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SUSTENTABILIDADE NO SISTEMA DE PRODUÇÃO DE BOVINOS: UMA BREVE REVISÃO

SUSTENTABILIDAD EN SISTEMA DE PRODUCCIÓN BOVINA: UNA BREVE REVISIÓN

SUSTENTABILITY ON BOVINE PRODUCTION SYSTEM: A BRIEF REVIEW

Presentation: Poster

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INTRODUCTION

In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" which have entailed in discussions concerning a myriad of environmental impacts, including those caused by global bovine agriculture (STEINFELD et al., 2006; FAO, 2011; CHUKWUOCHA et al., 2011). Ruminants are some of those having a high carbon footprint and water footprint because of the suggestion that greenhouse gas (GHG) has been emitted directly by enteric fermentation or manure or indirectly by activities developed during forage production and the conversion of forests into pastures or croplands.

The effects upon not only worldwide GHG emissions but upon also water quality, nutrients leaching, soil erosion, and biodiversity have been pointed for specifically bovine ruminants both dairy and beef production (MOLINA, 2020; STEINFELD et al., 2006; BAUMAN et al., 2010), which must be a focus of attention on mitigation measures and policies including some handling strategies and practice. Although global bovine production plays a prominent role in the global environmental impact of these recourses use, many mitigation practices ever-existing have been not known. Therefore, the present paper aims to

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lead a manuscript review approaching sustainability on the bovine production system underlying environmental impacts and opportunities to assuagement. The hypothesis considered the infrastructure conditions of the farm to meet those practices.

THEORETICAL FOUNDATION

There have been many discussions concerning worldwide population growth. Food and Agriculture Organization of the United Nations (2009) estimated the global population is predicted to plateau at over 9.5 billion people in the year 2050. The demand for food, especially those of animal sources, will be significant, as it was estimated the demand for meat and milk in 2050 will grow 73% and 58%, respectively, concerning the observed levels in 2011 (FAO, 2011). Thereat, bovine production system aims to provide sufficient affordable conditions to consumer milk and meat in conjugation with the maintenance of human health dietary choice while minimizing environmental impacts through mainly decreases in wasting in order to supply the growing population. A myriad of studies points out the evolution in science plays a fundamental role in sustainable growth. Sustainable development needs to be linked to new material realities, the product of science and technology, and associated shifts in consciousness (LEAVER, 2009; REDCLIFT, 2005).

METHODOLOGY

It was performed research with findings that report mainly results for environmental impacts of bovine production and mitigation strategies. It was consulted several platforms, including Google Scholar, Springer, Food and Agriculture Organization of the United Nations, and SciELO. The key-words used for the investigation were “sustainability + bovine production”, “impacts of dairy production”, “impacts of beef production” and “Mitigation for agricultural impacts” in sequence. Some of these words were substituted by their synonymous.

RESULTS AND DISCUSSION

Climate changes have been reported especially by other human-inducing actions such as industrial productions. Several research groups agree that this fact is related to the increase in atmospheric concentrations of greenhouse gases (GHG), which continue to increase, particularly during the past 250 years, coinciding with the start of the industrial revolution and the increase in the use of fossil fuels (CHUKWUOCHA et al., 2011). Respect the sustainability of the bovine production system, the Climate Change Act of 2008 purposed to

reduce 11% in GHG emissions from agriculture of 80% of all human-induced emissions by the year 2050 (CAPPER et al., 2015).

The strategies to achieve such a purpose should considerer the levels of emissions caused by bovine production which have been estimated incoherently by many pieces of research finding. Livestock's Long Shadow released by the FAO (2006) estimated the global contribution of human-emitted GHG from the livestock sector for about 18% of global anthropogenic GHG emissions, whereas the Environmental Protection Agency calculated that 5.8% associated to the entire agricultural sector (FAO et al., 2006; PITESKY et al., 2009; STEINFELD et al., 2006; CAPPER et al., 2015). The incoherence found out may be argued by different worldwide regions which vary significantly from countries developed to sub-developed, for instance, North America and Sub-Saharan Africa. In N. America, the California inventory estimated that 5.4% of California's gross anthropogenic GHG profile is associated directly and indirectly with agriculture. Respect the sub-Saharan Africa, low performances of agriculture have environmental influences reflecting the necessity for improvement livestock managing skills in the region (CAPPER et al., 2015; CARDOSO, 2012). This effort encompasses a myriad of components, including sanitary prophylaxis, reproduction, nutrition, and in particular, a substantial increase in livestock yield for human consumption. This will allow for agricultural management improved and soil preservation, enhancing meat production and decreasing methane and nitrogen emissions from enteric fermentation and manure (CARDOSO, 2012).

Dairy production

A nice instance of variation in GHG emissions among worldwide regions is the dairy production system. As a shift from N. America to Sub-Saharan Africa, the average annual milk yield decreases while GHG emissions increases. So, unlike Africa, in N. America there is a high milk production yield which plays a correlation with environmental impacts (CAPPER et al., 2015; CARDOSO, 2012).

Meat production

Among extensive and intensive productions, GHG emissions caused by meat production may vary significantly between regions. In extensive, the emissions ring 9.9 to 36.4 Kg carbonic gas whereas in intensive 12 to 44 Kg carbonic gas (CAPPER et al., 2015).

Strategies for mitigation

Description and adoption of mitigation strategies are required in the management of the bovine production system regarding water use and emissions. These practices will be

necessary to attach the sustainability not only of the bovine production but also the ecological, economic, and social viability (MOLINA, 2020). Death, carcass defects, drug residues, and suboptimal nutrition are some loss production impacting environmental sustainability (CAPPER et al., 2015). The implementation of mitigation measures should prioritize the rational use of resources, employment generation, and regional economic benefits as part of a more efficient and sustainable production process (MOLINA, 2020). Furthermore, anaerobic digesters, separation of manure, soil testing, and slurry injection to reduce nutrient leaching or recycling water for parlor sanitation (CAPPER et al., 2015) may decrease environmental impact.

CONCLUSIONS

From the current scientific literature, it is possible to infer that, despite the importance and applicability of mitigating methods of the environment impact related to cattle production, these strategies are not as widespread as they worth to be. This revision has found that the dairy bovine production system contributes large impact turning on the region it occurs, as it was predicted – developing countries show greater GHG than developed countries. On the other hand, the beef bovine production system varies according the production system: extensive and intensive has different variations. Therefore, it is proposed to apply minimizing practices of environmental impact. Finally, it is necessary a huge infrastructure and better tools to adopt the mitigating technique.

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