its equilibrium where it is hardly believed to have a pest or disease outbreak. A Scientific Opinion letter was provided by Dr. Jean Ometto (INPE; *Instituto Nacional de Pesquisas Espaciais*; National Space Research Institute). This letter is available for consultation by the audit team. According to Scientific Opinion by Dr. Jean Ometto (INPE): "*Regarding the disease and pest outbreaks in tropical humid forests, it is sound to belief that due to the high species diversity and resilience, these ecosystems have a strong capability to adapt and react to any specific single pathogen, insect, or pest (in general terms) that could develop into broadly spread damage to the vegetation, with consequent carbon loss. There is not scientific evidence on this sort of outbreaks in highly diverse tropical humid forests vegetation in Mato Grosso or other region in the Amazon, which could be different in single tropical species plantation (Nair, 2001).*"
Score (LS)	0
Mitigation	None

Extreme Weather (W)	
Significance	**No loss** **There is no record of any extreme event in the area for more than 80 years. The area is not affected by hurricanes, floods etc.**
Likelihood	Risk is not applicable to the project area
Score (LS)	0
Mitigation	None

Geological Risk (G)	
Significance	**No loss**
Likelihood	Not applicable to the project area The project area is located in a stable geological area with no faults. The risks of carbon losses related to geological phenomena are more prone to occur in steeply sloped landscapes, which is not the case in the FSM farm (predominantly flat landscape). In steeply sloped areas, biomass loss can occur through earthquake-induced landslides. Even in these cases, previous studies (ALLEN et al. 1999) show that much of an earthquake's immediate impact is low-intensity damage to forests. ALLEN et al. (1999) quantified the immediate impact of an earthquake (magnitude index MW 6.7 in 1994). Brazil has a mild seismic

	activity: earthquakes are predominantly of low intensity varying between 2 and 4 degrees Richter. The highest earthquake recorded in the country occurred in 1955 in the State of Mato Grosso (6.6 degrees Richter) (TOMINAGA et al. 2009). Thus, the average earthquakes in Brazil are not likely to produce significant losses of forest biomass. Moreover, according to REN et al. (2009), the occurrence an earthquake-induced landslide must comply with the combination of a series of factors, comprising soil mechanics, vegetation transpiration and root mechanical reinforcement, and hydrological processes. In this context, there are strong reasons to reject the possibility of any significant vegetation damage caused by earthquakes in the FSM region. Literature cited: ALLEN, ROBERT B., PETER J. BELLINGHAM, AND SUSAN K. WISER. 1999. IMMEDIATE DAMAGE BY AN EARTHQUAKE TO A TEMPERATE MONTANE FOREST. Ecology 80:708–714. [doi:http://dx.doi.org/10.1890/0012-9658(1999)080[0708:IDBAET]2.0.CO;2] REN, D.; WANG, J; FU, R.; KAROLY, D.J.; HONG, Y.; LESLIE, L.M.; FU, C.; HUANG, G. 2009. Mudslide-caused ecosystem degradation following Wenchuan earthquake 2008. GEOPHYSICAL RESEARCH LETTERS, v. 36, L05401, doi:10.1029/2008GL036702 TOMINAGA, L.K.; SANTORO, J.; AMARAL, R. DESASTRES NATURAIS: Conhecer para prevenir. Instituto Geológico, Governo do Estado de São Paulo, 2009.
Score (LS)	0
Mitigation	None of the above

Blow-Down Wind (ON)	
Significance	**No loss (0.004%)**
Likelihood	Less than every 10 years A Scientific Opinion letter was provided by Dr. Jean Ometto (INPE; *Instituto Nacional de Pesquisas Espaciais*; National Space Research Institute). This letter is available for consultation by the audit team. According to Scientific Opinion by Dr. Jean Ometto (INPE): "*1. The occurrence of blow-down in response to strong wind gasps, are natural and randomic occurrence in mature forests in the Tropical Amazon. According to Nelson et al (1994) few quantification of large scale blow-down, derived from convectional storms, had been reported in the literature, at that time. More recently, Laurance (2003) associated the increase of blow-down occurrence in areas where the forest is fragmented and Gloor et al (2009) reaffirmed, highlighting that large scale (more than 30ha) blow-down are rare and unpredictable events in preserved, primary forest.* *2. Nevertheless the occurrence of blow-down is considered in the scientific literature. Malhi et al (2003) highlight that the forest patches under disturbance, from a blow-down event, are under recovery processes by a succession of local*

	plant species, to which is conceivable to assume that the net biome production is zero. Which means that the carbon released by the dead of the trees is absorbed by the growth of the new plants, composing the stand biomass. This process is modulated by the resilience of the system. *3. Thus, biomass loss is negligible, once such disturbance does not export any material from the area, as it would occur if timber were harvest.*"
Score (LS)	0
Mitigation	None

Score for each natural risk applicable to the project (Determined by (LS × M)	
Fire (F)	(1 x 0.5) = 0.5
Pest and Disease Outbreaks (PD)	(0 x 1) = 0
Extreme Weather (W)	(0 x 1) = 0
Geological Risk (G)	(0 x 1) = 0
Other natural risk (ON)	(0 x 1) = 0
Total Natural Risk (as applicable, F + PD + W + G + ON)	**0.5**

4 OVERALL NON-PERMANENCE RISK RATING AND BUFFER DETERMINATION

4.1 Overall Risk Rating

Risk Category	Rating
a) Internal Risk	13
b) External Risk	0
c) Natural Risk	0.5
Overall Risk Rating (a + b + c)	**13.5**

4.2 Calculation of Total VCUs

Year	REDD Benefits (buffer included) (tCO_2)	REDD Benefits (buffer excluded) (tCO_2)	Buffer discount (13.5%)	Buffer return (15% of total buffer discount)	Annual Net REDD benefits (tCO_2)	Accumulative Net REDD benefits (tCO_2)
2009	677,971.3	586,445.2	91,526.1		586,445.2	586,445.2
2010	994,628.8	860,353.9	134,274.9		860,353.9	1,446,799.1
2011	981,512.7	849,008.5	132,504.2		849,008.5	2,295,807.6
2012	967,543.3	836,925.0	130,618.3		836,925.0	3,132,732.5
2013	986,304.1	853,153.1	133,151.1		853,153.1	3,985,885.6
2014	986,642.9	853,446.1	133,196.8		853,446.1	4,839,331.7
2015	986,642.9	853,446.1	133,196.8		853,446.1	5,692,777.9
2016	986,642.9	853,446.1	133,196.8		853,446.1	6,546,224.0
2017	987,421.4	854,119.5	133,301.9		854,119.5	7,400,343.5
2018	987,421.4	854,119.5	133,301.9	173,245.0	1,027,364.5	8,427,708.0
2019	987,590.8	854,266.0	133,324.8		854,266.0	9,281,974.0
2020	987,590.8	854,266.0	133,324.8		854,266.0	10,136,240.0
2021	987,590.8	854,266.0	133,324.8		854,266.0	10,990,506.0
2022	987,590.8	854,266.0	133,324.8		854,266.0	11,844,772.0
2023	987,590.8	854,266.0	133,324.8	99,990.1	954,256.1	12,799,028.1
2024	987,590.8	854,266.0	133,324.8		854,266.0	13,653,294.1
2025	1,005,366.4	869,641.9	135,724.5		869,641.9	14,522,936.1
2026	1,025,142.4	886,748.1	138,394.2		886,748.1	15,409,684.2
2027	1,025,908.1	887,410.5	138,497.6		887,410.5	16,297,094.7
2028	1,025,908.1	887,410.5	138,497.6	101,889.9	989,300.4	17,286,395.1
2029	1,026,077.5	887,557.1	138,520.5		887,557.1	18,173,952.2
2030	1,026,077.5	887,557.1	138,520.5		887,557.1	19,061,509.2
2031	1,026,077.5	887,557.1	138,520.5		887,557.1	19,949,066.3
2032	1,026,077.5	887,557.1	138,520.5		887,557.1	20,836,623.4
2033	1,026,077.5	887,557.1	138,520.5	103,886.9	991,444.0	21,828,067.3
2034	1,026,077.5	887,557.1	138,520.5		887,557.1	22,715,624.4
2035	1,026,077.5	887,557.1	138,520.5		887,557.1	23,603,181.5
2036	1,026,077.5	887,557.1	138,520.5		887,557.1	24,490,738.5
2037	1,026,077.5	887,557.1	138,520.5		887,557.1	25,378,295.6
2038	1,026,077.5	887,557.1	138,520.5		887,557.1	26,265,852.6
2039	111,954.4	96,840.6	15,113.9	126,935.5	223,776.1	**26,489,628.7**