**Integration Documentation for Food Waste Analysis Database**

**Overview**

This document provides guidelines for integrating external data sources and systems with the food waste analysis database. The goal is to enhance the database's capabilities and provide a more comprehensive understanding of food waste patterns and trends.

**Integration Methods**

1. **API Integration:**

* **Identify APIs:** Research and identify relevant APIs from external sources (e.g., government agencies, research institutions, food retailers) that offer data related to food consumption, pricing, or demographic information.
* **Authentication:** Obtain necessary API keys or credentials to access the data.
* **Data Extraction:** Use programming languages like Python or R to fetch and store data from the APIs in a temporary data structure.
* **Data Transformation:** Transform the data into a format compatible with your database schema.
* **Data Loading:** Load the transformed data into your database using SQL statements or database-specific tools.

1. **Data Import:**

* **File Formats:** Ensure external data is provided in compatible formats (e.g., CSV, JSON, Excel).
* **Data Validation:** Validate the data for accuracy and completeness before importing.
* **Database Tools:** Use database-specific tools or SQL statements to import the data into your database.

1. **ETL (Extract, Transform, Load):**

* **ETL Tools:** Consider using ETL tools like Talend, Informatica, or Pentaho to automate the data integration.
* **Data Extraction:** Extract data from various sources (e.g., files, databases, APIs).
* **Data Transformation:** Clean, standardise, and transform the data to match your database schema.
* **Data Loading:** Load the transformed data into your database.

**Data Sources**

* **Government Agencies:**

Census data

Economic indicators

Food safety regulations

* **Research Institutions:**

Academic studies

Survey data

Research reports

* **Food Retailers:**

Sales data

Inventory data

Customer demographics

* **Public Health Organizations:**

Disease surveillance data

Health indicators

* **Environmental Agencies:**

Climate data

Resource availability

**Data Integration Considerations**

* **Data Quality:** Ensure the integrated data is high quality and reliable.
* **Data Security:** Implement appropriate security measures to protect sensitive data.
* **Data Privacy:** Comply with data privacy regulations and obtain necessary consent.
* **Data Consistency:** Maintain consistency between the integrated data and existing data in your database.
* **Data Governance:** Establish governance policies and procedures for data integration.

**Example Use Cases**

* **Integrating census data:** Enhance understanding of population demographics and their relationship to food consumption patterns.
* **Integrating food price data:** Analyze the impact of food prices on household food waste.
* **Integrating weather data:** Examine the correlation between weather conditions and food waste.
* **Integrating social media data:** Analyze public sentiment and trends related to food waste.