

**ECONOMIC MANUFACTURING OF PAPER BY BLENDING  
COMPETING MATERIALS**

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**Demanding customers, legislation and raw materials shortages in the modern world have motivated companies to minimize the environmental impact by re-designing their logistics network and potential raw material sources. The purpose of this paper is to develop a mathematical model to study the economic impact of blending two competing raw materials for sustainable development of paper industries in under-developed/developing country like India. A linear programming model for a paper supply chain is proposed to minimize paper manufacturing cost by optimally blending wood pulp and after-use paper. In addition to conventional supply chain issues, the model also considers the issues of quality, environmental concern and reusability in the paper industry. Improving quality of after-use paper by proper recovery network reduces the manufacturing cost. Increasing proportion of wood fiber in the finished paper decreases the cost even at the cost of degradation in the environment. Thus, it is upto the manufacturer to reflect its degree of environmental concern to the government and society by assigning higher environmental opportunity costs in the model. Difficulty in obtaining the estimates of the environmental and quality cost is a major limitation of the study. This research provides manufacturers with a simple mathematical model to compare the economic feasibility of blending wood pulp and after-use paper depending on market situation/requirement. The major contribution of the model is its capability to study the economic impact of blending by considering some of the important sustainable development issues like environment, quality, shortage and reusability under one objective function.**

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