Company Water Footprint Guide

For the Replit Development Agent

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1. Objective

This document provides a detailed technical guide for the Replit Agent to build a **Company Water Footprint Calculator and Visualizer**. This feature will enable clients to capture their total operational water usage and view a comprehensive breakdown of their entire water footprint, combining agricultural, processing, and operational data.

2. Part 1: Backend & Database Enhancements

2.1. Data Storage (`company_data` table)

- **Requirement:** We need to store the company's total operational water consumption. The existing `company_data` table is suitable for this.
- **Action:** The backend must be updated to handle a new `data_type` value:
    - `total_metered_water_use`

2.2. New API Endpoint

- **Endpoint:** `POST /api/company/water`
- **Request Body:** `{ "total_consumption_m3": 1500, "reporting_period": "..." }`
- **Logic:** This endpoint will create a new record in the `company_data` table with the `data_type` set to `total_metered_water_use` and the value in cubic metres.

2.3. New Calculation Service Logic (Revised for Accuracy)

- **Service:** `WaterFootprintService`
- **Function:** `calculate_total_company_footprint(company_id)`
- **Logic:** This function will perform the following revised calculation to prevent double-counting:
    1. **Calculate Total Agricultural Water:**
        - Fetch all completed product LCAs for the company.
        - For each product, multiply its per-unit **agricultural water** footprint by the total number of units produced.

        - Sum these values to get the `total_agricultural_water`. This is all off-site water.
    2. **Calculate Total Processing & Dilution Water:**
        - From the same product LCAs, multiply the per-unit **processing and dilution water** by the total units produced.
        - Sum these values to get the `total_processing_and_dilution_water`.
    3. **Fetch Total Metered Water:**
        - Fetch the `total_metered_water_use` value from the `company_data` table. This is the total from the utility bill.
    4. **Calculate Net Operational Water:**
        - Perform a subtraction: `net_operational_water = total_metered_water_use - total_processing_and_dilution_water`. This isolates the water used for cleaning, sanitation, etc.
    5. **Return Breakdown:** Return a JSON object with the accurate, non-overlapping breakdown: `{ "total": ..., "agricultural_water": ..., "processing_and_dilution_water": ..., "net_operational_water": ... }`.

3. Part 2: Frontend Data Collection

A new data entry section must be added to the **'Company' tab** of the application.

- **UI Section:** "Company Water Usage"
- **Headline:** "What is your facility's total water consumption?"
- **Form:**
    - **Field 1:** Total Metered Water Consumption (Cubic Metres - m^3) (Numeric Input).
    - **Field 2:** Data Source (Optional) (File Upload for a water bill).
- **Guidance (Revised):** A prominent tooltip will explain: "Please enter the **total water consumption** for your production facility from your utility bill for the reporting period. Our tool will automatically allocate this between the water that goes into your product (processing & dilution) and the water used for general operations (like cleaning and cooling)."
- **Action:** A "Save" button that calls the `POST /api/company/water` endpoint.

4. Part 3: Frontend Visualization

A new visual component must be added to the main **Dashboard** (`/app/dashboard`).

- **UI Component:** `WaterFootprintBreakdownChart`
- **Type:** A Pie Chart or a Donut Chart (using the Recharts library).
- **Data:** The chart will be populated by a new API endpoint, `GET /api/company/water-footprint`, which calls the revised `WaterFootprintService`.
- **Visual Breakdown (Revised for Clarity):** The chart must clearly display the total company water footprint, with distinct, color-coded segments for:
    1. **Agricultural Water** (Off-site, for ingredients)

2. **Processing & Dilution Water** (On-site, in the product)
3. **Net Operational Water** (On-site, for cleaning, cooling, etc.)

- **Interactivity:** When a user hovers over a segment of the chart, a tooltip must appear showing the name of the category and its total volume in cubic metres (m^3).
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