Grupo Roncador Landscape Protection Plan

17 April 2020

Executive summary:

Agropecuária Roncador Ltda ("Roncador") is a Brazilian "corporate farmer" invested in cattle ranching and soy and corn production, in Mato Grosso state, Brazil. Roncador is partnering with &Green to prove the commercial success of its production blueprint: recuperating degraded pastures and restoring certain native forest areas, thus build credibility to this business model for others to copy.

Since 2008, the company has developed expertise in relation to the integration of crop-livestock models (i.e. on how to produce grains integrated with cattle ranching in a highly intensified manner) as well as in relation to the intensification of pastures, and took a decision to increase this approach to the full farm. With &Green's investments enabling this, Roncador will materially increase production, on the same farming area, through the "integration of crop-livestock" ("ICL") and recuperating degraded pastures. It is expected that the project will also result in an absolute reduction of greenhouse gas emissions.

The transformational impact of this project, is centered on the efforts of the company to create a blueprint for sustainable production (based on increasing productivity sustainably through ICL and adherence in spirit and practice to forest conservation regulation) and the dissemination of its knowledge. These efforts will provide important insights and design features affecting the Environmental Return and wider impact of the project.

The direct and measurable Environmental Return ("ER") Roncador will deliver through this program is:

ER 1: Conserved forest	ER 2: Intensification of productive areas	ER 3: Forest restoration
71,184.61ha[1]	60,000 ha	200 ha

The project's Environmental Returns are the sum of (a) results of Roncador's actions (e.i. ER) within its farm gate (e.g. forest conservation and restoration as well as land to be sustainably intensified), and (b) the potential results (e.i. ER) of Roncador actions outside its farm gates (e.g. engagement with 3rd parties such as suppliers, farmers, coordinating agencies, that in term generate ER). Roncador commitments for &Green's financing relate to directly attributable actions: achieving on-farm ER and implement off-farm activities.

[1] *These numbers may be changed due to the methodology used by SEMA to measure the property on SIMCAR (system which data of the property is input). The final area will be defined after the public agency's analysis.*

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DISCLAIMER: this document was prepared based on general market knowledge and inputs/information provided by Roncador. Notwithstanding the fact that Roncador has revised and agreed upon the content of this document, it shall only be legally bound to the terms of Annex 1 to the Landscape Protection Plan, which summarised the ERs included in this document.

Grupo Roncador Landscape Protection Plan

1. Definitions:

- Landscape protection plan (LPP): a sustainable land-use and management plan, which sets out how the impact will be generated during the financing period within the landscape or project area from which the Fund considers its Environmental Return and Social Inclusion to be derived.
- Environmental Returns (ER): the project's environmental impact and in particular the area of forest conserved or protected, and land sustainably intensified, achieved within the project area.
- Project area: the boundaries of Roncador's landscape and of interest for the &Green LPP.
- Forest Code: refers to law N 27136, 1 Nov 2017, of the state of Mato Grosso and complementary national level legislation as applicable in the future, for example for Environmental Reserve Quota (CRA).
- Cadastro Ambiental Rural (CAR): public registry with data on rural properties and their compliance with the environmental requirements of the Forest Code. All rural landholders in Brazil are obliged to register their properties in the Rural Environmental Registry (CAR).
- Biomes: clusters of ecosystems, gathered in terms of similarities in their vegetation, terrain and climate. In Brazil, the Ministry of the Environment works with seven biomes: The Amazon, the Cerrado, the Caatinga, the Pantanal, the Atlantic Forest, the Pampa - or Southern Fields - and the Coastal.
- Integration Crop and Livestock (ICL): a form of mixed production that utilizes crops and livestock in a way that they can complement one another through space and time.
- Intensification: an increase in agricultural production per unit of inputs (which may be labour, land, time, fertilizer, seed, feed or cash).

2. Landscape Rationale for generating Environmental Returns

Grupo Roncador is a family owned business founded in 1978 and perceived as one of the biggest agricultural groups in Brazil. Its founder, Pelerson Soares Penido first acquired land in the state of Mato Grosso back in the 80's, and has been turned into one of the largest productive rural farm in the country. The farming activities focused initially on cattle breeding, rearing and fattening leading to a herd of approximately 56,000 heads, in 2019. In 2008, Roncador started planting soy as a way of integrating livestock and agriculture; an entreprise originally aimed at restoring pastures, which turned into highly productive soy operations. The farm also produces corn and small amounts of eucalyptus– which both feed to its farming operations (i.e. entirely

consumed by Roncador). By 2017/18, almost 30,000 ha of grains are been planted on the farm. Finally, the group also has limestone mines and processing plants – a fundamental material for supporting agriculture in the region. Over the past 5 years, Grupo Roncador has tripled the number of employees and invested heavily in the control, professionalisation and qualification of its staff and operations.

The rationale for generating the three key environmental returns (forest conserved, land intensified and forest restored) in Roncador's "landscape" is centered on the company's production strategy and state of the art farming practices: focusing solely on areas that can demonstrate high levels of soil health and productivity, Roncador applies improved soil management, cattle ranching and agricultural practices to generate above state average productivity levels and increase production volumes for both soy and cattle. In turn, these practices demonstrate sufficient returns to guarantee the protection and restoration of forested areas beyond what is required by law. Roncador's business philosophy is thus built on the premise that the balance between forest conservation and production systems can be obtained by optimizing the productivity of cattle and soy farming businesses rather than on expansion of land.

To promote its business philosophy outside its farm gates, and support off-farm environmental returns, Roncador is taking an active stance to disseminate its knowledge and share its vision via various channels and for different communities. From the farmer's movement Liga do Araguaia, to publishing articles, including in partnership with Embrapa and other entities, as well as through social medias and website videos, Roncador should enable others to understand and replicate the model and create a market for rewarding and incentivizing sustainable products in the cattle industry.

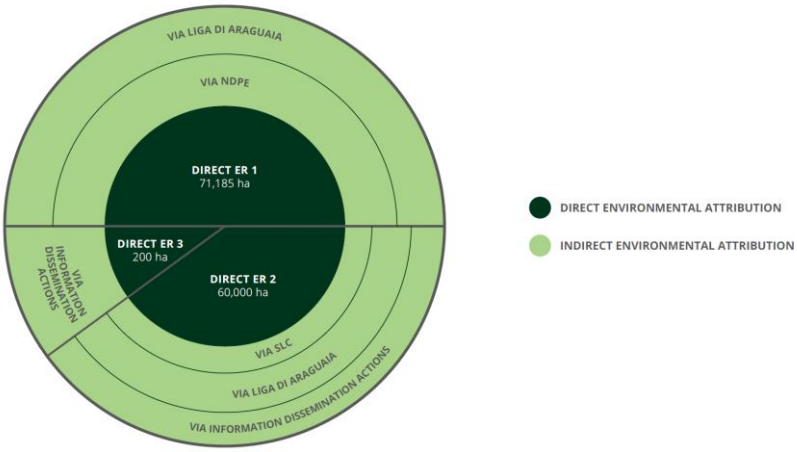

Figure 1. The landscape elements and their environmental returns

3. Project area

3.1 Location of the farm and land use:

Roncador's operations are located in the state of Mato Grosso, and center east of the municipality of Querencia. The farm is registered with the CAR number MT-5107065-DA3401D1A2754279BF4968EDA6813570, under the Rural Environmental Registry (Simcar).

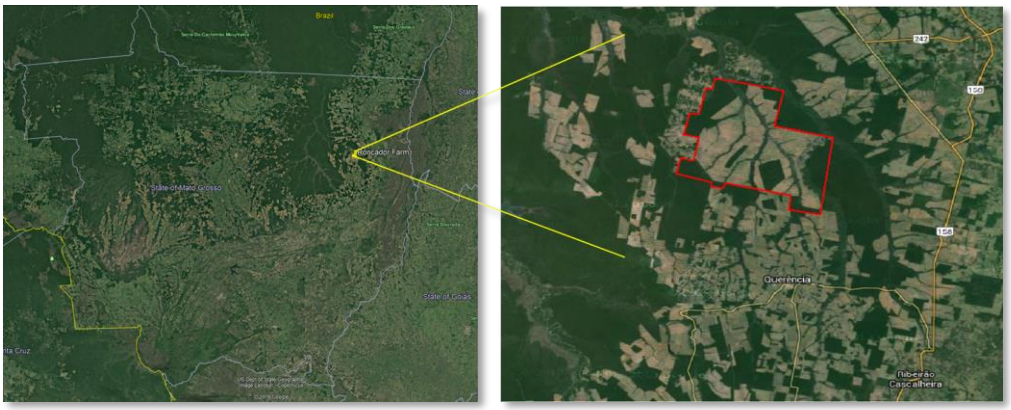

Figure 2. Roncador's farm location in the state of Mato Grosso. Source: Google earth

The total size of the property is approximately 152,160 ha, whereby nearly 80,000 ha are utilized for cattle and agriculture (a small portion for eucalyptus), 71,184 ha have been set aside as protected forest area, and around 1,000 ha accounted for other use or as other type (e.g. lake, infrastructure, etc.).

Category	Area	Notes
Agriculture	49,515 ha	Area reserved for Soy planting (based on 2030 targets) and CAI
Of which is used by SLC	19,400 ha	Area not part of Roncador's operations
Eucalyptus	376 ha	Área reserved for eucalyptus plantation
Cattle	30,085 ha	Area allocated for cattle only.
Protected Area	71,184 ha	Total area of legal reserval, APP and areas to be restored.
Of which is APP	6,167 ha	APP is a subset of the protected area above
Other	1,000 ha	Area used for infrastructure (housing, offices), as well as lakes etc.
Total	152,160 ha	

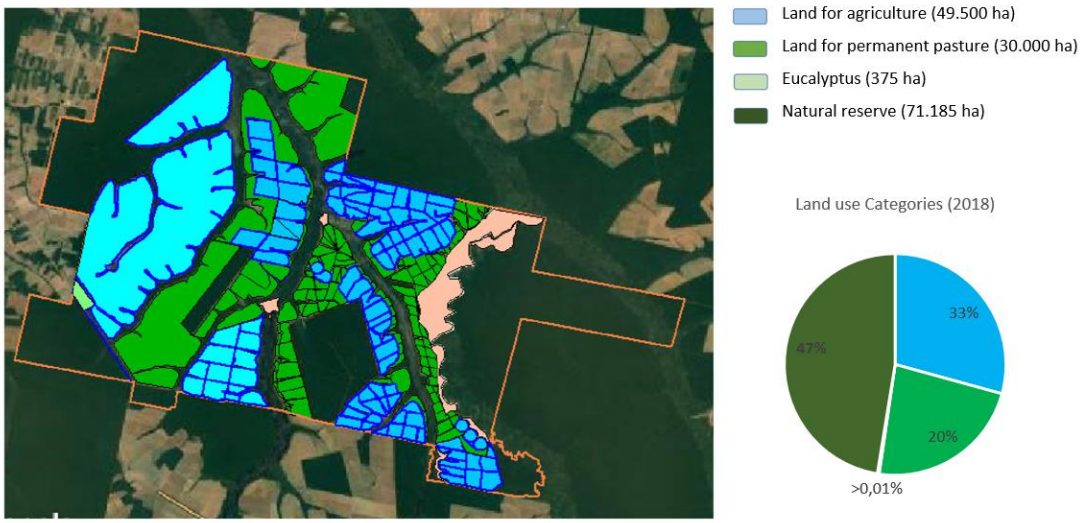

Figure 3. Land use within Roncador's farming property in 2018. Source: Roncador

Part of Roncador's property (19,400 ha), are being leased to listed corporate farming company Pioneira, a partnership between SLC and Roncador as a Joint Venture, whereby Roncador holds responsibility of ensuring compliance and alignment with environmental laws and regulations (as the landowner) and SLC maintains responsibility and independence of the farming operations. SLC typically produces cotton, soy and corn in six states of Brazil (total farming area of approx. 400,000 ha). Within these 19,400, Pioneira's is traditionally doing for soy and corn, with an incipient of cattle production integrated with grain production.

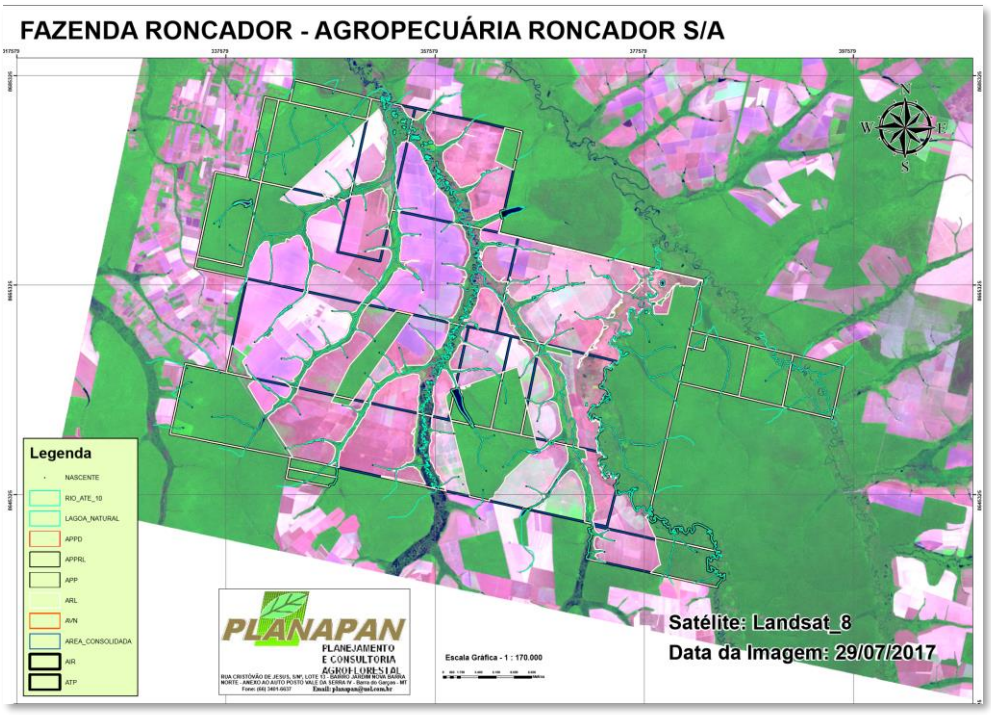

Figure 4. CAR registration map of Roncador's farm. Source: Roncador

From an environmental perspective, Roncador is operating within a transition area between the Amazon and the Cerrado Biomes. Given their heterogeneity, transition areas are places of high biodervisity, and can be considered high value conservation areas (HCV1, HCV 3 and HCV 4). The Cerrado is the largest savannah region in Latin America, located geographically in the center of the country, linking most of the countries' biomes. It characterized by scrubland, grassland and open- and closed canopy forest. It is the biggest biome in Brazil, after the Amazon, covering almost 25% of the country's total surface. Cerrado is considered by some to be the biologically most diverse savanna in the world.[2]

From a legal perspective, a property located in transition between biomes has implications in terms of the amount of forest area the company should preserve. Mapping the percentage of vegetation belonging to each biome can be a complicated exercise, requiring specialised biodiversisity assessments with high costs associated with it. The consequence is the perception of added complexity of the procedural pathway towards legal compliance, thus reducing incentives for landusers in these areas to follow the law. In the case of Roncador, the property accounts for 78% as Amazone Biome and 22% as Cerrado.

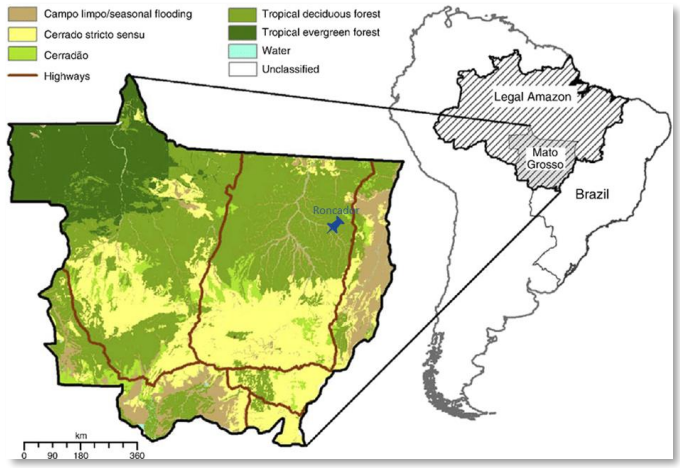

Figure 5. Map of the biomes in the state of Mato Grosso. Source: SEPLAN-MT 2007

The Jaguar: an endangered species, symbol of conflict between production and protection of the Amazon.

The jaguar's threats are said to be increasing threatened according to the IUCN as its long-term survival depends on persistence of large, undisturbed tracts of habitat. Jaguar are highly relevant from a biological perspective as they indirectly impact Amazonian ecosystems through their diet: : being at the top of the food chain they influence vegetation patterns and soil health through their consumption of herbivores. [2] While hunting is strictly forbidden, Jaguars represent a direct threat for ranchers that commonly kill the wild cat to defend their livestock and generate income from selling its parts. Roncador's conservation areas are home to a large jaguar community which has been thriving since the company committed to protecting the animal (2016), and partners with Instituto Onça Pintada to certify its conservation strategy.

3.2 Current land use in the project area (state of Mato Grosso)

Mato Grosso is Brazil's third largest State by area (903,357 km^2 , about the same as France and Germany combined) but home to only 3.4 million people (1.6 percent of the Brazilian

[2] http://www.climateandlandusealliance.org/wp-content/uploads/2016/09/Cerrado_Report_en.pdf
[2] https://amazonaid.org/species/jaguar/

population). Its GDP-per-capita (as of 2016) is the fourth highest among Brazilian states at USD 10,700. Over 50 percent of the State's GDP is related to agriculture and it has become a global powerhouse for soy and beef production, with 32 million tons of soy beans - 27 percent and 9 percent of Brazilian and global soy production, respectively - and 5.4 million heads of cattle raised in 2018. Livestock farming accounts for the largest portion of agricultural land use in Mato Grosso – approximately 29 million hectares (IMEA 2012)[3]. Soybean production covers a much smaller share of the state's land resources— 7,914,088 million hectares in 2012/13 (IMEA 2012)[4]. Other than for soy and cattle, Mato Grosso also ranks first amongst the country's state for crops such as cotton, corn and sunflower (used for oil).[5]

These land use trends are also applicable more specifically to the municipality of Querencia, where Roncador's farm is located.

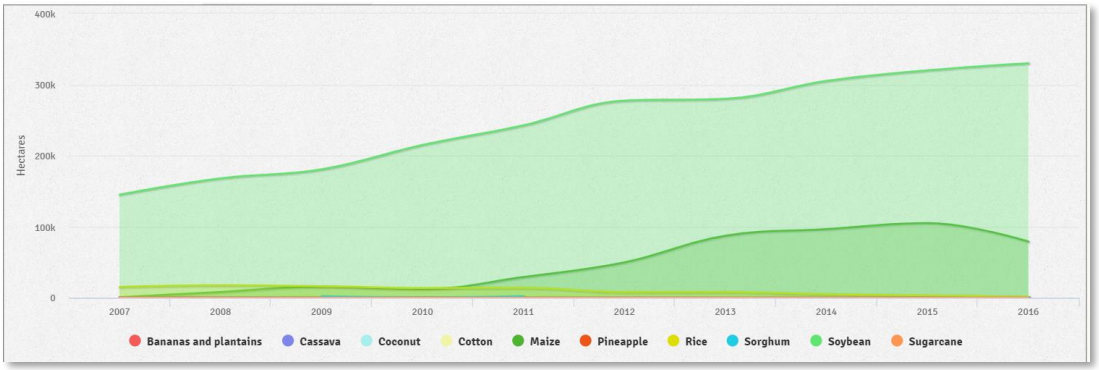

Figure 6. Crop area (in ha) of major crops in the Municipality of Querencia, from 2007 to 2016. Source: PCI

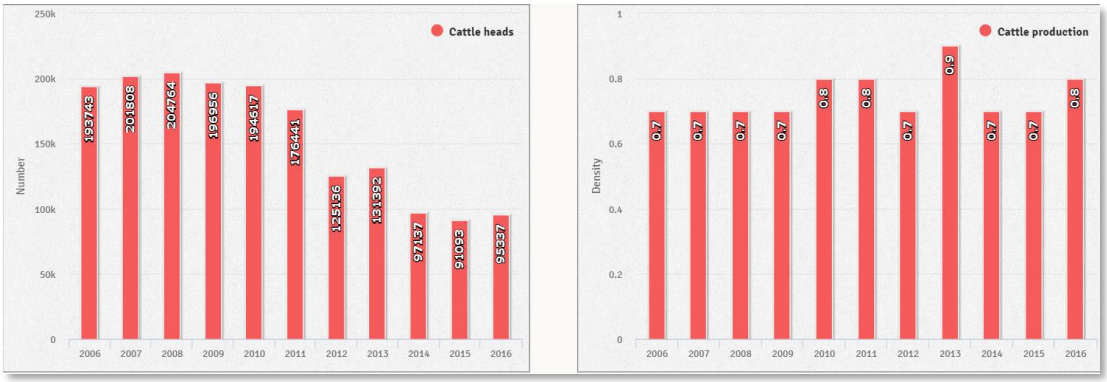

Figure 7. Cattle Heads and Cattle production density in the Municipality Querencia, from 2007 to 2016. Source: PCI

From an environmental stand point, primary forests, composed of Amazon and Cerrado biomes, cover 48.94 million ha, or 54%, of the Mato Grosso state. The Amazon biome covers

[3] IMEA 2012, Agro MT 2022 Outlook, Instituto Matogrossense de Economia Agrícola, Cuiabá, MT.
[4] IMEA 2012, Agro MT 2022 Outlook, Instituto Matogrossense de Economia Agrícola, Cuiabá, MT.
[5] https://www.businessinsider.com/brazil-agriculture-boom-mato-grosso-2012-12?international=true&r=US&IR=T#brazil-is-in-the-top-5-worldwide-for-most-major-crops-and-is-now-the-fourth-largest-grains-producer-in-the-world-4

30.5 million ha (63.11% of its initial area). The Cerrado biome covers 18.4 million ha (51.40% of its initial area)[6]. Querencia ranks amongst the municipalities in the state with the highest percentage of forest cover, with 60% of the land is still considered to be forested.

Within the context of Brazilian forest landscape and land rights, 24% of the remaining forests are located within farming properties (including Amazone Biome only), while the rest is situated within indigenous reserves, protected areas, land reform settlements etc. Private landowners thus hold a significant responsibility in terms of forest preservation and protection. Collaboration with the public sector, incentives and legislative regulation play a key role in framing the role of the private sector as guarantor of forest conservation in Brazil.

3.3. Forest Protection Code

The legal standard regarding deforestation can be considered high in Mato Grosso, based on a combination of federal Forest Code requirements and additional commitments of the MT government through the PCI program (Protect, Conserve, Include).
The Brazilian Forest Code, reformed in 2012, requires land owners to set aside Protection Areas based on topography, e.g. riparian areas, around lakes, hilltops, steep slopes (Area de Proteção Permanente – APP) and a percentage of the property as a legal reserve (Reserva Legal – RL). The percentage of required Legal Reserve varies from 20% in grassland (cerrado) areas to up to 80% in Amazon Forest areas, depending on the period when the deforestation occurred at any relevant farm (e.g., before or after May 2000). During the Forest Code reform in 2012, it was decided to tackle historically widespread incompliance by providing a certain level of amnesty (primarily for fines, not or only partially for the requirement to restore) to farms with illegal deforestation prior to 2008, and to focus investments and efforts on reforestation of these areas.
Important mechanisms of the Forest Code are the Rural Environmental Registry (Sicar) where all properties register with geospatial information (CAR), which is subsequently validated by the Environmental Agency (SEMA); and the Environmental Compliance Program, which is the mechanism through which the government encourages, enforces and monitors compliance with the Forest Code. In case of non-compliance, farmers have to restore their APPs according to the specifications of the Forest Code. For Legal Reserves, the Forest Code allows for restoration of the area through an approved restoration plan to be completed by 2036; or for compensation through purchase or lease of excess natural forest in the same biome for protection (registered) or through the purchase of government Environmental Reserve Quotas. The Brazilian Forest Code is widely regarded as a strong basis for protection of Brazil's remaining forest, while not

[6] http://www.sema.mt.gov.br/index.php?option=com_content&view=article&id=90&Itemid=150

undermining the strength of the Brazilian agricultural sector. Reputable NGOs like IDH, WWF and TNC support the implementation of the Forest Code.

3.4. Understanding the deforestation drivers in the project area

Mato Grosso has featured historically high levels of deforestation in the 1990s and early 2000s. The state ranks second highest in terms of level of deforestation in Legal Amazon (after Para state) with 1,449.50 km² deforested in 2018, accounting for 20% of the total deforestation in the region. Of that, 1,363.3 km² was in Amazon Biome.

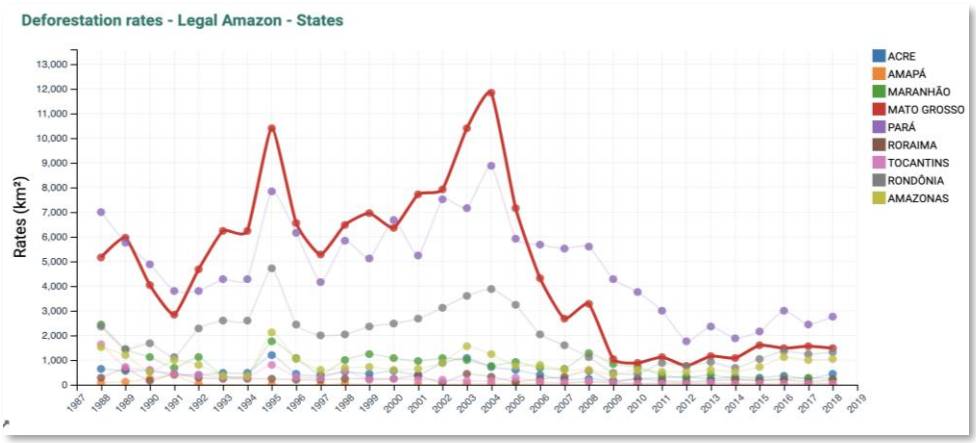

Figure 8. Deforestation rates in Legal Amazon states. Source: INPE (September 12, 2019)

While the state achieved substantial results in reducing deforestation in earlier years, there has been a rather stable deforestation rate during the last 4 reported years (2014-2018). The 2018 rate maintained the level of 2016, though revealing a 5% reduction comparing to 2017.

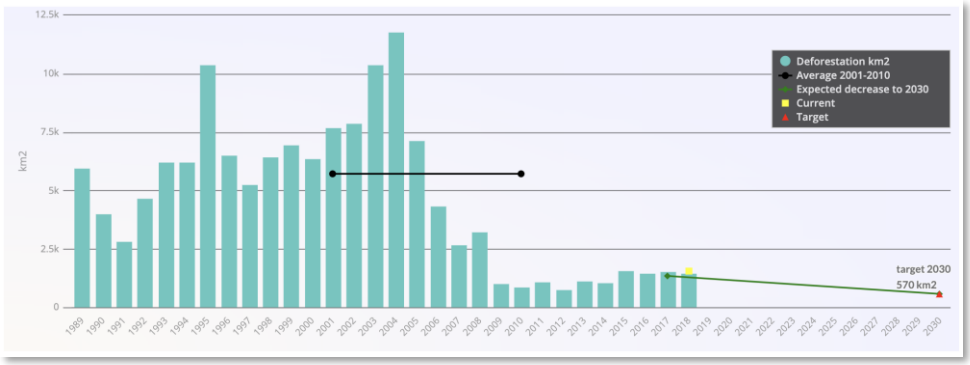

Figure 9. Baseline, historical rate and projections of deforestation in Mato Grosso. Dashboard of PCI Strategy. Source: PCI Monitor (Accessed on September 15, 2019).

This agricultural expansion has historically taken place through clearing of forests, for large-scale commercial agriculture, since the government offered land occupation and incentives for

its colonization, in years 1970's and 1980's.[7] The conversion of forests to pastures and subsequently cropland is the major driver of deforestation in the country. Cattle ranching is the sector with the greatest impact on Amazon deforestation; with an estimated 80% of deforestation steming from this industry, either directly or indirectly. Low input cost make ranching an attractive economic activity in the forest frontier. Most land in cattle operations in the Brazilian Amazon are medium size ranches, with averages of several hundreds of hectares and some ranches reaching thousands of hectares. Amazon cattle are rarely supplemented with additional protein, and grass needs to be burned every few years in order to resprout. Fires set to replenish soils and clear brush for new pasture are common in the Amazon in the dry season. Additionally, cattle ranching and soy cultivation are often linked as soy replaces cattle pasture, especially in land where soils are estimated to be fertile (e.g Amazon biome). Continued demand for animal feed into the 1990s and early 2000's created a soy-cattle pasture-deforestation dynamic where soy replaced existing cattle pasture, spurring new deforestation for cattle ranching further into the Amazon. Meanwhile, road improvements, especially the BR-163 "soy highway" in Mato Grosso reduced transport costs and world economic growth increased demand for agricultural products.[8]

During the summer 2019, the fires in the central states of the country (e.g. Para and Mato Grosso) drew a lot of attention from the international community and the media. The fire season in the southern Amazon runs from June to November, with peak burning activity in September along the eastern and southern Amazon forest frontiers, often referred to as the "arc of deforestation". Human-induced fires are common practice for farmers looking to either expand production area illegally or for the new production cycle. The level of international attention towards deforestation, due to the fires has been unprecedented in Brazil.

In the case of Roncador's farm (see figure 10, next page), deforestation related activities stopped in 2000; since then, attention has been given on legal compliance and improvement of farming practices and soil nutrient management to intensify its existing areas. Around the boundaries of the farm, land clearance has taken place in the north west boundaries. Deforestation is attributed to government based settlements, relating to the landless worker's movement who has been given land by the state as from 1994. The areas around Roncador's farm under pressure are deliniated by the yellow circles in the lower right snapshot of the landscape.

[7] Arvor, D., Meirelles, M., Dubreuil, V., Bégué, A. & Shimabukuro, Y.E. 2012, "Analyzing the agricultural transition in Mato Grosso, Brazil, using satellite-derived indices", Applied Geography.
[8] https://globalforestatlas.yale.edu/amazon/land-use/cattle-ranching

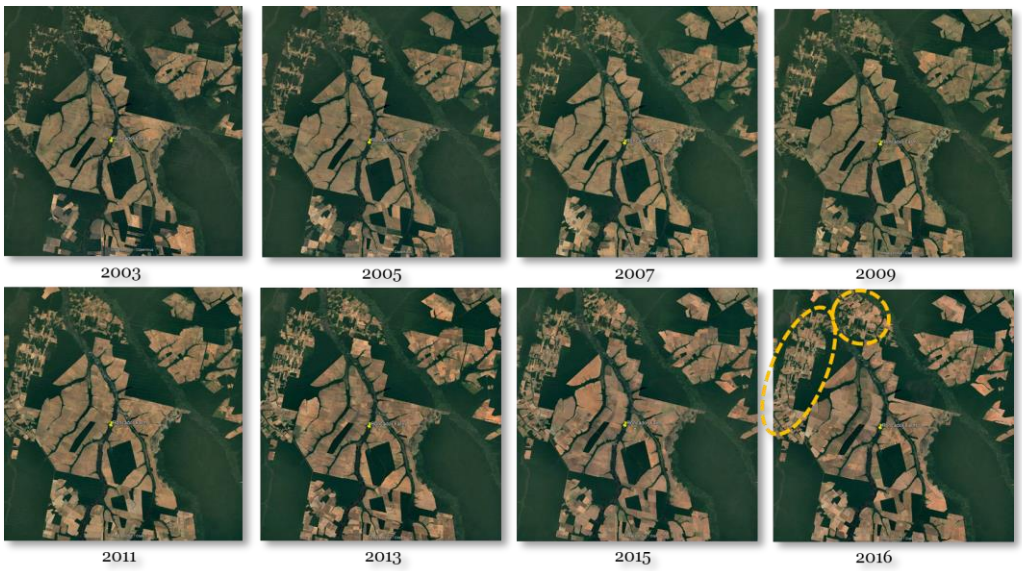

Figure 10. Time series showing the cumulative progress of deforestation in the landscape between 2003-2016. Source: landsat Copernicus.

3.5 Relevant stakeholders and initiatives in Roncador in the project area

The Landless Workers' Movement

The landless worker's movement (or Movimento dos Trabalhadores Rurais Sem Terra in portuguese) started in 1984, and is known to be one of the largest social movement in Latin America, with an estimated 1.5 million members within Brazil. The movement advocates the need to provide better access of land for poor workers via land reform and activism about specific societal issues such as inequality, poor wages, that are seen as root causes to inequal land ownership. Since its development, community settlements have taken place in most of the States of Brazil, by families attached to the movement, in an effort to claim redistribution of land to rural workers for small-scale farming. Currently, there are approximately 900 encampments holding 150,000 landless families in Brazil. Their livelihoods typically depend on small-scale farming and rent-based revenue.[9] Roncador's relationship with these family has been undisturbed and positive. FLUPP, the foundation belonging to Roncador's Group has been supporting the families in the neighbourhood through education related programs and yearly supply of basic food basket.[10]

Initiatives linked to forest conservation and sustainable intensification

[9] https://www.mstbrazil.org/content/what-mst
[10] http://www.rosapenido.com.br/flupp/

The Araguaia League

The Araguaia League is a movement comprised of 63 farms with 150,000 hectares of pasture dedicated to the adoption of sustainable livestock practices in the Araguaia Valley.[11] The purpose of the movement is to promote the economic and social development of the region by increasing productivity and income, while respecting current legislation and the limits of natural systems. The bottom-up driven movement drives multiple projects and pilots that support the implementation of sustainable practices and the development of more sustainable cattle farmling brands and markets. Key projects coordinated by the secretariat, and supported by the members' participation include:

- **The Campos do Araguaia project,** carried out in partnership with TNC and IDH and aimed at sharing sustainable intensification practices in beef cattle (e.g. pasture restoration, integration of crop-livestock systems) as well as supporting restoration activities and interconnection of forest fragments;
- **The Carbono di Araguaia project**, implemented with the support of Dow Química and Dow AgroSciense, focused on the development of tools for the monitoring of GHG emission reductions resulting from the adoption of intensification practices by a representative group of 24 (twenty-four) livestock farms in the region representing a pasture area of 89,000 hectares. The project provided environmental benefits of reducing emissions for the Rio 2016 Olympic Games, helping to mitigate GHG emissions due to the games held in July / 2016.
- **The "Baixo Carbono" Araguaia Project,** a cooperation with CNPGC / Embrapa Beef Cattle, Campo Grande and MS, which looks to validate practices and align them with guidelines established by Empraba for future validation and certification.
- **The Araguaia Guarantee project** implemented through a partnership established with Imaflora, Institute for Forest and Agricultural Management and Certification. The project focuses on the development of a holistic certification scheme (MRV strategy development, certification system, market access strategies) of productive and socio-environmental practices of farmers participating in the League's projects.

Roncador has been a key participant for the development and strengthening of the movement. Firstly through financial and institutional support to the Liga do Araguaia (the costs of coordination, and project activities are financed by the group, since its establishment) with an objective to establish the League as a financial sustainable and independent organisation. Secondly, through the participation of Roncador's farm in the Liga to support knowledge sharing and piloting of new practices.

Embrapa

[11] http://business.edf.org/files/2019/05/PCI-PitchBook-final-online.pdf

Created in 1972, the Agricultural Research Corporation, has been instrumental in transforming Brazil from a food importer into one of the world's leading agricultural powers. Embrapa's multiple advances turned the Cerrado, a biome with notoriously poor soils, into the producing land it is today.[12] Through these achievement, Embrapa has become a world research leader in tropical agriculture. Roncador is partnering with Embrapa to support the agency in advancing and disseminating knowledge and best practices on improved soil management and the integration of crop-livestock model for the rest of the scientific and practionner's community. The partnership with Embrapa relates specifically to:

1) Developing a methodology and monitoring the effect of the ICL model on GHG emissions,
2) Demonstrating and sharing knowledge on the implementation of ICL.

4. Program intervention and targets against business as usual scenario

The information presented in section 3 provide a background for understanding the main dynamics and elements in the operating landscape of Roncador – useful to frame the Environmental Returns brought and committed to by Roncador, via the program. In the subsequent paragraphs we describe the business as usual ("BAU") practices and &Green additionality with regards to the key environmental returns and impact on GHG emissions.

4.1. ER 1: Forest Conservation

Business as usual:

The large majority of farmers are expected not to deforest illegally at any significant scale. Illegal deforestation still occurs however. Mostly, this happens in small areas for which farmers expect that the deforestation will go unnoticed or unpunished. One key reason could be related to the slow implementation of the rural environmental registry aiming at verifying compliance of property with the forest code. By the end of 2018, only 53% of the State's private rural land (63,886 properties) had been registered with the SIMCAR, of which only 3% (1,420 properties) had already been validated. Further, merely 156 properties (out of 770 which are required to) had started the Environmental Regularization Program (PRA) process and were under evaluation by SEMA.

Besides government led tools, the market does not yet offer effective supply-chain driven solutions (e.g. traceability systems) that can help holistically control compliance to the forest code and thus disincentivise illegal deforestation. Soy related industry initiatives such as the soy moratorium in 2006 have succesfully curbed soy-related deforestation but, they also increased soy expansion into previously intact areas in the Cerrado. In cattle, policies and industry initiatives banning malpractices within supply chains have been few and their overall

[12] https://brazilian.report/money/2018/06/14/agricultural-research-embrapa/

net impact has been marginal beyond 1st tier suppliers. In Brazil, cattle commonly moves between various locations during their lifespan and may be raised on recently deforested pastures before moving to a compliant ranch. A lack of access to tracking data, and limited finance for sustainable intensification complicate the issue[13] . A 2017 study of the Brazilian Environmental Research Institute (PNAS) concludes: "Our results suggest that, from the landowner's perspective, full compliance with the Forest Code offers few economic benefits. Achieving zero illegal deforestation in this context would require the private sector to include full compliance as a market criterion, while state and federal governments develop SICAR as a de facto enforcement mechanism."[13]

Impact of the Program:

Roncador has already taken the necessary registrations actions to ensure full compliance with the law since 2017, and in 2019, the approval of the self-declared CAR is pending the verification and decision of SEMA. Considering the fact that all deforestation activities have stopped before the year 2000, and the share of Cerrado biome (22%) and Amazon Biome (78%), Roncador has to conserve around 66,078.01 ha of its land to meet its legal reserve requirements, out of which 6.167,54ha should be APP, provided that such number may vary as it is still subject to final validation under CAR system. Through this program, Roncador is committing to protect 71,184.61 ha of forest, out of which 6.167,54ha is APP – thus 5,106.6 ha above legal reserve requirements.

In addition, through the Program, and in accordance to the ESAP agreed-upon with &Green, Roncador will be adding NDPE clauses into its direct supplier selection criteria and contracts. In 2018, Roncador was sourcing approximately 15,000 cows from about 30 different direct suppliers. As from 2020, direct suppliers of cattle will be subject to verification against illegal deforestation as reported by IBAMA's publicy available tools. While the number of direct suppliers is small against some of the large traders operating in Brazil, Roncador's commitment is additional provided that it establishes a position on higher sustainability related market requirements for conservation.

Roncador's support of the Araguaia League as a member provides a positive influence towards other farmers of the initiative, and encourage property regularisation, forest conservation and restoration practices, as well as supporting the dissemination of Liga's publicly available information.

[13] https://chainreactionresearch.com/report/cattle-driven-deforestation-a-major-risk-to-brazilian-retailers/

[13] Limits of Brazil's Forest Code as a means to end illegal deforestation; Azevedo, A. et al.; p.4; May 2017; http://www.pnas.org/content/pnas/early/2017/06/27/1604768114.full.pdf

Finally, Roncador's effort in developing a downstream market for its products is instrumental for strengthening the supply-chain towards forest conservation and sustainable production systems.

Target:

ER 1: Conserved forest	Direct attribution (on-farm)	Indirect attribution (off-farm)
Hectares	71,184.61 ha	-
Activities	Maintain the conservation of 71,184.61 Ha of forest in its farm property	- NDPE policy applied at business and supplier level - Engagement with Liga do Araguaia as a member

Roncador commitment for &Green's financing are to (a) mantain 71,184.61 ha of forest conserved and (b) implement the activities linked to off-farm ER throughout the loan period (e.g. incorporate and enforce an NDPE policy and maintain engagement as a member of Liga di Araguaia).

4.2. ER 2: Intensification of productive areas and the CAI

Business as usual:

Brazil's agri-business growth over the last decades has been very successful, resulting more than five-fold increases in cattle and soy production. However, provided current business practices, agriculture's biggest challenge will be to overcome problems resulting from decades of monoculture practices as well as a lack of stewardship of the soils – leading to pressures such as soil erosion and loss of fertility, watercourse silting, soil and water pollution, and greenhouse gas emissions.

Most of the state's cattle farms operate at a low technological level and rarely incorporating best management practices. Pastures have a low carrying capacity with stocking rates of 0,8 Animal Unit per hectare (UA/ha) on average (state of Mato Grosso). This is mainly due to poor soil health and insufficiently restored pastures leading to inconsistent supply of grass and low stocking rates. Pastures are considered degraded when soil fertility has been exhausted, so that grazing is reduced and invasive plants of low nutritional quality appear (especially during the dry season)[14]. It is estimated that the highest cost of production corresponds to the restoration

[14] https://www.sciencedirect.com/science/article/pii/S2095633915300290#bb0060

of degraded pastures and is therefore rarely undertaken by farmholders. [15] In 2015, between 50% to 80% of the Amazon and Cerrado pastures were estimated to be degraded[16].
On the other hand, in soybean production yields tend to be high and these production systems are quite intensely managed. According to a study, productivity in Mato Grosso has been superior to the national average productivity since 1980 for several agricultural products including soy[17]. However, a basic condition for the expansion of industrialized agriculture in peripheral regions has been the large inputs of pesticides, herbicides, fungicides and fertilizers, and therefore the degradation of soil and loss of biodiversity. Soy cultivation is reported to drive approximately 50% of the pesticides trade in Brazil. With the country's agribusiness already being the world's first consumer of pesticides, and the re-introduction of 290 previously banned pesticides in 2019, Brazil's consumption of pesticides is projected to increase in the next years.[18]

Against the low cost of deforestation, the incentives for soy and cattle expansion are likely to first drive production on farms with excess forest, before the expansion is directed to degraded land, which is often owned by cattle farmers uninterested in soy farming. There are 5.7 million ha of excess forest, which could be legally deforested on farms in MT. At the same time there are 3,64 million ha of degraded land (mostly degraded pasture) with high agricultural suitability and another 5.41 million ha of degraded land with high agricultural suitability but some restrictions (e.g. altitude restrictions) that could be either restored for cattle productivity or converted to soy cultivation without impacting forests or natural vegetation. The PNAS study found that market incentives are currently insufficient to incentivize farmers from stopping deforestation. Another study presenting the consequence of agriculture expansion against growing food demands projects an increase in soil erosion, with degraded pasture, sugarcane and soybeans representing the main contributors. The expansion of agriculture into areas of native vegetation in the Cerrado and Amazon biomes and could increase total soil erosion in Brazil by as much as 20%.[19]

[15] Juliana Gil*, Matthias Siebold, Thomas Berger, 2014, Adoption and development of integrated crop-livestock-forestry systems in Mato Grosso, Brazil
[16] Degradação de pastagens, alternativas de recuperação e renovação, e formas de mitigação Embrapa Gado de Corte-Artigo Em Anais de Congresso (ALICE), Ribeirão Preto, SP
[17] Juliana Gil*, Matthias Siebold, Thomas Berger, 2014, Adoption and development of integrated crop-livestock-forestry systems in Mato Grosso, Brazil
[18] https://news.mongabay.com/2019/08/bolsonaro-administration-approves-290-new-pesticide-products-for-use/
[19] https://www.sciencedirect.com/science/article/pii/S2095633915300290
[18] https://www.embrapa.br/en/tema-integracao-lavoura-pecuaria-floresta-ilpf/nota-tecnica

Integrated Crop-Livestock systems within this context are considered to be a promising strategy to direct the expansion of pasture and crops towards already deforested areas and promote agricultural practices that can intensify production sustainably. By combining crop, livestock activities in the same area, they are able to increase fertility and organic matter in the soil. This

What are Integrated Crop-Livestock systems?

The overarching objective of ICL is to change the system of land use, basing it on the integration of productive system components to achieve increasingly higher levels of product quality, environmental quality and competitiveness. ICL is a strategy to maximize desirable environmental effects, combining productivity growth with natural resources conservation in the process of intensifying the use of deforested areas in Brazil. ICL models, may have different configurations depending on the farmers' production strategies.[18]

favors biomass production and allows for higher stocking rates in pasturelands and higher productivity for grain cultivation. Such increase in the system's total productivity represents a direct advantage for farmers if it can be translated into higher economic returns and soil conservation over the longer run. In fact, both individual farmers and the society as a whole can benefit from ICL given that the maintenance of soil fertility is critical for the conservation of natural resources and provision of environmental services.[20]

However, ICL models remain still uncommon within MT, a state considered to be leading force of the Brazilian agriculture. According to a study conducted in 2014, ICL systems were identified in 29 of the 141 municipalities of Mato Grosso. They are mostly concentrated around the municipalities of Sinop (36), Tangará da Serra (9) and Canarana (11). The total area under ICL was estimated to be around 500,000 hectares. Total farm size of adopters is 3,936 ha in average, and usually 30% of their property is allocated to the model.[21]

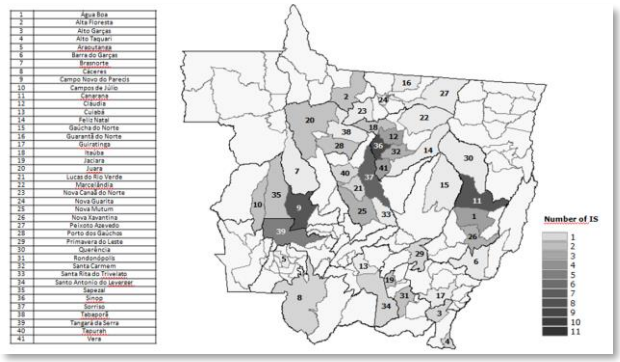

Figure 11. Distribution of ICL per municipality in Mato Grosso, Brazil (2012/13). Source: Juliana Gil*, Matthias Siebold, Thomas Berger, 2014. Roncador is situated in the municipality 30 (Querencia).

[20] Juliana Gil*, Matthias Siebold, Thomas Berger, 2014, Adoption and development of integrated crop-livestock-forestry systems in Mato Grosso, Brazil

[19] Juliana Gil*, Matthias Siebold, Thomas Berger, 2014, Adoption and development of integrated crop-livestock-forestry systems in Mato Grosso, Brazil

Impact of the Program:

Through the Program, Roncador will be financing and implementing plans to restore all of its permanent pastures and convert additional pasture into land suitable for soy and pasture rotation to support the adoption of ICL model to the entire farm property.

Roncador is implementing a ICL model that is particularly aimed a boosting off-season cattle. The focus of this configuration is utilizing part of the land for agriculture (against 100% land exclusively used for cattle), specifically soya and second-harvest maize. During the soy and maize crop season, grass is planted (in between rows of soy or maize). Maize and Soy are harvested first; cattle are then introduced around June on grasslands and remains in the area during the entire dry season (until September). Such shift between crop and pasture enhances soil fertility and biomass production – particularly during a period when stocking rates are considerably lower in traditional farming systems – and optimizes the use of land and other resources throughout the year. This configuration is considered the most sophisticated one in terms of management.[19]

In terms of pesticide use, ICL minimizes the use of herbicides (glyphosate) used during the early planting cycle of soybean, as grass planted in previous cycle of pasture, reduces the emergence of unwanted weeds. This in turn leads to lower chemical application. Based on Roncador soil tests, soybean produced under the ICL demonstrate significantly lower pesticide levels (<10% of conventional). Roncador agricultural practices are in line with the principles of integrated pest management, combining chemicals and non-chemicals approaches to minimize pest impact, while also minimizing the impact of such measures in the environment.

What are the benefits of ICL? [20]

Ecological & Environmental Benefits

- Improved use of natural resources through synergy between animal and plant components;
- Improved physical, chemical and biological properties of soil thanks to increase of organic matter;
- Greater input efficiency;
- Reduced agrochemicals use to control insect pests, diseases, and weeds;
- Reduced pressure to clear and open new areas for agriculture;
- GHG mitigation resulting from increased sequestration capacity;
- Reduced erosion risk.

Economic and Social Benefits

- Increased yield and production quality;
- Increased annual food production at lower costs;
- Reduced production seasonality;
- Reduced variability of herd size, less outsourcing needs and reduced sensitivity to market cycle and market prices for procurement.
- Increased competitiveness of animal product chains in national and international markets;
- diversified commercial activities;
- Enhanced public image of farmers, linked to environmental awareness.

[19] Juliana Gil*, Matthias Siebold, Thomas Berger, 2014, Adoption and development of integrated crop-livestock-forestry systems in Mato Grosso, Brazil.

[20] https://www.embrapa.br/en/tema-integracao-lavoura-pecuaria-floresta-ilpf/nota-tecnica

By optimizing land use and achieving consistent stocking rates throughout the season, the farm is also able to reduce its dependency to outside suppliers (typically, a farm would have lower stocking rates in the dry season and therefore having to supplement them around September, through procurement of calves from calves farms). This entails a significant reduction of deforestation risks linked to 'opaque' supply chains, and an ability to certify zero-deforestion beef.

Through the loan's financing Roncador will be able to accelerate its ambitions to restore all of its permanent pastures (30,085 ha) and to integrate soy through soil corrective activities, which has all been initiated and currently are under different stages of maturity. .

The results of the project is projected to bring a more than two fold increase in stocking rates (from 1,29 UA/ha in 2018 to 3 UA/ha in 2025), which in turn will increase overall production to 45,000 cattle heads. The productivity per hectare in cattle production (measured in UA/ha) will be almost four times higher than the average productivity of the state of MT. In terms of soy production, the integration of ICL system will allow Roncador to increase its productivity from 57 bag of soy/ha (2018) to 65 bags of soy/ha on harvest 2025/2026.

The number of corrective actions needed to both restore and convert pastures for the adoption of the ICL require significant upfront financing (as well as existing knowledge). &Green additionality is demonstrated through the acceleration of the model to 100% of the property. Considering the investment that has or will be made in the land (since 2017), the company estimates a productivity growth of 58% in the same current production area; that is, Roncador will produce 47,000 tons more food without opening a new area.

By 2025/2026 Roncador should reach a production of 115,000 tons of food in the whole 60,000 hectares, which is estimated to be composed of 9,500 tons of beef from approximately 30,000 hectares and 105,500 tons of soybeans from approximately 30,000 hectares (estimated in 2020).

	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026
Planted area (ha)	20,061	24,532	30,115	30,115	30,115	30,115	30,115	30,115	30,115
Production (Tons)	76,970	89,627	96,503	99,261	101,710	103,434	104,764	105,655	105,655
Área de Pecuária (ha)	35,413	30,085	30,085	30,085	30,085	30,085	30,085	30,085	30,085
Production (Tons)	3,917	3,984	4,131	5,353	6,877	7,924	8,855	9,587	9,587

Figure 12. Changes in landuseand production for soy and cattle farming. Source: Roncador.

Outside its farm gate and through the Program, Roncador's effort will be directed towards the dissemination, through a combination of tools, of best practices and knowledge about the ICL model, for others to gain and learn from. A study conducted in 2016, demonstrates that one of the key barriers for low of ICL adoption by farmers in Mato Grosso, is the insufficient availability of knowledge and expertise, which in turn contributes to high levels of risk aversion for implementing innovative production models.[21] This is especially relevant for innovations that require upfront investments and see productivity gains increase over a longer timeframe.

Most directly, Roncador will provide guidance and technical support to its partner SLC, to test and pilot the ICL model within their 19,400 ha farm. SLC has always traditionally focused on the production of soy and maize, but has expressed interest in 2018 to pilot the model, if – under their JV partnership—Roncador is providing operational guidance.

Secondly, Roncador's influence within the project Liga di Araguaia will also translate into indirect ER, via the members gradual adoption of the model. By 2019, and through the project, approximately 80,000 ha of farmland are committed to be sustainably intensified (including through ICL adoption and pasture restoration), by 62 farms (excluding Roncador).

Finally, to further promote the model and Roncador's best practices, the company commits to promote Roncador's production model, best practices and lessons learned via a combination of tools, such as Roncador's website videos and information, public articles, social medias campaigns, field days, participation of its executives and employees in seminars and workshops, including those organized by Liga do Araguaia, and any other relevant media for farmers.

Target:

ER 2: land sustainably intensified	Direct attribution (on-farm)	Indirect attribution (off-farm)
Hectares	60,000 ha	-
Activities	- Maintain 60,000 Ha under intensified production.	- Collaboration with SLC to support them in adopting ICL on their farm; - Maintain the engagement with Liga do Araguaia as a member to track progress against targets of ICL adoption; - Promote Roncador's production model, best

[21] https://www.bu.edu/gdp/files/2018/02/Gil_Garrett_et_al_2016_Determinants-of-ICLS.pdf

		practices and lessons learned via a combination of tools, such as Roncador's website videos and information, public articles, social medias campaigns, field days, participation of its executives and employees in seminars and workshops, including those organized by Liga do Araguaia, and any other relevant media for farmers.

4.3. ER 3: Forest Restoration / Compensation:

Business as usual:

Reforestation or compensation of forest deficits is unlikely to be implemented at significant scale for several years, given a lack of systematic enforcement and meaningful market incentives. The same study by PNAS mentioned above found that: "Only 6% of landowners with forest debts in Pará and Mato Grosso reported that they were taking the necessary measures to compensate or restore their Legal Reserves, whereas 76% affirmed that they would only compensate or restore if coerced to do so through government fines or market incentives."[22]

Impact of the Program:

Roncador already committed to a corrective action plan to restore 161.60ha of riparian forest in their APP by 2019 at an estimated cost at the time of R$1.2 millions. The APP (Permanent Preservation Areas) of a farm is calculated based on the characteristics of property's watercoursed (e.g. width) and requires protection of vegetation varying from the minimum of 30 meters to 500 meters around the watershed. In Roncador's case, the property has total conservation area above the Legal Reserve required based on the biome categorisation (approx. 5,000 ha as explained in section 4.1), but is at a deficit of area strictly related to the APP required, since the changes in Forest Code in 2012. Over the past years, Roncador implemented restoration actions, first through a partnership with Instituto Socio Ambiental - ISA through a low-cost technique called "muvuca" that included seedling provided by indigenous people from the Terra Indigena do Xingu. However, the technique was discontinued when SEMA forbid the use of herbicide in APPs to control brachiara and other aggressive grasses that jeopardize the

[22] Limits of Brazil's Forest Code as a means to end illegal deforestation; Azevedo, A. et al.; p.4; May 2017; http://www.pnas.org/content/pnas/early/2017/06/27/1604768114.full.pdf

tree planting effectiveness. Since then, Roncador has been implementing a natives species seedling nursery to supply the reforestation need of up to 40.000 tree seedlings/yearly. To date, 225,78ha of the required APP have been restored. Roncador is committing to restore more 200 ha by 2028.

Outside its farmgate and in addition to its own restoration activities, Roncador commits to promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of tools, such as Roncador's website videos and information, public articles, social medias campaigns, field days, participation of its executives and employees in seminars and workshops, including those organized by Liga do Araguaia, and any other relevant media for farmers.

Target:

ER 3: Restored forest	Direct attribution (on-farm)	Indirect attribution (off-farm)
Hectares	200 ha	-
Activities	- Restoration of farmland to support APP requirements as per the Forest Code.	- Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of tools.

Roncador commitment for &Green's financing are to (a) restore 200ha of forest within its farm gate and (b) implement the activities linked to off-farm ER throughout the loan period (e.g. carry out annual field days).

4.4. The impact of the project on GHG emissions

In addition to the benefits linked to the environmental and economic benefits of the ICL model explained in section ER 2, the model's impact on GHG emissions is relevant for &Green's additionality.

As described in the sections above, despite a relative increase in productivity levels of livestock, farmlands in MT are still predominantly characterised by degraded pastures and low stocking rates. When considering the biological nature of animal production as well (enteric fermentation and manure), livestock production ranks as top contributors to GHG emissions produced by the agricultural sector globally.

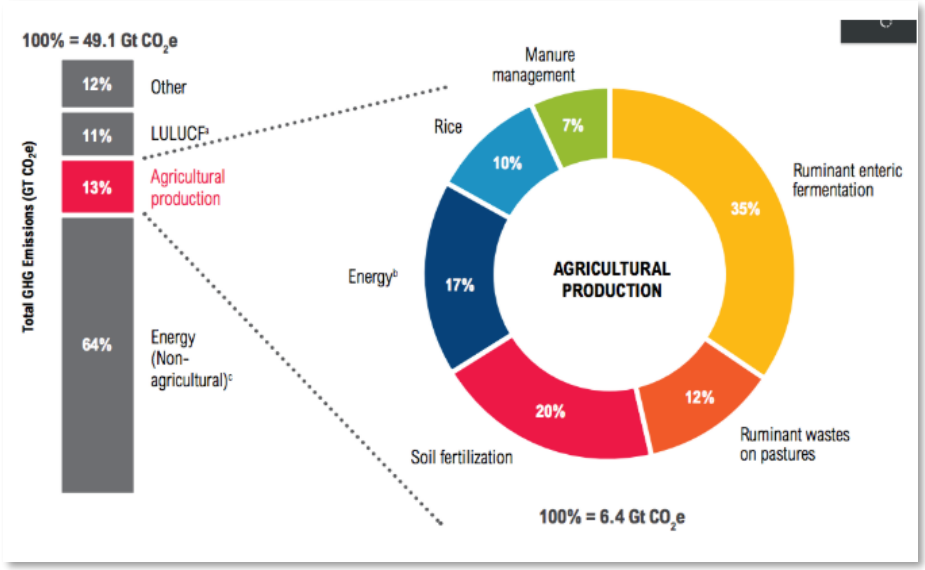

Figure 13. Global human GHG emissions breakdown, World Ressource Institute

Studies carried out to understand the comparative advantages of various production systems linked to cattle and soy over a 10 year period (see figure 14 below), demonstrate that when it comes to balancing high economic returns with low levels of climatic and economic risk, ICL emerged as the best option. Continuously grazed pasture (EXT) demonstrated few benefits, while a cattle system with rotational grazing (ROT) stood as the 2nd best option.[22]

Solid lines: current climate conditions.
Dashed lines: under optimistic projections of climate conditions by 2050 (GHG concentrations at 502 ppm)
Dotted lines: under pessimistic projects of climate conditions by 2050. (GHG concentrations at 541 ppm)
The symbols '×', 'o' and 'Δ' correspond to the economic optimal stocking rate each system under current climate.

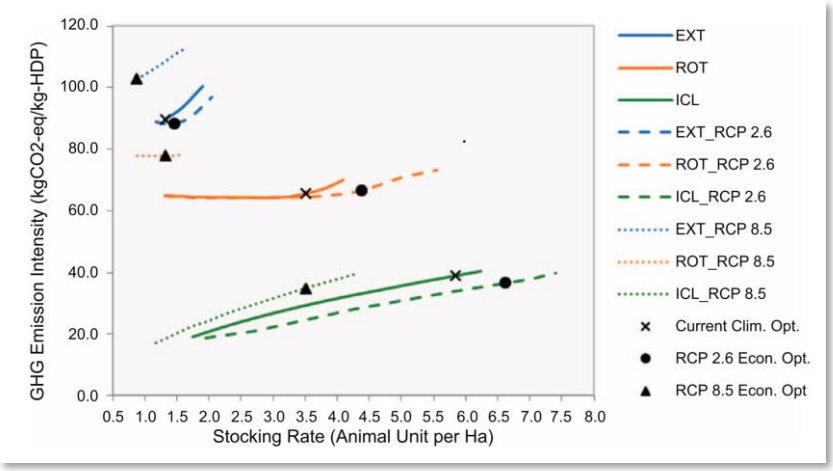

Figure 14. GHG emission intensity of different agricultural systems under varying stocking rates.

Against BAU practices in cattle farming, Roncador's model – linked to pasture intensification and ICL implementation, stands out as one that demonstrates a potential to reduce project-

[22] Juliana D B Gil, Rachael D Garrett, 2018, Tradeoffs in the quest for climate smart agricultural intensification in Mato Grosso, Brazil

related or business as usual GHG emissions instead of increasing them. A BAU as usual scenario (continuously grazed pastures, or EXT demonstrated in the graph above) with a stocking rate of 1,55UA/Ha and total number of approximately 22,400 cows in year 2019, would lead to approximately 1,236,480 MT CO_2e (under an assumption of 600 kg HDP/cow and GHG intensity of 92 kg CO2e/kg per HDP). Under similar assumption, but provided an increase in stocking rates to 3UA/Ha as well as an increase of heads to approximately 45,000 cows, to total estimated emission would be of 756,000 MT CO_2e, hence an overall net reduction of GHG/HDP. This reduction is based on: i) the improvements demonstrated on productivity and efficiency of livestock production (thus lowering the methane emissions per unit of livestock), and ii) the reduction in nitrious oxide and methane emissions due to the synergies in pasture / grazing management techniques, including not overstocking pastures, improving soil drainage, and avoiding soil compaction from grazing to maintain the anaerobicicity of the soil.

According to another study, especially focused on Roncador's farm, in 2017/2018 crops, Fazenda Roncador emitted 82.499tCO_2e, while it also potentially removed from 172.329 tCO_2e to up to 723.173 tCO_2e as carbon sink due to climate smart agricultural practices, having therefore an overall positive balance.

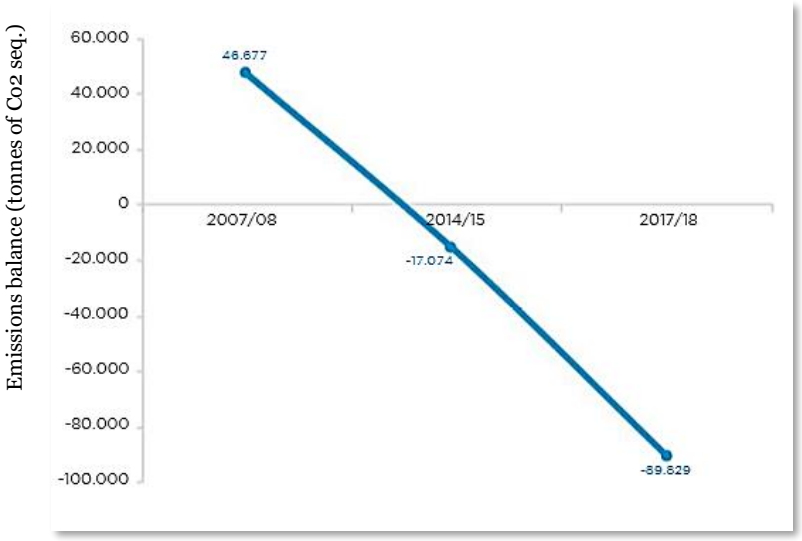

Figure 15. Change in emission balance in the Roncador farm over ten years of implementation of integrated agricultural production and pasture recovery systems. Source: Pangea Capital

To date, few studies have attempted to quantify and compare the impacts of integrated systems vis-à-vis other farming systems in the region. One challenge is the limited number of farms that have adopted the same system consistently over time, which inhibits statistically robust analysis. Roncador has been a relevant contributor in Brazil for the development of research to quantify impact: through external consultants and their partnership with Embrapa, the company has been developing scientifically robust GHG inventories for its activities that have

been used by various actors within the research and industry community, to turn it into knowledge available in the public domain and to everyone.

Through &Green, Roncador will be quantifying GHG emissions yearly in order to assess the impact of its production systems over the loan term.

5. Budget

	On farm	Off farm
ER 1	R$ 800.000,00	R$ 400,000.00 (labor only)
ER 2	Permanent Pasture: R$ 12,010,280.00 ICL: R$ 19,300,000.00	N/A
ER 3	R$ 1,400.000.00	N/A
Total	R$ 33,510,280.00	N/A
All cost based on 2020 year value.		

6. Milestones

Baseline for the Milestones is the contracting date of the &Green Facility

	ER1: **Forest Conservation**	**ER2:** **Intensification (pasture restoration and ICL implementation)**	**ER3:** **Forest Restoration**
Baseline (2019)	Direct ER: 71,184.61 ha	Direct ER: Soy – 89,627 tons Cattle – 3,984 tons	Direct ER: 0 ha
Year 1 (2020)	Direct ER: 71,184.61 ha	Direct ER: Soy – 96,503 tons Cattle - 4,131 tons	Direct ER: 25 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga do Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga do Araguaia;	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissementation tools.

		Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	
Year 2 (2021)	Direct ER: 71,184.61 ha	Direct ER: Soy – 99,261 tons Cattle - 5,353 tons	Direct ER: 50 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga do Araguaia; Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.
Year 3 (2022)	Direct ER: 71,184.61 ha	Direct ER: Soy – 101,710 tons Cattle - 6,877 tons	Direct ER: 75 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia; Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.
Year 4 (2023)	Direct ER: 71,184.61 ha	Direct ER: Soy – 103,434 tons Cattle - 7,924 tons	Direct ER: 100 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia;	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.

		Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	
Year 5 (2024)	Direct ER: 71,184.61 ha	Direct ER: Soy – 104,764 tons Cattle – 8,855 tons	Direct ER: 125 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia; Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.
Year 6 (2025)	Direct ER: 71,184.61 ha	Direct ER: Soy – 105,655 tons Cattle - 9,587 tons	Direct ER: 150 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia; Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.
Year 7 (2026)	Direct ER: 71,184.61 ha	Direct ER: Soy – 105,655 tons Cattle - 9,587 tons	Direct ER: 175 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia;	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.

		Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	
Year 8 (2027)	Direct ER: 71,184.61 ha	Direct ER: Soy – 105,655 tons Cattle - 9,587 tons	Direct ER: 200 ha of APP restored
	Indirect activities: NDPE is developed for monitoring and screening direct supplier; Engagement with Liga di Araguaia.	Indirect activities: If required, support Pioneira in the pilot and expansion of the ICL within their productive areas; NDPE is developed for monitoring and screening direct supplier, Engagement with Liga di Araguaia; Promote Roncador's production model, best practices and lessons learned via a combination of information dissemination tools.	Indirect activities: Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of information dissemination tools.

7. Reporting

Overally, Roncador will report on the three dimensions of environmental return and agreed upon milestones annually for the remaining tenor of the loan. The reporting approach will be designed based on Roncador existing monitoring systems as well as other relevant available information (third party and public data). Third party audits will confirm correctness of Roncador reporting and ER progress and results on a regular basis.

In terms of publicly available data, Brazil conducts a very advanced operational forest monitoring system, including publicly listed databases of illegal deforestation (IBAMA), non-compliant farms towards labour laws (MTE) and other forest and land-use indicators. This provides for high quality data on forest cover and land-use change, which Roncador can draw on, especially regarding the monitoring of forest conservations targets and NDPE (ER 1).
In addition, Roncador's partnership into the Liga provides an opportunity to draw on available third party documentations on the activities which Roncador will be taking part of to promote its business model and best practices (ER 1 and 2).
Finally, based on existing agreements and plans between SEMA and Roncador on forest restoration (PRA), Roncador will be able to provide final 3rd party approvals on the completion of its restorations targets (ER 3).

The remaining reporting will be carried out through self-reported information which will be audited on a regular basis: progress on ER 2 for direct its own productive land, and well as all information dissemination activities.

Annex 1

The following tables summarise the direct and indirect commitments of Roncador for the implementation of the Landscape Protection Plan to be implemented during the period of the loan tenor.

LPP <u>DIRECT</u> ER COMMITMENTS AND KPIs

Commitment	KPI unit	Baseline	Target	Reporting	Party
ER 1 Forest Conserved					
Maintain the conservation of 71,184.61 Ha[1] of forest in its farm property[2]	Hectares of forest	71,184.61 Ha at the year 1 of the loan	71,184.61 Ha maintained annually	Annually, conservation of legal reserve will be reported through public satellite images sent to &Green in January of each year, starting in January 2021.	3rd party audited
Definition of Forest: existing natural forest cover. *1These numbers may be changed due to the methodology used by SEMA to measure the property on SIMCAR (system which data of the property is input). The final area will be defined after the public agency's analysis.* *2 Roncador has a possessory legal dispute against INCRA related to an area of approx. 4,500 hectares, which is integrally part of the farm's Legal Reserve (as of February 2020). The case has been in courts since 1994 and on March 09, 2020 had a decision issued by the Superior Court of Justice ("STJ") which was not in favour of Roncador. Even though such claim is still subject to appeal, there is a chance that the outcome would lead to a reduction of Roncador's Legal Reserve required, due to overall reduction of farmland. Should Roncador not prevail in courts after its appeal, the company remains committed to endeavour its best efforts to negotiate with INCRA the incorporation of such area as part of the farm (as it has been for over 30 years) and, at the worst case, comply the federal and state laws in terms of minimum amount of Legal Reserve required.*					
ER 2 Sustainably intensified land					
Maintain 60,000 Ha under intensified production	Hectares of land under intensified production	60,000 Ha	60,000 Ha	Annually, Roncador will send to &Green supporting documents to evidence the	3rd party audited

				increase of herd of cattle and the production of the soy.	

Definition of 'intensified production': annual increase of the total volume of production (e.g., in Tons, for cattle and soy) based on the whole area of 60,000 ha until 2025/26, against the 2019/2020 baseline. After 2025/26, intensification of production will be defined by the maintenance of total volumes of production against the 2025/26 volumes (+/- variations due to climatic conditions).

By 2025/2026 Roncador should reach a production of 115,000 tons of food in the whole 60,000 hectares, which is estimated to be composed of 9,500 tons of beef from approximately 30,000 hectares and 105,500 tons of soybeans from approximately 30,000 hectares (estimated in 2020).

	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026
Planted area (ha)	20,061	24,532	30,115	30,115	30,115	30,115	30,115	30,115	30,115
Production (Tons)	76,970	89,627	96,503	99,261	101,710	103,434	104,764	105,655	105,655
Área de Pecuária (ha)	35,413	30,085	30,085	30,085	30,085	30,085	30,085	30,085	30,085
Production (Tons)	3,917	3,984	4,131	5,353	6,877	7,924	8,855	9,587	9,587

Note: Cattle and Soy production may vary proportionately on a yearly basis (e.g., more tons of cattle against less soybeans and vice-versa) due to market conditions and/or due to inclusion of crops as a substitutes for either soy or pasture. In all cases however, the intensified total production will be maintained through land use in the 60,000 hectares.

ER 3 Forest Restored					
Restore 200 Ha of APP	Hectares of APP restored	6,133 ha (total current APP)	6,333 ha	Annually, Restoration of APP reported through documents and annual reports presented to SEMA to demonstrate the fulfilment of PRA's obligation. Roncador	3rd party audited

				will send to &Green the reports within 30 days after the protocol at SEMA.	
Definition of 'forest restored': an area that is or was degraded and is currently under preservation and recovered or under recovery through replanting and/or fencing, as required by law or PRA.					

LPP INDIRECT ER COMMITMENTS AND KPIs

Commitment	KPI unit	Baseline	Target	Reporting	Party
ER 1 Forest Conserved					
NDPE is developed for monitoring and screening direct supplier	Policy, procedures, implementation plans	N.A.	Policy, procedures developed and implemented[1]	Annually, by sending the consultation of cattle suppliers at the Negative Certification of Penalties issued by IBAMA of cattle suppliers, from January 2021.	Policies, procedures and verification protocols audited by 3rd party. Information on direct suppliers is self-reported.
Maintain engagement with the Liga do Araguaia or with any other association with similar nature and region focus (as applicable, the "Association") as a member	Financial support as a member, participate of activities proposed by the Association	N.A.	Financial support as a member, participate of activities proposed by the Association	Annually, Roncador will share publicly available reports or communication pieces, if any, that highlight activities of the Association, key data on forest protection, restoration, production results, and the role of Roncador (activity based).	Self-reported and then included in the 3rd party audit

			(annually maintained)		
[1]Monitoring of direct cattle suppliers against illegal deforestation will be based on the analysis of the Negative Certification of Environmental Penalty (Certidão Negativa de Embargo), issued by IBAMA in order to screen (and blacklist) for illegal deforestation (exclusion criteria). From 2023 onwards (or earlier to the possible extent), Roncador will provide &Green with a report, at the end of each year, containing the amount of cattle acquisitions and information available (e.g., name of supplier, tax id number and, if possible, CAR/geo coordinates) of 5 biggest direct suppliers (in number of cattle actually supplied in any relevant year); &Green will process such information and provide a report to Roncador with status on eventual legal deforestation and make recommendations to the company (which will be accepted at its exclusive discretion). For more specification on the NDPE implementation, please refer to NDPE commitments annex					
ER 2 Sustainably intensified land					
If so required, support Pioneira in the pilot and expansion of the ICL within their productive areas.	Instructions provided on (i) planting and pasture management, (ii) cattle operational management, (iii) cattle feeding and supplementation, and (iv) IATF.	N.A.	Instructions provided on (i) planting and pasture management, (ii) cattle operational management, (iii) cattle feeding and supplementation, and (iv) IATF (artificial insemination).	Annually, Roncador will share progress made by Pioneira in implementing ICL (Ha under ICL, results in productivity and production at a minimum) and the role of Roncador (activity based).	Self-reported and then included in the 3rd party audit

Maintain engagement with the Association as a member	Financial support as a member, participate of activities proposed by the Association	N.A.	Financial support as a member, participate of activities proposed by the Association (annually maintained)	Annually, Roncador will share publicly available reports or communication pieces, if any, that highlight activities of the Association, key data on forest protection, restoration, production results, and the role of Roncador (activity based).	Self-reported and then included in the 3rd party audit
Promote Roncador's production model, best practices and lessons learned via a combination of tools, such as Roncador's website videos and information, public articles, social medias campaigns, field days, participation of its executives and employees in seminars and workshops, including those organized by the Association, and any other relevant media for farmers.	Communication and promotional activities carried out	N.A.	At least 01 promotion per year, out of a required combination of any 03 promotions under ER2+ER3	Annually, Roncador will share a report summarizing communication activities with evidence of the publication of videos or text on website and/or social medias and/or any other relevant activity performed by the company or its executives/shareholders.	Self-reported and then included in the 3rd party audit
ER 3 Restoration					

Promote Roncador's restoration models/pilots, best practices and lessons learned via a combination of tools, such as Roncador's website videos and information, public articles, social medias campaigns, field days, participation of its executives and employees in seminars and workshops, including those organized by the Association, and any other relevant media for farmers.	Communication and promotional activities carried out	N.A.	At least 01 promotion per year, out of a required combination of any 03 promotions under ER2+ER3	Annually, Roncador will share a report summarizing communication activities with evidence of the publication of videos or text on website and/or social medias and/or any other relevant activity performed by the company or its executives/shareholders	Self-reported and then included in the 3rd party audit