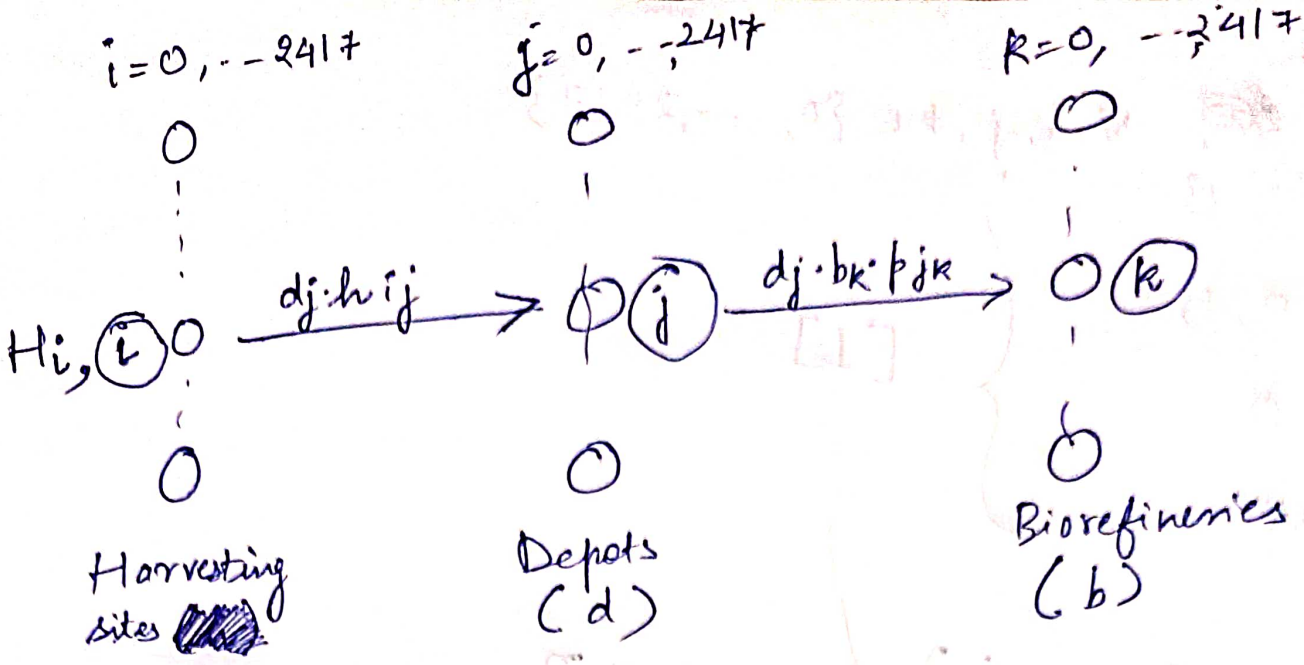

$d_j \cdot h_{ij}$ → harvest flowing from i^{th} harvesting site to j^{th} depot

$d_j \in \{0, 1\}$, H_i → harvest produced at i^{th} location

$d_j \cdot b_k \cdot p_{kj}$ → pellets flowing from j^{th} depot to k^{th} biorefinery

$b_k \in \{0, 1\}$, s_{ij} → distance from i^{th} to j^{th} location

$$\text{cost}_{\text{transport}} = \left(\sum_{i,j} s_{ij}\, d_j\, h_{ij} + \sum_{j,k} s_{jk} \cdot d_j \cdot p_{jk} \cdot b_k \right)$$

$$\text{Cost}_{\text{underutilization}} = \left[\sum_j d_j \left[20{,}000 - \sum_i h_{ij} \right] + \sum_k \left[1{,}00{,}000 - \sum_j p_{jk} \right] b_k \right]$$

total cost = 0.001 × cost of transpost + cost of underutilization

(excluding forecast

Constraints

$\forall i, j, k \in \{0, -, 2417\}$

$$\left.\begin{aligned} d_j &\in \{0, 1\} \\ b_k &\in \{0, 1\} \\ h_{ij} &\geq 0 \\ p_{jk} &\geq 0 \end{aligned}\right\} [1]$$

$$\left.\begin{aligned} \sum d_j &\leq 25 \\ \sum b_k &\leq 5 \end{aligned}\right\} [5] \& [6]$$

$$\left.\sum_j h_{ij} \leq H_i\right\} [2]$$

$$\left.\sum_i h_{ij} \leq 20,000\right\} [3]$$

$$\left.\sum_j p_{jk} \leq 1,00,000\right\} [4]$$

$$\left.\sum_{j,k} d_j b_k p_{jk} \geq (0.8) \sum_i H_i\right\} [7]$$

$$\left.\left(\sum_i h_{ij} d_j - \sum_k p_{jk} d_j b_k\right) \leq 0.001\right\} [8]$$