

TRANSPORTATION OPTIMIZATION IN ECUADOR

Masters Thesis Proposal

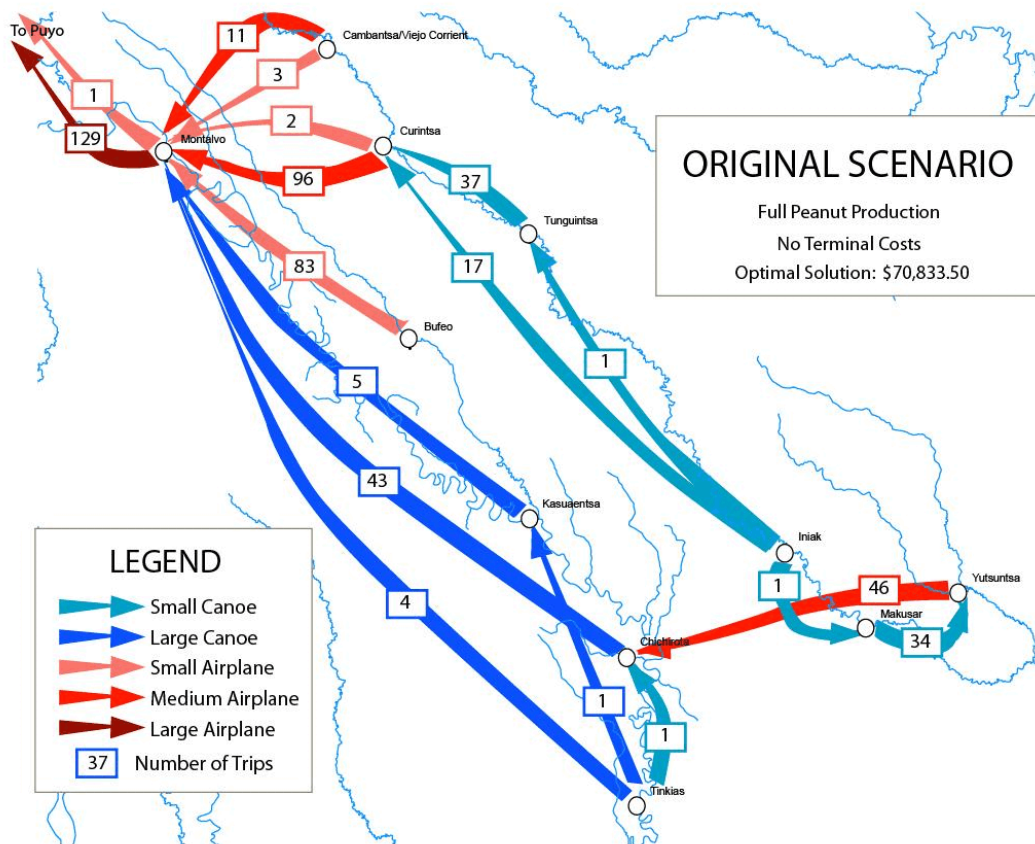
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ABSTRACT

Ecuador is a nation rich in biodiversity. Nowhere else in the country is this biodiversity more pronounced than in the rainforests of the Oriente region of eastern Ecuador. These same regions and the indigenous groups that inhabit them have come under serious pressure in recent years. In addition to rapid deforestation caused by cultivation, grazing, forestry, and road building, pressure to explore potential oil and gas reserves in the region is increasing. One response to the environmental threat of oil drilling has been to research alternative methods of sustainable economic development in the region, including the marketing of locally produced crops and handicrafts. An economically efficient system for transporting these products from this road-less region to market must be determined, however, in order to capitalize on their commercial potential. To address this problem, network optimization modeling and linear programming provide great potential. In this research project I will use a hybrid combination of min-cost network flow and location-routing models to determine an optimal transport network for the movement of goods from remote indigenous villages of the Ecuadorian Amazon. The objective of the model will be to maximize total profit by considering transportation costs, as well as production costs and capacities and current market prices. The data needed to address this problem include the production capacities of each community and the associated production costs, the weight and volume of the products, the transportation costs and capacities of the vehicles available, other necessary storage and seasonality considerations, and the market value and demand for such products. By applying linear programming techniques utilizing XpressMP optimization software, the data will be processed to determine the most economically efficient and cost-effective way of transporting products within the region. It is anticipated that such a model will provide helpful information for the decision-making process and that the successful implementation of such a model may help lead to economic self-sustainability for the indigenous groups of the region.



Study Area in the Pastaza region of Ecuador



Sample Results for Test Problem (created by GCU 591 class, Spring 2006)



Village (Yuntsunts) with air strip



Rodrigo Sierra, Project Leader, with guide



Mike and Ken Young (U Texas) with small airplane in Puyo