

The Crop Dietary Nutrition Ontology (CDNO): aligning the domains of production and consumption

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Science communication

Nutritional composition



- Researchers
- Breeders



- Nutritionist
- Dietitians

Chickpea



Cowpea



Mung bean



Soybean



Bambara



Available dietary nutritional information

Data sources

- FoodData Central
- FAO/INFOODS guidelines:

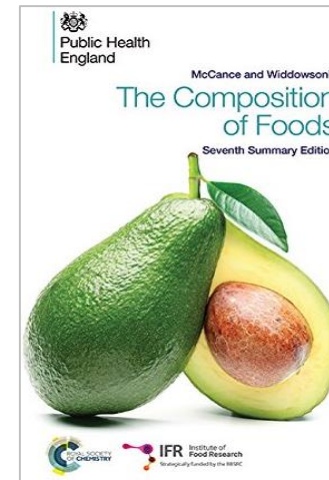
Food Composition DBs/Tables for nutritional content

low granularity

- no within-species variation
 - not cultivar-specific
- + key micronutrients often under-reported
- + no functional information



Innovative strategies for the management of dietary nutritional information in crop plants are required (Andrés-Hernández et al. 2020).



Bio-Ontologies that represent nutrition data and chemical components

Ontologies not efficiently managed, updated, or lack of granularity within the terminologies

- Food-Oriented Ontology-driven System (FOODS)
- OntoFood (OF)
- Ontology for Nutritional Epidemiology (ONE)
- Underutilized Crops Ontologies (UC-ONTO)
- Bionutrition Ontology (BNO)
- Crop Ontology (CO)

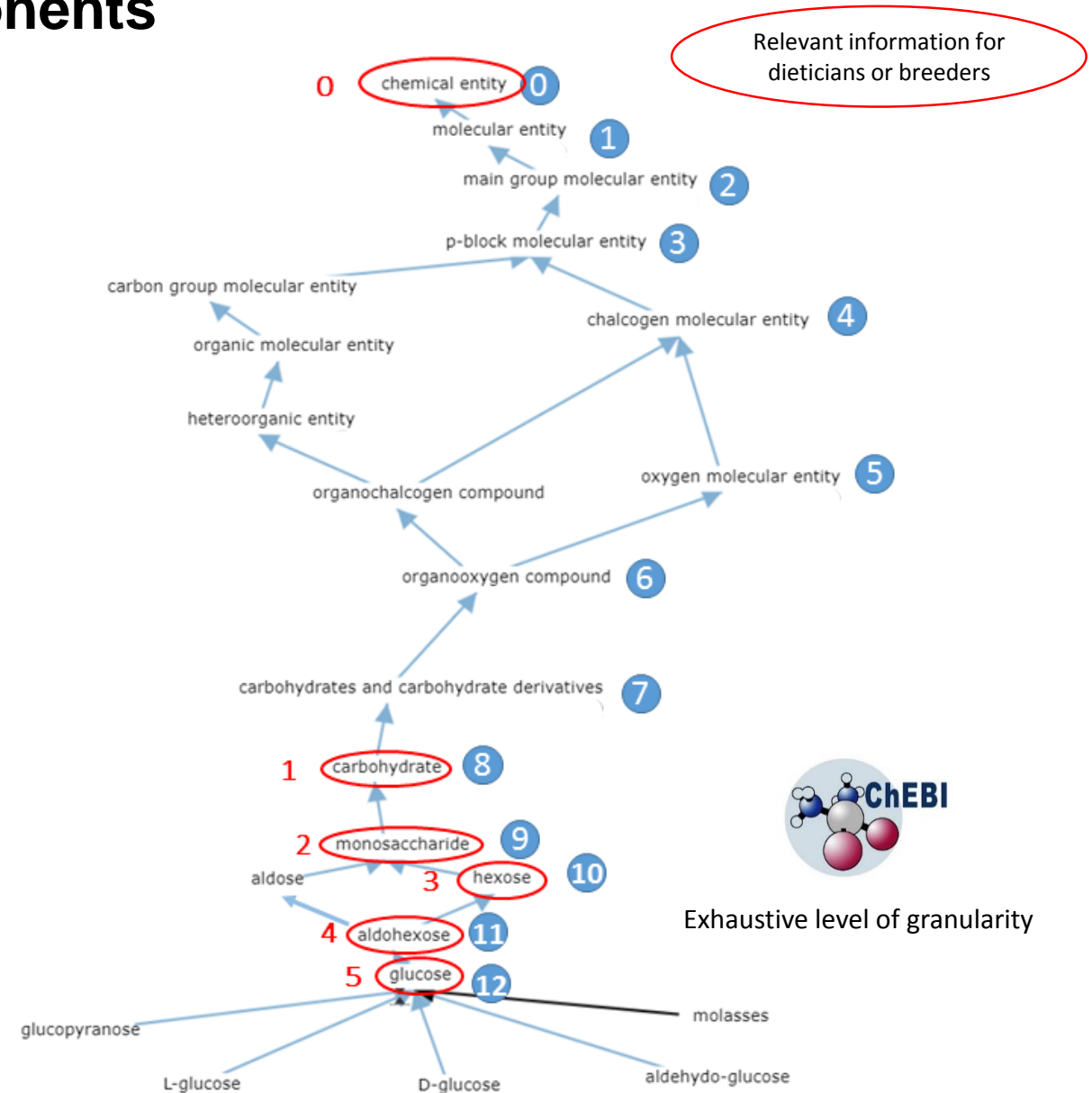
Incomplete classification of nutritional information or have more information than what is required

- Food Ontology (FOODON)
- Ontology for Nutritional studies (ONS)
- Chemical Entities for Biological Interest (ChEBI)



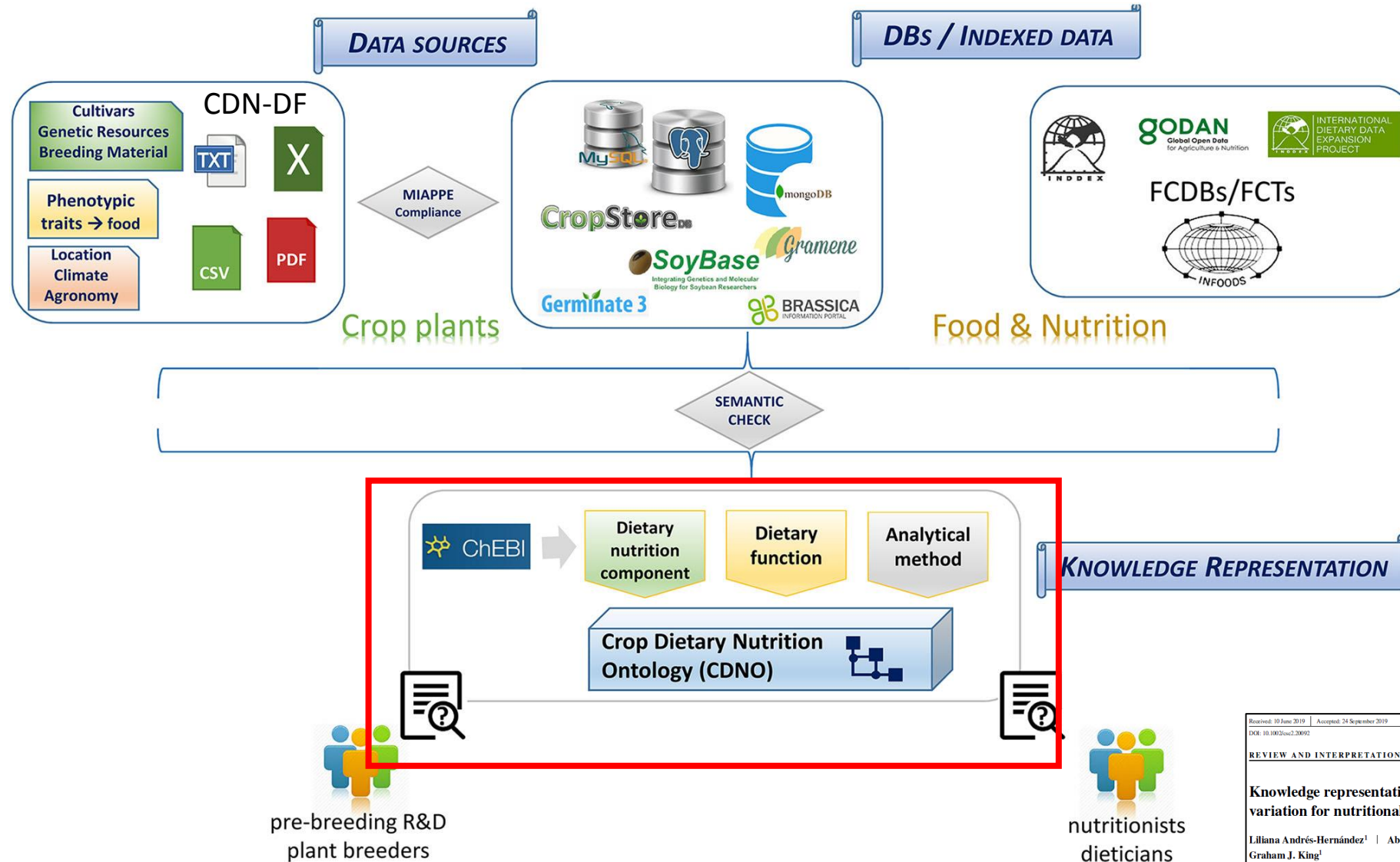
OBO Foundry

(Andrés-Hernández et al. 2020)



Methods and Results

Crop Dietary Nutrition Ontology (CDNO)



Crop Dietary Nutrition Data Framework (CDN-DF)

Branched-tree hierarchy, containing 478 dietary nutritional components (version 2).

v2 -updated with terms from FoodData Central

CDNF (v1.0)								CHEBI	
1st level	2nd level	3rd level	4th level	5th level	6th level	7th level	Nutrition_tree_ID	[Level]	ChEBI_ID
ROOT								0	n/a
water							01_water	[1]	CHEBI:15377
solids, total							01_solids, total	[1]	unspecified CHEBI
dry matter							01_dry matter	[1]	unspecified CHEBI
taurine							01_taurine	[1]	CHEBI:15891
carbohydrate							01_carbohydrate	[1]	CHEBI:16646
	digestible carbohydrate						02_digestible carbo	[2]	unspecified CHE
		starch					03_starch	[3]	CHEBI:28017
			amylopectin				04_amylopectin	[4]	CHEBI:28057
				glucose			05_glucose	[5]	CHEBI:17234
			amylose				04_amylose	[4]	CHEBI:28102



(wileyonlinelibrary.com) DOI 10.1002/jsfa.10157

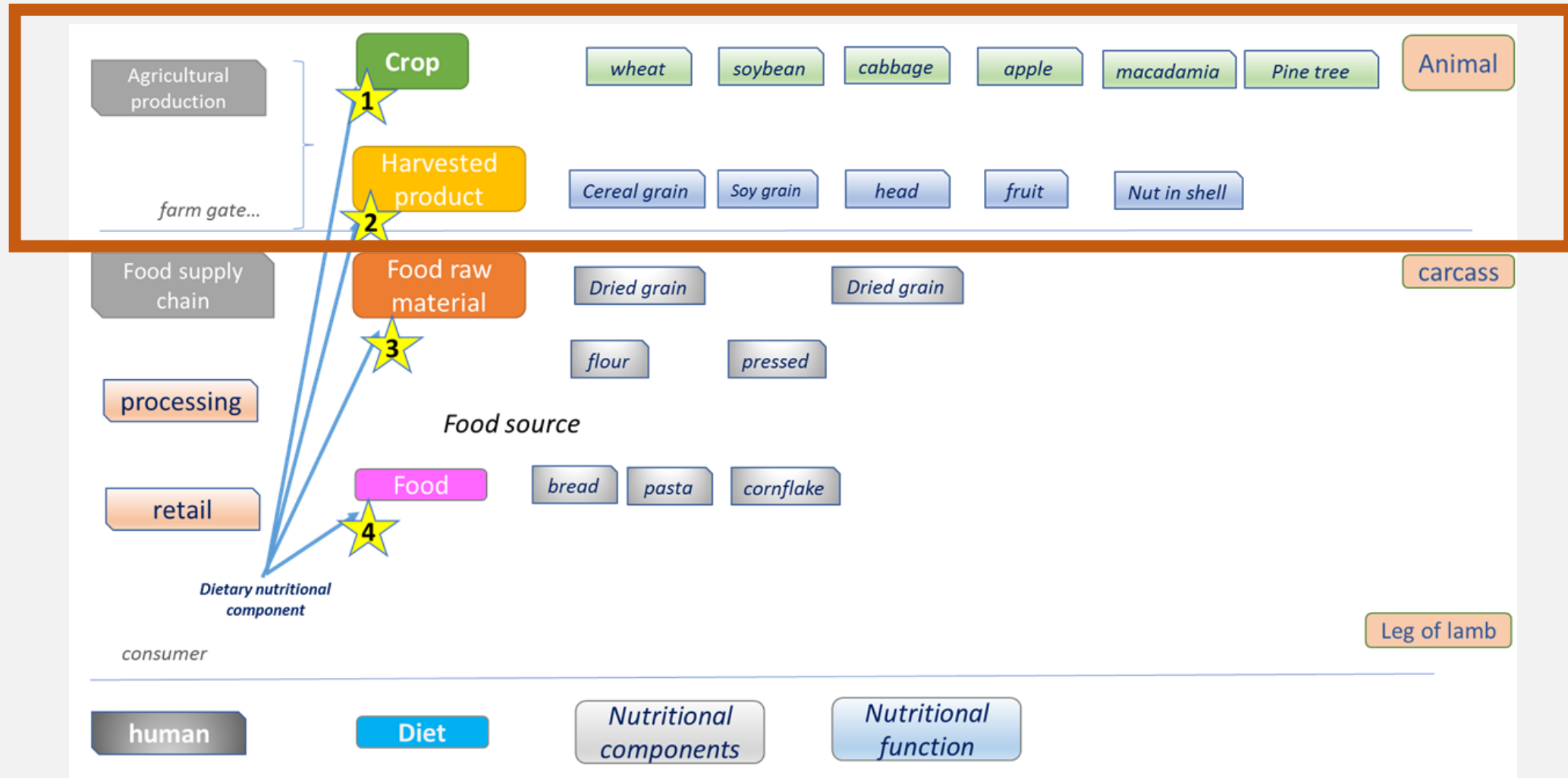
Bridging the food security gap: an information-led approach to connect dietary nutrition, food composition and crop production

Razlin Azman Halimi,^a Bronwyn J Barkla,^a Liliana Andrés-Hernández,^a Sean Mayes^{b,c} and Graham J King^{a,b,c*}

(Azman-Halimi et al., 2019)

Collaboration with FoodOn

Domains from Crop to Diet



Axiom concept reused from ENVO

Axiom reused from :

Concentration of X in Y.

(**PATO: ‘Concentration of’**) and

PATO:0000033

(‘inheres in’ some

(**CHEBI: ‘glucose’**)

CHEBI:17234

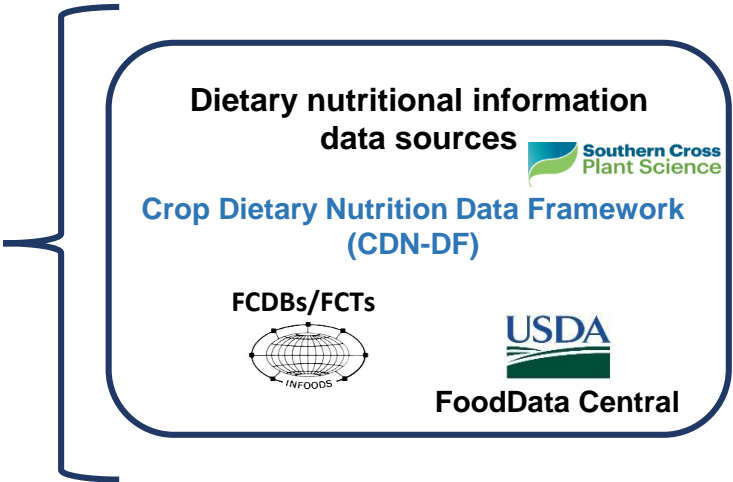
in the [**PO: ‘seed’**]

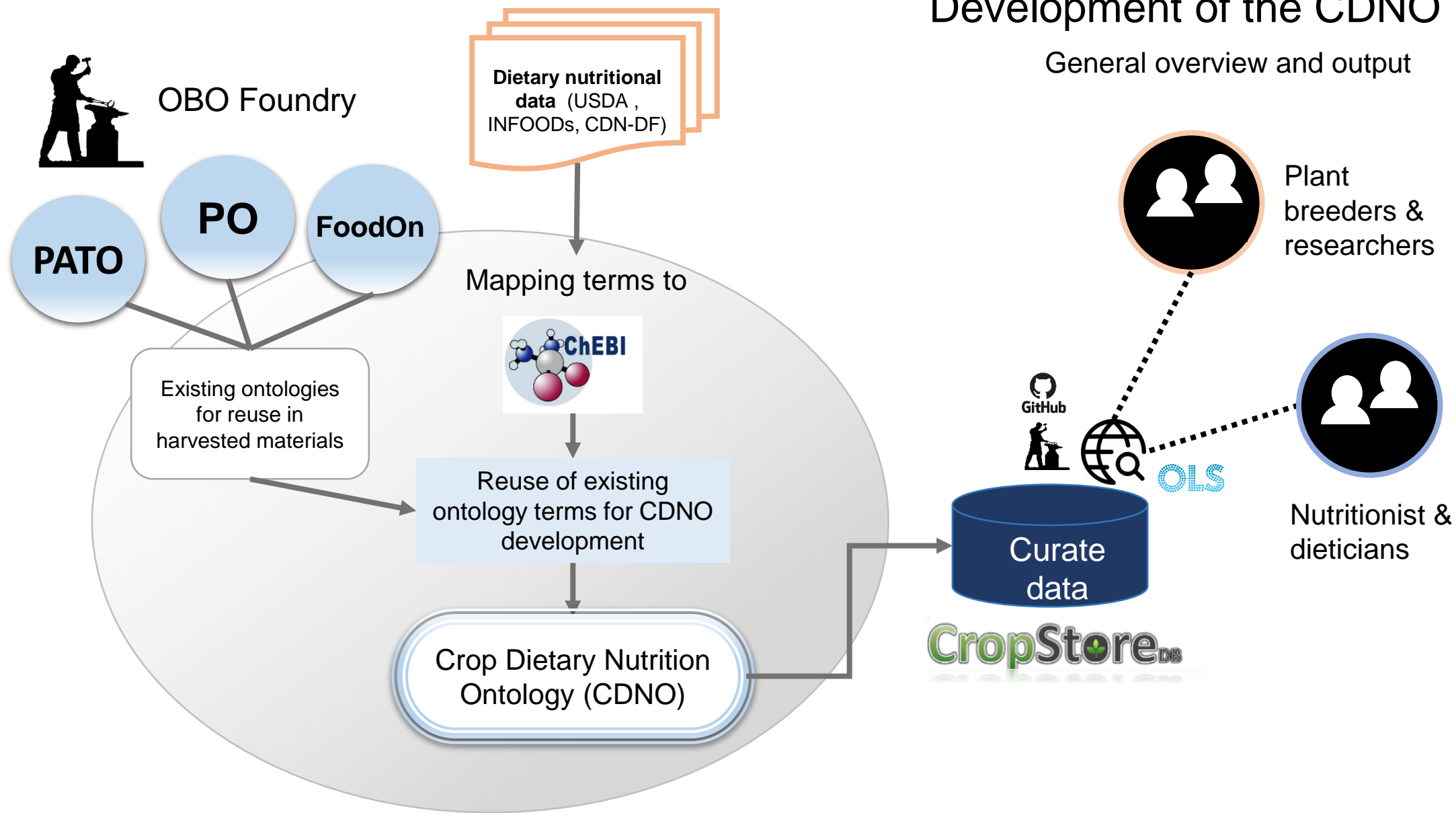
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derived from [**TaxonID: ‘bambara groundnut’**]

NCBITaxon115715

Harvested products
adopted by **FoodOn**





Development of the CDNO

General overview and output

Methods and Results

Thanks!

Supervisors



Prof. Graham J. King

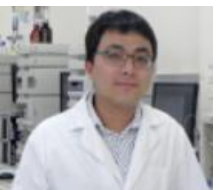


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