Decision Variables

Let = the tons of material to purchase for plant

( = 1 for Corn, 2 for Wheat, 3 for Potatoes)

( 1 for Yuma, 2 for Freson, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

Let the tons of product produced at plant to ship to customer

( = 1 for Regular, 2 for Green Onion, 3 for Party Mix)

( 1 for Yuma, 2 for Freson, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

( 1 for Salt Lake City, 2 for Albuquerque, 3 for Phoenix, 4 for San Diego, 5 for Los Angeles, 6 for Tucson)

Let  1 if production occurs at plant

( 1 for Yuma, 2 for Freson, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

0, otherwise

Let 1 if production occurs in CA

0, otherwise

Let 1 if production occurs in AZ

0, otherwise

Parameters

Let = the distance in miles from plant to customer

( 1 for Yuma, 2 for Freson, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

( 1 for Salt Lake City, 2 for Albuquerque, 3 for Phoenix, 4 for San Diego, 5 for Los Angeles, 6 for Tucson)

Let = the cost in dollars to purchase 1 ton of material for plant

( = 1 for Corn, 2 for Wheat, 3 for Potatoes)

( 1 for Yuma, 2 for Fresno, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

Let = the proportion of material in product

( = 1 for Corn, 2 for Wheat, 3 for Potatoes)

( = 1 for Regular, 2 for Green Onion, 3 for Party Mix)

Let = the fixed cost in dollars to operate plant

( 1 for Yuma, 2 for Fresno, 3 for Tucson, 4 for Pomona, 5 for Santa Fe, 6 for Flagstaff, 7 for Las Vegas, 8 for St. George)

Let = the demand in tons for product at customer

( = 1 for Regular, 2 for Green Onion, 3 for Party Mix)

( 1 for Salt Lake City, 2 for Albuquerque, 3 for Phoenix, 4 for San Diego, 5 for Los Angeles, 6 for Tucson)

Objective

Production Cost Shipping Cost Fixed-Cost

Minimize

Subject To

**Supply Output Constraint + Fixed Cost Constraint**

(8 total constraints, 1 for each plant)

Product-Ingredient Mix Constraint

(24 total constraints: 3 products \* 8 plants)

**Location Constraint**

**Demand Constraint**

(18 total constraints: 3 products \* 6 customers)

are integers ≥0.

are binary.

M is an arbitrarily large number.