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Hackathon Problem: AI + Supply Chain Hackathon: The Green Logistics Challenge （AI 赋能供应链黑客松：绿色物流挑战赛）

Mr. Young is an Operations Director in a co-operative formed by several vegetable farms. He wants to implement a workable strategy that fulfils the following requirements:

1. Co-operative farms and locations (refer to the datasets)

1.1 The co-operative consists of multiple farms across three production clusters:

- Cameron Highlands (Pahang)
- Batang Berjuntai (Selangor)
- Air Hitam (Johor)

1.2 Each cluster has 5 to 10 farms joining the co-operative.
1.3 Each farm produces 2 to 3 types of vegetables (SKUs).

2. Customers and service requirements (refer to the datasets)

2.1 Customers are located across all states in Peninsular Malaysia.
2.2 Customer types include supermarkets, wholesalers in pasar borong, community retail stores, and restaurants.
2.3 Some customers request cold-chain delivery; not all customers require it.
2.4 Freshness of products must be considered.

3. Your tasks (Preliminary & Presentation)

3.1 Use Dataset_Preliminary_Presentation.
3.2 You can use any tools to assist you in analyzing the problem and propose the solutions.
3.3 Provide TWO proposals (Proposal A and Proposal B) and choose the better one using KPIs.
3.4 Provide a simple simulation for your selected proposal under scenarios S0–S2.

4. Data and tool policy

4.1 The organiser provides an official dataset (farms, products, customers, demand, vehicles, scenarios, and coordinates).

4.2 Route estimation is OPEN. The dataset provides coordinates (lat/lon) only. Teams may use any tools to estimate distance_km and travel_time_h.

4.3 For transparency, include in your report appendix:

(i) Route Summary Table: From, To, Distance (km), Time (h), Tool/Source.

(ii) Delivery Plan Table: Customer, SKU, Boxes delivered, Vehicle type, Cold-chain (Y/N), Notes.

If you use a hub or multi-stop routing, split the route into multiple rows.

5. KPI Definitions and Calculation (Fuel-based Green KPI and 100% Demand Constraint)

5.1 Hard constraint: All demand must be fulfilled 100% in all scenarios. If a proposal cannot meet demand, it is considered invalid.

5.2 Fuel price parameter (default unless organiser updates): FUEL_PRICE_RM_PER_L = 2.05. Teams must state the value used.

5.3 Minimum KPIs to report (Proposal A vs B, and selected proposal under scenarios):

• Total Cost (RM) = Σ [fixed_cost_per_trip_rm + (fuel_l_per_km × FUEL_PRICE_RM_PER_L + maintenance_rm_per_km) × distance_km].

• Total Fuel (L) = Σ (fuel_l_per_km × distance_km).

• On-time compliance (%) = % deliveries with total time ≤ customer max_lead_time_h (teams must state any waiting/handling assumptions; simplest is travel_time_h only).

• Discard rate (%) = spoiled/expired boxes ÷ dispatched boxes (ambient vs cold shelf life).

Optional supporting metrics: total km, number of dispatches, freshness index.

6. Assumptions

6.1 available_days indicates the days a farm can supply/dispatch to the co-op. On non-available days, assume no harvest for the co-op (no farm storage modelling).

6.2 Spoilage/waste is counted ONLY after dispatch (once products enter delivery). If capacity is available but not dispatched, treat it as not harvested and do NOT count it as spoilage.