Perspective

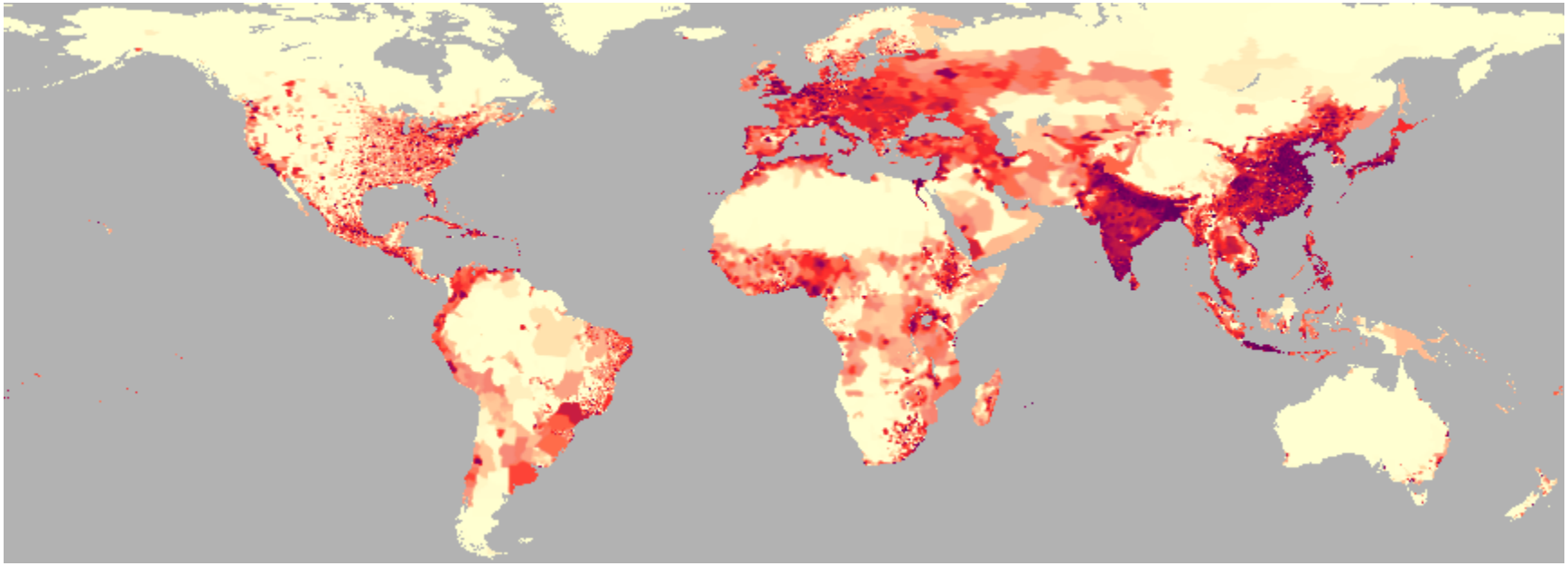
LanguaL Structured Vocabulary:

USDA Perspective

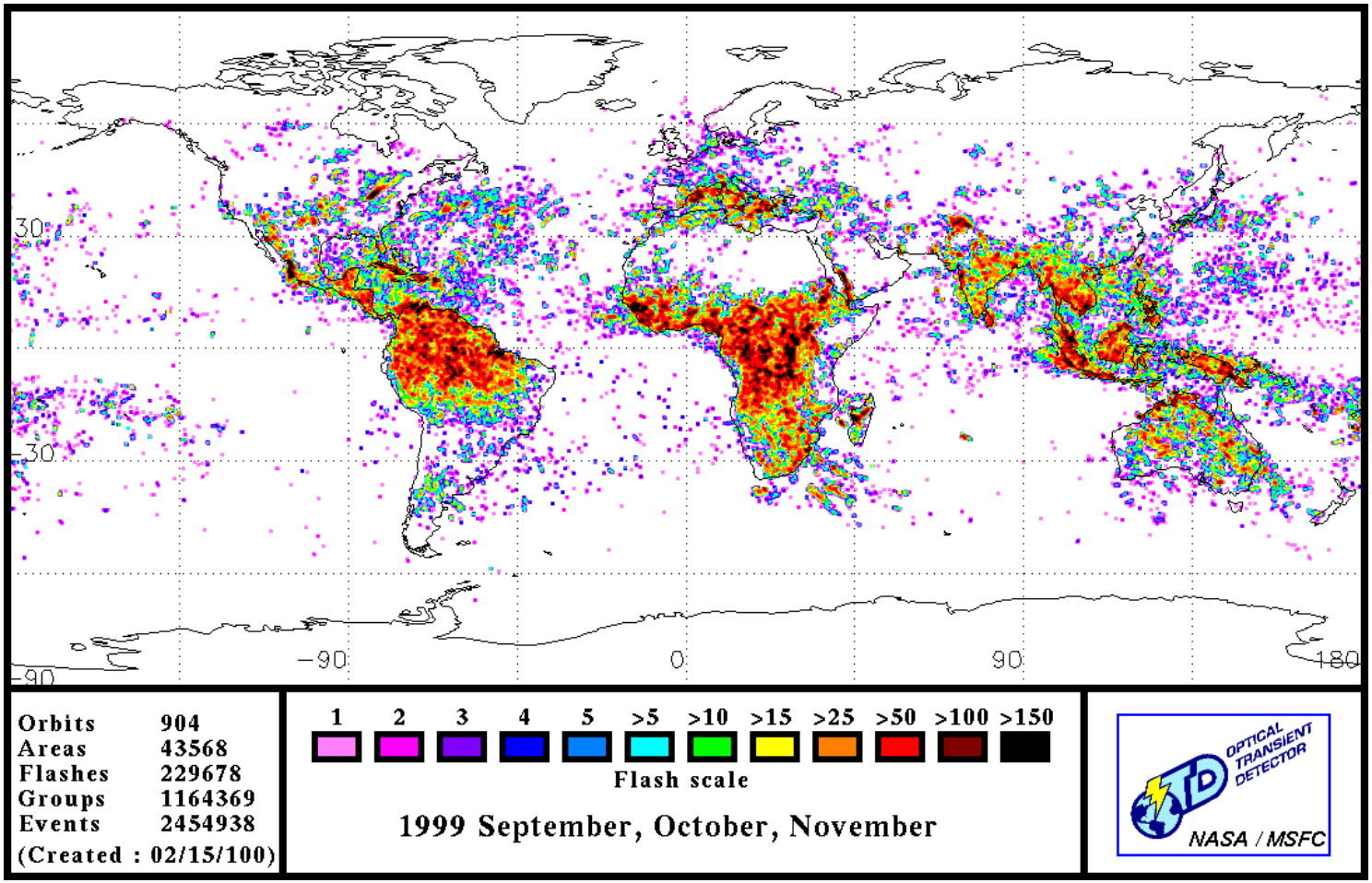
Joanne Holden

Perspective: Earth Rise from the Moon

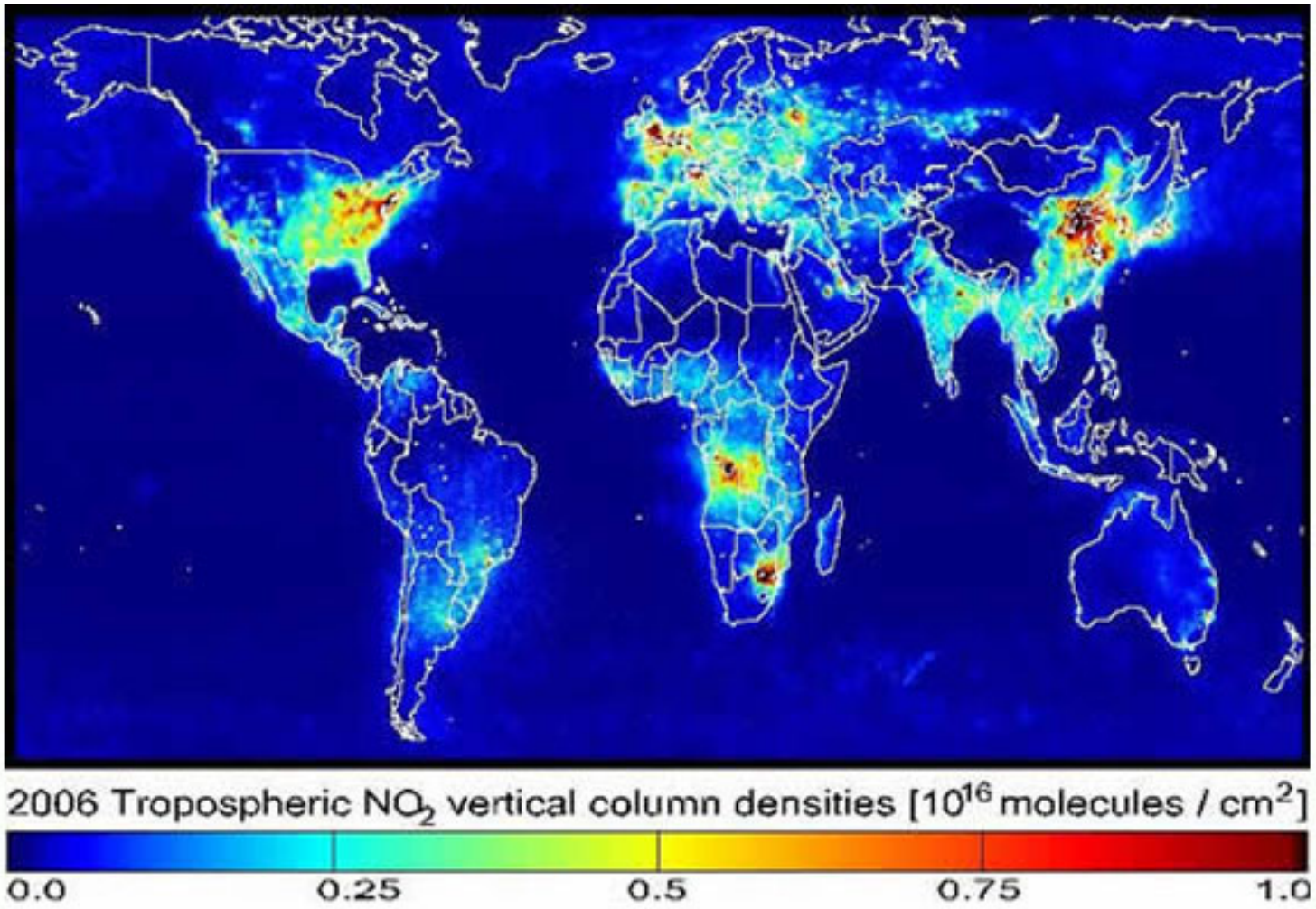
Perspective: Population Density



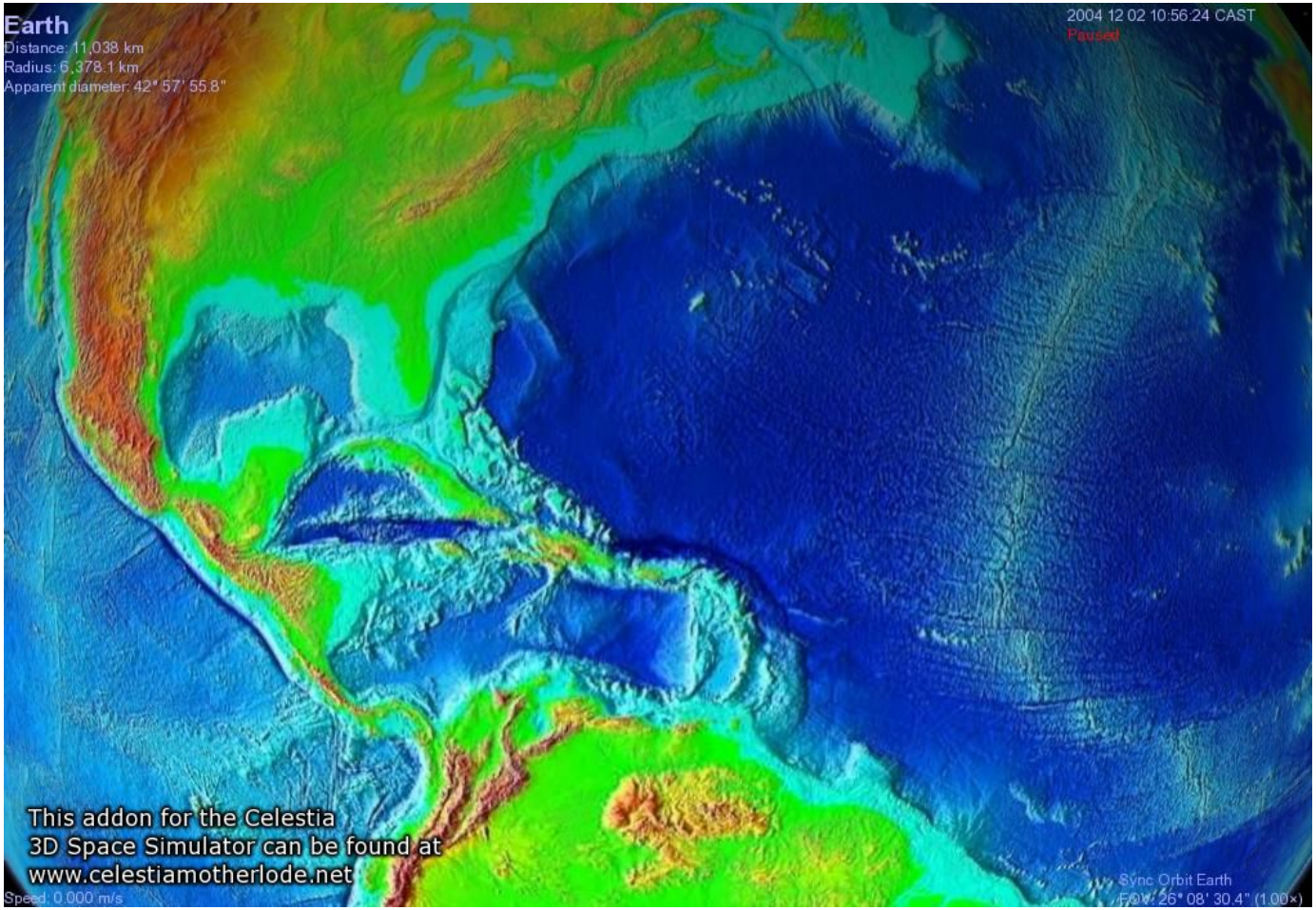
Perspective: Lightening Strikes



Perspective: Pollution in the Atmosphere



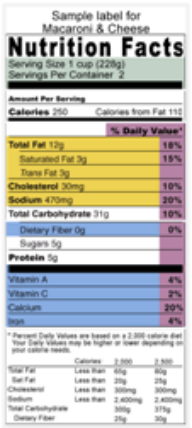
Perspective: Water



Perspectives

- **Each is a different view on the same object – the earth**
- **Each provides unique information about the same object**
- **People who research the common object can share information to discover relationships among their perspectives**

USDA Data Customers



World wide

Data: FDA, EPA, WHO, EuroFIR, UN FAO

Keyword search

Integrate

Generate label

Analyze

Foods and Dishes

Pack, stock, and label

Analyze

Food growers

Food manufacturers

Food preparers

Trace illness to origin

Environmental Protection Agency: Perspective

- Descriptions of foods and commodities for integration with pesticide and contaminant analysis and estimation

LanguaL, EPA and Potential Contamination

WHO GEMS

Global Environment Monitoring System - Food Contamination Monitoring and Assessment Program studied:

Food description	LanguaL facet term codes (FTCs)
Apples, raw, with skin	A0143 A0669 B1245 C0137 E0150 F0003 G0003 H0003 J0001 K0003 M0001 N0001 P0024
Banana, raw	A0143 A0673 B1266 C0167 E0150 F0003 G0003 H0003 J0001 K0003 M0001 N0001 P0024
Tomato, raw	A0152 A0677 B1276 C0140 E0150 F0003 G0003 H0003 J0001 K0003 M0001 N0001 P0024
Milk, whole, fluid	A0148 A0719 B1201 C0235 E0123 F0001 G0003 H0003 J0001 K0003 M0001 N0001 P0024

WHO GEMS CCPR Total Diet Study

The GEMS Codex Committee on Pesticide Residues (CCPR) analyzed the occurrence of the following contaminants in the LanguaL-coded foods:

Examples of pesticides	Examples of heavy metals	Examples of industrial chemicals	Byproduct by Cooking
Aldrin/dieldrin DDT (complex) Endosulfan	Cadmium Lead Mercury	Polychlorinated biphenyls Polybrominated diphenyls Dioxins	Acrylamide

FDA Food/Analyte Matrix from FDA Total Diet Study

The FDA Total Diet Study also used LanguaL to measure the occurrence of the following contaminants:

Food description	LanguaL	MRMs	CPA	Phen	Carb	ETU	Benz	VOC	Merc
Apples, raw, with skin	FTCs above	x		x	x	x	x	x	
Banana, raw		x		x	x	x	x	x	x
Tomato, raw		x			x	x	x	x	x
Milk, whole, fluid		x	x					x	x

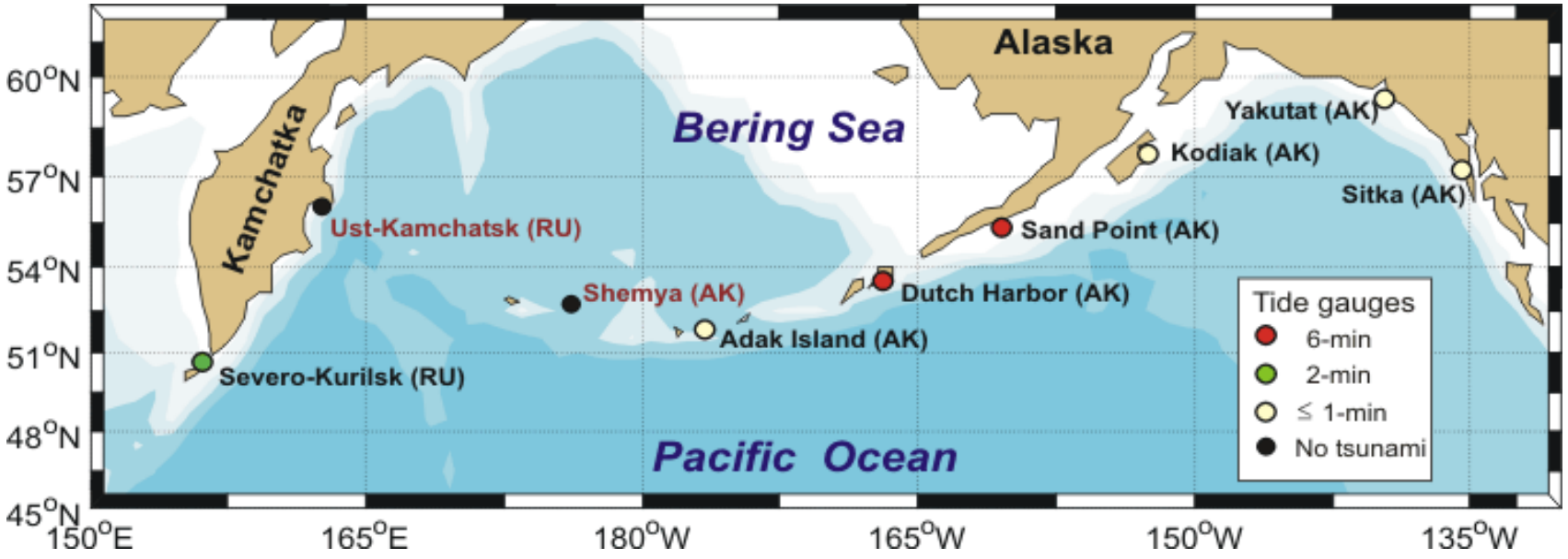
Abbreviations for the analytes listed in the food/analyte matrix are:

FTCs: (LanguaL) Facet Term Codes	Phen: phenylureas	Benz: benzimidazoles
MRMs: multi-residue methods for pesticides	Carb: carbamates	VOC: volatile organic compound
CPA: chlorophenoxy acids	ETU: ethylenethiourea	Merc: mercury

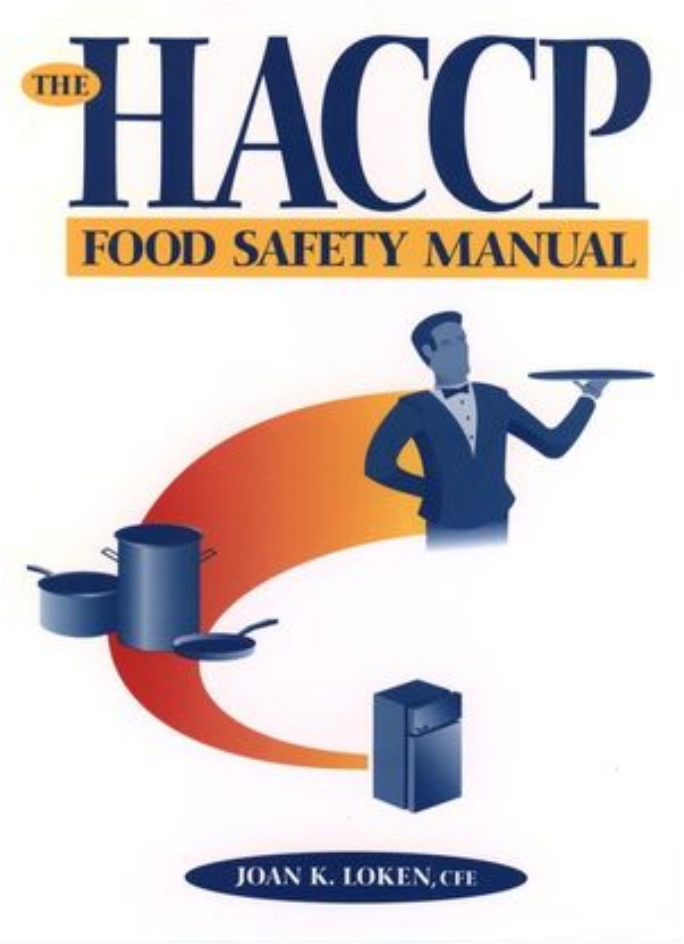
FDA Perspective

- Needs a method to describe changes to food as it moves – from farm to fork – thru the food chain, and the means to locate the source of food borne illness

Perspective: Origin of the Food



Perspective: Food Preparation Processes



LanguaL, FDA and Traceability

- **Lot-level information to trace food borne illness to its origin**

GS1 GTIN

GS1 GPC Brick code

Brick attribute values

Brick equivalence *set* of LanguaL facet terms

An extensive but incomplete data record

- *Member* of the Brick equivalence *set* of LanguaL facet terms.
- Additional LanguaL facet terms.

- Nutrient data base ID
- Nutrients values for a nutrition fact panel

Production Input
- Supplier ID
- Supplier Lot Number
- Food ID
- Food description
- Expiration date

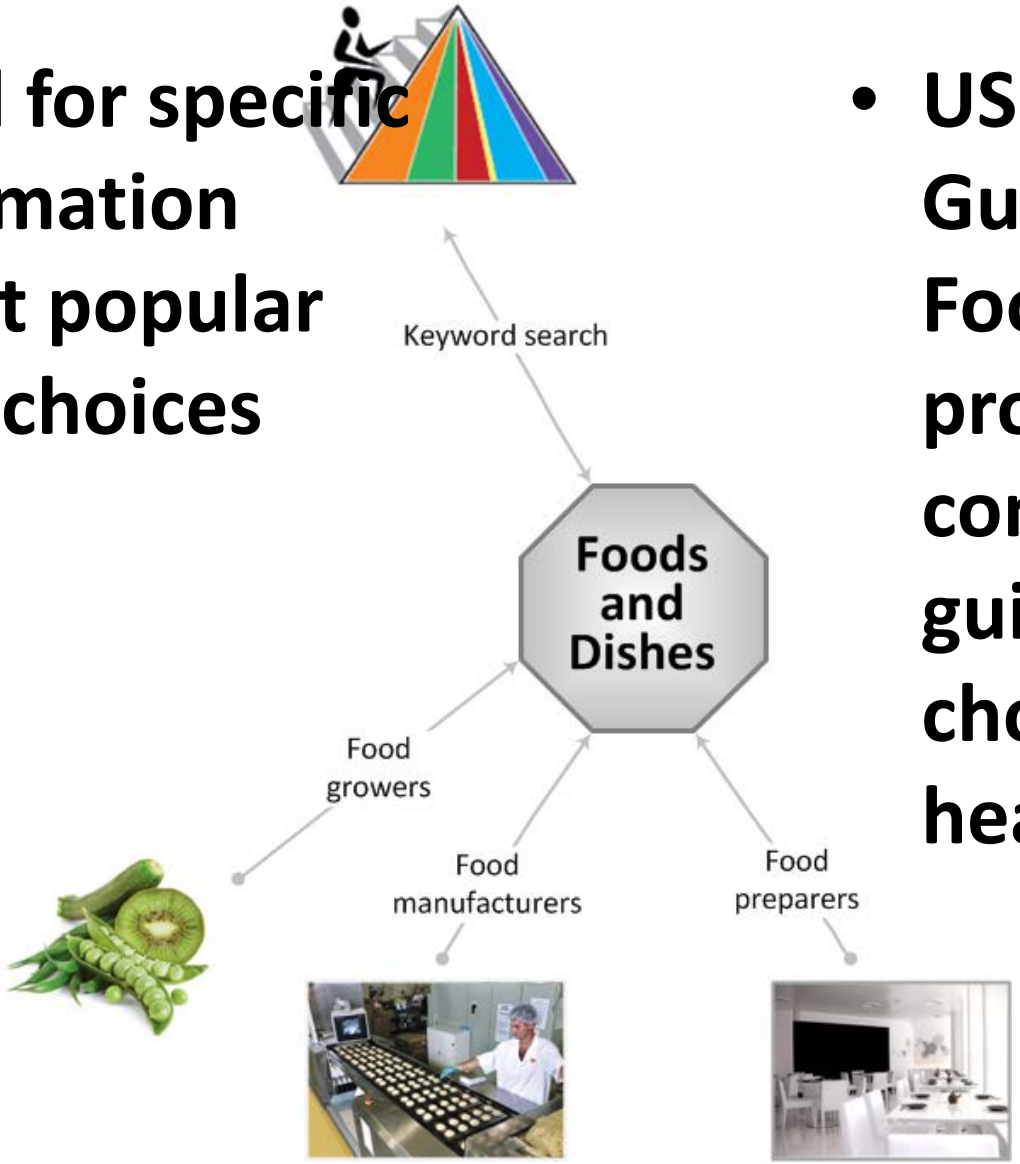
Production Output
- Output Lot Number
- Food ID
- Food description
- Expiration date

Additional data to complete a single record

Unified food packaging, description, nutrition and trace data

Food Pyramid Perspective

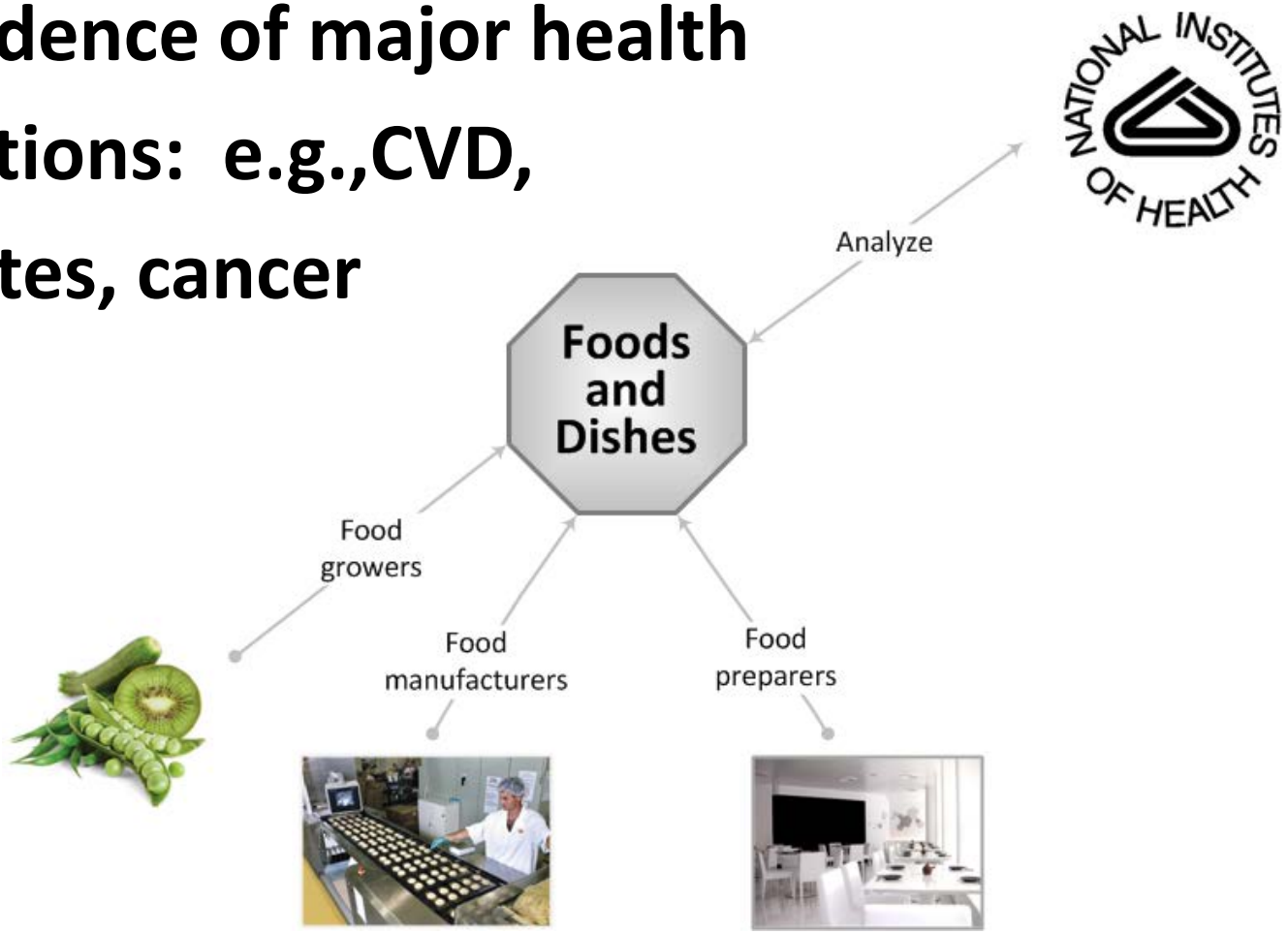
- **Need for specific information about popular food choices**



- **US Dietary Guidelines and Food Pyramid provide consumers with guidance for choosing a healthy diet**

Dietary Intake and the Health Perspective of the NIH

- **How does dietary intake of components affect incidence of major health conditions: e.g.,CVD, diabetes, cancer**



Collaboration

- **Each entity can make a contribution based on their exposure and knowledge and perspective**

Names Are Not Enough!

- **What are these products?**
  - **Fudge**
  - **Corn dogs**
  - **Bangers and Mash**
  - **Chicken Fricassee**

- **What are the ingredients? What was added?**
- **What is the source of the food? How was it prepared?**
- **What is the nutritional value of the food? What contamination may be present?**
- **What allergies might be triggered by the food?**

Fluid Milk Types

- **Milk, whole, 3.25% milk fat, with added vitamin D**
- **Milk, reduced fat, 2% milk fat, with added vitamin A and vitamin D**
- **Milk, low fat, 1% milk fat, with added vitamin A and vitamin D**
- **Milk, nonfat, with added vitamin A and vitamin D (fat free or skim)**

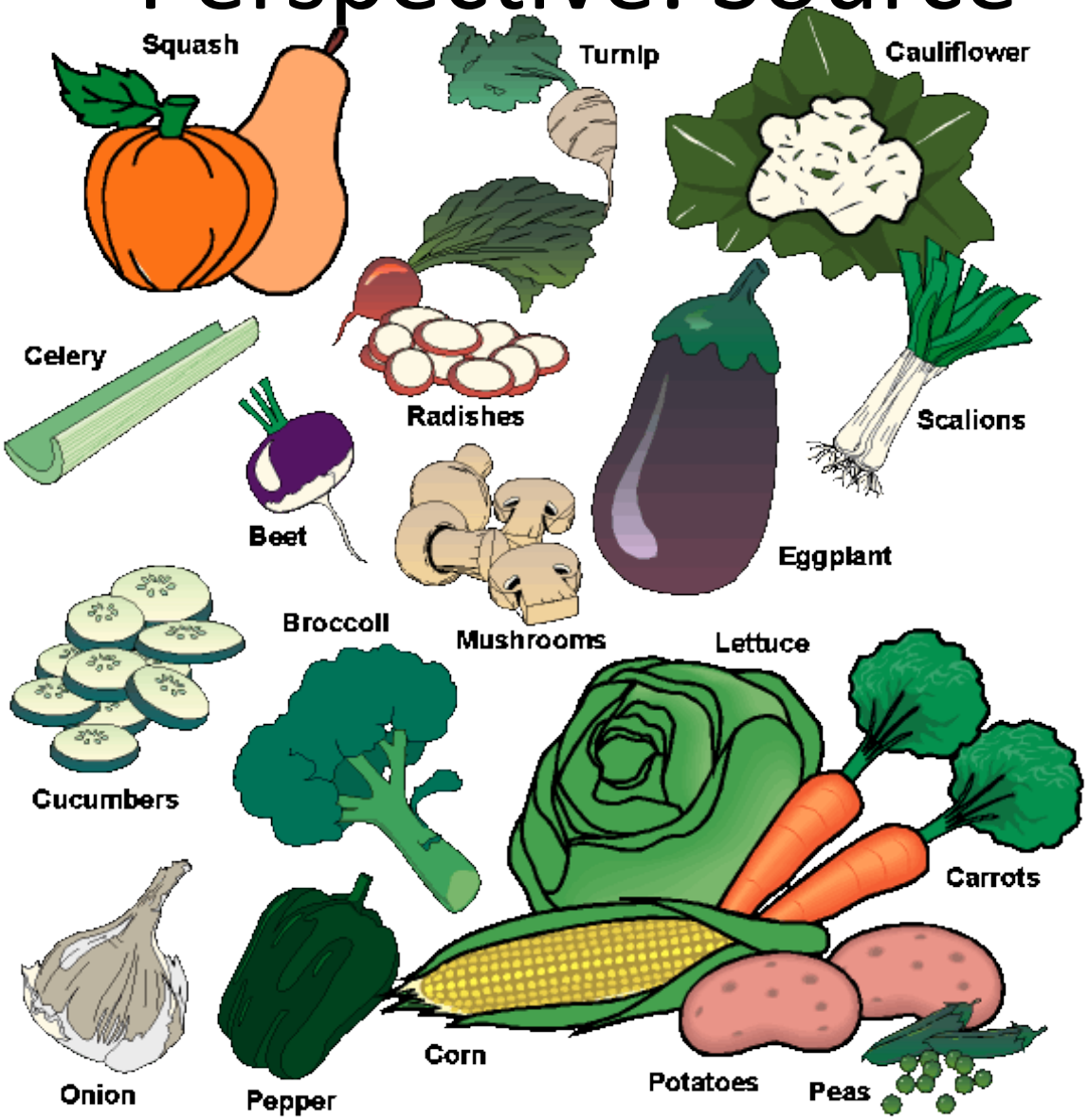
US Databases and LanguaL

- **USDA databases for composition and consumption are used to create a universe of commonly consumed products.**
- **The LanguaL controlled vocabulary provides a common definition of foods with diverse facets**
- **Manufacturers can use the vocabulary to create a specific catalog of descriptors for their products**
- **Agencies, vendors and consumers can:**
  - **Access the data they need**
  - **Retrieve foods and products information to address challenges (e.g., allergies) within the food network**

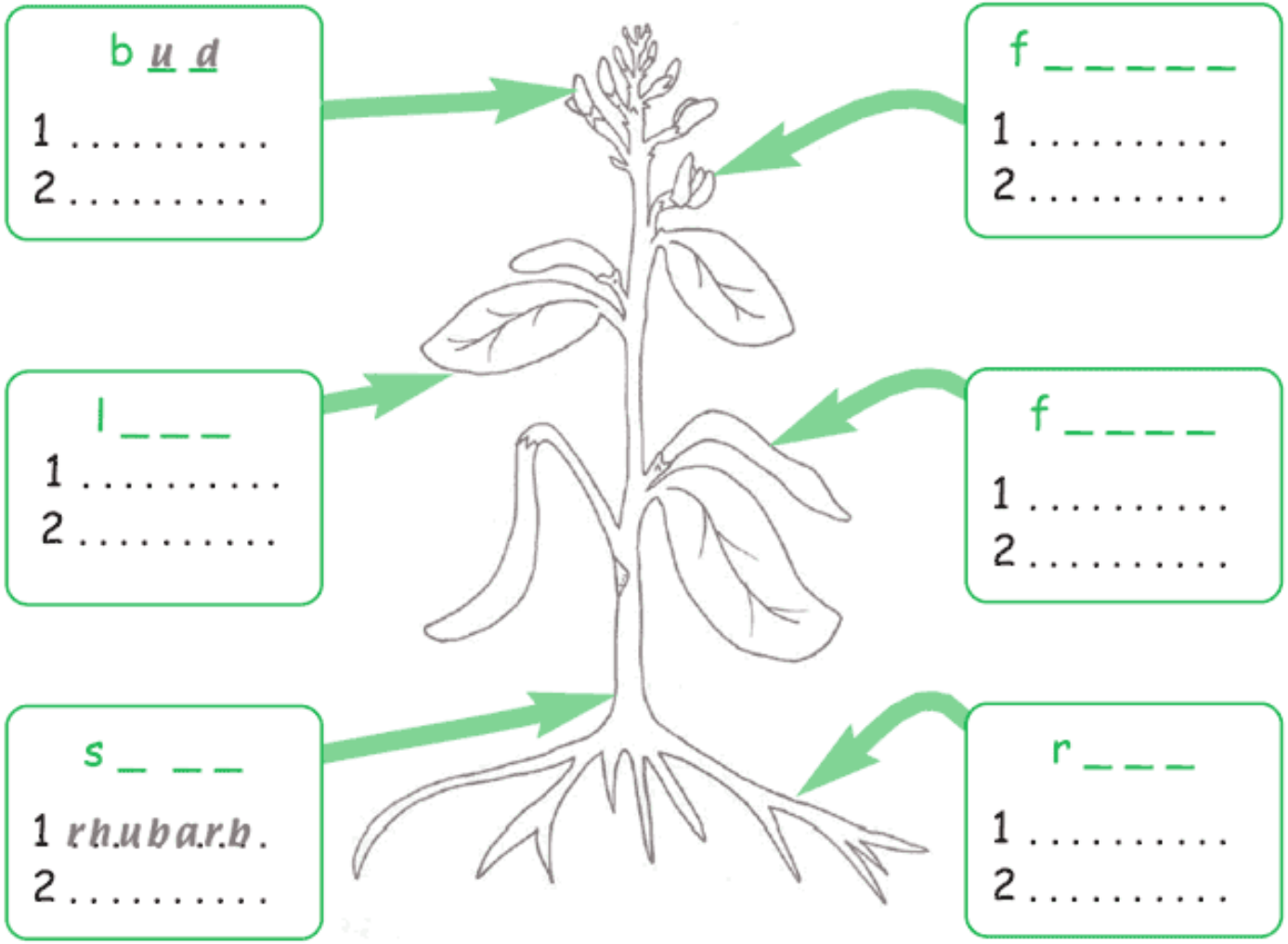
Controlled Vocabulary For Food

- Source
- Part of the source
- Physical state, shape or form
- Extent of heat treatment
- Cooking method
- Treatments applied
- Preservation method
- Packing medium
- Container or wrapping
- Food contact surface
- Consumer group, dietary use, label claim
- Geographic origin
- Adjunct characteristic

Perspective: Source



Perspective: Part of the Source



Perspective: Physical Shape or Form

Perspective: Physical Shape or Form

Perspective: Cooking Method

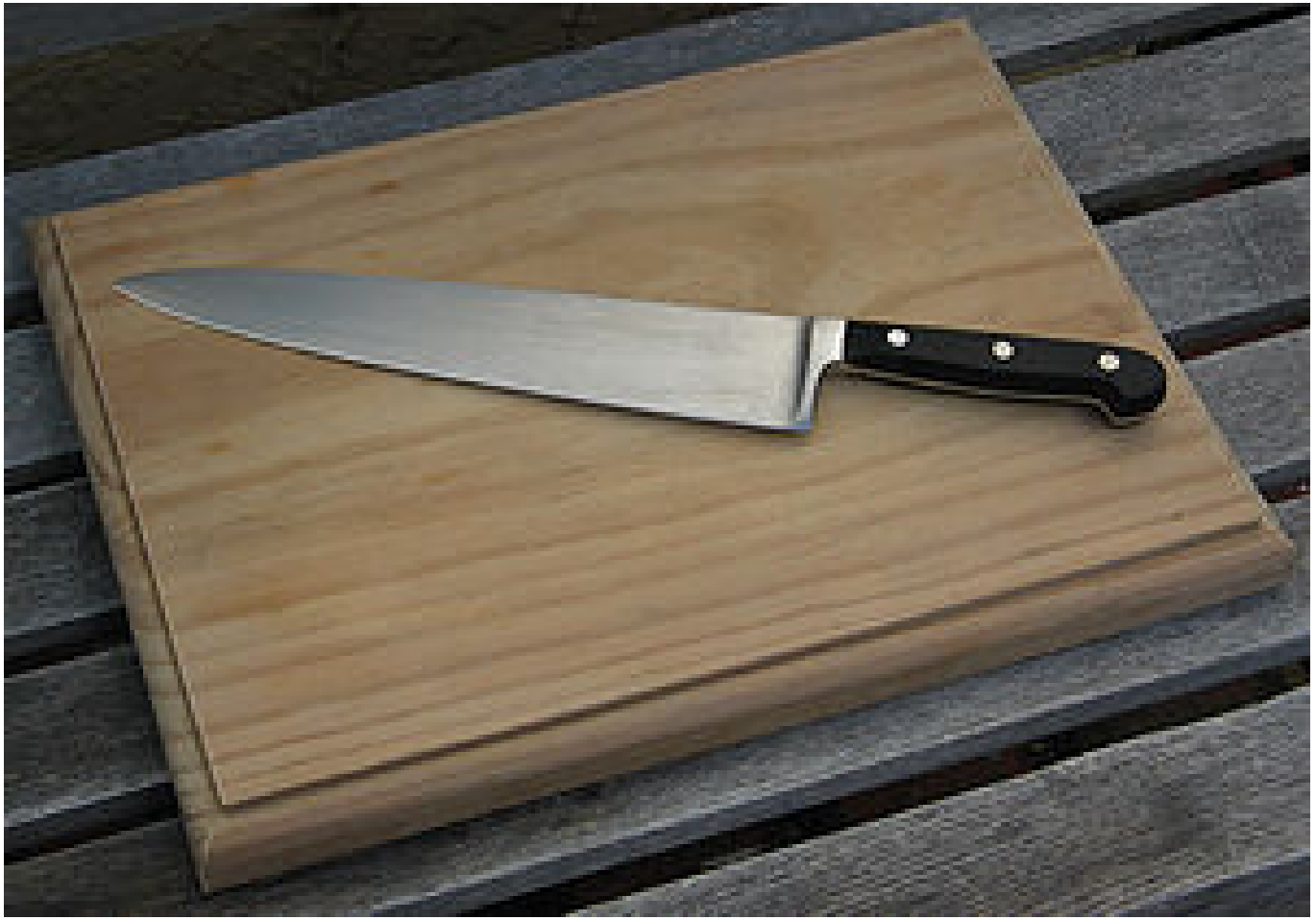
Perspective: Treatments Applied

Perspective: Preservation Method

Perspective: Packing Medium

Perspective: container

Perspective: Food Contact Surface



Perspective: Religious Customs

How to Stay Current with Reformulation and Innovation?

- **Every vendor can differentiate their products**
- **Food authorities need to help them register and document their "differentials"**
- **Make it easy!**

Development and Dissemination of LanguaL Files

- For foods NDL will factor or code and disseminate with the SR (23…) database
- Langual codes will be distributed with SR releases
- Interaction among federal agencies, industry and other stakeholders is critical
- Data analysis and retrieval according to facets will be possible through various existing search mechanisms
- Facilitate product indexing and/or registration

And, So…

- **USDA, US-FDA and EPA seek a common language for food information integration**
- **Controlled vocabulary provides the basis for a food classification system**
- **Multiple hierarchical approach can include diverse facets about foods and DS**
- **Clear definition of the elements is driven by science, the regulations, and the accepted conventions of the food systems**
- **“State of the art” approach to indexing and retrieval is critical**

How to describe Dietary Supplements?

- **Let's start with a blank sheet of paper**

Benefits of Common Perspectives

- Standardized vocabulary
- Specialized authorities
- Distributed responsibilities
- Shared information systems
- Integrated research results

US DS Databases and LanguaL

- US databases for composition and consumption of DS are used to create a universe of commonly consumed products.
- The LanguaL controlled vocabulary can provide a common definition of DSs with diverse facets
- Manufacturers can use the vocabulary to create a specific catalog of descriptors for their products
- Agencies, vendors and consumers can:
  - Access the data they need
  - Retrieve DS products information to address challenges (e.g., intended uses) within the DS network

Proposed Vocabulary For Dietary Supplements

- Source
- Part of the source
- Physical state, shape or form
- Extent of heat treatment
- Cooking method
- Treatments applied
- Preservation method
- Packing medium
- Container or wrapping
- Food contact surface
- Consumer group, dietary use, label claim
- Geographic origin
- Adjunct characteristic

Conclusion

- USDA, ODS, NCHS, and US-FDA and other stakeholders seek a common language for food (and DS) information integration
- Controlled vocabulary can provide the basis for a classification system
- Multiple hierarchical approach can include diverse facets about foods and DS
- Clear definition of the elements should be driven by science, the regulations, and the accepted conventions of the food and DS systems
- "State of the art" approach to indexing and retrieval is critical

A Global Food Supply Requires Global Integration of Dietary Information Systems

- Food and DS safety and traceability
- Nutrient content and intake studies
- Trade and regulation

Acknowledgements

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Collaboration among Perspectives

Comprehensive Dietary Supplements Record

	International	Jurisdiction	Vendor	Registration	Tarrifs/Trade	Description	Nutrition	Valuation	Distribution Traceability	
1	Facets B - Z					Authority				1
2	Nutrient tags						INFOODS			2
3	Methods, nutrients			Authority						3
4	Methods, valuation			Authority						4
5	Valuation tags							Authority		5
6	Vendor ID			GS1 GTIN					GS1 GTIN	6
7	Product ID			GS1 GTIN					GS1 GTIN	7
8	LanguaL Facet A			Authorities						8
9	Methods, nutrients			USDA						9
10	Baseline, generic Facet Term Codes					USDA				10
11	Baseline, generic nutrients						USDA			11
12	Dietary Supplement ID			USDA	US ITC				FDA	12
13	Methods, valuation							NIH/FDA		13
14	Baseline, generic evaluation							NIH/FDA		14
15	Evaluation ID			NIH/FDA						15
16	Output Dietary Supplement ID				Vendor				Vendor	16
17	Values, specific Facet Term Codes				Vendor	Vendor				17
18	Values, specific nutrients						Vendor			18
19	Values, specific evaluation							Vendor		19

Dietary Supplements record = Terms + Terms + Values + Terms + Terms + Values + Terms + Terms + Values + Terms + Terms + Values + Terms + Terms + Values