

Methodology for decisions making in transportation logistics function

For Supply Chain (SC) colombian green coffee study

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Abstract— The following article presents a review on the state of the art five basic criteria that a decision maker in the Supply Chain (SC) should consider in selecting carriers for the supply channel with suppliers and for channel distribution with distributors: opportunity, flexibility, cost savings, efficiency / productivity and technology. These are validated to a case study of SC Colombian green coffee, through the technical outranking multicriteria decision (ELECTRE), which seeks Carriers Selection (CS) under criteria. One of the contributions of this research is the methodology for decision making from building criteria from the literature to the application of ELECTRE technique. The second contribution to the decision maker in any SC is that he could take the code developed in Matlab and run at any time as making support organizational, logistical or production decisions, for any problem of selection, classification and prioritization.

Keywords— *ELECTRE, green coffee, supply chain, outranking, Supply Chain Management, Multicriteria Decision Techniques.*

I. INTRODUCTION

A. Caracterización de la SC del café en Colombia

The SC Colombian coffee has potential customers in different countries worldwide: USA, Russia, France, Japan, Netherlands Antilles, Spain, Norway and European Union. Coffee is a global commodity, whose industry drives economic and social development of more than 30 countries around the world, thanks to income from export [4], you can sell any type of transformation in the grain: brown green, ground, instant, special (decaffeinated, lyophilized, liquid and soluble), etc.; the

name and cost depend on the process that has taken [1, 2]. Only 7% of Colombian coffee is intended for the international market, domestic consumption is 2.7 kg per capita, indicating that the domestic market also has a potential expansion [1]

The countries most buyers of Colombian coffee are those of the European Union and the United States; the latter have a lower demand for coffee at 50% of total consumption: 2 million bags of coffee threshing less exalted, the pasilla and gravel. The SC coffee in Colombia, begins with the consolidation of 50% of the coffee by the 38 cooperatives [1] of farmers in purchasing 488 points located in coffee areas [5] of the National Coffee Fund [1].

In the channel providing the SC coffee:

a) Begins with the planting of shade trees strategically next to the coffee trees, which protect directly from sunlight.

b) Harvesting is done manually one year after the cherry or coffee fruit reaches a yellow or red, c) a selection process Cherry is then made with the guidance given by the National Coffee Research Centre (CENICAFE Colombia) for traceability to packaging and distribution.

d) The process of pulping red peel and pulp of the coffee bean is separated, with a machine for this use;

e) Finally there is the beneficiation process can be dry or wet.

f) The benefit wet, it is to obtain a better quality coffee, a system of water channels where the beans are put to float to remove the stones, earth, immature and ripe grain is used; further

classification is based on the size before passing to the pulping machine.

g) The benefit is dry, wash the seeds to remove contamination and extend the sun for 2-3 weeks to allow moisture decreases from 75% to 10% to 12% humidity, for which the grains are moved periodically. Grains reach the fermentation tank where they remain 36 hours, during which fragments pulp and mucilaginous layer decompose due to natural enzymes mucilage left grains only cover parchment, then is extended to the sun or mechanically dried with a dryer [3], here the grain is called wet or dry parchment coffee.

i) Then dried parchment coffee is packaged in bags sisal and polypropylene and can be stored for months in a controlled [3], atmosphere, the variation of relative humidity should be avoided to 70% and temperature preferably below 25 ° C, therefore drying areas should be designed to keep as constant as possible environmental conditions [6].

j) The bags are transported overland to the thresher affiliated with the National Found of Coffee (NFC), trucks, trailers and some opportunities because it eliminates bulk packaging in bags.

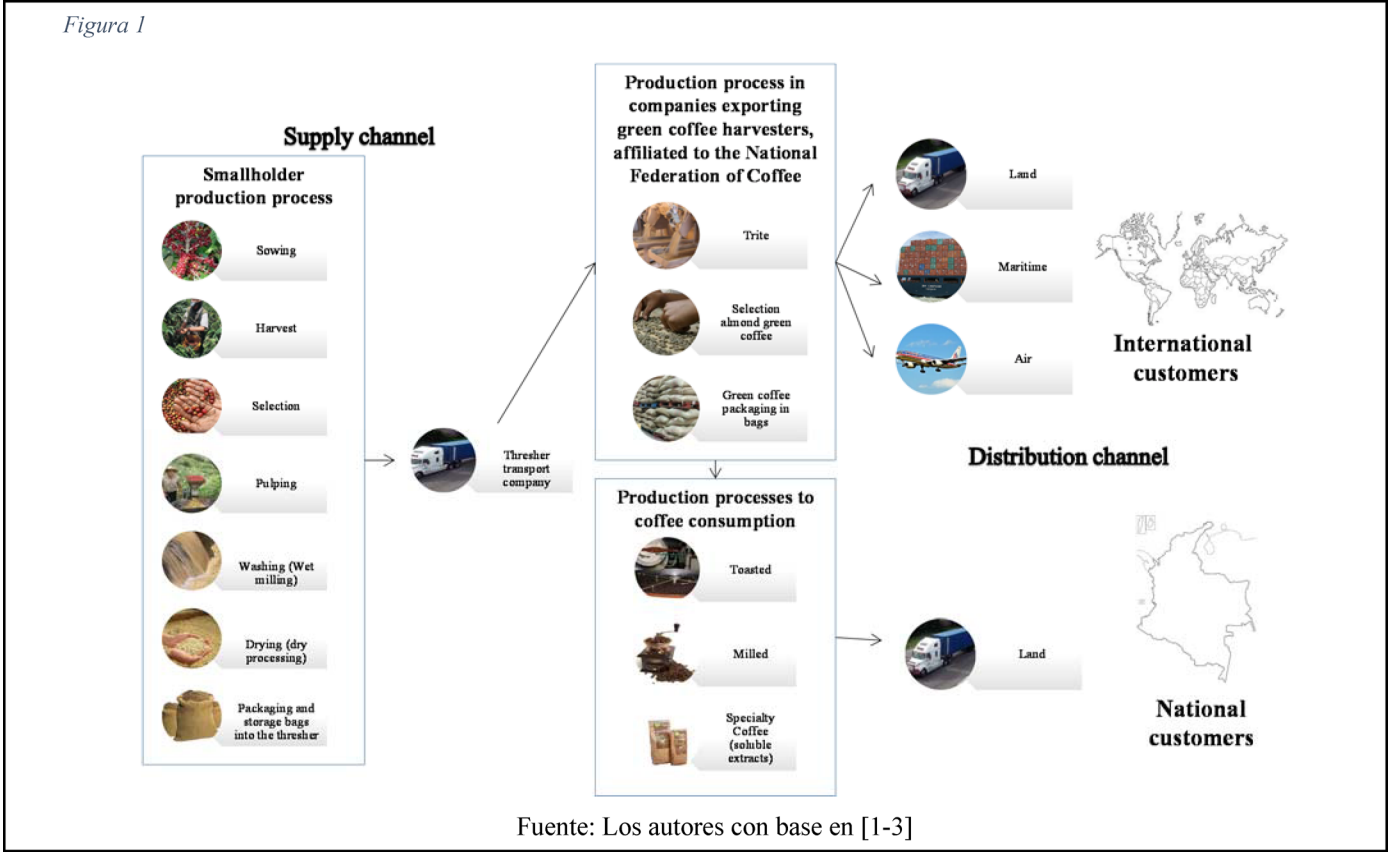
k) In the second part of the SC coffee threshing production

features that allow transpiration of coffee and the formation of large drifts [5].

The polypropylene packaging used for export of green coffee are Big Bags and Jumbo Liner. The Big Bags are polypropylene bags used for export of solid bulk and liquids in large non-traditional volumes, allows perspiration preserving its quality, storage capacity is between 1000-1300 kilos of green coffee, are reusable, has decreased logistics costs for handling, storing large drifts up to three levels high, the greater volume of coffee per packing unit, dimensions commonly used in these bags are: width * 1.05 * 1.05 * 1.20 over high [5].

Gaskets Jumbo Liner, are lining in polypropylene fiber, used for coffee exports in bulk in containers of 20 feet, allows perspiration coffee preserving its quality, they are not reusable, reduce logistics costs, are manufactured in fabrics polypropylene ranging from 80 to 120 grams per square meter of density. The main difference is determined by the design of the mooring system in the main lid [5].

j) To transport coffee 20ft containers are used with 250 and 275 bags of 70kg, bulk equivalent to 300 sacks. The 40-foot containers have capacity for 300 and 350 bags of 70kg [5]. A 20



process that takes place in companies affiliated with the NFC, which involves removing the parchment seed inserting it into a threshing machine to make coffee is almond green coffee parchment. One of the biggest export demands is this [2].

l) The NFC green coffee exports in two types of packaging: sisal and polypropylene. Figue gaskets are made of 100% biodegradable natural fiber obtained from the sisal plant, with

'container has a maximum capacity of 275 bags of green coffee than 70 kilograms, with a weight of 19250 kg [7]. Usually, it is exported in bags of 70 kg with dimensions: 70 cm wide x 95 cm long, with a tolerance of 3% [5], the costs below:

Table 1 Rates UCS per kilogram