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LIVESTOCK IN AMAZON: EXTENSIVE SYSTEM TO MODERNIZATION

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The livestock in Amazon is a secular activity. Operation date of the end of the 17th century. Its inception in native pastures in savanna badly drained in its gradients of floods, whose prototypes are the Marajó island and the Baixada Maranhense. Also occurred in alluvial soils, which correspond to the fields of floodplains, subject to periodic flooding regimes. From the late 1950 's going on its expansion on the dry land. This began in the State of Pará in the northern region, specifically in the current municipality of Paragominas, with the design and construction of the Belém-Brasília highway, in a process of forest felling, burning of biomass and seed grass seed.

The name Paragominas means lands conquered by pioneers of Goiás and Minas Gerais States under the leadership of Célio Rezende Miranda, from 1959. However, the first open area to livestock due to the baiano Ariston Alves Silva, who launched the first grass seeds in 1957, after an epic climbing in Guamá and Capim rivers he walks in the forest until to find the Potirité river, and by this to the location where you deployed the first pasture on dry land, later named Agropecuária Boa Sorte Ltda., located in the village known as km 204 of the Belém-Brasília highway, today Piriá township in Paragominas. Completed this phase, in the decades of 1960 and 1970, other pioneers from São Paulo, Bahia and Pará. These last have the marajoara cattleman Amílcar Batista Tocantins, first mayor – intervener designated by Governor of the State of Pará – from 1965 to 67. The exposure park of Paragominas has his name.

Several factors have contributed to this new stage of livestock in Amazon: i) local production wasn't answering the growing demand, mainly of fresh beef, which

depended largely on imports; II) opening of the Belém-Brasília highway; III) tax incentive policy, intensified by the federal Government from 1966; iv) Programa de Redistribuição de Terras e Estímulos à Agroindústria do Nordeste e Norte – PROTERRA – in the decade of 1970, which was financing the implementation of the activity to the cattlemen that if they do it in the region, the subsidized interest; v) expansion of the highway network that stretched on Amazon enabling deployment of planted grassland to its banks; vi) dole lands or low price then available; vii) the Government urged the occupation of Amazon with the motto "*integrate not deliver*".

These conditions attract the cattlemen of Brazil Livestock Center – Goiás e Minas Gerais States – that brought to the Amazon your experience in extensive livestock. The deployment of grazing on land in the region followed the traditional system of forest felling, biomass burning and planting of grass, which at the beginning of this process was the capim-colônia (*Panicum maximum*).

The burning of biomass provided the increase in nutrient availability in the soil, causing the grass to come with force which in the view of the cattleman indicated good soil fertility. In addition, the stable climate contributes to a lower incidence of disease of cattle. This vision the warmed to disclose the new frontier as excellent for livestock, contributing to the far-reaching migration toward the new frontier. However, the pioneers began to introduce a growing decline of fodder, being degraded in the late 1970.

The pioneering phase was characterized by intense migratory flow, and rapid rate of expansion of the livestock, encouraged by the financing of PROTERRA the subsidized interest – inflation of 35 percent a year, to the detriment of the interest charged at 7% per annum funding – and the tax incentives granted by Superintendência de Desenvolvimento da Amazônia (SUDAM). The return of these investments was more for land transactions, benefited by the conditions of the economy, than the production. Secondly, was the sale of wood, years 1980, when rural subsidized credit was disabled due to the economic crisis that reached the Brazil. These features demonstrates that with a more speculative than productive agrarian.

Register that during this period there was no lack in technologies for deployment and management of pastures, and also availability of forage germplasm adapted to breeding on land in the Amazon. In this situation, serious errors in the establishment and management of pastures formed in the Amazon region were often committed, resulting in low longevity and production capacity of these areas. Then wonders itself: is it possible the livestock in the Amazon, on land with grazing planted?

Since its expansion, the system then employed, could only occur with the advance on new forest area, to repeat the same cycle.

The rise of the environmental movement, the distances of new areas of roads and rural credit allowance began to derail the extensive livestock on land in the Amazon. The solution was for agricultural research. To happen with the Projeto de Melhoramento de Pastagens da Amazônia Legal – PROPASTO – released in 1976, involving the Centro de Pesquisa Agropecuária do Trópico Úmido (CPATU), today Embrapa Amazônia Oriental, the Banco da Amazônia and cattlemen partners.

The objective was to study the causes of the low productivity of pastures located in Amazonia and seek solutions to increase the productivity of native grassland ecosystems – low productivity – natural, recover degraded grasslands planted or degradation in forest areas and keep the longevity of production of these pastures. Researches that project identified the dynamics of available phosphorus in soils under forest and after the establishment and use of pasture in the Amazon.

In this dynamic boom of grazing occurred in function of the dynamics of phosphorus (P^{2O5}) in the soil. In the forest is of the order of five parts per million (5 ppm), after the burning of the biomass arrives at 10 ppm, and after ten years of pasture usage drops to 0 ppm, featuring what has become known in the Amazon as degraded pasture. In addition to the total fall of phosphorus in the soil, this degradation hits two more levels: i) agricultural, where the botanical composition changes with less participation of grazing and greater number of invasive plants; ii) biological, with drastic reduction of organic plant biomass, contributing to damage to physical property of soil by erosion and/or compression.

The PROPASTO was extinct in 1980, because of a lack of strategic vision and scientific decision-makers of dry land, however he was a milestone in the generation of technologies and the formation of team of experts in degraded pasture recovery in Legal Amazon. From the pasture research continued providing technologies for formation, renewal, recovery and management of grasslands, including the launch of the first book published in Brazil about tropical grassland degradation and recovery in 2003, by researcher at Embrapa Amazônia Oriental, Moacyr Bernardino Dias-Filho with the title: *"Degradation of Pastures: processes, causes and strategies of recovery."* This publication is currently in its fourth edition.

According Dias-Filho: *"pasture ecosystems differ in complexity of other agricultural ecosystems in which, generally, only culture and the weeds are the main*

components of the system. In pastures, the presence of the animal as a "harvest" of culture extends, in the complexity of the system, interfering directly or indirectly in the patterns of competition and succession. (...) the nature of this competition is not yet fully understood. (...) thus, agronomic practices employed in this activity should be based also on ecological concepts".

This new phase in which the livestock has contributed to reversing the bleak that hovered over this economic activity, enabling expansion of the bovine herd in Legal Amazon, which reached approximately 59 million heads, corresponding to 30% of the national herd in 2015. It is important to mention that the increase in the herd has been greater than the expansion of grazing areas, which denotes that pastures, animal breeding technologies and better management of the property are already being practiced in livestock in the Amazon.

Unlike the early years of the implementation of the livestock on land in the Amazon, the economic and environmental context started to change from the years 1980 not allowing the expansion of this activity in the extensive system. The subsidized interest to this activity were suppressed and the environmental pressure was beginning to show its strength. So that wouldn't be a possible expansion of the livestock in the extensive system, since it relies on the natural fertility of the soil increased by burning biomass, which decreases with use; performs inadequate management (soil, pasture and herd), consequently does not present environmental and economic sustainability. His continuity depends on the availability of the agricultural frontier and the non-existence of environmental policy. In other words, shows itself as an extractive activity.

The availability of technologies began to change by replacing the *colonião* preferred grass in the implementation phase of the livestock, replaced by grasses more adapted and shown by research from the late 1980. Among the nominations include those of the genera *Andropogon*, *Brachiaria*, *Centrosema*, *Cinodon*, *Echinochloa*, *Hymenachne*, *Luziola*, *Panicum*, *Pueraria*, *Stylosanthes*. Also some new practices in the pasture and herd management, as well as the affirmation of the Nelore breed as the most adapted to Amazonian conditions for meat production.

On the other hand, environmental restrictions are being applied to livestock. National Monetary Council resolution of 2008, requires environmental regularization for the financing of agricultural projects in the Amazon Biome. Administrative restrictions to municipalities with the highest deforestation rates in the Amazon. Rural properties that remain in this system suffering the embargoes the meat market. Efficient surveillance

operations. Environmental pressure for not expanding the area deforested in the Amazon, today around 763 1000 km²

Also contributes consumer behavior increasingly demanding regarding quality and origin of the products they consume, and the companies that produce them. Market demanding certified product and production traced. And the producer may obtain greater productivity, higher income and sustainability with the modernização of this activity.

In the face of this new reality, the livestock will have to leave for a paradigm shift, which means turn it into production system that increases the productivity of the soil, and the flock giving it sustainability. In other words, leaves the monoculture of grass and turns into cultivation – pasture, agriculture and forest – increasing the productive chain, producing more and better in the same area. To do so, requires planning and management.

To follow this new path search is its big ally for this achievement, providing technologies that provide intensification and greater efficiency of land use in the areas occupied by man, generating, also, other benefits to the environment, such as: increased carbon sequestration; increased soil organic matter; erosion reduction; microclimatic conditions and improvement of animal welfare. As for the economic benefits include: reduction of production costs; increased productivity and decreased risk inherent in agriculture, especially by climatic variations and market fluctuations.

They are operating within the formation, in the improvement and in the recovery of grassland; integrated systems of production: crop-livestock (ILP); livestock-forest (IPF); crop-livestock-forest (ILPF); in no-till (PD); biological nitrogen fixation (FBN). Acronyms in Portuguese.

The employment of these technologies has the financing of Low Carbon Agriculture Program (ABC), acronym in Portuguese, priority in the Amazon biome. However, its implementation is serious obstacles: i) ignorance of the producers on the ILPF systems, PD, FBN; II) barriers in the environmental and agrarian regularization; iii) lack of technical assistance to producers; IV) low performance of State managers groups; v) delay in the review and approval of funding; v) adequacy of compatible type of interest and compensation for the investment period; vi) legal certainty for producers and investors.

The modernization of livestock has important role in economic development due to the integration of productive chains, leading producers to innovations, strengthened

politically the segment of the livestock by economic and environmental results achieved.

Nevertheless the change of paradigm of ranching in the Amazon, at the same time there has been a reduction of financial resources intended for substance with pasture recovery in the region, but also of the researchers and research units, such as Embrapa Amazônia Oriental, do not come with recovery activities prioritizing of pasture.

It is necessary for society to be informed that extensive livestock does not find more space to be practiced, also be aware that the modernization of this segment is a reality that contributes to sustainable economic development.

However, the continuity and expansion of research are important and a priority, and to that end, requires a permanent and updated supply of financial resources to be developed efficiently. Also, the maintenance of researchers with academic background in forage, pasture management and other related areas to livestock, and that has not only the knowledge, but, above all, commitment to the region.

The dissemination and adoption of new technologies by the producers cannot be overlooked. Plus, the adoption of a new technology has to add profit to the producer, because only the environmental benefit won't convince him to be the savior of the planet Earth.

Only with a new vision about the livestock in the Amazon region, boosting its modernization, based on scientific knowledge, on economic and environmental rationality without ideological bias, using areas occupied by man and not advancing on the forest is that this activity may give larger and increasing benefits to regional society, to Brazil and to the world, in providing such a noble food: animal protein.

The change of paradigm of livestock in the Amazon will in Amazon dimension when the various sectors that make up, starting with the leaders – public and private – this segment, work together with producers, researchers, technical assistance, financial agents and lawmakers with the aim of implementing it, and gradually show the society, in order to make her understand that the benefits of modernization of livestock are not only with producers but the company itself also win with positive economic and environmental externalities that will occur.