Chapter 7
Selecting Location for Agro-Based Industry Using ELECTRE III Method

Seema Gupta Bhol
KIIT University (Deemed), India

Jnyana Ranjan Mohanty
KIIT University (Deemed), India

Proshikshya Mukherjee
KIIT University (Deemed), India

Prasant Kumar Pattnaik
KIIT University (Deemed), India

ABSTRACT

The Indian economy is driven by its agricultural sector. Industries based on agricultural produce are important as they give a competitive market for the agricultural production. Mustard is one of the major cash crops selected for this chapter. Mustard oil is used as cooking medium as well as other purpose in Indian households. Selecting the best location for setting up a mustard mill can be considered as a multiple criteria decision-making problem (MCDM), and ELECTRE III method is used and explained in detail to rank different location options in increasing order of suitability.

DOI: 10.4018/978-1-5225-9004-0.ch007

INTRODUCTION

India is leading producer of mustard; it is ranked third after China and Canada (Kumar, Premi, and Thomas). This plant belongs to cabbage family (Brassica); its botanical name is Brassica juncea. India produces 12 percent of world production (Kumar, Premi, and Thomas). India is also leading consumer of mustard. Mustard is second most important oil seed crop of India after Groundnut. The plant thrives in north and west India, mainly Satluj-Ganga plain. Indian mustard is cultivated in the states of Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh, and Gujarat which contribute 81.5% area and 87.5% production (Kumar, Premi, and Thomas). Alwar, Mathura, Morena are leading mustard producing districts in state of Rajasthan, Uttar Pradesh, Madhya Pradesh respectively.Rapeseed-Mustard is the main oilseed crop for the Rabi season which is planted on more than 74% area covered under oilseeds ("Executive Summary"). Mustard oil is main product of mustard seed. Oil can be extracted using cold pressing (kachhi ghani) or mechanical expelling and solvent extraction (Swati and Sehwag, 2015). Mustard oil accounts for 18% of Indian edible oil consumption ("Executive Summary"). Mustard seeds have 25-45% oil content and its oil cake makes important cattle feed and manure.

Taking into consideration the huge amount of mustard production and mustard oil consumption, it's profitable to setup mustard oil mill. The setting up of mustard mill depends upon various factors, thus the selection of suitable location can be considered as Multi criteria decision making problem. Selecting a location for the projects is common but difficult task. It is complicated because there are many criteria that needed to be compared. ELECTRE III method has several unique features like the concepts of outranking and the use of indifference and preference thresholds. The imprecise and uncertain nature of decision making can be incorporated, by using thresholds of indifference and preference. It allows the evaluation of alternatives to be undertaken as objectively as possible. Moreover, It is non-compensatory i.e. a very bad score on a criterion cannot be compensated by good scores on other criteria. ELECTRE models allow for incomparability and defines clear distinction between. Incomparability, and indifference (for alternatives a and b, when there is no clear evidence in favor of either a or b).