

Dealing with the variability and heterogeneity of quality within sustainable fruit-based supply chains

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Agricultural supply chains are providers and receivers of ecosystem services. Providers when supplying food, non-food products and services; and receivers as they benefit from natural resources (Le Roux et al., 2008). Agriculture and its supply chains must be considered as social-ecological systems due to the participation of different actors that interact within natural, economic, institutional and social dimensions (Moraine et al., 2015). Partners within the supply chains coordinate to organize exchanges while managing the natural resources and adapting to changes and uncertainties, whether linked to natural or to economic factors. This study focuses the analysis on two fruit-based food supply chains: apples and mangoes, particularly at the interface between agricultural raw materials and processing. Supply chains of fruits are especially complex. At the production stage, climate, i.e. sunlight, temperature, humidity among other agronomical factors, are source of variability and heterogeneity of the raw material. Beside the influence of climate on the quality attributes of fruit, climate also affects the apparition of plant diseases, which on one hand, have direct and harmful effects on fruit quality, and on the other, trigger the use of phytosanitary substances to control pests with the consequently emergence of chemical hazards due to residues in fruits. This complexity makes more difficult for growers and processors to control the food quality which is increasingly relevant and demanding. Quality has evolved towards a more comprehensive concept that beyond the organoleptic and nutritional attributes, involve the respect for sanitary, social and ecological considerations. Firms, i.e. growers, processors, traders and distributors of the supply chains, have the responsibility to satisfy consumer, to protect human health and to protect natural resources. Firms have also the challenge of ensuring their own position in a highly competitive and uncertain environment. To do so, they implement strategies to control quality and to protect assets involved in transactions with partners that can also be competitors (Menard, 2013:130). This study asks the question: How do firms manage the variability and the heterogeneity of fruits within the supply chains? To answer this question, our framework is the New Institutional Economics. We resort to the institutional analysis applied to the agricultural sector by Menard (2013, 2014), that allows studying the existence of simultaneous and different modes of governance within the commercial activity and to have a better understanding of the multilayer institutions in place to regulate the social-ecosystems. Using a qualitative method of analysis, we gathered primary information from 34 firms with a main focus on France for apples and mangoes (La Reunion), we also explored other European, Asian and Latin-American countries to have a wider scope of analysis and comparison. We uncover the main problems concerning quality of products, and the strategies of coordination adopted by firms within the supply chains. The complexity of global supply chains leads to the emergence of (also) plural forms of governance. These forms of governance occur simultaneously as a strategy to improve positioning, to balance risks of these agricultural transactions, and to better comply with health, social and ecological objectives.