



## Market-oriented cattle traceability in the Brazilian Legal Amazon



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### ABSTRACT

The purpose of this paper is to note the importance of market orientation in agribusiness and to describe the relevance of market-oriented traceability in the export of beef from the Brazilian Legal Amazon, one of the most scrutinised areas of the world in terms of environmental risks. The study is of a descriptive nature and it uses bibliographic references and secondary data to discuss bovine traceability in the context of deforestation of the Brazilian Legal Amazon and its consequences for international beef trade. Analysed data include those related to the Amazon Region and the following aspects are considered: deforestation dynamics, consumer demands, the volume of exported meat and traceability as a prerequisite for meat export based on the market orientation theory. The results indicated that, according to market orientation, beef certification is a prerequisite for meat produced in the Brazilian Amazon Region for maintaining and expanding a sustainable share of the international markets without the burden of presumptive deforestation. The findings markedly affect primary beef production in the region analysed and the local production systems are forced to adapt to the demands of consumers who are anxious to be assured that the environmental footprint of livestock produced is mitigated worldwide, particularly in the Brazilian Amazon. Concerns regarding the environmental impact of animal production are crucial in the promotion of sustainability of agriculture production, furthermore the major drivers of sustainability in agriculture are the demands of the food market.

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### Introduction

The traceability of food has been pivotal for food security. By knowing the origin, the way it is produced, and the path of the components of a food species, we can find the possible sources of food anomalies and control quality in all steps of production. Traceability of food allows one to entrust error responsibility and to claim in mitigation any negative impact of its production and distribution. This same concept of food traceability is currently used to trace the environmental impact of food production as well. In this way, consumers can choose food of lower environmental impact, and society as a whole can demand specifically localised, cleaner, and sustainable agriculture.

In this sense, the growing concerns related to food security and environmental impact must be taken into account when seeking to expand business opportunities. This kind of market demand

for differentiated food products leads to the adoption of institutional food certification procedures, which provide information to the consumers concerning the composition quality and the environmental amiability of the food.

These trends in the dynamic market cause changes in the agribusiness sector. Consumers are becoming more conscious of the diversity of products and more attentive to their quality and security, as well as the environmental aspects of their production.

Since 2004, Brazil has been the world's largest cattle breeder for beef for human consumption. To maintain this position or win new market niches, it is necessary to observe the market orientation requirements of this industrial sector.

Adaptation to the market is characterised as one of the greatest demands on companies. The demand is particularly great in agribusiness, due to the greater risk and smaller predictability inherent in agriculture activities. "Market orientation" is an organisational culture that generates the behaviour necessary to create a superior value for consumers and a sustainable competitive advantage for the organisation.

Consumers concerned with reducing the environmental footprint of the agro-industry hope the negative influence of livestock production in the Amazon rainforest will be minimal or

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non-existent. The expansion of beef production into the deforested areas of the so-called Legal Amazon, a political-geographical area that expands far beyond the rainforest, brings serious concerns to this segment of Brazilian agribusiness. International consumers are led to think that all Brazilian beef is produced on pristine land.

A major misconception is that all of the Legal Amazon is incompatible with livestock production. The reckless, unplanned deforestation practiced in the past has been gradually abandoned because it is not sustainable over time. The old predatory livestock production systems are losing ground to models of production with environmental responsibility. Economic interest and preservative and conservative beliefs are integrated into acceptable production processes for the region. The environmental issues are serious, particularly for people concerned with economic activities in the Amazon. People are looking for ways to promote sustainable livestock production in harmony with environmental considerations.

Traceability requires local assessment of the environmental quality of production. Life Cycle Assessment (LCA) methodology provides a powerful analytical instrument to evaluate the environmental impacts of beef production and strengthen its sustainability (ISO, 2006). Cattle traceability – required by the main importing countries – and LCA practices are prerequisites for Brazil. The country can then properly address the origin and characteristics of its beef and remain competitive in the international markets without the burden of Amazon rainforest deforestation.

This paper aims to describe traceability as an answer to market orientation in beef production in the Brazilian Legal Amazon region.

## Theoretical background

### *Market orientation theory*

The market orientation theory focuses on market research as a strategic way to increase organisational performance. Studies have described market orientation as having three behavioural components: customer orientation, competitor orientation, and inter-functional coordination. These should be the axes of the company when establishing the relationship between market orientation and business performance (Kohli and Jaworski, 1990; Narver and Slater, 1990). This concept goes beyond consumer-oriented marketing practices. It includes analysing the behaviour of competitors and coordinating actions within the organisation that affect performance.

Market orientation takes into account both current and potential customers by the evaluation of market information early and systematically (Slater, 2001). The adoption of market orientation-based strategies is a possible source of competitive advantage that can differentiate a company from its competitors and lead to superior organisational performance (Kirca and Hult, 2009).

One conceptual model with respect to external market orientation is credited to Cadogan et al. (1999). This kind of orientation towards the international market complements the work of Kohli and Jaworski (1990) and Narver and Slater (1990). It adds an integrative dimension called the coordination mechanism, which includes activities associated with the generation of information, internal dissemination of information, and the formulation of responses to the external market.

Many studies are focused on evaluating the positive relationship between the constructs of market orientation and organisational performance (Steinman et al., 2000; Cano et al., 2004; Urdan, 2004) either by sales growth indicators (Narver and Slater, 1990) or by the number of exports (Cadogan et al., 2003). It appears that the positive relationship between market orientation and organisational performance also exists between external market orientation

and international performance (Rose and Shomam, 2002; Cadogan et al., 2003; Macera and Urdan, 2004).

The opening of international markets and the expansion of Brazilian agribusiness exports have been essential for the growth of this economic sector. Despite the existing literature on external market orientation, studies focused on Brazilian agribusiness products are still emerging. This is most likely because the analysts of this sector are focused more on production than on the market itself. It is possible for production managers to start focusing on the agribusiness market, following some changes in strategy and marketing practices of the organisations involved (Beverland and Lindgreen, 2007).

### *Traceability*

The International Organisation for Standardisation (ISO, 2007) defines traceability as “The ability to follow the movement of a feed or food through specified stage (s) of production, processing and distribution”.

Several traceability systems have been established in Europe, North America and elsewhere that define traceability as the ability to track consumer products over production and distribution channels, facilitating quality control and possible withdrawal of the product from the market.

Effective traceability provides a safety net where any unanticipated adverse effect can be determined. Traceability and certification are basic tools for guaranteeing the origin and the quality of products and of agro-industrial processes. Traceability depends on a complex information system, starting with the production of raw materials (Portelle et al., 2000; Cochoy, 2001).

For firms, certification raises the quality of their processes, products or services, improves their competitiveness, and allows exporting companies to comply with the technical requirements of international trade (Zeidan et al., 2011). Traceability is of growing importance in the beef production chain; however, its implementation is hindered by a lack of chain coordination between many producers, the heterogeneity of firm sizes with different levels of capitalisation, and the diversity of cattle breeds (Marques et al., 2005).

### *Life cycle assessment*

The LCA methodology has been used to evaluate the environmental profile of alternative agricultural products and food processing methods. According to the ISO (2006), an LCA comprises four main stages: goal and scope definition, life cycle inventory, life cycle impact assessment, and interpretation of the results. This methodology consists of a detailed compilation of all the environmental inputs (material and energy) and outputs (air, water, and solid emissions) at each stage of the life cycle. LCA in beef production could improve the safety of the meat based on the Food Traceability System. In Brazil, the collected data for beef production through LCA provide solid information to the Brazilian Service of Supply Chain Traceability of Cattle and Buffaloes (SISBOV) databases concerning farmer, location, land use, bovine species, yield, production area, crop production, and N, P, and K (MAPA, 2004).

Some important international studies have focused on the feasibility of LCA applications in agriculture (Crosson et al., 2011; Ruviano et al., 2012). Detailed research reports address the life cycle of the most important livestock production systems. Some researchers have used the LCA methodology to investigate the total environmental impact of beef production, such as Casey and Holden (2006), Koneswaran and Nierenberg (2008), Pelletier et al. (2010) and Place and Mitloehner (2012). In addition, Cederberg et al. (2009) performed an LCA of beef cattle production using data

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