UNIVERSIDAD DE MURCIA

Master's Degree in Artificial Intelligence

Approximate Knowledge and Reasoning

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1. INTRODUCTION

The main objective of this document is to describe the development and structuring of an ontology focused on sustainable water management in agriculture. In today's context, where water resources are increasingly scarce and agricultural demand continues to rise, it is essential to adopt strategies that promote efficient water use. The creation of this ontology aligns with global efforts to ensure the equitable and sustainable management of water resources, which is crucial for supporting the world's population and preserving the environment.

The ontology described in this document serves as a fundamental tool for organizing and analysing data related to water in agriculture, enabling users, researchers, and decision-makers to access structured and relevant information that facilitates informed decision-making in this critical area. By defining clear concepts, relationships, and attributes, the ontology provides a framework that not only enhances communication across various systems and stakeholders but also contributes to the implementation of more sustainable practices in agricultural water management.

The following sections will present the theoretical framework, methodologies, and main findings of this study, as well as a comprehensive breakdown of the ontology's design and its practical applications in sustainable agriculture.

2. ONTOLOGY FOUNDATION AND SOURCE DOCUMENTS

Sustainable water management in agriculture is a critical challenge, especially in the context of climate change and water scarcity. To address this issue, in this paper we have developed an ontology that captures key concepts and relevant relationships surrounding the efficient management of water, with a particular focus on water reuse for agriculture. The conceptual foundation of our ontology has been constructed from two key documents: **"Sustainable Water Management in Agriculture under Climate Change"** (https://www.sciencedirect.com/science/article/pii/S2210784315000741) and **"From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach"** (https://www.epa.gov/system/files/documents/2023-03/From%20Water%20Stressed%20to%20Water%20Secure%20-%20Lessons%20from%20Israel%27s%20Water%20Reuse%20Approach.pdf).

The first document provides a comprehensive view of the strategies needed to tackle the effects of climate change on water management in agriculture, exploring concepts such as water conservation, water use efficiency, and sustainable water management in agriculture. The second document focuses on Israel's successful experience in water reuse, a country that has pioneered turning water scarcity into an opportunity by developing innovative approaches to treat and reuse wastewater for irrigation.

2.1. Data Encoding

Sustainable Water Management in Agriculture under Climate Change

Concept	Count	Noun Phrases
water	220	"water (28)" "sustainable water management (7)" "water application (6)" "water availability (5)" "water use (5)" "irrigation water (4)" "how much water (3)" "less water (3)" "the water (3)" "water efficiency (3)" "water scarcity (3)" "water stress (3)" "water use efficiency (3)" "fresh water supplies (2)" "full crop water requirements (2)" "marginal waters (2)" "soil water (2)" "soil water availability (2)" "soil

		water estimates (2)" "the applied water (2)" "the sustainable water management (2)" "the water productivity (2)" "the water quality (2)" "the water retention capacity (2)" "the water use efficiency (2)" "water authorities (2)" "water losses (2)" "water management (2)" "water resources (2)" "water savings (2)" "a crop water stress indicator (1)" "a soil water balance and crop growth simulation system (1)" "a water conservation equation (1)" "a water deficit (1)" "a) water conservation (1)" "abundant water (1)" "allocative and/or irrigation water efficiency (1)" "considerable water losses (1)" "crop water requirements (1)" "crop water stress parameters (1)" "crop-based and water-saving irrigation scheduling (1)" "crop's critical water requirements (1)" "drip irrigation water (1)" "efficient irrigation water management (1)" "excess water use (1)" "global water demand (1)" "increased water retention capacity (1)" "irrigation water delivery systems availability (1)" "irrigation water efficiency (1)" "irrigation water management purposes (1)" "irrigation water-supplying sources (1)" "leaf water content (1)" "leaf water potential (1)" "limited water supply (1)" "low quality water (1)" "low water holding capacity (1)" "minimal water (1)" "modern pressurized irrigation networks water (1)" "nonbeneficial water use (1)" "old water projects (1)" "optimum soil water conditions (1)" "outgoing water fluxes (1)" "overabundant water (1)" "plant water status (1)" "poor quality water (1)" "reclaimed waters (1)" "saline water (1)" "saline water table (1)" "serious water constrains (1)" "soil induced plant water potential depressions (1)" "soil water balance approach (1)" "soil water balance estimates (1)" "soil water capacity (1)" "soil water content measurement (1)" "soil water evaporation (1)" "soil water holding characteristics (1)" "soil

		water measurements (1)" "soil water potential (1)" "soil water potential measurement (1)" "soil-water balance approach (1)" "steadily water allocation (1)" "temporal water shortage (1)" "that water (1)" "the allowed water deficits (1)" "the available water (1)" "the available water content (1)" "the available water supplies (1)" "the crops' water requirements (1)" "the full crop water requirements (1)" "the irrigation water demand (1)" "the saved water (1)" "the soil water characteristics (1)" "the soil water content (1)" "the soil water parameters (1)" "the soil water variability (1)" "the surface water (1)" "the total water withdraw (1)" "the water application cost (1)" "the water content (1)" "the water resources (1)" "their traditional high-water demand cropping and irrigation practices (1)" "unit water (1)" "volumetric water (1)" "water allocation (1)" "water amount (1)" "water and energy saving (1)" "water and transpiration losses (1)" "water application, d) elimination (1)" "water balance (1)" "water conservation (1)" "water decisions (1)" "water deficit (1)" "water deficits (1)" "water demand management (1)" "water konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "water leakages (1)" "water loss (1)" "water management objectives technical support (1)" "water managers (1)" "water needs (1)" "water overland flow (1)" "water pricing (1)" "water pricing policy (1)" "water production functions (1)" "water projects (1)" "water relations (1)" "water report (1)" "water resources planning (1)" "water resources res (1)" "water resources uncertainty (1)" "water scarce regions (1)" "water shortage (1)" "water storage capacity infiltration rate crop response (1)" "water stress development (1)" "water supplies (1)" "water use levels (1)" "water utilization efficiency (1)"

		"water-logging (1)" "water-logging conditions (1)" "yield and water utilization efficiency (1)"
irrigation	142	"irrigation (22)" "irrigation scheduling (9)" "localized irrigation systems (5)" "deficit irrigation (4)" "drip irrigation (4)" "irrigation water (4)" "subsurface irrigation (4)" "regulated deficit irrigation (3)" "the irrigation method (3)" "the irrigation system (3)" "appropriate irrigation scheduling (2)" "irrigation management (2)" "irrigation scheduling techniques (2)" "irrigation system (2)" "irrigation technology (2)" "localized irrigation (2)" "localized irrigation localized irrigation (2)" "regulated deficit irrigation regulated deficit irrigation (2)" "subsurface drip irrigation (2)" "the irrigation scheduling (2)" "3.2.5 effective irrigation scheduling (1)" "98 irrigation scheduling techniques (1)" "a 0.49 a deficit irrigation (1)" "a low-pressure, low volume irrigation system (1)" "a new irrigation technique (1)" "allocative and/or irrigation water efficiency (1)" "any irrigation scheduling method (1)" "appropriate deficit irrigation (1)" "both irrigation scheduling (1)" "conventional irrigation practices (1)" "crop irrigation requirements (1)" "crop-based and water-saving irrigation scheduling (1)" "deficit irrigation practices (1)" "different irrigation systems (1)" "drip irrigation water (1)" "drip irrigation's fig (1)" "efficient irrigation water management (1)" "even furrow irrigation (1)" "frequent and light irrigations (1)" "innovative irrigation techniques (1)" "irrigation agriculture (1)" "irrigation amount (1)" "irrigation application (1)" "irrigation depths (1)" "irrigation design (1)" "irrigation management performance (1)" "irrigation method (1)" "irrigation methods (1)" "irrigation practices method (1)" "irrigation scheduling components92 (1)" "irrigation strategies (1)" "irrigation system construction (1)" "irrigation system water

		(1)" "irrigation treatments (1)" "irrigation water delivery systems availability (1)" "irrigation water efficiency (1)" "irrigation water management purposes (1)" "irrigation water-supplying sources (1)" "irrigations (1)" "large regional irrigation schemes (1)" "local or regional irrigation schemes (1)" "modern pressurized irrigation networks water (1)" "over-irrigation (1)" "pre-existing irrigation systems (1)" "scarce regions irrigation approaches (1)" "small-scale irrigation (1)" "sprinkle and trickle irrigation (1)" "sprinkler irrigation systems (1)" "supplementary irrigation (1)" "the intensive irrigation (1)" "the irrigation depths (1)" "the irrigation miracle (1)" "the irrigation schedules (1)" "the irrigation season (1)" "the irrigation systems (1)" "the irrigation water demand (1)" "the proper irrigation scheduling (1)" "their irrigation schedules (1)" "their traditional high-water demand cropping and irrigation practices (1)" "trickle or drip irrigation, micro (1)" "typical irrigation calendars (1)"
soil	74	"the soil (14)" "the soil surface (3)" "high infiltration soils (2)" "soil (2)" "soil and crop characteristics (2)" "soil born diseases (2)" "soil management (2)" "soil surface (2)" "soil water availability (2)" "soil water estimates (2)" "soils (2)" "a soil water balance and crop growth simulation system (1)" "better soil aggregation (1)" "crop characteristics soil (1)" "improved soil aggregation (1)" "optimum soil water conditions (1)" "remotely sensed soil moisture (1)" "sand/coarse soils (1)" "soil and leaf analyses (1)" "soil appearance (1)" "soil characteristics (1)" "soil cultivation (1)" "soil induced plant water potential depressions (1)" "soil infiltration (1)" "soil infiltration rate (1)" "soil matrix suction (1)" "soil salinization (1)" "soil spectrometers (1)" "soil surface tillage (1)" "soil type (1)" "soil water (1)" "soil

		water balance approach (1)" "soil water balance estimates (1)" "soil water capacity (1)" "soil water content measurement (1)" "soil water evaporation (1)" "soil water holding characteristics (1)" "soil water measurements (1)" "soil water potential (1)" "soil water potential measurement (1)" "soil-water balance approach (1)" "the rooted soil (1)" "the soil determine (1)" "the soil management (1)" "the soil water characteristics (1)" "the soil water content (1)" "the soil water parameters (1)" "the soil water variability (1)" "the upper soil layers (1)" "traditional and modern soil and crop management practices (1)"
crop	71	"crops (7)" "the crop (5)" "crop evapotranspiration (3)" "the crops (3)" "a double row crop (2)" "crop (2)" "crop species (2)" "full crop water requirements (2)" "soil and crop characteristics (2)" "a crop water stress indicator (1)" "a soil water balance and crop growth simulation system (1)" "actual crop requirements (1)" "almost all crops (1)" "appropriate crop coefficients (1)" "critical crop growth stages (1)" "crop (salt tolerant varieties) field management (1)" "crop and climate data (1)" "crop characteristics soil (1)" "crop et (1)" "crop growth stage (1)" "crop irrigation requirements (1)" "crop production (1)" "crop residues (1)" "crop response (1)" "crop stress (1)" "crop stress parameters (1)" "crop water requirements (1)" "crop water stress parameters (1)" "crop yield (1)" "crop yields (1)" "crop-based and water-saving irrigation scheduling (1)" "crop's critical water requirements (1)" "each crop (1)" "economic crops (1)" "fodder crops (1)" "horticultural crops (1)" "horticultural row crops (1)" "irrigated agricultural crop systems (1)" "more intensive and deep rooting, better crop development (1)" "other crops (1)" "principal california crops (1)" "specific crops (1)" "the crop response factor (1)"

		"the crop yield response (1)" "the crops' water requirements (1)" "the expected and maximum crop yield (1)" "the full crop water requirements (1)" "the previous crop (1)" "their crops (1)" "traditional and modern soil and crop management practices (1)" "tree crops (1)" "water storage capacity infiltration rate crop response (1)"
system	38	"localized irrigation systems (5)" "the irrigation system (3)" "the root system (3)" "irrigation system (2)" "a collective system (1)" "a low-pressure, low volume irrigation system (1)" "a soil water balance and crop growth simulation system (1)" "a system (1)" "an increasing block tariff charging system (1)" "careful system maintenance (1)" "different irrigation systems (1)" "different systems (1)" "farm systems (1)" "information systems (1)" "irrigated agricultural crop systems (1)" "irrigation system construction (1)" "irrigation system water (1)" "irrigation water delivery systems availability (1)" "modern, reduced demand systems (1)" "most conveyance and delivery systems (1)" "pre-existing irrigation systems (1)" "sprinkler irrigation systems (1)" "storage or delivery systems (1)" "telemetry systems (1)" "the collective system (1)" "the irrigation systems (1)" "the natural system (1)" "the system (1)" "the system limitations (1)"
management	36	"sustainable water management (7)" "better management (4)" "irrigation management (2)" "management (2)" "soil management (2)" "the management (2)" "the sustainable water management (2)" "water management (2)" "crop (salt tolerant varieties) field management (1)" "efficient irrigation water management (1)" "human resources management (1)" "irrigation management performance (1)" "irrigation water management purposes (1)" "rational management (1)" "salinity management techniques (1)"

		"such management practices (1)" "the soil management (1)" "the sustainable management (1)" "traditional and modern soil and crop management practices (1)" "water demand management (1)" "water management objectives technical support (1)"
use	33	"the use (7)" "water use (5)" "water use efficiency (3)" "domestic use (2)" "the water use efficiency (2)" "a "use (1)" "excess water use (1)" "land use (1)" "more effective and rational use (1)" "nonbeneficial water use (1)" "the excessive use (1)" "the major agricultural use (1)" "the obligatory use (1)" "the sustainable use (1)" "the use efficiency (1)" "their rational use (1)" "their use (1)" "use (1)" "water use levels (1)"
application	29	"water application (6)" "the application (5)" "application (4)" "application rates (2)" "efficient fertilizer application (2)" "application date (1)" "application methods (1)" "fertilizer application (1)" "irrigation application (1)" "prd application (1)" "the effective application (1)" "the inorganic fertilizer application (1)" "the practical application (1)" "the water application cost (1)" "water application, d) elimination (1)"
scheduling	23	"irrigation scheduling (7)" "appropriate irrigation scheduling (2)" "irrigation scheduling techniques (2)" "the irrigation scheduling (2)" "3.2.5 effective irrigation scheduling (1)" "98 irrigation scheduling techniques (1)" "a microcomputer scheduling program (1)" "any irrigation scheduling method (1)" "both irrigation scheduling (1)" "crop-based and water-saving irrigation scheduling (1)" "irrigation scheduling components92 (1)" "scheduling (1)" "the proper irrigation scheduling (1)" "the scheduling (1)"

efficiency	21	"efficiency (3)" "the efficiency (3)" "water efficiency (3)" "water use efficiency (3)" "the water use efficiency (2)" "98 95 fertilizer efficiency (1)" "allocative and/or irrigation water efficiency (1)" "cattle-breeding efficiency (1)" "irrigation water efficiency (1)" "the use efficiency (1)" "water utilization efficiency (1)" "yield and water utilization efficiency (1)"
farmer	20	"farmers (7)" "the farmers (6)" "the farmer (2)" "a farmer (1)" "farmer's awareness (1)" "farmers' participation (1)" "other farmers (1)" "small farmers (1)"
yield	19	"yield (4)" "higher yields (2)" "2 plant yield response (1)" "crop yield (1)" "crop yields (1)" "maximum yields (1)" "mm) yield (1)" "the crop yield response (1)" "the expected and maximum crop yield (1)" "the resulting yield reduction (1)" "the yield response curve (1)" "yield and water utilization efficiency (1)" "yield reduction (1)" "yield reduction strategies (1)" "yield sensitivities (1)"
practice	18	"agricultural practices (3)" "practice (2)" "a common practice (1)" "agricultural practice (1)" "appropriate agronomical practices (1)" "conventional irrigation practices (1)" "deficit irrigation practices (1)" "farming practices (1)" "irrigation practices method (1)" "practices (1)" "shallow tillage practices (1)" "such management practices (1)" "their traditional high-water demand cropping and irrigation practices (1)" "this practice (1)" "traditional and modern soil and crop management practices (1)"
growth	18	"growth (4)" "plant growth (3)" "growth stage (2)" "a soil water balance and crop growth simulation system (1)" "critical crop growth stages (1)" "crop growth stage (1)" "economic growth (1)" "fruit growth (1)" "reproductive

		growth (1)" "the growth (1)" "the rapid growth (1)" "vegetative growth (1)"
agriculture	17	"agriculture (15)" "irrigation agriculture (1)" "modern irrigated agriculture (1)"
cost	16	"the cost (3)" "the high cost (2)" "associated costs (1)" "production cost (1)" "reasonable cost (1)" "sunk costs (1)" "the additional cost (1)" "the high investment cost (1)" "the implementation cost (1)" "the total cost (1)" "the true environmental cost (1)" "the water application cost (1)" "very high cost (1)"
deficit	16	"deficit irrigation (4)" "regulated deficit irrigation (3)" "regulated deficit irrigation regulated deficit irrigation (2)" "a water deficit (1)" "appropriate deficit irrigation (1)" "deficit (1)" "deficit irrigation practices (1)" "the allowed water deficits (1)" "water deficit (1)" "water deficits (1)"
plant	15	"plant growth (3)" "the plant (2)" "2 plant yield response (1)" "individual plant tissues (1)" "individual plants (1)" "plant (1)" "plant physiology (1)" "plant stress indicators (1)" "plant water status (1)" "plant-protection products (1)" "plants (1)" "soil induced plant water potential depressions (1)"
fertilizer	14	"fertilizers (5)" "efficient fertilizer application (2)" "fertilizer (2)" "98 95 fertilizer efficiency (1)" "fertilizer application (1)" "soluble fertilizers (1)" "the inorganic fertilizer application (1)" "the soluble fertilizers (1)"
control	14	"control (5)" "easy control (2)" "pest control (2)" "the control (2)" "appropriate weed control techniques (1)" "runoff control (1)" "weed control (1)"

loss	13	"losses (3)" "evaporation losses (2)" "loss (2)" "water losses (2)" "considerable water losses (1)" "fig 1 water losses (1)" "water and transpiration losses (1)" "water loss (1)"
development	13	"the development (3)" "development (1)" "disease development (1)" "farm technological development (1)" "further developments (1)" "industrial development (1)" "more intensive and deep rooting, better crop development (1)" "sustainable agricultural development (1)" "sustainable development (1)" "technological development (1)" "water stress development (1)"
technique	13	"irrigation scheduling techniques (2)" "this technique (2)" "98 irrigation scheduling techniques (1)" "a new irrigation technique (1)" "appropriate weed control techniques (1)" "innovative irrigation techniques (1)" "new techniques (1)" "salinity management techniques (1)" "the techniques (1)" "these advanced techniques (1)" "these techniques (1)"
Agriculture	13	"konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (5)" "agriculture (3)" "bertaki / agriculture (1)" "it94 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "konstantinos chartzoulakis and maria bertaki / agriculture (1)" "partial root-zone98 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "water konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)"
area	13	"irrigated areas (4)" "the area (2)" "a given area (1)" "areas (1)" "arid areas (1)" "global irrigated area (1)" "the world's irrigated area (1)" "these areas (1)" "windy areas (1)"

condition	12	"conditions (3)" "environmental conditions (2)" "scarcity conditions (2)" "climatic conditions (1)" "infiltration conditions (1)" "optimum soil water conditions (1)" "water-logging conditions (1)" "weather conditions (1)"
resource	11	"the most critical resource (2)" "water resources (2)" "an increasingly valuable and scarce resource (1)" "any other natural resource (1)" "human resources management (1)" "resources (1)" "the water resources (1)" "water resources planning (1)" "water resources uncertainty (1)"
adoption	11	"the adoption (7)" "adoption (3)" "its adoption (1)"
quality	11	"quality (2)" "the quality (2)" "the water quality (2)" "better quality (1)" "low quality water (1)" "poor quality water (1)" "the groundwater quality (1)" "the quantity and quality aspects (1)"
method	11	"the irrigation method (3)" "any irrigation scheduling method (1)" "application methods (1)" "irrigation method (1)" "irrigation methods (1)" "irrigation practices method (1)" "methods (1)" "the most efficient methods (1)" "the sampling methods (1)"
root	11	"the root system (3)" "root zone (2)" "partial root (1)" "partial root drying (1)" "partial root-zone98 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "the drying roots (1)" "the root zone (1)" "the root-zone (1)"
availability	11	"water availability (5)" "soil water availability (2)" "high availability (1)" "irrigation water delivery systems availability (1)" "the availability (1)" "the multi-sectoral information availability (1)"

stress	11	"water stress (3)" "stress (2)" "a crop water stress indicator (1)" "crop stress (1)" "crop stress parameters (1)" "crop water stress parameters (1)" "plant stress indicators (1)" "water stress development (1)"
drip	11	"drip irrigation (4)" "a single drip line (2)" "subsurface drip irrigation (2)" "drip irrigation water (1)" "drip irrigation's fig (1)" "trickle or drip irrigation, micro (1)"
surface	11	"the soil surface (3)" "soil surface (2)" "bed surface profile (1)" "soil surface tillage (1)" "surface (1)" "surface infiltration problems (1)" "the ground surface (1)" "the surface water (1)"
RDI	10	"rdi (9)" "successful rdi (1)"
requirement	10	"full crop water requirements (2)" "actual crop requirements (1)" "crop irrigation requirements (1)" "crop water requirements (1)" "crop's critical water requirements (1)" "diverse requirements (1)" "leaching requirements (1)" "the crops' water requirements (1)" "the full crop water requirements (1)"
level	10	"all levels (2)" "certain level (1)" "farm level (1)" "field level (1)" "high levels (1)" "saturation level (1)" "the overall national level (1)" "the primary and secondary levels (1)" "water use levels (1)"
rate	10	"application rates (2)" "a discharge rate (1)" "a rapid rate (1)" "discharge rate (1)" "soil infiltration rate (1)" "temporary drought surcharges rates (1)" "the global rate (1)" "the infiltration rate (1)" "water storage capacity infiltration rate crop response (1)"
demand	10	"climate evaporative demand rainfall amount (1)" "demand (1)" "global water demand (1)" "modern, reduced demand

		systems (1)" "municipal and industrial demands (1)" "the increased demand (1)" "the increasing demand (1)" "the irrigation water demand (1)" "their traditional high-water demand cropping and irrigation practices (1)" "water demand management (1)"
capacity	10	"the capacity (2)" "the water retention capacity (2)" "capacity building (1)" "increased water retention capacity (1)" "low water holding capacity (1)" "soil water capacity (1)" "the existing “capacity building (1)" "water storage capacity infiltration rate crop response (1)"
pressure	10	"pressure and discharge variations (2)" "a low-pressure, low volume irrigation system (1)" "lower pressure (1)" "pressure regulators (1)" "pressure transducers (1)" "pressure variation (1)" "socio-economic pressures (1)" "the average sprinkler pressure (1)" "the monitoring and adjustment pressure equipment (1)"
Agricultural Science Procedia	10	"konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (5)" "agricultural science procedia (2)" "it94 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "partial root-zone98 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "water konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)"
Konstantinos Chartzoulakis	10	"konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (5)" "it94 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "konstantinos chartzoulakis (1)" "konstantinos chartzoulakis and maria bertaki / agriculture (1)" "partial root-zone98 konstantinos chartzoulakis and maria bertaki / agriculture and

		agricultural science procedia (1)" "water konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)"
Maria Bertaki	9	"konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (5)" "it94 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "konstantinos chartzoulakis and maria bertaki / agriculture (1)" "partial root-zone98 konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)" "water konstantinos chartzoulakis and maria bertaki / agriculture and agricultural science procedia (1)"
response	9	"2 plant yield response (1)" "biochemical responses (1)" "crop response (1)" "the crop response factor (1)" "the crop yield response (1)" "the yield response curve (1)" "this response (1)" "this transient response (1)" "water storage capacity infiltration rate crop response (1)"
infiltration	9	"high infiltration soils (2)" "infiltration conditions (1)" "soil infiltration (1)" "soil infiltration rate (1)" "surface infiltration problems (1)" "the infiltration (1)" "the infiltration rate (1)" "water storage capacity infiltration rate crop response (1)"
tube	8	"the tube (3)" "buried tubes (1)" "pe tubes (1)" "porous tubes (1)" "the tubes (1)" "tubes (1)"
tillage	8	"conservation tillage (2)" "contour tillage (1)" "no-tillage (1)" "reduced tillage (1)" "shallow tillage practices (1)" "soil surface tillage (1)" "suitable tillage (1)"
decision	8	"agricultural decisions (1)" "decision makers (1)" "decision-makers (1)" "decision-making (1)" "decisions (1)" "the

		decision making process (1)" "the decision process (1)" "water decisions (1)"
production	8	"agricultural production (3)" "crop production (1)" "increased food production (1)" "production (1)" "production cost (1)" "water production functions (1)"
environment	8	"the environment (7)" "favorable environment (1)"
improvement	8	"improvement (4)" "improvements (4)"
characteristic	8	"soil and crop characteristics (2)" "the emitter characteristics (2)" "different characteristics (1)" "soil characteristics (1)" "soil water holding characteristics (1)" "the soil water characteristics (1)"
reduction	7	"reduction (2)" "the reduction (2)" "the resulting yield reduction (1)" "yield reduction (1)" "yield reduction strategies (1)"
balance	7	"balance (2)" "a soil water balance and crop growth simulation system (1)" "soil water balance approach (1)" "soil water balance estimates (1)" "soil-water balance approach (1)" "water balance (1)"
measurement	7	"measurements (2)" "evaporation measurements (1)" "sap flow measurement (1)" "soil water content measurement (1)" "soil water measurements (1)" "soil water potential measurement (1)"
approach	7	"an integrating approach (1)" "scarce regions irrigation approaches (1)" "several approaches (1)" "soil water balance approach (1)" "soil-water balance approach (1)" "the optimization approach (1)" "this approach (1)"
weed	7	"weeds (4)" "appropriate weed control techniques (1)" "weed (1)" "weed control (1)"

depth	7	"the depth (3)" "depth (1)" "depth criteria (1)" "irrigation depths (1)" "the irrigation depths (1)"
extension	7	"extension (1)" "extension officers (1)" "extension offices experts (1)" "extension programmes (1)" "strong extension services (1)" "the extension (1)" "trained extension officers (1)"
conservation	7	"conservation tillage (2)" "a water conservation equation (1)" "a) water conservation (1)" "conservation (1)" "health and nature conservation (1)" "water conservation (1)"
problem	7	"a technological problem (1)" "reduced problems (1)" "surface infiltration problems (1)" "technological problems (1)" "the increasing problems (1)" "the institutional problems (1)" "the problems (1)"
technology	7	"irrigation technology (2)" "technology (2)" "advanced technologies (1)" "technologies (1)" "technology transfer (1)"
policy	7	"policies (2)" "a consistent policy (1)" "agricultural policies (1)" "social, cultural and policy constraints (1)" "technological, managerial, policy innovation (1)" "water pricing policy (1)"
supply	7	"fresh water supplies (2)" "its supply (1)" "limited water supply (1)" "supply projections (1)" "the available water supplies (1)" "water supplies (1)"
PRD	7	"prd (6)" "prd application (1)"
fruit	6	"fruit (1)" "fruit growth (1)" "fruit size (1)" "fruits (1)" "high value fruit (1)" "stem or fruit diameter (1)"

volume	6	"the volumes (2)" "a low-pressure, low volume irrigation system (1)" "the wetted volume (1)" "volume (1)" "volumes (1)"
tree	6	"tree (2)" "fino lemon trees (1)" "kg/tree (1)" "olive trees (1)" "tree crops (1)"
grapevine	6	"grapevines (5)" "grapevine vigour (1)"
support	6	"support (2)" "some support (1)" "support services (1)" "technical support (1)" "water management objectives technical support (1)"
effort	6	"considerable effort (2)" "effort (2)" "every effort (1)" "special effort (1)"
disease	6	"disease (3)" "soil born diseases (2)" "disease development (1)"
time	6	"time (3)" "real time (1)" "short time storage (1)" "the time (1)"
change	6	"climate change (3)" "changes (2)" "dramatic changes (1)"
climate	6	"climate change (3)" "climate (1)" "climate evaporative demand rainfall amount (1)" "crop and climate data (1)"
impact	6	"acceptable environmental impact (1)" "direct impact (1)" "little impact (1)" "significant impact (1)" "the economic impact (1)" "the impacts (1)"
discharge	5	"pressure and discharge variations (2)" "a discharge rate (1)" "discharge rate (1)" "discharges (1)"
estimate	5	"soil water estimates (2)" "accurate estimates (1)" "relative evapotranspiration estimates (1)" "soil water balance estimates (1)"

process	5	"administrative efficient and effective processes (1)" "processes (1)" "the above processes (1)" "the decision making process (1)" "the decision process (1)"
fertigation	5	"fertigation (5)"
row	5	"a double row crop (2)" "row (2)" "horticultural row crops (1)"
sprinkler	5	"large sprinkler drops (1)" "sprinkler (1)" "sprinkler irrigation systems (1)" "sprinkler spacing (1)" "the average sprinkler pressure (1)"
al	5	"chartzoulakis et al (2)" "et al (2)" "domingo et al (1)"
et	5	"chartzoulakis et al (2)" "et al (2)" "domingo et al (1)"
mean	5	"means (3)" "the financial means (1)" "the sole means (1)"
micro	5	"micro (4)" "trickle or drip irrigation, micro (1)"
farm	5	"farm level (1)" "farm systems (1)" "farm technological development (1)" "individual farms (1)" "the farm gates (1)"
field	5	"crop (salt tolerant varieties) field management (1)" "field level (1)" "sloping fields (1)" "that field slopes (1)" "the field (1)"
period	5	"a particular period (1)" "a period (1)" "no windy periods (1)" "the period (1)" "whole period (1)"
zone	5	"root zone (2)" "arid zones (1)" "the root zone (1)" "the root-zone (1)"
evaporation	5	"evaporation losses (2)" "evaporation (1)" "evaporation measurements (1)" "soil water evaporation (1)"
land	5	"land (1)" "land and water digital media series (1)" "land use (1)" "most irrigated lands (1)" "the land contour (1)"

FAO	5	"fao (5)"
need	5	"a need (1)" "actual needs (1)" "the major need (1)" "the need (1)" "water needs (1)"
pricing	5	"adequate pricing (2)" "the non-economic pricing (1)" "water pricing (1)" "water pricing policy (1)"
scarcity	5	"water scarcity (3)" "scarcity conditions (2)"
parameter	5	"climatic parameters (1)" "crop stress parameters (1)" "crop water stress parameters (1)" "many parameters (1)" "the soil water parameters (1)"
content	5	"leaf water content (1)" "soil water content measurement (1)" "the available water content (1)" "the soil water content (1)" "the water content (1)"

From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach

Concept	Count	Noun Phrases
water	179	"water (23)" "water reuse (13)" "Israel's water supply (4)" "the water (4)" "effluent and treated water (3)" "non-revenue water (3)" "recycled water (3)" "the water sector (3)" "treated water (3)" "water losses (3)" "water management (3)" "water use (3)" "39 water leaders (2)" "non-revenue water losses (2)" "reuse water (2)" "water regulation (2)" "water rights (2)" "water storage (2)" "water technology providers (2)" "water treatment (2)" "a key water reuse research and development center (1)" "a large and innovative water utility corporation (1)" "Israel's water reuse approach (1)" "a more sustainable and resilient water supply (1)" "a new water supply (1)" "a primary water supply method (1)" "a record-low 5 percent annual water loss rate (1)" "a water distribution station (1)" "a water supply disruption (1)" "additional water sources (1)" "adequate and resilient water supplies (1)" "adequate water supply (1)" "agricultural water reuse (1)" "all their drinking water (1)" "all water resources (1)" "ample water supplies (1)" "an abundant, nutrient-rich water supply (1)" "clean, potable water (1)" "desalinated water (1)" "digital water technologies (1)" "e.g., saline water (1)" "effective water management (1)" "emergency water supply planning (1)" "flood waters (1)"

		“fresh water (1)” “future water and food security challenges (1)” “high-quality water (1)” “improved water quality (1)” “innovative, elegant water solutions (1)” “integrated water management (1)” “integrated water management approaches (1)” “Israel’s domestic water supply (1)” “Israel’s largest and most innovative water utility corporations (1)” “Israel’s overall water resources management strategy (1)” “Israel’s water history (1)” “Israel’s water management (1)” “Israel’s water supply system (1)” “Israeli water counterparts (1)” “its overall water resources management strategy (1)” “its water resources (1)” “leading Israeli water technology providers (1)” “marginal water (1)” “Meniv Rishon's water management (1)” “multiple leading Israeli water technology providers (1)” “municipal water corporations (1)” “national water quality standards (1)” “overall water management methodology (1)” “potable water (1)” “product water recovery (1)” “raw water production (1)” “recycled water users (1)” “reused water (1)” “s. water sector (1)” “significant water savings (1)” “soft water (1)” “successful Israeli water reuse strategies (1)” “surface water (1)” “the highest water self-sufficiency (1)” “the incoming water (1)” “the largest water recycling facility (1)” “the largest water recycling plant (1)” “the municipal water demand (1)” “the national water company (1)” “the recorded water usage (1)” “the treated water (1)” “the united states’ water resources (1)” “the water and wastewater related aspects (1)” “the water consumption (1)” “the water technologies (1)” “the world’s most water-stressed countries (1)” “various water reuse approaches (1)” “water analytics (1)” “water and chemical reduction projects (1)” “water consumption (1)” “water leakages (1)” “water management methodology (1)” “water meters (1)” “water modeling (1)” “water planning (1)” “water problems (1)” “water providers (1)” “water quality (1)” “water quality issues (1)” “water resilience (1)” “water resources (1)” “water reuse policies (1)” “water sector leaders (1)” “water supply crises (1)” “water systems (1)” “water usage/need (1)” “water utilities (1)” “a water-starved world (1)” “the environment water quality modeling division/water & science administration (1)” “374 water (1)” “water/wastewater technology (1)”
Israel	95	“Israel (68)” “Israel’s water supply (4)” “Israel’s approach (3)” “israel’s high-tech industry (2)” “both Israel (1)” “Israel identifies (1)” “Israel's national water company (1)” “Israel’s ability (1)” “Israel’s domestic freshwater supply (1)” “Israel’s domestic water supply (1)” “Israel’s experience (1)” “Israel’s largest and most innovative water utility corporations (1)” “Israel’s long-term use (1)” “Israel’s overall approach (1)” “Israel’s overall water resources management strategy (1)” “Israel’s solution (1)” “Israel’s successful expansion (1)” “Israel’s water history (1)” “Israel’s water law (1)” “Israel’s

		water management (1)" "Israel's water reuse approach (1)" "Israel's water supply system (1)"
delegation	36	"2022 delegation (15)" "the delegation (12)" "s. delegation (3)" "a delegation (2)" "delegation activities and site visits (1)" "delegation member (1)" "s. delegation summary march (1)" "the delegation's activities (1)"
wastewater	34	"wastewater (7)" "wastewater treatment (4)" "a wastewater utility (3)" "treated wastewater (3)" "a wastewater intelligence solution (1)" "its treated municipal wastewater (1)" "its wastewater (1)" "MBR wastewater treatment (1)" "the municipal wastewater collection system (1)" "the nation's wastewater (1)" "the third largest wastewater treatment plant (1)" "the water and wastewater related aspects (1)" "treated municipal wastewater (1)" "treated wastewater irrigation (1)" "wastewater collection systems (1)" "wastewater data analysis (1)" "wastewater salinity (1)" "wastewater sludge (1)" "wastewater transmission (1)" "wastewater treatment technologies (1)" "water/wastewater technology (1)"
treatment	33	"treatment (6)" "wastewater treatment (4)" "tertiary treatment (3)" "extensive tertiary treatment (2)" "treatment technologies (2)" "water treatment (2)" "a space-efficient treatment option (1)" "additional treatments (1)" "additional unit treatments (1)" "advanced effluent treatment (1)" "aquifer treatment (1)" "MBR wastewater treatment (1)" "saturated aquifer treatment (1)" "secondary biological treatment (1)" "sludge treatment (1)" "the effluent treatment system (1)" "the Ein Bokek treatment (1)" "the third largest wastewater treatment plant (1)" "treatment units (1)" "wastewater treatment technologies (1)"
reuse	31	"water reuse (13)" "agricultural reuse (2)" "reuse (2)" "reuse water (2)" "a key water reuse research and development center (1)" "agricultural water reuse (1)" "agriculture) reuse (1)" "further agricultural reuse (1)" "non-potable reuse (1)" "potable reuse opportunities (1)" "reuse onsite (1)" "Israel's water reuse approach (1)" "successful Israeli water reuse strategies (1)" "the reuse (1)" "various water reuse approaches (1)" "water reuse policies (1)"
United States	23	"the United States (19)" "the western United States (2)" "the United States' water resources (1)" "wrap action partners United States (1)"
supply	21	"Israel's water supply (4)" "a more sustainable and resilient water supply (1)" "a new water supply (1)" "a primary water supply method (1)" "a water supply disruption (1)" "adequate and resilient water supplies (1)" "adequate water supply (1)" "ample water supplies (1)" "an abundant, nutrient-rich water supply (1)" "emergency water supply planning (1)" "Israel's domestic freshwater supply (1)" "Israel's domestic water supply (1)" "Israel's water supply system (1)" "potable supplies

		(1)" "the agricultural supply systems (1)" "the total supply (1)" "various supply needs (1)" "water supply crises (1)"
system	21	"decentralized systems (2)" "two different systems (2)" "a regional reservoir system (1)" "a regional system (1)" "an agricultural system (1)" "an integrated regional distribution system (1)" "effluent distribution systems (1)" "green energy generation systems (1)" "Israel's water supply system (1)" "neighboring regional systems (1)" "reverse osmosis system (1)" "the agricultural supply systems (1)" "the effluent treatment system (1)" "the Emek Hefer system (1)" "the municipal wastewater collection system (1)" "the sat system (1)" "these systems (1)" "wastewater collection systems (1)" "water systems (1)"
technology	20	"technologies (4)" "technology providers (2)" "treatment technologies (2)" "water technology providers (2)" "advanced technologies (1)" "digital water technologies (1)" "leading Israeli water technology providers (1)" "multiple leading Israeli water technology providers (1)" "new technologies (1)" "selected technologies presentations (1)" "the water technologies (1)" "vertical reverse osmosis technology (1)" "wastewater treatment technologies (1)" "water/wastewater technology (1)"
use	20	"the use (5)" "use (4)" "water use (3)" "agricultural use (1)" "agriculture uses (1)" "different uses (1)" "energy use (1)" "Israel's long-term use (1)" "long-term use (1)" "municipal use (1)" "uses (1)"
ministry	18	"ministry (16)" "the ministry (1)" "the Israeli ministry (1)"
agriculture	18	"agriculture (15)" "agriculture uses (1)" "agriculture) reuse (1)" "precision agriculture (1)"
facility	17	"facilities (3)" "the facility (3)" "a distribution facility (1)" "an intel corporation facility (1)" "Ein Bokek hotels treatment and reuse facilities (1)" "facility tours (1)" "hands-on facility tour (1)" "more desalination facilities (1)" "neighboring facilities (1)" "other facilities (1)" "the Emek Hefer water reclamation project facility (1)" "the largest water recycling facility (1)" "the world's largest reverse osmosis desalination facilities (1)"
management	17	"water management (3)" "environmental management (2)" "adaptive management approaches (1)" "agile management (1)" "data management (1)" "effective water management (1)" "integrated water management (1)" "integrated water management approaches (1)" "Israel's overall water resources management strategy (1)" "Israel's water management (1)" "its overall water resources management strategy (1)" "Meniv Rishon's water management (1)" "overall water management methodology (1)" "water management methodology (1)"
plant	17	"the plant (2)" "another desalination plant (1)" "intel semiconductor plant (1)" "ocean desalination plants (1)" "plant health (1)" "soil and plant health (1)" "the desalination plants

		(1)" "the Emek Hefer effluent plant (1)" "the intel semiconductor plant (1)" "the largest desalination plants (1)" "the largest reverse osmosis desalination plants (1)" "the largest water recycling plant (1)" "the plant's footprint (1)" "the Sorek desalination plant (1)" "the Sorek plant (1)" "the third largest wastewater treatment plant (1)"
WRAP Action	17	"WRAP Action (17)"
EPA	16	"EPA (14)" "EPA's national program leader (1)" "s. EPA (1)"
approach	14	"Israel's approach (3)" "a coordinated national approach (1)" "a successful, innovative approach (1)" "a true integrated approach (1)" "adaptive management approaches (1)" "approaches (1)" "collaborative approaches (1)" "integrated water management approaches (1)" "Israel's overall approach (1)" "Israel's water reuse approach (1)" "the innovative approaches (1)" "various water reuse approaches (1)"
site	19	"site visit (4)" "site (3)" "site visits (3)" "summary report delegation activities and site visits (2)" "its first manufacturing site (1)" "the first research and development intel site (1)" "the Intel Lachish site (1)" "the premier sites (1)" "the site visit (1)" "delegation activities and site visits (1)" "the sites (1)"
health	13	"health (7)" "public health (2)" "long-term soil health (1)" "plant health (1)" "soil and plant health (1)" "soil health (1)"
quality	13	"different qualities (1)" "effluent quality (1)" "high-quality secondary effluents (1)" "high-quality effluent (1)" "high-quality water (1)" "improved water quality (1)" "national water quality standards (1)" "quality (1)" "quality monitoring (1)" "similar quality (1)" "soil quality (1)" "water quality (1)" "water quality issues (1)"
visit	13	"site visit (3)" "site visits (3)" "summary report delegation activities and site visits (2)" "the visit (2)" "delegation activities and site visits (1)" "the site visit (1)" "old city tour site visit (1)"
WWTP	13	"WWTP (4)" "a dedicated WWTP (2)" "the WWTP (2)" "an arid climate Ein Bokek hotels WWTP (1)" "Ein Bokek hotels WWTP (1)" "I'ron WWTP (1)" "the I'ron WWTP (1)" "the WWTP and agricultural irrigation demands (1)"
delegate	12	"delegate (6)" "delegates (3)" "delegates' introductory meeting (1)" "s. delegates (1)" "state delegates (1)"
irrigation	12	"irrigation (5)" "agricultural irrigation (2)" "food crop irrigation (1)" "irrigation purposes (1)" "the irrigation (1)" "the WWTP and agricultural irrigation demands (1)" "treated wastewater irrigation (1)"
photo	12	"photo (11)" "photo credits (1)"
utility	11	"a wastewater utility (3)" "utilities (3)" "a large and innovative water utility corporation (1)" "e.g., utilities (1)" "Israel's largest and most innovative water utility corporations (1)" "s. utilities (1)" "water utilities (1)"
desalination	10	"desalination (2)" "another desalination plant (1)" "more desalination facilities (1)" "ocean desalination plants (1)" "the

		desalination plants (1)" "the largest desalination plants (1)" "the largest reverse osmosis desalination plants (1)" "the Sorek desalination plant (1)" "the world's largest reverse osmosis desalination facilities (1)"
part	10	"part (3)" "a critical part (1)" "many parts (1)" "other parts (1)" "parts (1)" "the main parts (1)" "the northern part (1)" "the western, coastal part (1)"
crop	9	"agricultural crops (2)" "various crops (2)" "crop (1)" "food crop irrigation (1)" "food crops (1)" "the crops' needs (1)" "the food crop (1)"
effluent	9	"effluent (2)" "effluents (2)" "the effluent (2)" "high-quality secondary effluents (1)" "high-quality effluent (1)" "the MABR effluent (1)"
Environmental Protection	9	"Environmental Protection (9)"
example	9	"example (5)" "a few examples (1)" "an example (1)" "examples (1)" "share examples (1)"
loss	9	"water losses (3)" "non-revenue water losses (2)" "a record-low 5 percent annual water loss rate (1)" "evaporation losses (1)" "revenue losses (1)" "the loss (1)"
osmosis	9	"osmosis (2)" "an additional reverse osmosis step (1)" "reverse osmosis (1)" "reverse osmosis system (1)" "the largest reverse osmosis desalination plants (1)" "the world's largest reverse osmosis desalination facilities (1)" "vertical reverse osmosis cylinders (1)" "vertical reverse osmosis technology (1)"
distribution	8	"distribution (2)" "a distribution facility (1)" "a water distribution station (1)" "about 80 distribution stations (1)" "an integrated regional distribution system (1)" "effluent distribution systems (1)" "rapid regional distribution (1)"
Emek Hefer Water Reclamation Project	8	"Emek Hefer Water Reclamation Project (4)" "the Emek Hefer Water Reclamation Project (3)" "the Emek Hefer Water Reclamation Project facility (1)"
energy	8	"associated energy (1)" "energy onsite (1)" "energy use (1)" "great energy (1)" "green energy generation systems (1)" "lower energy requirements (1)" "minimal energy requirements (1)" "reduced energy consumption (1)"
Intel	8	"Intel (5)" "Intel semiconductor plant (1)" "the first research and development Intel site (1)" "the Intel semiconductor plant (1)"
level	8	"the high level (2)" "a lower level (1)" "biological oxygen demand levels (1)" "the appropriate level (1)" "the federal and state level (1)" "the level (1)" "this level (1)"
provider	8	"technology providers (2)" "water technology providers (2)" "leading Israeli water technology providers (1)" "multiple leading Israeli water technology providers (1)" "providers (1)" "water providers (1)"
research	8	"research (2)" "a key water reuse research and development center (1)" "research and development center (1)" "research

		efforts (1)" "scientific research (1)" "several research institutes (1)" "the first research and development Intel site (1)"
Sorek Desalination Plant	8	"the Sorek Desalination Plant (5)" "Sorek Desalination Plant (3)"
state	8	"states (2)" "different states (1)" "from left: state representatives (1)" "state agencies (1)" "state and regional cooperation (1)" "state delegates (1)" "the federal and state level (1)"
CEO	7	"CEO (7)"
cooperation	7	"cooperation (3)" "technical cooperation (2)" "bilateral cooperation (1)" "state and regional cooperation (1)"
demand	7	"the demand (2)" "biological oxygen demand levels (1)" "demand (1)" "increasing demands (1)" "the municipal water demand (1)" "the WWTP and agricultural irrigation demands (1)"
director	7	"director (7)"
economy	7	"economy (7)"
industry	7	"industry (7)"
percent	7	"20 percent (1)" "a record-low 5 percent annual water loss rate (1)" "approximately 50 percent (1)" "approximately 90 percent (1)" "less than 5 percent (1)" "more than 90 percent (1)" "nearly 90 percent (1)"
soil	7	"soil (2)" "agricultural soil (1)" "long-term soil health (1)" "soil and plant health (1)" "soil health (1)" "soil quality (1)"
tour	7	"a hands-on tour (1)" "facility tours (1)" "hands-on facility tour (1)" "Masada National Park tour closing meeting (1)" "the Meniv Rishon utility facility tour (1)" "tour (1)" "virtual tours (1)"
collaboration	6	"collaboration (2)" "a growing collaboration (1)" "formal collaborations (1)" "potential future collaborations (1)" "s.-Israel practical collaboration (1)"
community	6	"communities (2)" "IL community (1)" "our communities (1)" "the agricultural community (1)" "the regulated community (1)"
Dead Sea	6	"the Dead Sea (2)" "Dead Sea (1)" "the Dead Sea area (1)" "the Dead Sea recreational area (1)" "the Dead Sea shore (1)"
equipment	6	"equipment (6)"
government	6	"government control (1)" "government participants (1)" "governments (1)" "local governments (1)" "one autonomous government agency (1)" "the government (1)"
hotel	6	"a secluded hotel complex (2)" "an arid climate Ein Bokek hotels WWTP (1)" "Ein Bokek hotels WWTP (1)" "hotels (1)" "the hotel complex (1)"
implementation	6	"implementation (4)" "real-world implementation (1)" "the implementation (1)"

information	6	"information (3)" "potentially useful information (1)" "scientific, technological, and policy information (1)" "this information (1)"
membrane	6	"membrane bioreactors (2)" "16-inch membranes (1)" "8-inch membranes (1)" "full-scale membrane (1)" "these membranes (1)"
participant	6	"participants (4)" "based participants (1)" "government participants (1)"
resource	6	"all water resources (1)" "Israel's overall water resources management strategy (1)" "its overall water resources management strategy (1)" "its water resources (1)" "the united states' water resources (1)" "water resources (1)"
Rural Development	6	"Rural Development (6)"
sector	6	"the water sector (3)" "s. private sector (1)" "s. water sector (1)" "water sector leaders (1)"
view	6	"view (6)"
world	6	"the world (2)" "real-world implementation (1)" "real-world performance (1)" "the world's largest reverse osmosis desalination facilities (1)" "the world's most water-stressed countries (1)"
agency	5	"an Israeli regulatory agency (1)" "federal agencies (1)" "one autonomous government agency (1)" "regulatory agencies (1)" "state agencies (1)"
area	5	"other areas (1)" "remote arid areas (1)" "some areas (1)" "the dead sea area (1)" "the dead sea recreational area (1)"
aspect	5	"aspects (1)" "environmental aspects (1)" "important aspects (1)" "many aspects (1)" "the water and wastewater related aspects (1)"
country	5	"the country (2)" "a water-secure country (1)" "the country's population (1)" "the world's most water-stressed countries (1)"
department	5	"s. department (3)" "department (1)" "the department (1)"
discussion	5	"discussion (1)" "discussions (1)" "group discussions (1)" "informal networking discussions (1)" "the discussion (1)"
IL	5	"IL (4)" "IL community (1)"
infrastructure	5	"drastic infrastructure (1)" "infrastructure (1)" "infrastructures (1)" "new infrastructure (1)" "the infrastructure (1)"
insight	5	"insights (2)" "other insights (1)" "scientific insights (1)" "technological insights (1)"
Israel Export Institute	5	"Israel Export Institute (4)" "e.g., Israel Export Institute (1)"
Israel Water Authority	5	"Israel Water Authority (3)" "Israel Water Authority's crisis readiness assessment (1)" "the Israel Water Authority (1)"
meter	5	"100,000 cubic meters (1)" "624,000 cubic meters (1)" "million cubic meters (1)" "old or inaccurate meters (1)" "water meters (1)"

method	5	"a primary water supply method (1)" "an activated sludge method (1)" "methods (1)" "the build-operate-transfer project delivery method (1)" "the sat method (1)"
need	5	"changing needs (1)" "the crops' needs (1)" "the need (1)" "various supply needs (1)" "water usage/need (1)"
October	5	"October (5)"
policy	5	"policies (3)" "scientific, technological, and policy information (1)" "water reuse policies (1)"
regulation	5	"regulations (2)" "water regulation (2)" "the regulations (1)"
security	5	"security (4)" "future water and food security challenges (1)"
sludge	5	"aerated activated sludge (1)" "an activated sludge method (1)" "sludge (1)" "sludge treatment (1)" "wastewater sludge (1)"
source	5	"source (2)" "additional water sources (1)" "one source (1)" "viable, alternative freshwater sources (1)"
strategy	5	"Israel's overall water resources management strategy (1)" "its overall water resources management strategy (1)" "strategies (1)" "successful Israeli water reuse strategies (1)" "the integrated water resources management national strategy (1)"
Summary Report Attachment	5	"Summary Report Attachment (5)"
trip	5	"the trip (4)" "this trip report (1)"

2.2. Analysis and Selection of Terms

Sustainable Water Management in Agriculture under Climate Change

1. **Water (220 mentions)**
    - **Relevance:** Water is the most crucial resource for agriculture, and its management directly impacts crop yields and sustainability. Efficient use, availability, and conservation are essential to mitigating water scarcity and ensuring long-term food security.
2. **Irrigation (142 mentions)**
    - **Relevance:** Irrigation systems provide the water needed to maintain crop health and productivity. Various techniques like deficit irrigation and drip irrigation are used to optimise water use and reduce wastage.
3. **Soil (74 mentions)**
    - **Relevance:** Soil health and its ability to retain water are vital for plant growth. Soil water content, infiltration rates, and management practices such as tillage all contribute to efficient water use in agriculture.
4. **Crop (71 mentions)**

- **Relevance:** Different crops have varying water needs, and understanding these requirements is critical for efficient irrigation scheduling and water use. Water stress and crop-specific irrigation techniques can improve water efficiency.

5. **System (38 mentions)**
    - **Relevance:** Irrigation systems and other water management systems help deliver water efficiently to crops. Modern systems, such as localized irrigation or telemetry, are designed to optimize water usage while minimizing losses.
6. **Management (36 mentions)**
    - **Relevance:** Sustainable water management involves the strategic allocation of resources to meet crop water needs while minimizing waste. Effective management practices are key to combating water scarcity and ensuring long-term agricultural productivity.
7. **Use (33 mentions)**
    - **Relevance:** Water use efficiency is crucial in agriculture to reduce unnecessary consumption. Managing the right amount of water at the right time ensures that crops receive what they need without overuse, preserving water resources for future use.
8. **Application (29 mentions)**
    - **Relevance:** The application of water, including the rate and method, directly affects water efficiency. Different techniques, such as drip irrigation and fertigation, help improve water delivery to crops.
9. **Scheduling (23 mentions)**
    - **Relevance:** Irrigation scheduling ensures that crops receive water at the most critical stages of growth. Proper scheduling minimizes water loss and maximizes crop yield, making it an essential tool for sustainable agriculture.
10. **Efficiency (21 mentions)**
    - **Relevance:** Water use efficiency refers to using water in a way that maximizes crop yield with minimal waste. Higher efficiency reduces water consumption and helps address water scarcity issues.
11. **Farmer (20 mentions)**
    - **Relevance:** Farmers are the key stakeholders in implementing sustainable water management practices. Their participation and understanding of efficient irrigation techniques can lead to significant water savings and productivity improvements.
12. **Yield (19 mentions)**

- **Relevance:** Crop yield is directly influenced by water availability. Managing water stress and optimizing irrigation practices help maximize yields and ensure the economic viability of farming.

13. **Practice (18 mentions)**
    - **Relevance:** Agricultural practices, including traditional and modern methods, determine the sustainability of water use in farming. Best practices such as deficit irrigation and shallow tillage help conserve water while maintaining productivity.
14. **Growth (18 mentions)**
    - **Relevance:** Plant growth depends on the availability of water at different stages of development. Proper irrigation management supports both vegetative and reproductive growth, improving overall crop health.
15. **Agriculture (17 mentions)**
    - **Relevance:** Agriculture is a water-intensive industry, and sustainable water management is crucial for its long-term success. Modern agriculture techniques, such as precision irrigation, play a key role in conserving water.
16. **Cost (16 mentions)**
    - **Relevance:** The cost of irrigation and water management systems is a significant factor for farmers. Implementing cost-effective techniques helps reduce water wastage while keeping production expenses manageable.
17. **Deficit (16 mentions)**
    - **Relevance:** Deficit irrigation refers to the practice of applying less water than the full crop water requirement, which can save water without significantly affecting yields. It's particularly useful in areas with limited water supplies.
18. **Plant (15 mentions)**
    - **Relevance:** Plants have varying water needs depending on their growth stages and environmental conditions. Effective water management ensures that plants receive adequate water to thrive without experiencing stress.
19. **Fertilizer (14 mentions)**
    - **Relevance:** Efficient fertilizer application, often combined with irrigation (fertigation), ensures that plants receive the necessary nutrients while minimizing water and fertilizer wastage.
20. **Control (14 mentions)**

- **Relevance:** Controlling water distribution and runoff is essential to prevent water loss and manage resources effectively. Techniques such as pest control and weed management also play a role in ensuring water is used efficiently.

21. **Loss (13 mentions)**
    - **Relevance:** Water loss, through evaporation, runoff, or inefficient irrigation, leads to wasted resources. Minimising these losses is essential for improving water use efficiency and ensuring sustainable agricultural practices.
22. **Development (13 mentions)**
    - **Relevance:** Agricultural development depends on sustainable water management. Technological advancements and innovative techniques help farmers address water stress and improve crop productivity.
23. **Technique (13 mentions)**
    - **Relevance:** Various irrigation and water conservation techniques, such as drip irrigation and regulated deficit irrigation, help improve water use efficiency. The adoption of these techniques can reduce water consumption without sacrificing yields.
24. **Agriculture (13 mentions)**
    - **Relevance:** Agriculture relies heavily on water, making efficient water management critical for the industry's sustainability. Properly managing water resources ensures food security and environmental preservation.
25. **Area (13 mentions)**
    - **Relevance:** Irrigated areas are regions where crops depend on artificial water supply. Expanding and optimising these areas through efficient irrigation techniques helps maximise agricultural output.
26. **Condition (12 mentions)**
    - **Relevance:** Environmental and soil conditions, such as water scarcity and soil quality, directly affect crop health. Managing these conditions with appropriate water application ensures better yields.
27. **Resource (11 mentions)**
    - **Relevance:** Water is a finite resource, and its management is crucial for agricultural sustainability. Efficient use of this resource through innovative practices and technology is key to addressing water scarcity.
28. **Adoption (11 mentions)**

- **Relevance:** The adoption of sustainable water management practices and advanced irrigation techniques can significantly improve water efficiency in agriculture. It also plays a critical role in mitigating water scarcity.

29. **Quality (11 mentions)**
    - **Relevance:** Water quality affects crop health and productivity. Using clean water or properly treating reclaimed water for irrigation ensures that crops grow optimally without being harmed by contaminants.
30. **Method (11 mentions)**
    - **Relevance:** Different irrigation methods, such as drip, surface, and sprinkler irrigation, have varying effects on water use efficiency. Choosing the right method based on crop needs and environmental conditions is crucial for reducing water waste.
31. **Root (11 mentions)**
    - **Relevance:** The root zone is where plants absorb water, and managing soil moisture in this zone is critical for healthy plant growth. Proper irrigation methods ensure that the roots receive sufficient water without causing waterlogging or drought stress.
32. **Availability (11 mentions)**
    - **Relevance:** Water availability is a critical factor in agricultural productivity. Managing water resources to ensure availability during critical growth periods helps maintain crop health and optimise yields.
33. **Stress (11 mentions)**
    - **Relevance:** Water stress negatively impacts plant growth and yields. Managing water stress through efficient irrigation is essential for healthy crops and long-term sustainability.
34. **Drip (11 mentions)**
    - **Relevance:** Drip irrigation is an efficient water delivery method that reduces evaporation and runoff. By providing water directly to the roots, it optimises water use and conserves resources.
35. **Surface (11 mentions)**
    - **Relevance:** Surface irrigation is one of the oldest methods of water application. However, it is less efficient than modern techniques like drip or sprinkler irrigation, as it often leads to significant water loss through evaporation and runoff.
36. **RDI (10 mentions)**

- **Relevance:** Regulated Deficit Irrigation (RDI) involves applying water below the full crop water requirements during specific growth stages. This method conserves water while maintaining acceptable yields.

37. **Requirement (10 mentions)**
    - **Relevance:** Each crop has specific water requirements, which change depending on growth stages. Understanding and meeting these requirements through precise irrigation is crucial for optimising water use efficiency.
38. **Level (10 mentions)**
    - **Relevance:** Managing water levels in the soil is essential for ensuring that crops receive the right amount of moisture without overwatering or causing water stress.
39. **Rate (10 mentions)**
    - **Relevance:** The rate of water application affects how well crops absorb water. Applying water at the correct rate ensures efficient use and prevents wastage due to runoff or deep percolation.
40. **Demand (10 mentions)**
    - **Relevance:** Water demand varies by crop type, weather conditions, and growth stages. Meeting this demand efficiently helps avoid water stress and ensures healthy crop development.
41. **Capacity (10 mentions)**
    - **Relevance:** Soil water holding capacity is crucial for plant growth. Soils with higher capacity can store more water, reducing the need for frequent irrigation and improving water use efficiency.
42. **Pressure (10 mentions)**
    - **Relevance:** Water pressure in irrigation systems affects how evenly water is distributed. Proper pressure management ensures that water reaches all parts of the field, preventing under- or over-irrigation.
43. **Agricultural Science Procedia (10 mentions)**
    - **Relevance:** This refers to academic research and proceedings related to sustainable agricultural practices, including efficient water management, which is critical for improving agricultural productivity while conserving water resources.
44. **Konstantinos Chartzoulakis (10 mentions)**

- **Relevance:** Konstantinos Chartzoulakis is a key figure in agricultural research, particularly in water management techniques, making his work highly relevant for understanding and improving irrigation practices.

45. **Maria Bertaki (9 mentions)**
    - **Relevance:** Maria Bertaki contributes to research in water management and agricultural science, focusing on sustainable practices that can help address water scarcity issues in agriculture.
46. **Response (9 mentions)**
    - **Relevance:** Crop response to irrigation is an important factor in determining water requirements. Understanding this response allows for more precise irrigation scheduling, optimising water use.
47. **Infiltration (9 mentions)**
    - **Relevance:** Soil infiltration rates determine how quickly water enters the soil. Proper management of infiltration helps prevent waterlogging or runoff, ensuring that crops receive adequate moisture.
48. **Tube (8 mentions)**
    - **Relevance:** Tubes are commonly used in drip irrigation systems to deliver water directly to the roots of plants. Efficient design and placement of these tubes can significantly reduce water wastage.
49. **Tillage (8 mentions)**
    - **Relevance:** Conservation tillage practices reduce soil disturbance and help maintain soil moisture. These practices are essential for sustainable water management in agriculture.
50. **Decision (8 mentions)**
    - **Relevance:** Decision-making in water management involves choosing the right irrigation methods, scheduling, and techniques to optimise water use and crop health. Informed decisions can mitigate water stress and improve efficiency.
51. **Production (8 mentions)**
    - **Relevance:** Agricultural production relies heavily on water availability and efficient water use. Sustainable water management ensures stable food production without depleting water resources.
52. **Environment (8 mentions)**

- **Relevance:** Environmental conditions such as temperature, rainfall, and humidity directly influence water needs in agriculture. Managing these conditions through proper water use is essential for sustainable farming.

53. **Improvement (8 mentions)**
    - **Relevance:** Continuous improvement in water management practices, such as adopting new technologies and refining irrigation methods, helps farmers adapt to water scarcity and climate change.
54. **Characteristic (8 mentions)**
    - **Relevance:** Soil and crop characteristics, such as texture and root depth, affect water needs and irrigation efficiency. Understanding these characteristics allows for more precise water management.
55. **Reduction (7 mentions)**
    - **Relevance:** Reducing water usage while maintaining crop yields is a key goal of sustainable agriculture. Methods like deficit irrigation help achieve this balance.
56. **Balance (7 mentions)**
    - **Relevance:** Soil water balance refers to the equilibrium between water input (irrigation, rainfall) and water losses (evaporation, drainage). Maintaining this balance is critical for crop health.
57. **Measurement (7 mentions)**
    - **Relevance:** Accurate water measurement, including soil moisture and evapotranspiration, is essential for efficient irrigation scheduling and reducing water waste.
58. **Approach (7 mentions)**
    - **Relevance:** An integrated approach to water management considers all factors—crop needs, soil properties, and environmental conditions—to optimise water use in agriculture.
59. **Weed (7 mentions)**
    - **Relevance:** Weeds compete with crops for water. Effective weed control ensures that crops receive sufficient moisture, improving water use efficiency.
60. **Depth (7 mentions)**
    - **Relevance:** Irrigation depth refers to how deep water penetrates into the soil. Managing depth ensures that water reaches the root zone without causing waterlogging or runoff.
61. **Extension (7 mentions)**

- **Relevance:** Agricultural extension services provide farmers with the knowledge and tools needed for efficient water management practices. Strong extension services help promote sustainable agriculture and better irrigation techniques.

62. **Conservation (7 mentions)**
    - **Relevance:** Water conservation practices, such as reducing water wastage and increasing efficiency, are critical for managing limited water resources, particularly in arid regions.
63. **Problem (7 mentions)**
    - **Relevance:** Addressing problems related to water management, such as soil infiltration issues or over-irrigation, is essential for maintaining sustainable agriculture and reducing water losses.
64. **Technology (7 mentions)**
    - **Relevance:** Advances in irrigation technology, such as automated systems and precision agriculture tools, are key to improving water use efficiency and reducing water waste.
65. **Policy (7 mentions)**
    - **Relevance:** Water pricing and agricultural policies can influence water usage patterns. Proper policies encourage efficient water use and the adoption of sustainable practices in farming.
66. **Supply (7 mentions)**
    - **Relevance:** The availability of water supplies, including fresh and reclaimed water, directly affects agricultural productivity. Managing these supplies efficiently ensures sustainable food production.
67. **PRD (7 mentions)**
    - **Relevance:** Partial Root Drying (PRD) is an irrigation technique that can improve water use efficiency by alternating water supply to different parts of the root zone, encouraging deeper root growth and reducing water consumption.
68. **Fruit (6 mentions)**
    - **Relevance:** Fruit crops require careful water management to ensure optimal growth and yield. Efficient irrigation practices can enhance fruit size and quality while conserving water.
69. **Volume (6 mentions)**
    - **Relevance:** Managing the volume of water applied in irrigation is critical for preventing over-irrigation and water wastage, ensuring that plants receive only the amount of water they need.

70. **Tree (6 mentions)**
    - **Relevance:** Trees, especially in orchards, have unique water requirements. Tailored irrigation strategies for tree crops help conserve water and maintain crop health and productivity.
71. **Grapevine (6 mentions)**
    - **Relevance:** Efficient irrigation is vital for grapevines, particularly in wine production regions. Managing water availability for grapevines can improve fruit quality and yield while conserving water.
72. **Support (6 mentions)**
    - **Relevance:** Technical support in irrigation practices, including guidance on water-saving technologies and efficient management, helps farmers improve water use efficiency.
73. **Effort (6 mentions)**
    - **Relevance:** Sustained efforts from farmers, policymakers, and researchers are needed to improve water management practices and address the challenges of water scarcity in agriculture.
74. **Disease (6 mentions)**
    - **Relevance:** Proper water management can help reduce the spread of soil-borne diseases, which thrive in poorly drained or over-irrigated soils, ensuring healthier crops.
75. **Time (6 mentions)**
    - **Relevance:** Timely irrigation is essential for meeting crops' water needs at critical growth stages. Proper scheduling and timing of water applications can improve water use efficiency and crop yields.
76. **Change (6 mentions)**
    - **Relevance:** Climate change affects water availability and demand. Adapting irrigation practices to changing weather patterns is crucial for sustainable agriculture.
77. **Climate (6 mentions)**
    - **Relevance:** Understanding local climate conditions, including temperature, rainfall, and humidity, helps optimise irrigation practices and manage water resources efficiently.
78. **Impact (6 mentions)**
    - **Relevance:** Efficient water management reduces the environmental impact of agriculture, including water wastage and soil degradation, ensuring long-term sustainability.
79. **Discharge (5 mentions)**

- **Relevance:** Water discharge rates in irrigation systems need to be carefully managed to ensure uniform water distribution and prevent waterlogging or runoff.

80. **Estimate (5 mentions)**
    - **Relevance:** Accurate estimates of water requirements based on factors like soil moisture and crop type are essential for developing efficient irrigation schedules and reducing water waste.
81. **Process (5 mentions)**
    - **Relevance:** Efficient agricultural processes, including water management and irrigation scheduling, help optimise water use, reduce waste, and improve crop productivity.
82. **Fertigation (5 mentions)**
    - **Relevance:** Fertigation combines fertilisation with irrigation, allowing for precise application of nutrients directly to the root zone, improving plant health and reducing water and fertiliser waste.
83. **Row (5 mentions)**
    - **Relevance:** Row crops, like corn or soybeans, require efficient irrigation practices to ensure each row receives the correct amount of water, maximising growth and yield.
84. **Sprinkler (5 mentions)**
    - **Relevance:** Sprinkler irrigation systems distribute water evenly across fields, but managing the system's pressure and spacing is critical for preventing water waste and ensuring even coverage.
85. **Mean (5 mentions)**
    - **Relevance:** Statistical means are used to summarise data on water use, crop growth, and irrigation efficiency, providing valuable insights for improving water management strategies.
86. **Micro (5 mentions)**
    - **Relevance:** Micro-irrigation systems, like drip or trickle irrigation, deliver water directly to the plant's root zone, significantly reducing water loss due to evaporation or runoff.
87. **Farm (5 mentions)**
    - **Relevance:** Efficient water management at the farm level is critical for ensuring sustainable agricultural practices and conserving water resources on a larger scale.
88. **Field (5 mentions)**
    - **Relevance:** Water management practices at the field level, including irrigation design and scheduling, directly influence crop yields and water use efficiency.

89. **Period (5 mentions)**
    - **Relevance:** Irrigation needs vary by period, such as growth stages or seasonal changes. Managing water use according to these periods ensures optimal water use and plant growth.
90. **Zone (5 mentions)**
    - **Relevance:** Different root zones within the soil have varying water needs. Understanding these zones helps in delivering the right amount of water where it's most effective.
91. **Evaporation (5 mentions)**
    - **Relevance:** Minimising water loss through evaporation is crucial in water-scarce regions. Efficient irrigation practices reduce surface evaporation, conserving water for crop use.
92. **Land (5 mentions)**
    - **Relevance:** Land use and its management directly influence water availability. Sustainable practices help conserve both land and water resources, ensuring long-term agricultural productivity.
93. **FAO (5 mentions)**
    - **Relevance:** The Food and Agriculture Organization (FAO) provides guidelines and frameworks for sustainable water management, supporting global efforts in improving water use efficiency in agriculture.
94. **Need (5 mentions)**
    - **Relevance:** Water needs for crops vary based on factors like growth stages, soil type, and climate. Efficient water management ensures these needs are met without overuse or waste.
95. **Pricing (5 mentions)**
    - **Relevance:** Water pricing policies influence water use behaviour. Properly structured pricing can encourage conservation and more efficient water use in agriculture.
96. **Scarcity (5 mentions)**
    - **Relevance:** Water scarcity is a growing issue in many regions. Efficient irrigation and water management practices are essential for mitigating the impact of limited water resources on agriculture.
97. **Parameter (5 mentions)**
    - **Relevance:** Parameters such as soil moisture, crop type, and climate are used to develop efficient irrigation schedules and improve water use efficiency in agricultural systems.
98. **Content (5 mentions)**

- **Relevance:** Soil water content is a key factor in determining irrigation needs. Monitoring this content helps optimise water use and ensure that plants receive the right amount of moisture for growth.

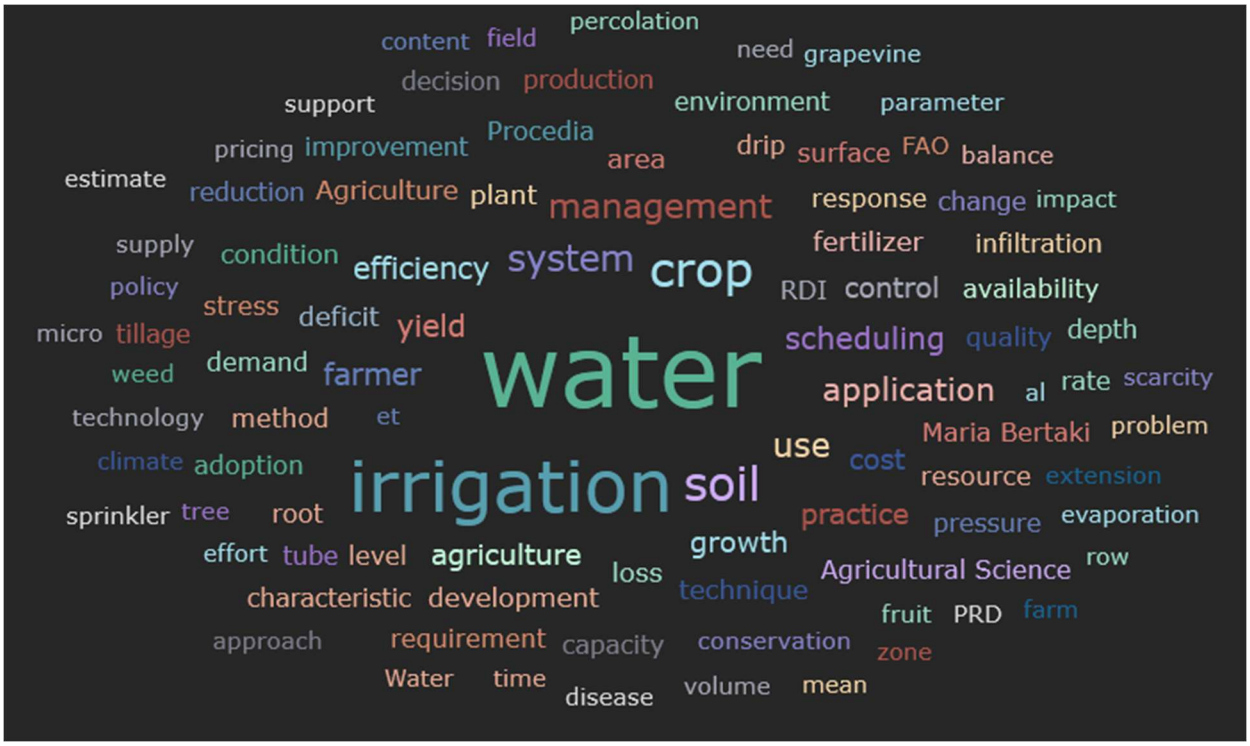


Illustration 1. Concept cloud of the document "Sustainable water management in agriculture under climate change"

From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach

1. **Water (179 mentions)**
   - **Relevance:** Essential for agriculture, impacting irrigation and crop growth.
2. **Israel (95 mentions)**
   - **Relevance**: A leader in water management practices for sustainable agriculture.
3. **Delegation (36 mentions)**
   - **Relevance**: Key for assigning responsibilities in water resource management.
4. **Wastewater (34 mentions)**
   - **Relevance:** Crucial for understanding water reuse in agriculture, promoting sustainability and resource efficiency.

5. **Treatment (33 mentions)**
    - **Relevance**: Essential for ensuring that wastewater is safely reused in agriculture, protecting health and the environment.
6. **Reuse (31 mentions)**
    - **Relevance:** Key for sustainable water management in agriculture, promoting the practice of using treated wastewater and reducing the demand for fresh water resources.
7. **United States (23 mentions)**
    - **Relevance:** Influential in water management practices impacting sustainable agriculture.
8. **Supply (21** mentions**)**
    - **Relevance**: Critical for understanding the availability of water resources for agricultural use, influencing irrigation practices and sustainability strategies.
9. **System (21 mentions)**
    - **Relevance**: Important for the integrated processes in agricultural water management.
10. **Technology (20 mentions)**
    - **Relevance**: Crucial for improving irrigation efficiency and water recycling in agriculture.
11. **Use (20 mentions)**
    - **Relevance:** Central to understanding how water is utilized in agricultural practices and sustainability efforts.
12. **Ministry (18 mentions)**
    - **Relevance:** Key for governance and policy-making in water resource management and agricultural sustainability.
13. **Agriculture (18 mentions)**
    - **Relevance:** Central to the discussion of sustainable water management, directly affecting food production and resource conservation.
14. **Facility (17 mentions)**
    - **Relevance:** Important for referring to infrastructure that supports water treatment and distribution in agricultural practices.
15. **Management (17 mentions)**
    - **Relevance:** Essential for organizing and overseeing water resources to ensure sustainable agricultural practices.
16. **Plant (17 mentions)**

- **Relevance:** Crucial for both agricultural crops and infrastructure like desalination plants, impacting water use efficiency and overall plant health.

17. **WRAP Action (17 mentions)**
    - **Relevance:** Important for initiatives focused on water resource management and sustainable agricultural practices, often promoting efficiency and conservation.
18. **EPA (16 mentions)**
    - **Relevance:** Central to regulating water quality and promoting sustainable practices in agriculture through environmental protection policies.
19. **Approach (14 mentions)**
    - **Relevance:** Key for describing strategies and methodologies in sustainable water management for agriculture.
20. **Site (19 mentions)**
    - **Relevance:** Important for referring to locations relevant to water management practices, including manufacturing facilities and research sites in agriculture.
21. **Health (13 mentions)**
    - **Relevance:** Crucial for assessing the well-being of soil and plants, directly influencing agricultural productivity and water management practices.
22. **Quality (13 mentions)**
    - **Relevance:** Essential for assessing the suitability of water for agricultural use, impacting crop health and sustainability.
23. **Visit (13 mentions)**
    - **Relevance:** Important for on-site assessments and evaluations of water management practices in agriculture.
24. **WWTP (13 mentions)**
    - **Relevance:** Stands for Wastewater Treatment Plant, crucial for treating and reusing wastewater in agriculture, promoting sustainability and resource efficiency.
25. **Delegate (12 mentions)**
    - **Relevance:** Key for assigning responsibilities in water management and ensuring effective governance in agricultural practices.
26. **Irrigation (12 mentions)**
    - **Relevance:** Essential for supplying water to crops, directly influencing agricultural productivity and sustainability.
27. **Photo (12 mentions)**

- **Relevance:** Important for visual documentation and representation of water management practices and agricultural activities.

28. **Utility (11 mentions)**
    - **Relevance:** Crucial for understanding the provision and management of water services essential for agricultural practices.
29. **Desalination (10 mentions)**
    - **Relevance:** Key process for converting seawater into fresh water, enhancing water supply for agricultural use in arid regions.
30. **Part (10 mentions)**
    - **Relevance:** Relevant for indicating components or roles within water management systems and agricultural practices.
31. **Crop (9 mentions)**
    - **Relevance:** Essential for understanding the types of plants cultivated in agriculture, directly linked to water use and sustainability practices.
32. **Effluent (9 mentions)**
    - **Relevance:** Important for discussing treated wastewater used in agriculture, highlighting issues of water reuse and sustainability.
33. **Environmental Protection (9 mentions)**
    - **Relevance:** Critical for ensuring sustainable practices in water management and agriculture, safeguarding ecosystems and public health.
34. **Example (9 mentions)**
    - **Relevance:** Important for illustrating best practices and case studies in sustainable water management for agriculture.
35. **Loss (9 mentions)**
    - **Relevance:** Relevant for discussing various types of losses, such as water loss in irrigation, which impacts resource efficiency in agriculture.
36. **Osmosis (9 mentions)**
    - **Relevance:** Key process in water movement through plants and in desalination technologies, impacting water efficiency in agriculture.
37. **Distribution (8 mentions)**
    - **Relevance:** Essential for understanding how water resources are allocated and managed for agricultural use, influencing efficiency and sustainability.
38. **Emek Hefer Water Reclamation Project (8 mentions)**

- **Relevance:** Significant case study in sustainable water management, showcasing effective reuse of treated wastewater for agricultural irrigation.

39. **Energy (8 mentions)**
    - **Relevance:** Important for discussing the energy requirements of water treatment processes and irrigation systems in sustainable agriculture.
40. **Intel (8 mentions)**
    - **Relevance:** Relevant for understanding the role of technology companies in advancing water management solutions and sustainable practices in agriculture.
41. **Level (8 mentions)**
    - **Relevance:** Important for measuring water availability and quality, as well as assessing irrigation efficiency in agricultural practices.
42. **Provider (8 mentions)**
    - **Relevance:** Key for identifying companies or organizations that supply water management technologies essential for sustainable agriculture.
43. **Research (8 mentions)**
    - **Relevance:** Crucial for advancing knowledge and developing innovative practices in water management and sustainable agriculture.
44. **Sorek Desalination Plant (8 mentions)**
    - **Relevance:** A significant facility in Israel, demonstrating advanced desalination technology to provide fresh water for agricultural use in arid regions.
45. **State (8 mentions)**
    - **Relevance:** Important for discussing the role of different government levels in water management policies and practices related to agriculture.
46. **CEO (7 mentions)**
    - **Relevance:** Important for understanding leadership in organizations that develop and implement water management strategies and technologies in agriculture.
47. **Cooperation (7 mentions)**
    - **Relevance:** Essential for collaborative efforts among stakeholders in water management, promoting sustainable agricultural practices across regions.
48. **Demand (7 mentions)**
    - **Relevance:** Relevant for understanding the pressures on water resources from various sectors, including agriculture, and how it influences water management strategies.
49. **Director (7 mentions)**

- **Relevance:** Key for leadership roles in organizations that manage water resources and develop sustainable agricultural practices.

50. **Economy (7 mentions)**
    - **Relevance:** Important for discussing the financial aspects of water management and its impact on agricultural sustainability and resource allocation.
51. **Industry (7 mentions)**
    - **Relevance:** Important for understanding the role of agricultural and water management sectors in promoting sustainable practices and technologies.
52. **Percent (7 mentions)**
    - **Relevance:** Useful for quantifying water usage, efficiency rates, and sustainability metrics in agricultural practices.
53. **Soil (7 mentions)**
    - **Relevance:** Essential for determining water retention and quality, directly influencing agricultural productivity and sustainability practices.
54. **Tour (7 mentions)**
    - **Relevance:** Important for educational opportunities and demonstrations of water management practices and facilities in agriculture.
55. **Collaboration (6 mentions)**
    - **Relevance:** Key for joint efforts among stakeholders in water management, enhancing sustainable agricultural practices and resource sharing.
56. **Community (6 mentions)**
    - **Relevance:** Vital for fostering local involvement and awareness in sustainable water management and agricultural practices.
57. **Dead Sea (6 mentions)**
    - **Relevance**: Important for discussing regional water challenges and conservation efforts, especially in relation to water scarcity and agricultural impacts in the area.
58. **Equipment (6 mentions)**
    - **Relevance**: Key for the tools and machinery used in water management and irrigation systems to improve agricultural efficiency.
59. **Government (6 mentions)**
    - **Relevance:** Central for policy-making and regulation in water management, ensuring **sustainable** practices in agriculture.
60. **Hotel (6 mentions)**

- **Relevance:** Relevant when discussing water management in large facilities like hotels, especially in arid regions where efficient water use and wastewater treatment intersect with agriculture.

61. **Implementation (6 mentions)**
    - **Relevance:** Crucial for the execution of water management strategies and technologies that promote sustainable agricultural practices.
62. **Information (6 mentions)**
    - **Relevance:** Important for data sharing and knowledge dissemination related to water management techniques and agricultural sustainability.
63. **Membrane (6 mentions)**
    - **Relevance:** Essential for advanced water treatment processes, like membrane bioreactors and desalination, improving water reuse for agriculture.
64. **Participant (6 mentions)**
    - **Relevance:** Important for referring to individuals or entities involved in water management projects, including government and institutional stakeholders in agriculture.
65. **Resource (6 mentions)**
    - **Relevance:** Critical for discussing the availability and management of water resources essential for sustainable agricultural practices.
66. **Rural Development (6 mentions)**
    - **Relevance:** Important for improving agricultural practices and water management in rural areas, enhancing sustainability and community resilience.
67. **Sector (6 mentions)**
    - **Relevance**: Key for categorizing different areas of water management and agricultural practices, influencing policies and collaboration efforts.
68. **View (6 mentions)**
    - **Relevance:** Relevant for perspectives on water management practices and the impact of agricultural policies.
69. **World (6 mentions)**
    - **Relevance:** Important for discussing global water management challenges and practices, particularly in relation to agricultural sustainability and water scarcity issues.
70. **Agency (5 mentions)**
    - **Relevance:** Critical for understanding the roles of governmental and regulatory bodies in water management and agricultural policy development.

71. **Area (5 mentions)**
    - **Relevance:** Important for discussing specific geographic regions related to water management and agricultural practices, particularly in arid and resource-stressed environments.
72. **Aspect (5 mentions)**
    - **Relevance:** Relevant for highlighting various factors in water management and agricultural practices, including environmental and operational considerations.
73. **Country (5 mentions)**
    - **Relevance:** Important for discussing national water security and management strategies, particularly in relation to agricultural sustainability and resource allocation.
74. **Department (5 mentions)**
    - **Relevance:** Key for identifying governmental bodies responsible for water management and agricultural policy implementation.
75. **Discussion (5 mentions)**
    - **Relevance:** Important for exploring topics related to water management practices and agricultural sustainability among stakeholders and experts.
76. **IL (5 mentions)**
    - **Relevance:** Relevant for referring to specific communities or initiatives within Israel that focus on water management and sustainable agricultural practices.
77. **Infrastructure (5 mentions)**
    - **Relevance:** Essential for supporting water management systems and agricultural practices, including irrigation and wastewater treatment facilities.
78. **Insight (5 mentions)**
    - **Relevance:** Important for sharing valuable knowledge and understanding related to water management and agricultural technologies.
79. **Israel Export Institute (5 mentions)**
    - **Relevance:** Key organization promoting Israeli water technologies and practices, facilitating international collaboration in sustainable agricultural solutions.
80. **Israel Water Authority (5 mentions)**
    - **Relevance:** Central governing body responsible for water resource management and policy in Israel, impacting agricultural sustainability and water conservation efforts.
81. **Meter (5 mentions)**

- **Relevance:** Important for measuring water usage and efficiency in agriculture, aiding in resource management and conservation efforts.

82. **Method (5 mentions)**
    - **Relevance:** Crucial for identifying techniques and strategies used in water management and treatment processes in agriculture.
83. **Need (5 mentions)**
    - **Relevance:** Important for addressing the requirements for water resources in agriculture, focusing on efficiency and sustainability in water use.
84. **October (5 mentions)**
    - **Relevance:** Relevant for seasonal discussions in agriculture, particularly regarding water management practices and crop cycles.
85. **Policy (5 mentions)**
    - **Relevance:** Essential for governing water management practices and sustainable agriculture, influencing regulations and strategies for resource use.
86. **Regulation (5 mentions)**
    - **Relevance:** Critical for establishing rules and standards for water management, ensuring sustainable practices in agriculture and resource conservation.
87. **Security (5 mentions)**
    - **Relevance:** Important for addressing the challenges of ensuring reliable water and food resources for sustainable agricultural practices.
88. **Sludge (5 mentions)**
    - **Relevance:** Crucial for understanding wastewater treatment processes, including methods for managing sludge and its potential reuse in agriculture.
89. **Source (5 mentions)**
    - **Relevance:** Important for identifying various origins of water supply, including alternative and sustainable options for agricultural use.
90. **Strategy (5 mentions)**
    - **Relevance:** Essential for outlining comprehensive plans and approaches to effective water resource management in agriculture, ensuring sustainability and efficiency.
91. **Summary Report Attachment (5 mentions)**
    - **Relevance:** Important for providing consolidated information on water management activities and findings related to agricultural practices.
92. **Trip (5 mentions)**

- **Relevance:** Relevant for documenting travel related to water management assessments and agricultural site visits, offering insights into practices and technologies.

Illustration 2. Concept cloud of the document "From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach"

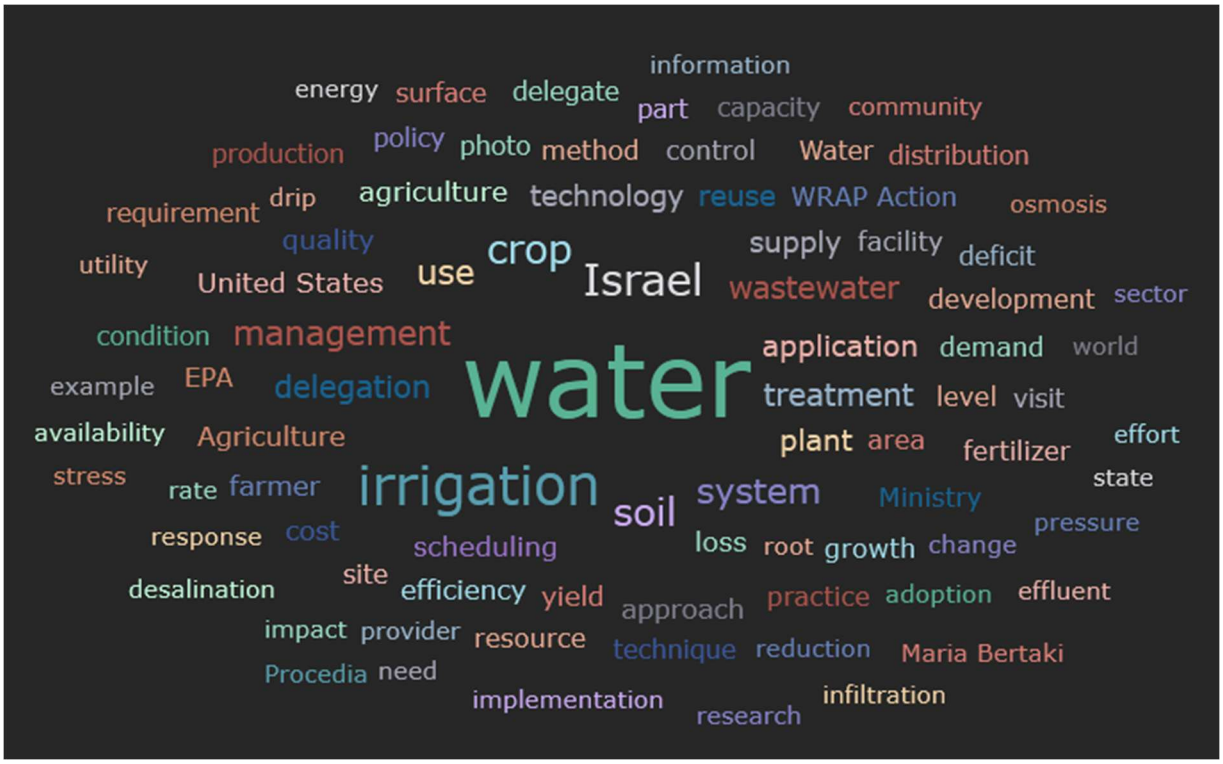


Illustration 3. Concept cloud of both documents together

3. IMPLEMENTATION OF ONTOLOGY IN SUSTANAIBLE WATER MANAGEMENT

3.1. Key Concepts

1. **Water Management Relevance**: Central to ensuring efficient use and allocation of water resources in agriculture. Includes strategies for irrigation, water conservation, and addressing scarcity.

   Application: Optimisation of irrigation techniques and schedules to reduce water wastage.

2. **Irrigation Systems Relevance**: Various systems like drip and sprinkler irrigation help in maintaining proper water distribution.

   Application: Helps in selecting and implementing the most efficient irrigation methods, such as deficit irrigation, for various crop types.

3. **Soil Management Relevance**: The ability of soil to retain water and nutrients is critical for plant growth. Efficient soil management enhances water use efficiency. **Application**: Application of techniques like conservation tillage to improve soil structure and water retention.
4. **Crop-Specific Water Needs Relevance**: Different crops have specific water requirements that need to be considered in irrigation schedules. **Application**: Development of crop-specific irrigation plans to maximise yield and minimise water stress.
5. **Water Stress Relevance**: Water stress occurs when plants do not receive adequate water, leading to reduced yields.
   Application: Monitoring and mitigating water stress through advanced irrigation systems and sensors.

3.2. Purpose

This ontology is designed to facilitate knowledge management and decision-making in sustainable water management for agriculture. By categorising and linking key concepts such as water use efficiency, irrigation scheduling, and soil water balance, the ontology helps in the optimisation of water resources, ultimately leading to increased crop yields and sustainability in agricultural practices.

3.3. Applications

- **Water Conservation Initiatives**: Supports projects aimed at reducing water consumption in agriculture by improving irrigation techniques and soil management.
- **Decision Support Systems**: Enhances systems that help farmers and policymakers make data-driven decisions regarding water allocation, irrigation schedules, and crop management.
- **Agricultural Research**: Assists in research focused on improving crop water productivity and developing sustainable agricultural practices.
- **Policy Development**: Helps in formulating policies for efficient water use and management, particularly in areas facing water scarcity challenges.

1.5. REPRESENTATION OF THE ONTOLOGY

3.4. Classes

In this section, we will explore the various classes that compose the ontology related to sustainable water management in agriculture. The primary class of this ontology is **Sustainable Water Management**, which refers to the integrated management of water resources aimed at meeting the water needs of agricultural production while ensuring environmental protection. This approach promotes efficient water use and addresses the impacts of climate change. It emphasizes the importance of water conservation, reuse, and sustainable practices to secure water availability for future generations. Below is a list of sub-classes that fall under **Sustainable Water Management**:

1. **Agricultural Engineering:** Agricultural engineering, also known as agricultural and biosystems engineering, is the field of study and application of engineering science and designs principles for agriculture purposes, combining the various disciplines of mechanical, civil, electrical, food science, environmental, software, and chemical engineering to improve the efficiency of farms and agribusiness enterprises as well as to ensure sustainability of natural and renewable resources.
    - **Accessories:** These include valves, bends, plugs, risers, and other small components that contribute to the system's efficiency but are not listed individually to keep the ontology concise.
    - **Couplers:** Used in Sprinkler Irrigation systems for connecting two pipes and uncoupling quickly and easily, ensuring that water flows smoothly throughout the system.
    - **Irrigation Scheduling:** The planning and timing of irrigation to meet the water requirements of crops while minimizing water wastage and ensuring efficient water use.
    - **Irrigation Technology:** Technologies designed to improve the efficiency of water distribution for irrigation purposes. This includes smart irrigation

systems, automated irrigation controllers, and water-saving technologies to optimize water use in agriculture.

- **Precision Agriculture:** An agricultural management system based on observing, measuring, and responding to variability in crops and fields, using advanced technologies such as sensors, satellite imagery, and GPS for optimized water use, fertilization, and pest management.
- **Pump Unit:** Part of Sprinkler Irrigation systems, responsible for supplying the pressure needed to distribute water through the system.
- **Sprinkler Head:** A device used in sprinkler irrigation systems to distribute water over a specific area in the form of droplets. It helps to ensure even coverage and efficient water application to crops.
- **Tubings:** These include mainline, submains and laterals, which transport water from the source to the sprinkler heads in Sprinkler Irrigation systems.
- **Water Sensors:** Devices used to monitor and measure soil moisture, water levels, or other key parameters in agricultural water management systems to ensure precise water distribution and minimize waste.

2. **Crops:** A cultivated plant that is grown commercially on a large scale.
    - **Crop Evapotranspiration:** The combined process of evaporation from the soil and transpiration from plants, which determines the water loss from a crop system. It is a critical factor in water management and irrigation planning.
    - **Crop Growth Stages:** The various phases of development that crops undergo from germination to maturity. Each stage has specific water and nutrient requirements, which are crucial for effective management.
    - **Crop Irrigation Requirements:** The specific water needs of a crop during its growth stages, including the frequency and amount of irrigation required to maintain optimal soil moisture levels for healthy growth.
    - **Crop Water Stress:** The physiological condition experienced by crops when water availability is insufficient or excessive for optimal growth. Water stress

can affect crop yield, quality, and overall health, leading to reduced productivity.

3. **Irrigation Systems:** Supplying dry land with water by means of ditches etc.
    - **Drip Irrigation:** Also called localized irrigation, is a highly efficient irrigation method that delivers water directly to the roots of plants through a network of tubing and emitters. This system minimizes evaporation and runoff, making it ideal for water conservation.
    - **Regulated Deficit Irrigation:** A strategic irrigation method that allows for controlled water deficits during certain growth periods to improve water efficiency and crop yield.
    - **Sprinkler Irrigation:** A method of applying water to crops in the form of small droplets, simulating rainfall. Sprinklers can be stationary or portable, and they are suitable for a variety of crops and field sizes.
    - **Subsurface Irrigation:** An irrigation system where water is applied below the soil surface, directly to the root zone of crops. This method can reduce evaporation and water loss while providing moisture to the plants.
    - **Surface Irrigation:** An irrigation method that distributes water over the soil surface by gravity. This includes furrow, flood, and basin irrigation, commonly used in various agricultural settings.
4. **Regions:** Geographical areas that have distinct climate, soil, and water availability characteristics, impacting agricultural practices and water management strategies.
    - **Arid Regions:** Arid regions are characterized by low rainfall, typically less than 250 mm per year, resulting in a scarcity of water resources and posing significant challenges for agriculture and habitation.
    - **Irrigated Areas:** Irrigated areas refer to regions of land where water is supplied to crops through various irrigation methods, enhancing agricultural productivity and enabling cultivation in otherwise arid environments.

- **Rural Areas:** Rural areas are regions located outside urban centers, often characterized by agricultural land use, lower population density, and greater dependence on natural resources, including water for irrigation and livestock.

5. **Soil Management:** Soil management is the application of operations, practices, and treatments to protect soil and enhance its performance.
    - **Soil Analysis:** The process of testing soil for nutrients, pH, and other characteristics to inform agricultural practices.
    - **Soil Conservation:** Soil conservation encompasses a range of practices aimed at preventing soil erosion, maintaining soil fertility, and promoting sustainable land use, thereby preserving the natural resource base for future generations.
    - **Soil Health:** Refers to the ability of soil to sustain plant and animal life, maintain water quality, and support human health.
    - **Soil Moisture:** Refers to the volumetric amount of water held in the soil at a given time, expressed as a percentage of the soil's total volume. It is crucial for plant growth and agricultural productivity, influencing irrigation practices and water management strategies.
    - **Soil Quality:** Represents the capacity of soil to function, to sustain plant and animal productivity, maintain environmental quality, and promote plant and human health.
    - **Soil Salinity:** Soil salinity is the concentration of soluble salts in soil, which can negatively impact crop growth and soil health, often resulting from inadequate drainage and excessive irrigation practices.
    - **Soil Water:** Refers to the water that is held in the soil and is available for plants, including both readily available water and water that may be retained but less accessible.

6. **Sustainability and Environmental Impact:** Refers to the practices, policies, and principles aimed at ensuring the long-term viability of resources while minimizing harm to the environment. This includes efforts to balance environmental, economic,

and social goals, while managing resources responsibly to protect ecosystems and reduce pollution and waste.

- **Environmental Impact:** Refers to the direct or indirect effect that an activity, project, or policy has on the environment, including land, water, air, and biodiversity.
- **Sustainable Agriculture:** Agricultural practices that prioritize environmental health, social equity, and economic viability, ensuring that farming can continue for generations.

7. **Water Management:** Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources.
    - **Water Conservation:** Refers to the strategies and practices employed to manage and reduce water usage, ensuring that water is used efficiently and waste is minimized. This includes techniques such as reducing water loss, optimizing water use in agriculture, and recycling wastewater for reuse.
    - **Water Efficiency:** Refers to the optimal use of water resources, ensuring that water is utilized in a manner that maximizes its utility while minimizing waste. Water efficiency is crucial for sustainable development and the preservation of water supplies.
    - **Water Optimization:** The process of managing and adjusting water resources to achieve maximum efficiency in usage, ensuring that the available water meets the needs of various sectors without compromising future availability.
    - **Water Policy:** Refers to the laws, regulations, and guidelines set by governments or regulatory bodies to govern water use, distribution, and conservation. Effective water policies are essential for ensuring equitable access to water and protecting water resources.
    - **Water Rights:** Refers to the legal entitlements that individuals or organizations have regarding the use and access to water resources. Water rights regulate the allocation and usage of water in a manner that ensures fairness and sustainability.

- **Water Use:** Refers to the various ways water is utilized, including domestic, agricultural, industrial, and environmental purposes. Efficient and sustainable water use is key to managing the growing demand for water resources.

8. **Water Resources:** Water resources are natural resources of water that are potentially useful for humans, for example as a source of drinking water supply or irrigation water.
    - **Desalinated Water:** Refers to water that has been purified by removing salt and other minerals, typically from seawater or brackish water, using technologies such as reverse osmosis. Desalinated water is an important source in areas facing freshwater scarcity.
    - **Groundwater:** Refers to water located beneath the Earth's surface in soil pore spaces and in the fractures of rock formations. Groundwater is a critical water resource for agriculture, drinking water, and industrial processes, especially in arid regions.
    - **Recycled Water:** Refers to treated wastewater that has been purified for reuse in various applications, such as irrigation, industrial processes, and groundwater replenishment. Recycling water helps to conserve freshwater resources and reduce the environmental impact of water consumption.
    - **Surface Water:** Refers to water that is found on the surface of the Earth, such as in rivers, lakes, and reservoirs. Surface water is a major source of water for human consumption, agriculture, and industry, and its management is crucial for sustaining ecosystems and communities.

9. **Weather Conditions:** The atmospheric conditions that comprise the state of the atmosphere in terms of temperature and wind and clouds and precipitation.
    - **Climate Change:** The long-term alteration of temperature and typical weather patterns in a place, often influenced by human activity. Climate change has profound impacts on water availability, agricultural practices, and ecosystem sustainability.

- **Drought:** A prolonged period of abnormally low rainfall, leading to a shortage of water. Drought can significantly impact agriculture, water resources, and sustainability efforts.
- **Rainwater Harvesting:** The collection and storage of rainwater for reuse, rather than letting it run off. Rainwater harvesting is an important technique in water-scarce regions to supplement water supply.

3.5. Taxonomic Sub-Ontology

In this section, we present the taxonomic sub-ontology focused on **Irrigation Systems**, a key concept within the broader ontology of **Sustainable Water Management**. The class **Irrigation Systems** is divided into several specialized types, each representing a different method of water delivery in agricultural settings. These include:

- **Drip Irrigation**
- **Regulated Deficit Irrigation**
- **Sprinkler Irrigation**
- **Subsurface Irrigation**
- **Surface Irrigation**

Each of these sub-classes represents a different technique for delivering water to crops, reflecting various levels of efficiency and suitability for different regions or crops. Among these, **Drip Irrigation** is a highly efficient method that minimizes water loss by delivering water directly to the plant's roots. Within this class, we have created two specific instances to reflect real-world applications of drip irrigation systems in different geographical contexts:

- **DripIrrigationSystem_Australia**: This instance represents a drip irrigation system in Australia, where water scarcity is a major concern. The system is adapted to the region’s dry conditions, aiming to maximize water use efficiency.
- **DripIrrigationSystem_Israel**: This instance represents a drip irrigation system in Israel, a country renowned for its innovative water conservation strategies. Israel's system is

particularly adapted to arid regions, with a strong emphasis on technological advancements in irrigation.

This taxonomic sub-ontology not only illustrates the classification of various irrigation systems but also emphasizes how specific instances can be used to model real-world applications of water management technologies.

3.6. Partonomic Sub-Ontology

In this section, we present a partonomic sub-ontology that details the relationship between different components within irrigation systems. A partonomic structure focuses on the "part-whole" relationships, showing how certain elements are integral parts of larger systems.

Irrigation systems consist of various mechanical and technological components, which are crucial to ensuring water is distributed efficiently and effectively. Here, we examine a particular irrigation system, **Sprinkler Irrigation,** and its essential components.

Sprinkler Irrigation consists of several important parts, based on information from Agritech TNAU (https://agritech.tnau.ac.in/agricultural_engineering/spring_irrigation.pdf):

- **Pump Unit:** Responsible for supplying the pressure needed to distribute water through the system.
- **Tubings:** These include mainline, submains and laterals, which transport water from the source to the sprinkler heads.
- **Couplers:** Used for connecting two pipes and uncoupling quickly and easily, ensuring that water flows smoothly throughout the system.
- **Sprinkler Head:** A device used to distribute water over a specific area in the form of droplets. It helps to ensure efficient water application to crops.
- **Accessories:** These include valves, bends, plugs, risers, and other small components that contribute to the system's efficiency.

The relationship between **Sprinkler Irrigation** and its components is expressed through the **hasPart** property, creating a partonomic structure which can be summarized as:

- **Sprinkler Irrigation hasPart Pump Unit**
- **Sprinkler Irrigation hasPart Tubings**
- **Sprinkler Irrigation hasPart Couplers**
- **Sprinkler Irrigation hasPart Sprinkler Head**
- **Sprinkler Irrigation hasPart Accesories**

1.6. ATTRIBUTES OF THE ONTOLOGY CONCEPTS

In this section, we will focus on the data properties associated with the key concepts in the ontology. Data properties are used to describe the characteristics or attributes of concepts with specific values and help provide more detail and context to each concept.

Sustainable Water Management

- **hasOverallEfficiency:** Indicates the overall efficiency of sustainable water management practices in optimizing water use. It assesses how effectively water resources are managed to achieve sustainability. Possible values include *"Low Efficiency"*, *"Medium Efficiency"*, and *"High Efficiency"*.
- **hasLegalCompliance:** Describes how well sustainable water management practices adhere to legal requirements and environmental standards. Possible values include *"Fully Compliant", "Partially Compliant"*, and *"Non-Compliant"*.

1. Agricultural Engineering

- **hasTechnologicalAdvancement:** Describes the level and sophistication of technology involved in agricultural practices. Its values include *"Low Tech"*, *"Moderate Tech"*, and *"High Tech"*.
- **hasInnovationRate:** Reflects the rate of innovation and new technology adoption in agricultural engineering. Values include *"Slow Innovation", "Moderate Innovation"* and *"Rapid Innovation".*

- **hasImplementationStatus:** Current state of implementation of agricultural engineering technologies in farming practices. Values include *"Fully Implemented" "Partially Implemented"* and *"Not Implemented".*
- **hasImpactLevel:** Efficiency and operational impact of agriculture engineering solutions, with possible values such as *"Low Impact"*, *"Medium Impact"*, and *"High Impact"*.

- **Accessories**
  - **hasMaterialType:** Specifies the type of material used in manufacturing accessories. Values include *"Plastic", "Metal"* and *"Composite Materials".*
  - **hasDurabilityLevel:** Indicates the durability of the accessory components. Values include *"Low Durability", "Medium Durability"* and *"High Durability".*
  - **hasCost:** Represents the monetary cost of accessory components, using numeric values.

- **Couplers**
  - **hasDurabilityLevel:** Indicates the durability of the couplers' components. Values include *"Low Durability", "Medium Durability"* and *"High Durability".*
  - **hasCost:** Represents the monetary cost of the couplers, using numeric values.

- **Irrigation Scheduling**
  - **hasFrequency:** Indicates the frequency of irrigation in an agricultural system. Possible values include *"Daily", "Weekly"* and *"Monthly".*
  - **hasIrrigationDuration:** Refers to the duration of each irrigation session, measured in minutes.

- **Irrigation Technology**

- **hasTechnologyType:** Specifies the type of irrigation technology used, such as *"Drip Irrigation", "Regulated Deficit Irrigation", "Sprinkler Irrigation", "Surface Irrigation"*, or *"Subsurface Irrigation"*.
- **hasCost:** Represents the monetary cost of implementing the irrigation technology, using numeric values.
- **hasAutomationLevel:** This attribute measures the level of automation in the irrigation system. Possible values may include *"Manual", "Semi-Automatic"*, and *"Fully Automatic".*

- **Precision Agriculture**
  - **hasDataSource:** Identifies the sources of data used in precision agriculture, which may include *"Satellite Imagery", "Soil Sensors", "Weather Stations"*, or *"Drones"*.
  - **hasTechnologicalAdvancement:** Describes the level and sophistication of technology involved in precision agriculture. Its values include *"Low Tech"*, *"Moderate Tech"*, and *"High Tech"*.
  - **hasEconomicImpact:** Represents the economic impact of precision agriculture practices. This attribute evaluates how optimized water use affects the financial aspects of agricultural practices. Its values include *"Positive Impact"*, *"Neutral Impact"*, and *"Negative Impact".*

- **Pump Unit**
  - **hasFlowRate:** Specifies the flow rate of the pump unit, measured in liters per minute (L/min). It indicates the volume of water that the pump can deliver over a specified time period.
  - **hasEnergyConsumption:** Quantifies the energy consumption of the pump unit, expressed in kilowatt-hours (kWh).
  - **hasMaintenanceFrequency:** Indicates the recommended frequency of maintenance for the pump unit, with values such as *"Monthly", "Quarterly"*, or *"Annually"*.

- **hasCost:** Represents the monetary cost of the pump unit, using numeric values.

- **Sprinkler Head**
  - **hasSprayRadius:** Specifies the spray radius of the sprinkler head, measured in meters. It indicates the maximum distance that water can be distributed from the sprinkler head.
  - **hasApplicationRate:** Measures the rate at which water is applied to the soil, expressed in millimeters per hour (mm/h).
  - **hasType:** Defines the type of sprinkler head, such as "Fixed", "Rotary", or "Oscillating".
  - **hasCost:** Represents the monetary cost of the sprinkler head, using numeric values.

- **Tubings**
  - **hasLength:** Specifies the length of the tubing, measured in meters.
  - **hasDiameter:** Defines the diameter of the tubing, expressed in millimeters.
  - **hasMaterial:** Specifies the material from which the tubing is made, such as *"PVC", "Polyethylene"*, or *"Metal".*
  - **hasCost:** Represents the monetary cost of the tubings, using numeric values.

- **Water Sensors**
  - **hasSensorType:** Specifies the type of water sensor, such as *"Soil Moisture Sensor", "Flow Sensor"*, or *"Water Quality Sensor".*
  - **hasAccuracy:** Measures the accuracy of the sensor, expressed as a percentage.
  - **hasRange:** Defines the range of the sensor, indicating the limits within which it can accurately measure.
  - **hasCost:** Represents the monetary cost of the water sensors, using numeric values.

2. Crops

- **hasWaterDemand:** Represents the amount of water required by a crop for optimal growth. Possible values include *"Low Demand", "Medium Demand"* and *"High Demand".*
- **hasGrowthDuration:** Represents the time it takes for a crop to reach maturity, measured in days.

- **Crop Evapotranspiration**
  - **hasEvapotranspirationRate:** Rate at which water is lost from the crop surface and soil through evaporation and transpiration. Its values include *"Low Rate", "Medium Rate"* and *"High Rate"*.
  - **hasMeasurementPeriod:** Indicates how frequently evapotranspiration data is collected for the crop. Its values include *"Daily"*, *"Weekly"* and *"Monthly".*

- **Crop Growth Stages**
  - **hasGrowthStage:** Refers to the specific stages of crop development, which require different water and nutrient resources. Its values include *"Germination"*, *"Vegetative", "Flowering"* and *"Maturity"*.
  - **hasWaterRequirementPerStage:** Indicates the amount of water needed at each growth stage. Its values include *"Low Requirement"*, *"Moderate Requirement "* and *"High Requirement "*.

- **Crop Irrigation Requirements**
  - **hasWaterDemand:** Represents the amount of water required by a crop for optimal growth, that is, the different levels of irrigation requirement. Possible values include *"Low Demand", "Medium Demand"* and *"High Demand".*

- **hasSeasonalVariation:** Refers to how irrigation requirements change throughout the growing season due to climate and crop growth stages. Its values include *"Consistent", "Slightly Variable"* and *"Highly Variable".*

- **Crop Water Stress**
  - **hasWaterStressLevel:** Level of water stress experienced by a crop due to insufficient or excessive water. Possible values include *"Low Stress", "Medium Stress"*, and *"High Stress"*.
  - **hasRecoveryRate:** Refers to the crop's ability to recover from water stress. Values might include *"Fast Recovery"*, *"Moderate Recovery"*, and *"Slow Recovery"*.

3. Irrigation Systems

- **hasEfficiencyLevel:** Degree of effectiveness in irrigation systems. It indicates how efficiently water is used or conserved in a particular system. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
- **hasMaintenanceFrequency:** Indicates the recommended frequency of maintenance for the irrigation system, with values such as *"Monthly", "Quarterly"*, or *"Annually"*.
- **hasCost:** Represents the monetary cost of the irrigation system, using numeric values.
- **hasWaterDistributionMethod:** Represents the method used to distribute water within the irrigation system, with possible values such as *"Drip", "Sprinkler", "Surface"* or *"Subsurface"*.

- **Drip Irrigation:**
  - **hasEfficiencyLevel:** Degree of effectiveness in drip irrigation system. It indicates how efficiently water is used or conserved. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.

- **hasCost:** Represents the monetary cost of the drip irrigation system, using numeric values.
- **hasEmitterType:** Specifies the type of emitter used in the drip irrigation system, which controls the flow of water to crops, with possible values such as *"Point Source Emitter"*, *"In-line Emitter"*, and *"Bubbler"*.

- **Regulated Deficit Irrigation**
  - **hasEfficiencyLevel:** Degree of effectiveness in regulated deficit irrigation system. It indicates how efficiently water is used or conserved. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasIrrigationSchedule:** Represents the scheduling of water applications in the regulated deficit irrigation system, which strategically withholds water during non-critical growth stages. Values include *"Flexible Schedule"*, *"Fixed Schedule"*, and *"Seasonal Schedule"*.
  - **hasWaterReductionPercentage:** Represents the percentage of water reduction applied compared to the full irrigation requirement. This attribute captures the degree of deficit applied, with possible values such as *"Low Reduction"*, *"Medium Reduction"*, and *"High Reduction"*.
  - **hasCost:** Represents the monetary cost of the regulated deficit irrigation system, using numeric values.

- **Sprinkler Irrigation**
  - **hasCost:** Represents the monetary cost of the sprinkler irrigation system, using numeric values.
  - **hasEfficiencyLevel:** Degree of effectiveness in sprinkler irrigation system. It indicates how efficiently water is used or conserved. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasSprinklerRange:** Refers to the range of the sprinklers used in the system, that is, the distance covered by the spray, which can be adjusted based on the

type of crop and land size. The values can be *"Short Range", "Medium Range"*, or *"Long Range"*.

- **hasWaterPressureLevel:** Measures the level of water pressure required for the sprinkler system. Possible values are *"Low Pressure", "Medium Pressure"*, and *"High Pressure"*.
- **hasWaterDistributionMethodSprinkler:** Describes how water is distributed by the sprinkler system, either uniformly or variably across the field. Possible values include *"Uniform Distribution", "Variable Distribution"*, and *"Targeted Distribution"*.

- **Subsurface Irrigation**
  - **hasCost:** Represents the monetary cost of the subsurface system, using numeric values.
  - **hasEfficiencyLevel:** Degree of effectiveness in subsurface system. It indicates how efficiently water is used or conserved. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasInstallationComplexity:** Refers to the level of complexity involved in installing subsurface irrigation systems. These systems often require careful placement of pipes below the soil surface. Possible values include *"Low Complexity"*, *"Medium Complexity"* and *"High Complexity"*.

- **Surface Irrigation**
  - **hasCost:** Represents the monetary cost of the surface system, using numeric values.
  - **hasEfficiencyLevel:** Degree of effectiveness in surface system. It indicates how efficiently water is used or conserved. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasWaterDistributionMethodSurface:** Describes the method by which water is distributed across the surface of the field. Possible values include *"Furrow", "Basin", "Border"*, and *"Flood"*.

4. Regions

- **hasClimateType:** Represents the climate type in a region, which influences water availability and agricultural viability. Its values include *"Arid", "Semi-Arid"* and *"Humid"*.
- **hasWaterAvailability:** Describes the water availability in a region. Possible values include *"Low Availability", "Moderate Availability"*, and *"High Availability"*.

- **Arid Regions**
  - **hasWaterScarcityLevel:** Describes the level of water scarcity typical of arid regions. Its values include *"Severe Scarcity", "Moderate Scarcity"*, and *"Low Scarcity".*
  - **hasVegetationPresence:** Represents the level of vegetation presence in arid regions, as it impacts water conservation and land use. Values might include *"Sparse Presence", "Minimal Presence"* and *"No Presence".*

- **Irrigated Areas**
  - **hasIrrigationDependence:** Represents the dependence of agriculture in irrigated areas on artificial irrigation systems. Possible values include *"High Dependence", "Moderate Dependence"*, and *"Low Dependence".*
  - **hasSoilFertilityLevel:** Indicates the soil fertility level in irrigated areas. Its values include *"High Fertility", "Medium Fertility"*, and *"Low Fertility"*.

- **Rural Areas**
  - **hasPopulationDensity:** Represents the number of people per unit area in rural regions. Values can be categorized as *"Low Density", "Medium Density"* and *"High Density"*.

- **hasAccessToWater:** Indicates the accessibility of water resources in rural areas, with possible values such as *"Limited Access"*, *"Moderate Access"*, and *"Full Access"*.

5. Soil Management

- **hasSoilType:** Represents the type of soil present in a specific area. Possible values include *"Sandy Soil"*, *"Clay Soil"*, *"Loamy Soil"*, and *"Silty Soil"*.
- **hasSoilQuality:** Indicates the quality of the soil based on its ability to support plant growth. Possible values include *"High Quality"*, *"Moderate Quality"*, and *"Low Quality"*.
- **hasOrganicMatterContent:** Represents the percentage of organic matter in the soil, which is crucial for soil fertility. It is expressed as a percentage.

• Soil Analysis

- **haspHLevel**: Represents the pH level of the soil, which affects nutrient availability and soil health. The pH scale ranges from 0 to 14, with values less than 7 indicating acidic conditions, values of 7 being neutral, and values greater than 7 being alkaline.
- **hasNutrientContent:** Indicates the levels of essential nutrients in the soil, such as nitrogen, phosphorus, and potassium. Possible values can include ranges like *"Low Content"*, *"Medium Content"*, and *"High Content"*.

• Soil Conservation

- **hasConservationMethod:** Represents the techniques used to maintain soil health and prevent erosion. Examples include *"Contour Farming"*, *"No-Till Farming"*, and *"Cover Cropping"*.
- **hasErosionRiskLevel:** Indicates the level of risk of soil erosion based on current practices and environmental conditions. Possible values are *"Low Risk"*, *"Moderate Risk"*, and *"High Risk"*.

- **hasNutrientManagementStrategy:** Refers to the strategies for managing soil nutrients effectively. It includes *"Organic Amendments", "Crop Rotation"*, and *"Precision Fertilization"*.

- **Soil Health**
  - **hasOrganicMatterContent:** Represents the percentage of organic matter in the soil, which is crucial for soil fertility. It is expressed as a percentage.
  - **hasSoilMicrobialActivity:** Indicates the level of microbial activity in the soil, which affects nutrients and soil health. Possible values include *"Low Microbial Activity", "Moderate Microbial Activity"*, and *"High Microbial Activity"*.
  - **haspHLevel**: Represents the pH level of the soil, which affects nutrient availability and soil health. The pH scale ranges from 0 to 14, with values less than 7 indicating acidic conditions, values of 7 being neutral, and values greater than 7 being alkaline.

- **Soil Moisture**
  - **hasMoistureLevel:** Represents the current level of moisture in the soil. It indicates how wet or dry the soil is, with possible values such as *"Dry", "Optimal"*, and *"Saturated".*
  - **hasMoistureRetentionCapacity:** Refers to the ability of the soil to retain moisture over time. It ensures that plants receive the necessary water for growth. Possible values can be *"Low Retention", "Medium Retention"*, and *"High Retention".*

- **Soil Quality**
  - **hasNutrientContent:** Indicates the levels of essential nutrients in the soil, such as nitrogen, phosphorus, and potassium. Possible values can include ranges like *"Low Content", "Medium Content"*, and *"High Content"*.

- **hasOrganicMatterContent:** Represents the percentage of organic matter in the soil, which is crucial for soil fertility. It is expressed as a percentage.

- **Soil Salinity**
  - **hasSalinityLevel:** Refers to the concentration of salts in the soil, which can affect plant growth and crop yields. Possible values can include *"Low Salinity", "Moderate Salinity"*, and *"High Salinity"*.
  - **hasElectricalConductivity:** Measures the ability of soil to conduct electrical current, which is related to salinity levels. Possible values can be *"Low Conductivity", "Medium Conductivity"*, and *"High Conductivity"*.

- **Soil Water**
  - **hasWaterRetentionCapacity:** Refers to the ability of the soil to hold water for plant use. It indicates how much water the soil can retain after irrigation or rainfall. Possible values can include *"Low Capacity", "Medium Capacity"*, and *"High Capacity"*.
  - **hasAvailableWaterContent:** Indicates the amount of water in the soil that is available for plants. Possible values can be *"Low Availability", "Moderate Availability"*, and *"High Availability"*.

6. Sustainability and Environmental Impact

- **hasSustainabilityRating:** The sustainability level of water management practices in the long term. Its values include *"Low Sustainability"*, *"Moderate Sustainability"*, and *"High Sustainability".*
- **hasEnvironmentalImpactLevel:** Indicates the degree of environmental impact associated with a specific practice. It helps in assessing the negative or positive effects on the environment. Possible values can be *"Low Impact", "Medium Impact"*, and *"High Impact"*.

- **Environmental Impact**
  - **hasEnvironmentalImpactLevel:** Indicates the degree of environmental impact associated with a specific practice. It helps in assessing the negative or positive effects on the environment. Possible values can be *"Low Impact"*, *"Medium Impact"*, and *"High Impact"*.
  - **hasPollutionLevel:** Indicates the level of pollution produced by a specific water management or agricultural practice, that is, the degree of contamination that may affect soil, water, and air quality. Possible values include *"Low Pollution"*, *"Moderate Pollution"*, and *"High Pollution"*.
  - **hasCarbonFootprint:** Represents the estimated carbon footprint associated with a particular practice, indicating its greenhouse gas emissions and its impact on climate change. Possible values are *"Low Emission"*, *"Medium Emission"*, and *"High Emission"*.

- **Sustainable Agriculture**
  - **hasSustainabilityRating:** The sustainability level of water management practices in the long term. Its values include *"Low Sustainability"*, *"Moderate Sustainability"*, and *"High Sustainability".*
  - **hasEfficiencyLevel:** Degree of effectiveness in water conservation practices, water efficiency strategies and water use in agricultural practices. It indicates how efficiently water is used or conserved in a particular method or system, maximizing productivity with minimal environmental impact. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.

7. Water Management

- **hasOptimizationLevel:** Degree to which water management practices optimize resource use. Its values include *"Low Optimization"*, *"Medium Optimization"*, and *"High Optimization"*.

- **hasImplementationStatus:** Current status of implementation of water management practices. Its values include *“Fully Implemented”*, *“Partially Implemented”*, and *“Not Implemented”*.
- **hasSustainabilityRating:** The sustainability level of water management practices in the long term. Its values include *"Low Sustainability"*, *"Moderate Sustainability"*, and *"High Sustainability".*

- **Water Conservation**
  - **hasEfficiencyLevel:** Degree of effectiveness in water conservation practices. It indicates how efficiently water is used or conserved in a particular method. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasImpactLevel:** Environmental or operational impact of water conservation measures. It classifies practices based on their overall effect on the environment or agricultural system, with possible values such as *"Low Impact"*, *"Medium Impact"*, and *"High Impact"*.
  - **hasCostEffectiveness:** Indicates how cost-effective water conservation measures are, evaluating their economic viability. Its values include *"Low Cost"*, *"Moderate Cost"*, and *"High Cost".*

- **Water Efficiency**
  - **hasEfficiencyLevel:** Degree of effectiveness in water efficiency strategies. It indicates how efficiently water is used or conserved in a particular method. Its values include *"Low Efficient"*, *"Efficient"*, and *"Highly Efficient"*.
  - **hasImplementationStatus:** Current status of implementation of water efficiency measures. Its values include *“Fully Implemented”*, *“Partially Implemented”*, and *“Not Implemented”*.
  - **hasWaterWasteReductionLevel:** Shows how effectively the water efficiency measures reduce water waste. Its values include *"Minimal Reduction"*, *"Moderate Reduction"*, and *"High Reduction"*.

- **Water Optimization**
  - **hasOptimizationLevel:** Degree to which water management practices optimize resource use. It reflects how effectively water resources are utilized through various optimization strategies in water optimization practices. Its values include *"Low Optimization"*, *"Medium Optimization"*, and *"High Optimization"*.
  - **hasEconomicImpact:** Represents the economic impact of water optimization practices. This attribute evaluates how optimized water use affects the financial aspects of agricultural practices. Its values include *"Positive Impact"*, *"Neutral Impact"*, and *"Negative Impact"*.
  - **hasTechnologicalAdvancement:** Describes the level and sophistication of technology involved in water optimization practices. Its values include *"Low Tech"*, *"Moderate Tech"*, and *"High Tech"*.

- **Water Policy**
  - **hasRegulatoryFramework:** Indicates the existence of legal and regulatory frameworks governing water use. Its values include *"Strong Regulatory Framework"*, *"Moderate Regulatory Framework"* and *"Weak Regulatory Framework"*.
  - **hasEngagementLevel:** Measures the level of engagement in water policy decisions. Its values include *"High Engagement"*, *"Moderate Engagement"* and *"Low Engagement"*.

- **Water Rights**
  - **hasRightsType:** Describes the type of water rights, including *"Permanent Rights"*, *"Temporary Rights"* and *"Conditional Rights"*.
  - **hasComplianceLevel:** Indicates the level of compliance with established water rights regulations. Its values include *"Fully Compliant"*, *"Partially Compliant"* and *"Non-Compliant"*.

- **hasImpactOnStakeholders:** Evaluates how water rights impact stakeholders. Its values include *"Positive Impact", "Neutral Impact"* and *"Negative Impact".*

- **Water Use**
  - **hasUsageLevel:** Indicates the level of water use in specific agricultural practices. The values include *"Low Usage", "Medium Usage"* and *"High Usage".*
  - **hasWaterSource:** It identifies different sources of water utilized in agricultural practices, such as *"Desalinated Water", "Surface Water", "Ground Water"* and *"Recycled Water".*
  - **hasEfficiencyLevel:** Degree of effectiveness in water use in agricultural practices. It indicates how efficiently water is used or conserved in a particular method. Its values include *"Low Efficient", "Efficient"*, and *"Highly Efficient"*.
  - **hasImpactLevel:** Environmental or operational impact of water use measures. It classifies practices based on their overall effect on the environment or agricultural system, with possible values such as *"Low Impact"*, *"Medium Impact"*, and *"High Impact"*.

8. Water Resources

- **hasWaterAvailability:** Describes the water availability in a region. Possible values include *"Low Availability", "Moderate Availability"*, and *"High Availability"*.
- **hasQualityLevel:** Represents the quality level of water resources, which is essential for determining its suitability for agricultural use. Possible values are *"Low Quality", "Moderate Quality"*, and *"High Quality"*.

- **Desalinated Water**
  - **hasProductionCost:** Indicates the cost associated with producing desalinated water. This helps evaluate the economic feasibility of using desalinated water in agriculture. Values are numeric.

- **hasPurityLevel:** Represents the purity level of desalinated water, for studying how suitable water is for crops. Possible values include *"Low Purity", "Moderate Purity"*, and *"High Purity"*.
- **hasQualityLevel:** Represents the quality level of desalinated water, which is essential for determining its suitability for agricultural use. Possible values are *"Low Quality", "Moderate Quality"*, and *"High Quality"*.

- **Groundwater**
  - **hasWaterAvailability:** Describes the groundwater availability in a region. Possible values include *"Low Availability", "Moderate Availability"*, and *"High Availability"*.
  - **hasQualityLevel:** Represents the quality level of groundwater, which is essential for determining its suitability for agricultural use. Possible values are *"Low Quality", "Moderate Quality"*, and *"High Quality"*.

- **Recycled Water**
  - **hasTreatmentLevel:** Indicates the level of treatment applied to recycled water, which determines its safety for irrigation use. Possible values include *"Primary", "Secondary"*, and *"Tertiary"*.
  - **hasUsagePotential:** Indicates the potential for using recycled water in agricultural practices based on its quality and treatment level. Values include *"High Potential", "Moderate Potential"*, and *"Low Potential"*.
  - **hasQualityLevel:** Represents the quality level of recycled water, which is essential for determining its suitability for agricultural use. Possible values are *"Low Quality", "Moderate Quality"*, and *"High Quality"*.

- **Surface Water**

- **hasSeasonalVariabilitySurface:** Indicates the level of seasonal variability in the availability of surface water. Possible values include *"High Variability", "Moderate Variability"*, and *"Low Variability"*.
- **hasPollutionLevel:** Indicates the level of pollution pin surface water. Possible values include *"Low Pollution", "Moderate Pollution"*, and *"High Pollution"*.
- **hasQualityLevel:** Represents the quality level of surface water, which is essential for determining its suitability for agricultural use. Possible values are *"Low Quality", "Moderate Quality"*, and *"High Quality"*.

9. Weather Conditions

- **hasTemperatureRange:** Describes the typical range of temperatures in an area, influencing plant growth and water needs. Possible values include *"Low Temperature Range", "Moderate Temperature Range"*, and *"High Temperature Range"*.
- **hasRainfallLevel:** Indicates the average rainfall in a specific region, which is essential for determining natural water availability for crops. Possible values include *"Low Rainfall", "Moderate Rainfall"*, and *"High Rainfall"*.

- ## Climate Change
  - **hasImpactSeverity:** Indicates the severity of climate change effects on agriculture and water resources. Possible values include *"Low Impact", "Moderate Impact"*, and *"High Impact"*.
  - **hasAdaptationLevel:** Represents how extensively adaptation strategies for climate change have been implemented. Possible values include *"Low Adaptation", "Moderate Adaptation"*, and *"High Adaptation"*.

- ## Drought
  - **hasSeverityLevel:** Indicates the severity of drought conditions affecting water resources and agriculture. Possible values include *"Mild Drought", "Moderate Drought"*, and *"Severe Drought"*.

- **hasDuration:** Represents the length of time (in days) that drought conditions persist. It is expressed as a positive integer.

- **Rainwater Harvesting**
  - **hasCollectionEfficiency:** Indicates how effectively the rainwater collection system captures and stores rainwater. Possible values include *"Low Efficiency", "Medium Efficiency"*, and *"High Efficiency"*.
  - **hasStorageCapacity:** Indicates the maximum volume of rainwater that can be stored in the harvesting system, expressed in liters as a positive integer.

3.7. Axioms

1. Relationship between water conservation and water use efficiency

Logical expression: ∀x (WaterConservation(x) → ∃y (optimizes(y) ∧ WaterUse(y)))

Explanation: Every water conservation effort optimises water use, which means "For each instance of water conservation (WaterConservation), there is at least one instance of water use (WaterUse) being optimised."

2. Relationship between irrigation scheduling and crop yield

Logical expression: ∀x (IrrigationScheduling(x) → ∃y (increases(y) ∧ CropYield(y)))

Explanation: Irrigation scheduling increases crop yield, meaning "For each instance of irrigation scheduling (IrrigationScheduling), there is at least one crop yield (CropYield) that increases."

3. Relationship between water management and resource allocation

Logical expression: ∀x (WaterManagement(x) → ∃y (allocates(y) ∧ WaterResources(y)))

Explanation: Water management involves resource allocation, meaning "For each instance of water management (WaterManagement), there is at least one allocation of water resources (WaterResources)."

4. Relationship between soil conservation and soil erosion

Logical expression: ∀x (SoilConservation(x) → ∃y (prevents(y) ∧ SoilErosion(y)))

Explanation: Soil conservation prevents soil erosion, meaning "For each instance of soil conservation (SoilConservation), there is at least one instance of soil erosion (SoilErosion) being prevented."

5. Relationship between crop water stress and water efficiency

Logical expression: ∀x (CropWaterStress(x) → ∃y (isMitigatedBy(y) ∧ WaterEfficiency(y)))

Explanation: Crop water stress is mitigated by water efficiency, meaning "For each instance of crop water stress (CropWaterStress), there is at least one instance of water efficiency (WaterEfficiency) mitigating it."

6. Relationship between surface water and irrigation systems

Logical expression: ∀x (SurfaceWater(x) → ∃y (usedIn(y) ∧ IrrigationSystem(y)))

Explanation: Surface water is used in irrigation systems, meaning "For each instance of surface water (SurfaceWater), there is at least one irrigation system (IrrigationSystem) that uses it."

7. Relationship between groundwater and crop growth

Logical expression: ∀x (Groundwater(x) → ∃y (supports(y) ∧ CropGrowth(y)))

Explanation: Groundwater supports crop growth, meaning "For each instance of groundwater (Groundwater), there is at least one crop growth (CropGrowth) supported by it."

8. Relationship between recycled water and sustainable agriculture

Logical expression: ∀x (RecycledWater(x) → ∃y (usedIn(y) ∧ SustainableAgriculture(y)))

Explanation: Recycled water is used in sustainable agriculture, meaning "For each instance of recycled water (RecycledWater), there is at least one instance of sustainable agriculture (SustainableAgriculture) using it."

9. Relationship between precision agriculture and water sensors

Logical expression: ∀x (PrecisionAgriculture(x) → ∃y (requires(y) ∧ WaterSensors(y)))

Explanation: Precision agriculture requires water sensors, meaning "For each instance of precision agriculture (PrecisionAgriculture), there is at least one water sensor (WaterSensors) required."

10. Relationship between climate change adaptation and irrigation planning

Logical expression: ∀x (ClimateChangeAdaptation(x) → ∃y (involves(y) ∧ IrrigationPlanning(y)))

Explanation: Climate change adaptation involves irrigation planning, meaning "For each instance of climate change adaptation (ClimateChangeAdaptation), there is at least one irrigation planning (IrrigationPlanning) involved."

11. Relationship between sustainable water management and policy

Logical expression: ∀x (SustainableWaterManagement(x) → ∃y (regulatedBy(y) ∧ WaterPolicy(y)))

Explanation: Sustainable water management is regulated by water policy, meaning "For each instance of sustainable water management (SustainableWaterManagement), there is at least one water policy (WaterPolicy) that regulates it."

12. Relationship between irrigation technology and efficiency

Logical expression: ∀x (IrrigationTechnology(x) → ∃y (improves(y) ∧ WaterEfficiency(y)))

Explanation: Irrigation technology improves water efficiency, meaning "For each instance of irrigation technology (IrrigationTechnology), there is at least one improvement in water efficiency (WaterEfficiency)."

13. Relationship between soil management and crop production

Logical expression: ∀x (SoilManagement(x) → ∃y (enhances(y) ∧ CropProduction(y)))

Explanation: Soil management enhances crop production, meaning "For each instance of soil management (SoilManagement), there is at least one enhancement in crop production (CropProduction)."

14. Relationship between water scarcity and agricultural sustainability

Logical expression: ∀x (WaterScarcity(x) → ∃y (affects(y) ∧ AgriculturalSustainability(y)))

Explanation: Water scarcity affects agricultural sustainability, meaning "For each instance of water scarcity (WaterScarcity), there is at least one instance of agricultural sustainability (AgriculturalSustainability) that is affected."

15. Relationship between ecosystem services and sustainable agriculture

Logical expression: ∀x (EcosystemServices(x) → ∃y (supports(y) ∧ SustainableAgriculture(y)))

Explanation: Ecosystem services support sustainable agriculture, meaning "For each instance of ecosystem services (EcosystemServices), there is at least one instance of sustainable agriculture (SustainableAgriculture) supported by it."

16. Relationship between soil management and salinity

Logical expression: ∀x (SoilManagement(x) → ∃y (controls(y) ∧ SoilSalinity(y)))

Explanation: Soil management controls salinity, meaning "For each instance of soil management (SoilManagement), there is at least one instance of soil salinity (SoilSalinity) that is controlled."

17. Relationship between soil moisture and crop growth

Logical expression: ∀x (SoilMoisture(x) → ∃y (supports(y) ∧ CropGrowth(y)))

Explanation: Soil moisture supports crop growth, meaning "For each instance of soil moisture (SoilMoisture), there is at least one instance of crop growth (CropGrowth) supported by it."

18. Relationship between rainwater harvesting and water conservation

Logical expression: ∀x (RainwaterHarvesting(x) → ∃y (enhances(y) ∧ WaterConservation(y)))

Explanation: Rainwater harvesting enhances water conservation, meaning "For each instance of rainwater harvesting (RainwaterHarvesting), there is at least one instance of water conservation (WaterConservation) enhanced by it."

19. Relationship between climate change adaptation and sustainable water management

Logical expres∀x (ClimateChangeAdaptation(x) → ∃y (involves(y) ∧ SustainableWaterManagement(y)))

Explanation: Climate change adaptation involves sustainable water management, meaning "For each instance of climate change adaptation (ClimateChangeAdaptation), there is at least one instance of sustainable water management (SustainableWaterManagement) involved."

20. Relationship between water efficiency and crop water stress

Logical expression: ∀x (WaterEfficiency(x) → ∃y (reduces(y) ∧ CropWaterStress(y)))

Explanation: Water efficiency reduces crop water stress, meaning "For each instance of water efficiency (WaterEfficiency), there is at least one instance of crop water stress (CropWaterStress) reduced."

21. Relationship between irrigation systems and water conservation

Logical expression: ∀x (IrrigationSystem(x) → ∃y (supports(y) ∧ WaterConservation(y)))

Explanation: Irrigation systems support water conservation, meaning "For each instance of an irrigation system (IrrigationSystem), there is at least one instance of water conservation (WaterConservation) supported by it."

22. Relationship between drip irrigation and soil moisture

Logical expression: ∀x (DripIrrigation(x) → ∃y (maintains(y) ∧ SoilMoisture(y)))

Explanation: Drip irrigation helps maintain soil moisture, meaning "For each instance of drip irrigation (DripIrrigation), there is at least one instance of soil moisture (SoilMoisture) being maintained."

23. Relationship between water allocation and agricultural sustainability

Logical expression: ∀x (WaterAllocation(x) → ∃y (ensures(y) ∧ AgriculturalSustainability(y)))

Explanation: Water allocation ensures agricultural sustainability, meaning "For each instance of water allocation (WaterAllocation), there is at least one instance of agricultural sustainability (AgriculturalSustainability) ensured."

24. Relationship between crop irrigation requirements and irrigation planning

Logical expression: ∀x (CropWaterRequirements(x) → ∃y (guides(y) ∧ IrrigationPlanning(y)))

Explanation: Crop irrigation requirements guide irrigation planning, meaning "For each instance of crop irrigation requirements (CropIrrigationRequirements), there is at least one instance of irrigation planning (IrrigationPlanning) being guided by it."

25. Relationship between ecosystem services and water resources

Logical expression: ∀x (EcosystemServices(x) → ∃y (dependOn(y) ∧ WaterResources(y)))

Explanation: Ecosystem services depend on water resources, meaning “For each instance of ecosystem services (EcosystemServices), there is at least one instance of water resources (WaterResources) that they depend on."

26. Relationship between sustainable agriculture and environmental impact

Logical expression: ∀x (SustainableAgriculture(x) → ∃y (reduces(y) ∧ EnvironmentalImpact(y)))

Explanation: Sustainable agriculture reduces environmental impact, meaning "For each instance of sustainable agriculture (SustainableAgriculture), there is at least one instance of environmental impact (EnvironmentalImpact) being reduced."

27. Relationship between desalinated water and water resources

Logical expression: ∀x (DesalinatedWater(x) → ∃y (supplements(y) ∧ WaterResources(y)))

Explanation: Desalinated water supplements water resources, meaning "For each instance of desalinated water (DesalinatedWater), there is at least one instance of water resources (WaterResources) being supplemented."

28. Relationship between groundwater and irrigated areas

Logical expression: ∀x (Groundwater(x) → ∃y (supports(y) ∧ IrrigatedAreas(y)))

Explanation: Groundwater supports irrigated areas, meaning "For each instance of groundwater (Groundwater), there is at least one instance of irrigated areas (IrrigatedAreas) being supported."

29. Relationship between drought and water conservation

Logical expression: ∀x (Drought(x) → ∃y (increasesNeedFor(y) ∧ WaterConservation(y)))

Explanation: Drought increases the need for water conservation, meaning "For each instance of drought (Drought), there is at least one instance of water conservation (WaterConservation) becoming necessary."

30. Relationship between precision agricuture and water efficiency

Logical expression: ∀x (PrecisionAgriculture(x) → ∃y (improves(y) ∧ WaterEfficiency(y)))

Explanation: Precision agriculture improves water efficiency, meaning "For each instance of precision agriculture (PrecisionAgriculture), there is at least one instance of water efficiency (WaterEfficiency) being improved."

31. Relationship between crop irrigation requirements and irrigation system

Logical expression: ∀x (CropIrrigationRequirements(x) → ∃y (isMetBy(y) ∧ IrrigationSystem(y)))

Explanation: Crop irrigation requirements are met by irrigation systems, meaning "For each instance of crop irrigation requirements (CropIrrigationRequirements), there is at least one instance of irrigation system (IrrigationSystem) that meets it."

32. Relationship between soil health and good crop quality

Logical expression: ∀x (SoilHealth(x) ↔ GoodCropQuality(x))

Explanation: "Soil health implies good crop quality, and vice versa." This means, "For each instance of soil health (SoilHealth), there exists good crop quality (GoodCropQuality), and if good crop quality exists, the soil is healthy."

33. Relationship between irrigation systems and water use

Logical expression: ∀x (IrrigationSystem(x) → UsesWater(x))

Explanation: "Every irrigation system uses water." This means that for each instance of an irrigation system (IrrigationSystem), it uses water (UsesWater).

34. Relationship between surface irrigation and drip irrigation

Logical expression: ∀x (SurfaceIrrigation(x) → ∃y (UsesMoreWaterThan(y) ∧ DripIrrigation(y)))

Explanation: "Surface irrigation uses more water than drip irrigation." This establishes a direct comparison between two types of irrigation.

35. Relationship between climate change and drought

Logical expression: ∀x (ClimateChange(x) → CausesDrought(x))

Explanation: "Climate change causes drought." This expresses that for each instance of climate change (ClimateChange), there is a resulting drought (CausesDrought).

36. Relationship between water scarcity and crop growth

Logical expression: ∀x (WaterScarcity(x) → ¬IncreasesCropGrowth(x))

Explanation: "Water scarcity does not increase crop growth." This indicates that for each instance of water scarcity (WaterScarcity), it is not the case that crop growth increases (¬IncreasesCropGrowth).

37. Relationship between non-sustainable agriculture and resource conservation

Logical expression: ∀x(¬SustainableAgriculture(x) → ¬ConservesResources(x))

Explanation: "Non-sustainable agriculture does not conserve resources. "This suggests that for every instance of non-sustainable agriculture (¬SustainableAgriculture), it is not the case that resources are conserved (¬ConservesResources).

38. Relationship between soil salinity and crop health

Logical expression: ∀x (SoilSalinity(x) → ¬ImprovesCropHealth(x))

Explanation: "Soil salinity does not improve crop health." This means that for each instance of soil salinity (SoilSalinity), it is not the case that crop health improves (¬ImprovesCropHealth).

39. Relationship between drought and water abundance

Logical expression: ∀x (Drought(x) → ¬CausesWaterAbundance(x))

Explanation: "Drought does not cause water abundance." This expresses that for each instance of drought (Drought), it does not lead to water abundance (¬CausesWaterAbundance).

40. Relationship between irrigation technology and water efficiency

Logical expression: ∃x (IrrigationTechnology(x) ∧ ImprovesWaterEfficiency(x))

Explanation: "There exists irrigation technology that improves water efficiency." This indicates that at least one instance of irrigation technology (IrrigationTechnology) enhances water efficiency (ImprovesWaterEfficiency).

41. Relationship between water efficiency and irrigation systems

Logical expression: ∀x (WaterEfficiency(x) → ImprovesIrrigation(x))

Explanation: "Water efficiency improves irrigation." This means that for each instance of water efficiency (WaterEfficiency), irrigation is improved (ImprovesIrrigation).

42. Relationship between water use and crop yield

Logical expression: ∃x (WaterUse(x) ∧ IncreasesCropYield(x))

Explanation: "There exists a level of water use that increases crop yield." This means that at least one instance of water use (WaterUse) contributes to an increase in crop yield (IncreasesCropYield).

43. Relationship between traditional farming and precision agriculture

Logical expression: ∀x (TraditionalFarming(x) → ∃y (ProducesLessYieldThan(y) ∧ PrecisionAgriculture(y)))

Explanation: "For every instance of traditional farming, there exists an instance of precision agriculture that produces a higher yield." This implies that precision agriculture (PrecisionAgriculture) tends to yield more crops than traditional farming (TraditionalFarming).

44. Relationship between irrigated and non-irrigated areas

Logical expression: ∀x (IrrigatedAreas(x) → ∃y (HasHigherCropYieldThan(y) ∧ ¬ IrrigatedAreas(y)))

Explanation: "For every instance of irrigated areas, there exists an instance of non-irrigated areas that has a lower crop yield." This indicates that irrigated areas (IrrigatedAreas) generally produce more crops than non-irrigated areas (¬ IrrigatedAreas).

45. Relationship between water-efficient practices and non-efficient practices

Logical expression: ∀x (WaterEfficientPractice(x) → ¬∃y (ConsumesMoreWaterThan(y) ∧ ¬ EfficientPractice(y)))

Explanation: "For every instance of water-efficient practices, there does not exist an instance of non-efficient practices that consumes more water." This indicates that water-efficient practices (WaterEfficientPractice) are always better in terms of water consumption.

46. Relationship between sustainable practices and soil health

Logical expression: ∀x (SustainablePractices(x) ↔ SoilHealth(x))

Explanation: "For every instance of sustainable practices, there is a corresponding instance of soil health, and vice versa." This suggests that implementing sustainable agricultural practices (SustainablePractices) is directly related to maintaining healthy soil (SoilHealth).

47. Relationship between rainwater harvesting and water supply

Logical expression: ∀x (RainwaterHarvesting(x) → WaterSupply(x))

Explanation: "For every instance of rainwater harvesting, there is a corresponding instance of increased water supply." This indicates that collecting rainwater (RainwaterHarvesting) directly contributes to improving the available water supply (WaterSupply).

48. Relationship between agricultural engineering and productivity

Logical expression: ∀x (AgriculturalEngineering(x) → ImprovesAgriculturalProductivity(x))

Explanation: "For every instance of agricultural engineering, there is a corresponding instance of agricultural productivity." This shows that technological advancements (AgriculturalEngineering) are essential for increasing agricultural productivity (AgriculturalProductivity).

49. Relationship between climate change and irrigation requirements

Logical expression: ∀x (ClimateChange(x) → ∃y (increasesNeedFor(y) ∧ IrrigationRequirements(y)))

Explanation: "For every instance of climate change, there exists an increase in irrigation requirements." This indicates that climate change (ClimateChange) tends to raise the demand for irrigation (IrrigationRequirements).

50. Relationship between water conservation and water use

Logical expression: ∀x (WaterConservation(x) ↔ ¬ExcessiveWaterUse(x))

Explanation: "For every instance of water conservation, it is true that there is no excessive water use." This means that practicing water conservation (WaterConservation) directly correlates with avoiding excessive use of water (¬ExcessiveWaterUse).

4. ANNEXES

4.1. implementation of the ontology in Protégé

In this section, we present the implementation of the ontology in Protégé, showing how the concepts related to sustainable water management and agricultural practices are organized and structured. This ontology was designed to model and represent various water management strategies, conservation practices, and agricultural techniques that contribute to sustainability in water use.

Ontology metrics:

Metrics

Axiom	899
Logical axiom count	417
Declaration axioms count	183
Class count	53
Object property count	19
Data property count	97
Individual count	15
Annotation Property count	2

Class axioms

SubClassOf	52
EquivalentClasses	19
DisjointClasses	3
GCI count	0
Hidden GCI Count	19

Ontology metrics:

Object property axioms

SubObjectPropertyOf	2
EquivalentObjectProperties	0
InverseObjectProperties	1
DisjointObjectProperties	0
FunctionalObjectProperty	0
InverseFunctionalObjectProperty	2
TransitiveObjectProperty	0
SymmetricObjectProperty	0
AsymmetricObjectProperty	0
ReflexiveObjectProperty	0
IrrefexiveObjectProperty	0
ObjectPropertyDomain	1
ObjectPropertyRange	1
SubPropertyChainOf	0

Data property axioms

SubDataPropertyOf	0
EquivalentDataProperties	0
DisjointDataProperties	0
FunctionalDataProperty	0
DataPropertyDomain	224
DataPropertyRange	97

Individual axioms

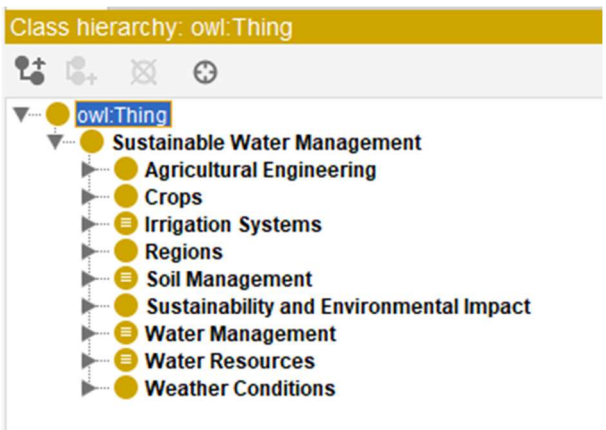
ClassAssertion	15
ObjectPropertyAssertion	0
DataPropertyAssertion	0
NegativeObjectPropertyAssertion	0
NegativeDataPropertyAssertion	0
SameIndividual	0
DifferentIndividuals	0

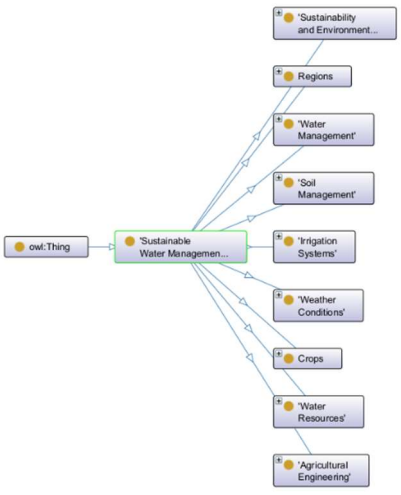
Annotation axioms

AnnotationAssertion	299
AnnotationPropertyDomain	0
AnnotationPropertyRangeOf	0

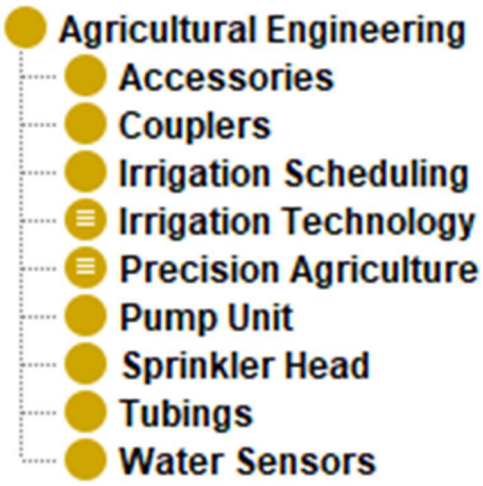
To illustrate the setup of this ontology in Protégé, we start by displaying the defined classes and an overview of the class hierarchy through tree-structured graphs. These views provide insight into the taxonomic structure of the ontology, showing how main concepts and their subclasses relate to one another, establishing a clear structure for water management in agricultural contexts.

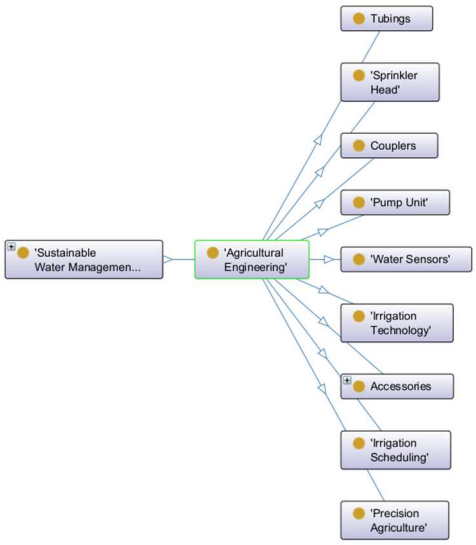
To begin with the ontology implementation, we have structured the main class, **Sustainable Water Management**, from which the primary subclasses are derived to represent key areas in sustainable water management in agriculture. This organization in Protégé allows us to visualize how each subclass contributes to the overall structure of the ontology.



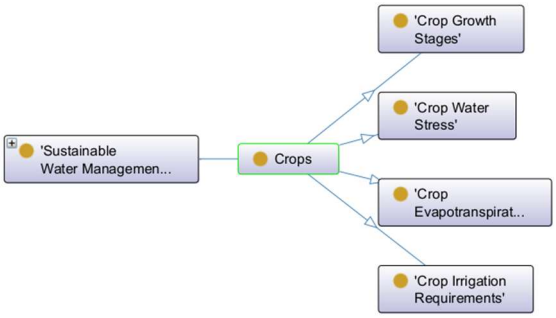


Now we show the main subclasses of the **Sustainable Water Management** ontology to illustrate the detailed structure within each key area. We start with **Agricultural Engineering**:

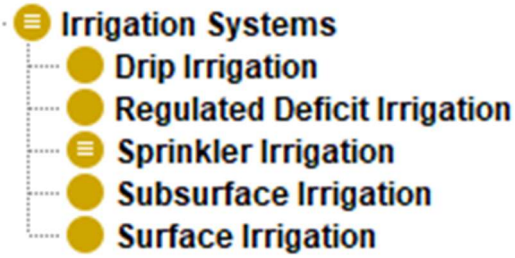


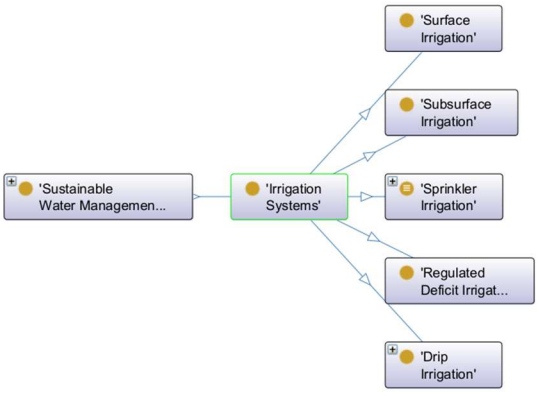


Now we show the subclass **Crops**:



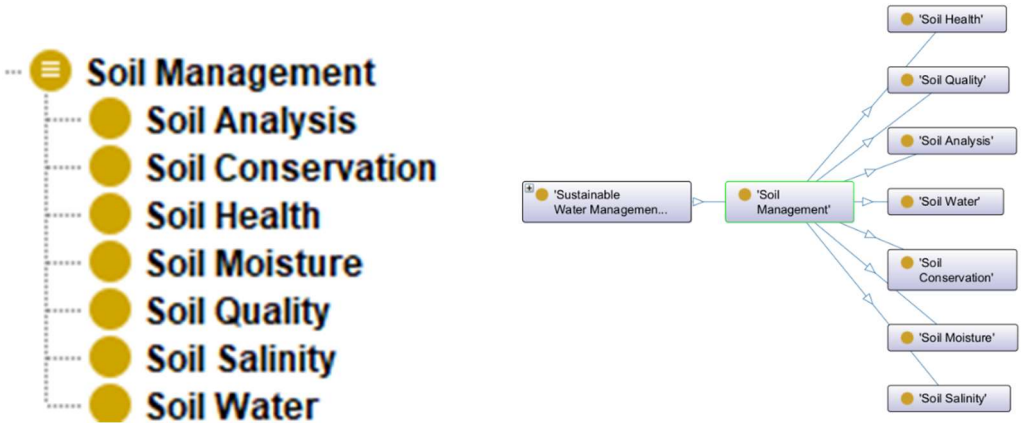
Next, we have the subclass **Irrigation Systems**:





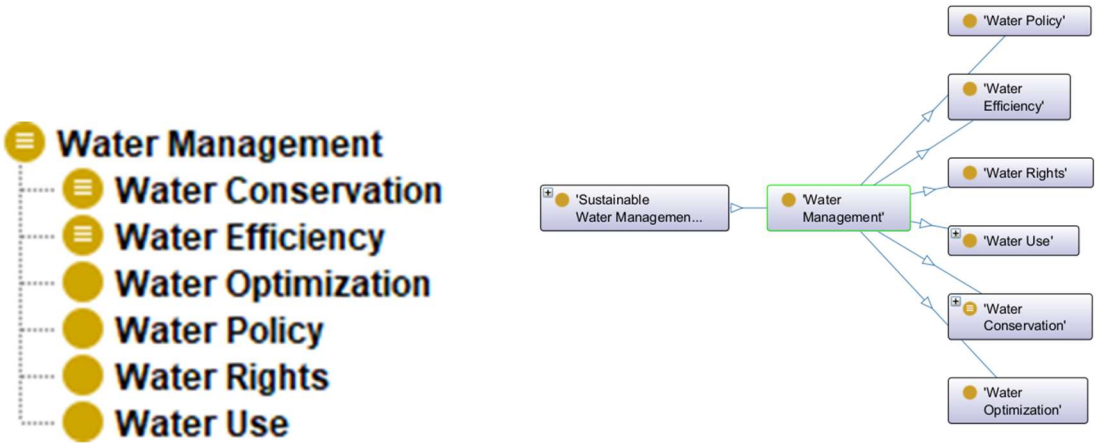
Now we show the subclass **Regions**:

The next subclass in our ontology is **Soil Management**:

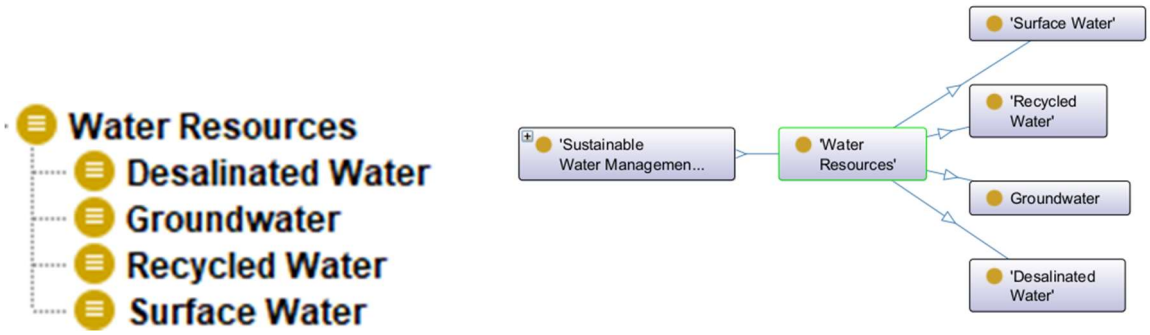


Next, we have the subclass **Sustainability and Environmental Impact**:

Now we show the subclass **Water Management**:

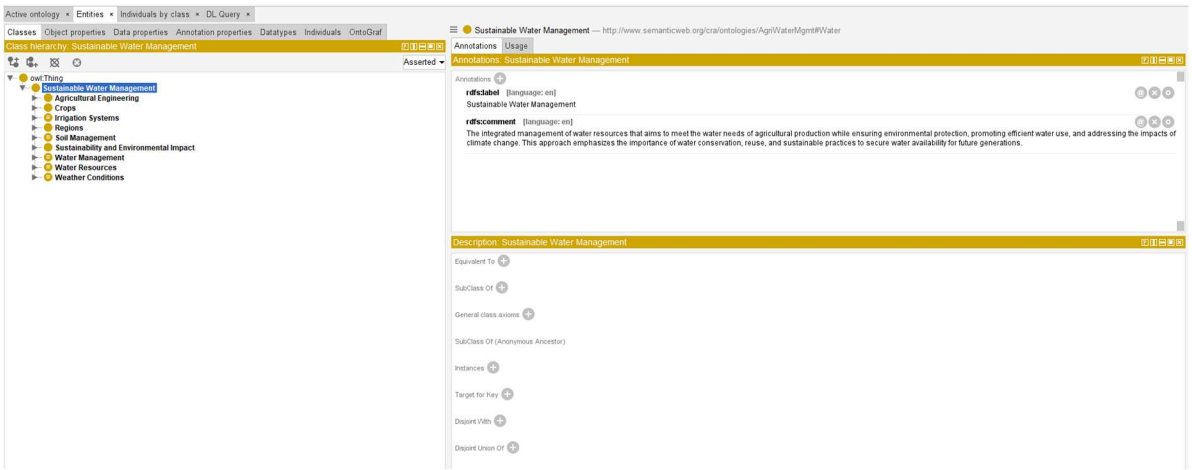


Next, we show the subclass **Water Resources**:

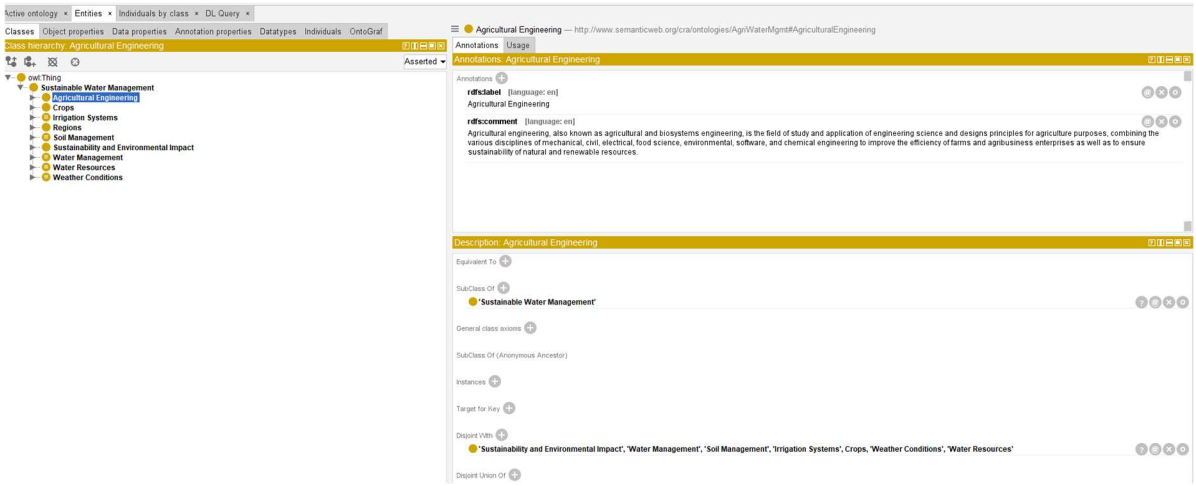


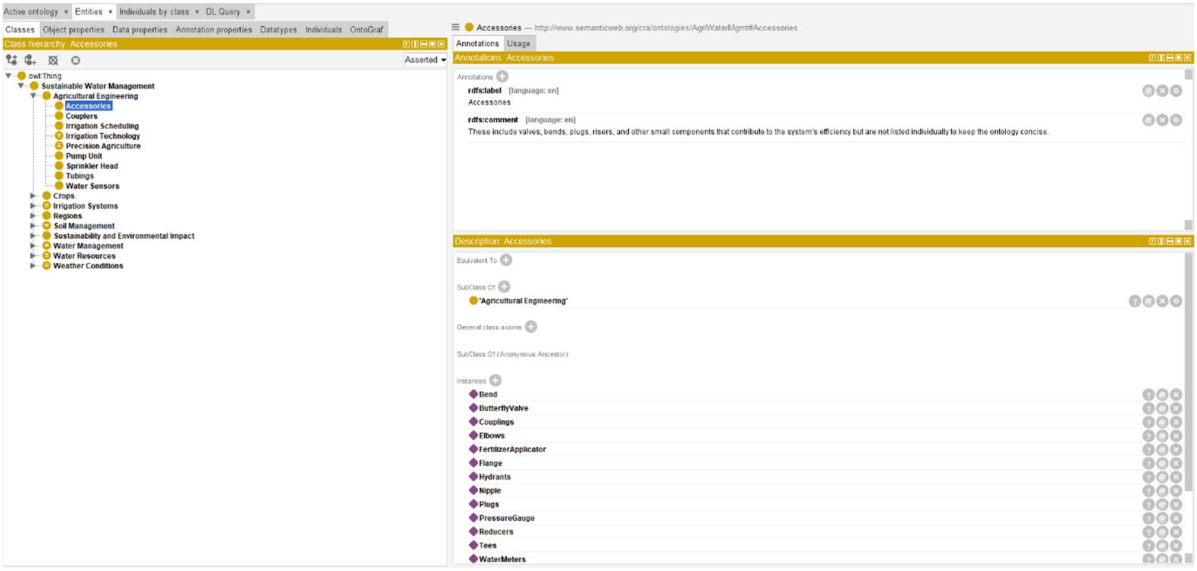
The last subclass is **Weather Conditions:**

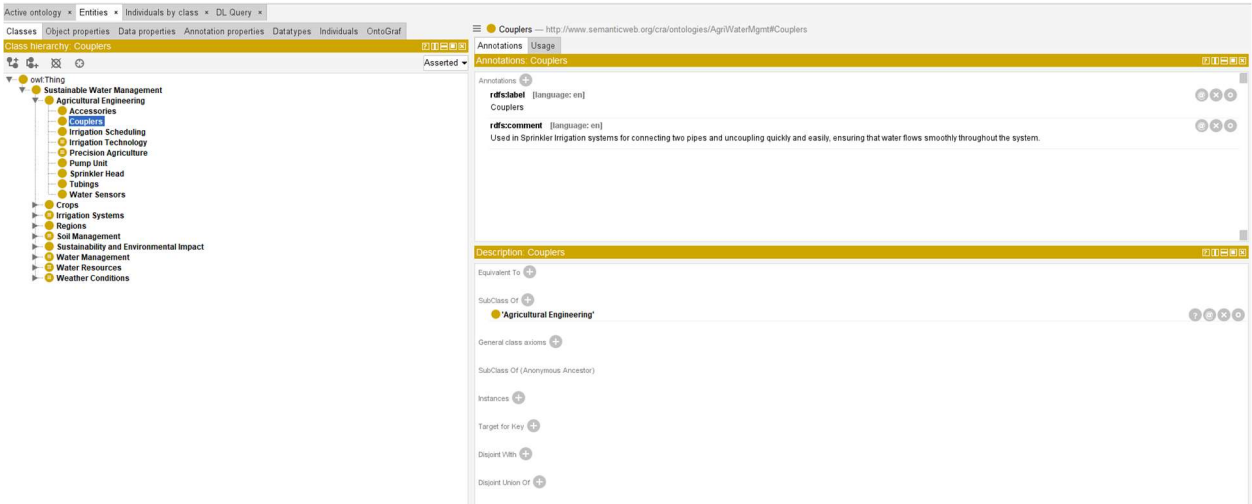
Now we will show each class of the ontology, providing an overview of their annotations and characteristics. Each class will be presented with its respective descriptions, including **rdfs:label** and **rdfs:comment**. We start with the main class, **Sustainable Water Management**:

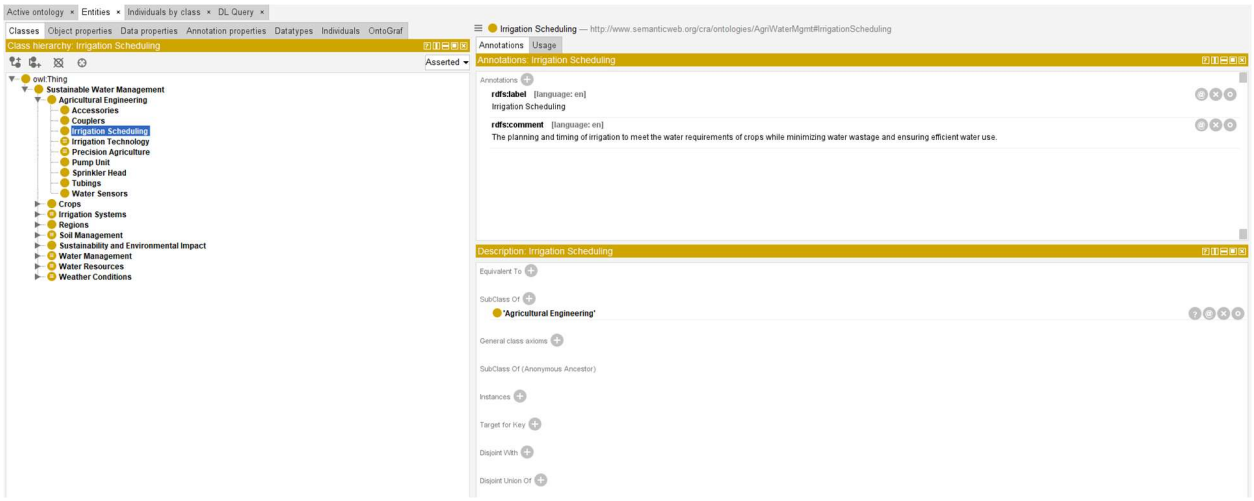


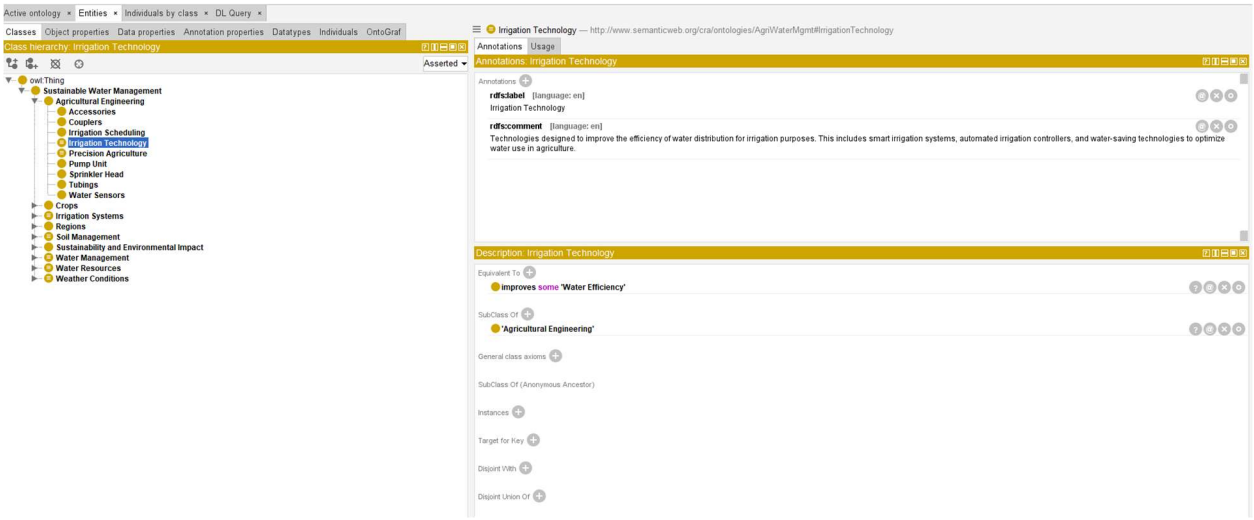
Next, we show **Agricultural Engineering** and its subclasses:

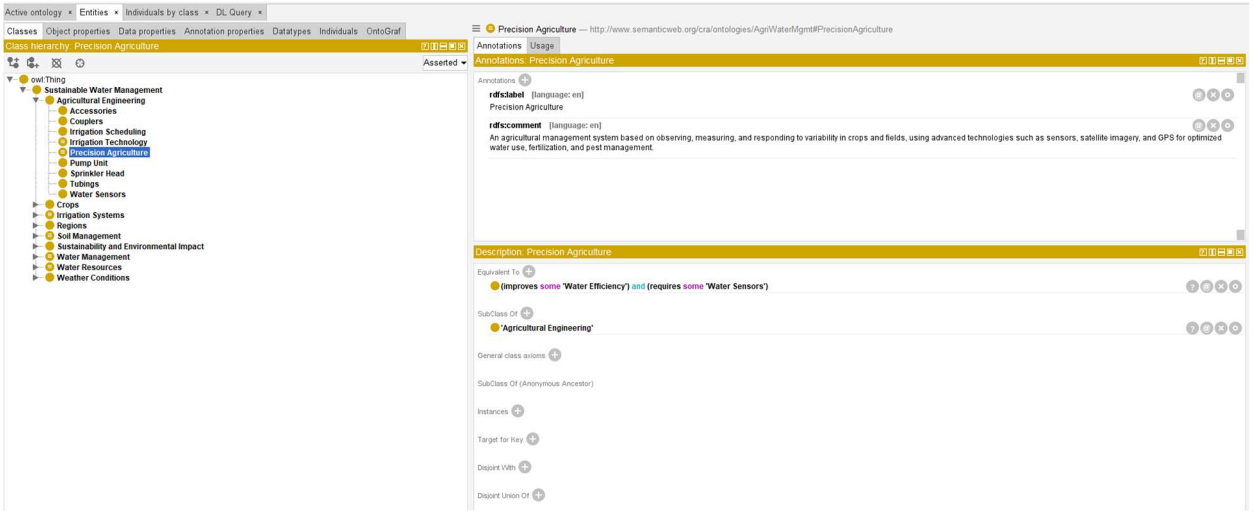

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Agricultural Engineering
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Agricultural Engineering — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#AgriculturalEngineering
Annotations
Usage
Annotations: Agricultural Engineering
rdfs:label [language: en]
Agricultural Engineering
rdfs:comment [language: en]
Agricultural engineering, also known as agricultural and biosystems engineering, is the field of study and application of engineering science and designs principles for agriculture purposes, combining the various disciplines of mechanical, civil, electrical, food science, environmental, software, and chemical engineering to improve the efficiency of farms and agribusiness enterprises as well as to ensure sustainability of natural and renewable resources.
Description: Agricultural Engineering
Equivalent To
SubClass Of
'Sustainable Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
'Sustainability and Environmental Impact', 'Water Management', 'Soil Management', 'Irrigation Systems', Crops, 'Weather Conditions', 'Water Resources'
Disjoint Union Of

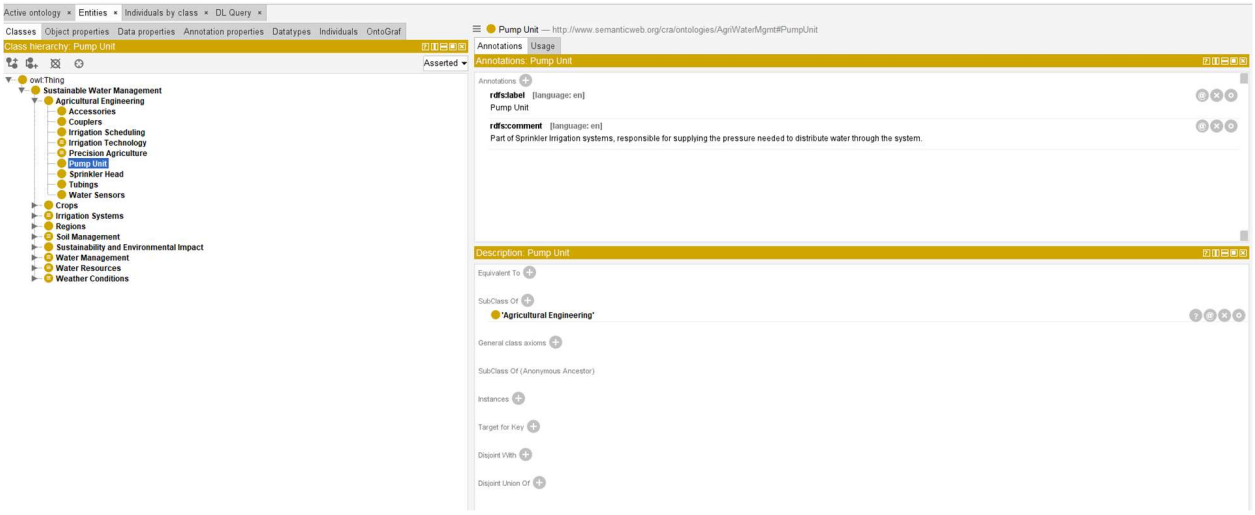

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Accessories
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Accessories — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#Accessories
Annotations
Usage
Annotations: Accessories
rdfs:label [language: en]
Accessories
rdfs:comment [language: en]
These include valves, bends, plugs, risers, and other small components that contribute to the system's efficiency but are not listed individually to keep the ontology concise.
Description: Accessories
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Bend
ButterflyValve
Couplings
Elbows
FertilizerApplicator
Flange
Hydrants
Nipple
Plugs
PressureGauge
Reducers
Tees
WaterMeters

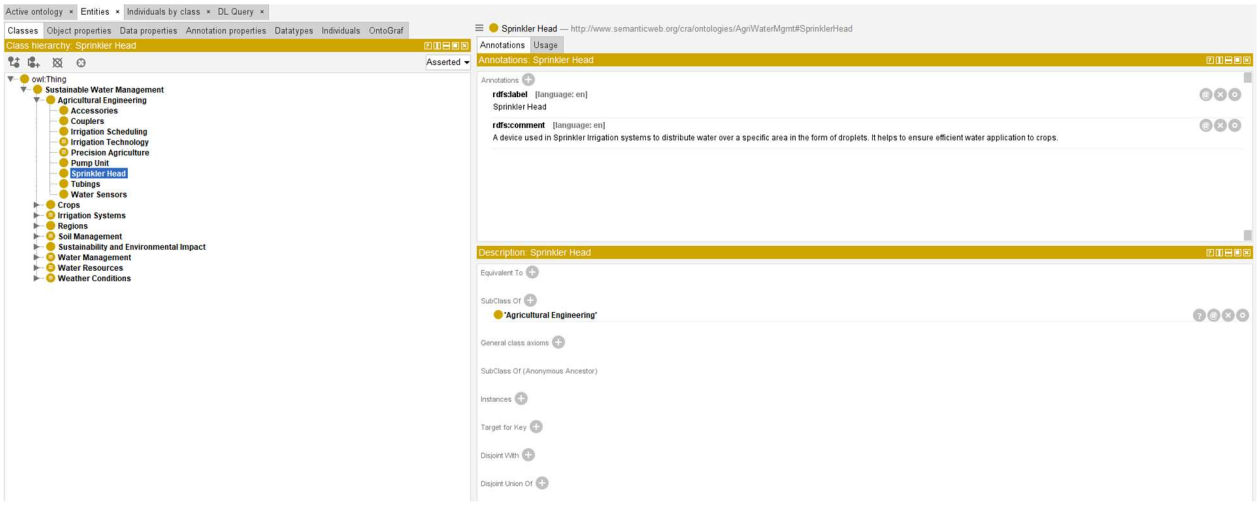

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Couplers
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Couplers — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#Couplers
Annotations
Usage
Annotations: Couplers
rdfs:label [language: en]
Couplers
rdfs:comment [language: en]
Used in Sprinkler Irrigation systems for connecting two pipes and uncoupling quickly and easily, ensuring that water flows smoothly throughout the system.
Description: Couplers
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

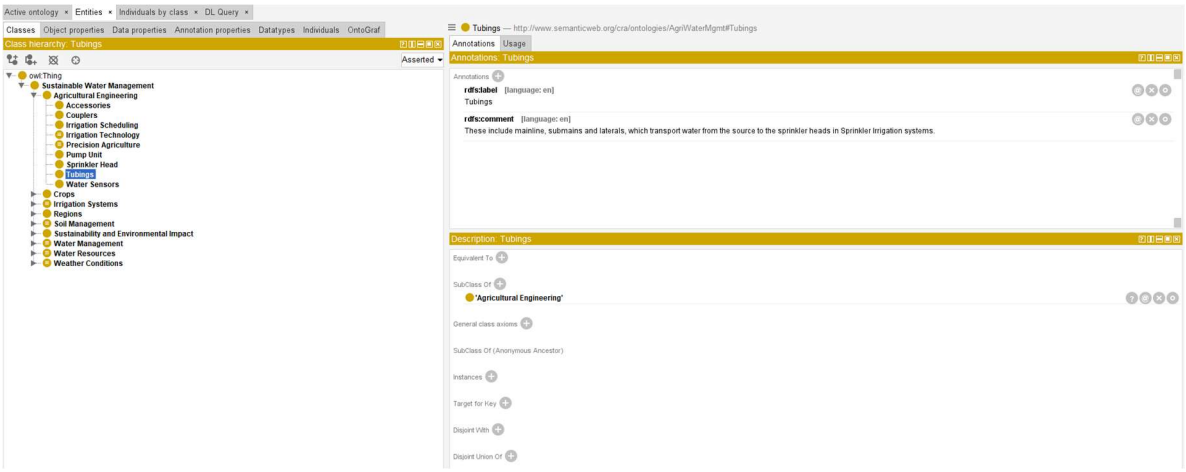

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Irrigation Scheduling
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Irrigation Scheduling — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#IrrigationScheduling
Annotations Usage
Annotations: Irrigation Scheduling
rdfs:label [language: en]
Irrigation Scheduling
rdfs:comment [language: en]
The planning and timing of irrigation to meet the water requirements of crops while minimizing water wastage and ensuring efficient water use.
Description: Irrigation Scheduling
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

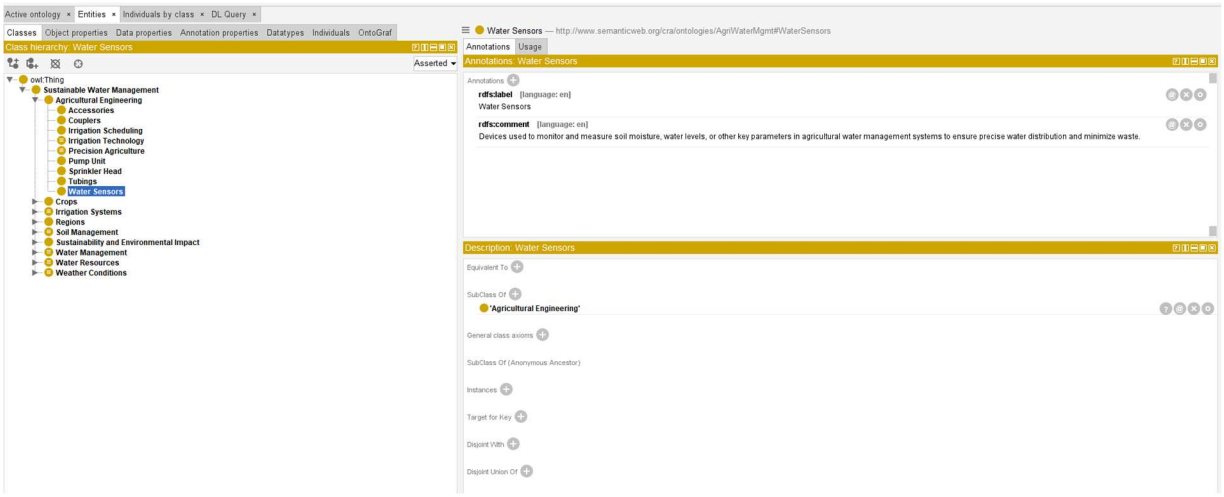

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Irrigation Technology
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Irrigation Technology — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#IrrigationTechnology
Annotations Usage
Annotations: Irrigation Technology
rdfs:label [language: en]
Irrigation Technology
rdfs:comment [language: en]
Technologies designed to improve the efficiency of water distribution for irrigation purposes. This includes smart irrigation systems, automated irrigation controllers, and water-saving technologies to optimize water use in agriculture.
Description: Irrigation Technology
Equivalent To
improves some 'Water Efficiency'
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Precision Agriculture
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Precision Agriculture — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#PrecisionAgriculture
Annotations Usage
Annotations: Precision Agriculture
rdfs:label [language: en]
Precision Agriculture
rdfs:comment [language: en]
An agricultural management system based on observing, measuring, and responding to variability in crops and fields, using advanced technologies such as sensors, satellite imagery, and GPS for optimized water use, fertilization, and pest management.
Description: Precision Agriculture
Equivalent To
(improves some 'Water Efficiency') and (requires some 'Water Sensors')
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

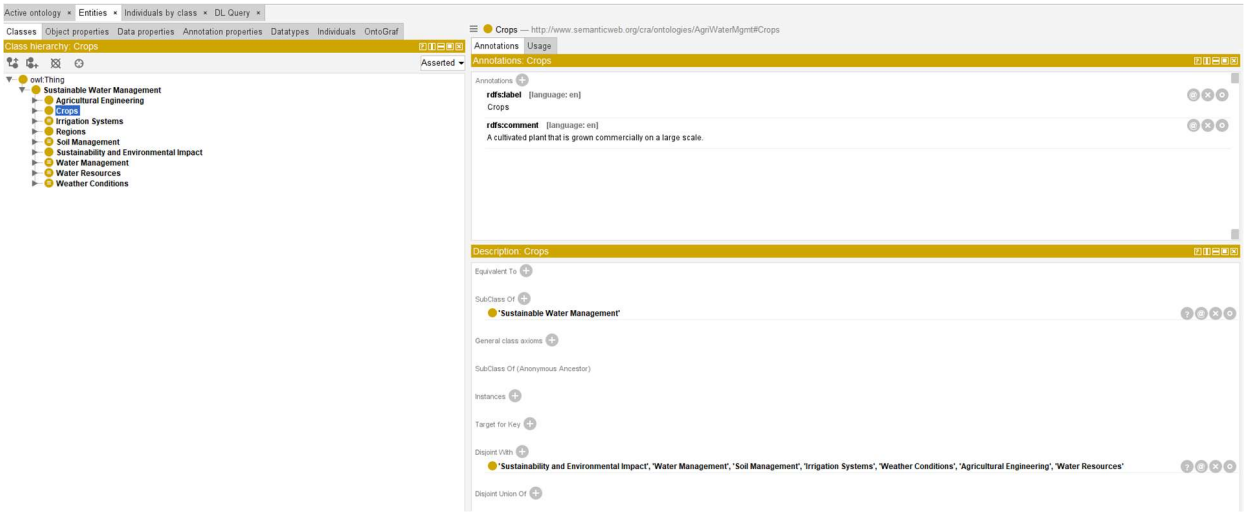

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Pump Unit
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Pump Unit — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#PumpUnit
Annotations
Usage
Annotations: Pump Unit
rdfs:label [language: en]
Pump Unit
rdfs:comment [language: en]
Part of Sprinkler Irrigation systems, responsible for supplying the pressure needed to distribute water through the system.
Description: Pump Unit
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

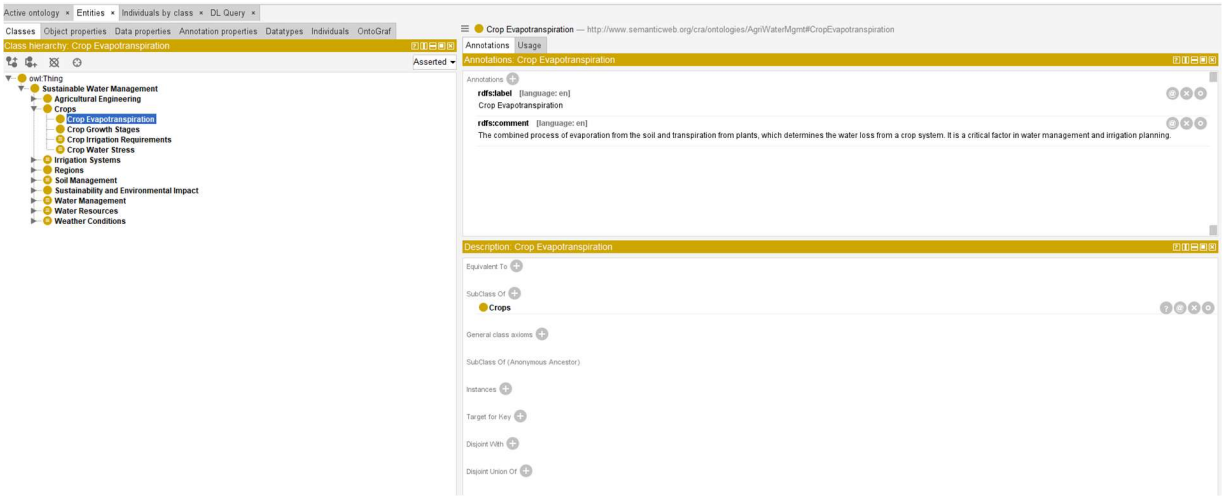

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Sprinkler Head
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Sprinkler Head — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#SprinklerHead
Annotations
Usage
Annotations: Sprinkler Head
rdfs:label [language: en]
Sprinkler Head
rdfs:comment [language: en]
A device used in Sprinkler Irrigation systems to distribute water over a specific area in the form of droplets. It helps to ensure efficient water application to crops.
Description: Sprinkler Head
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

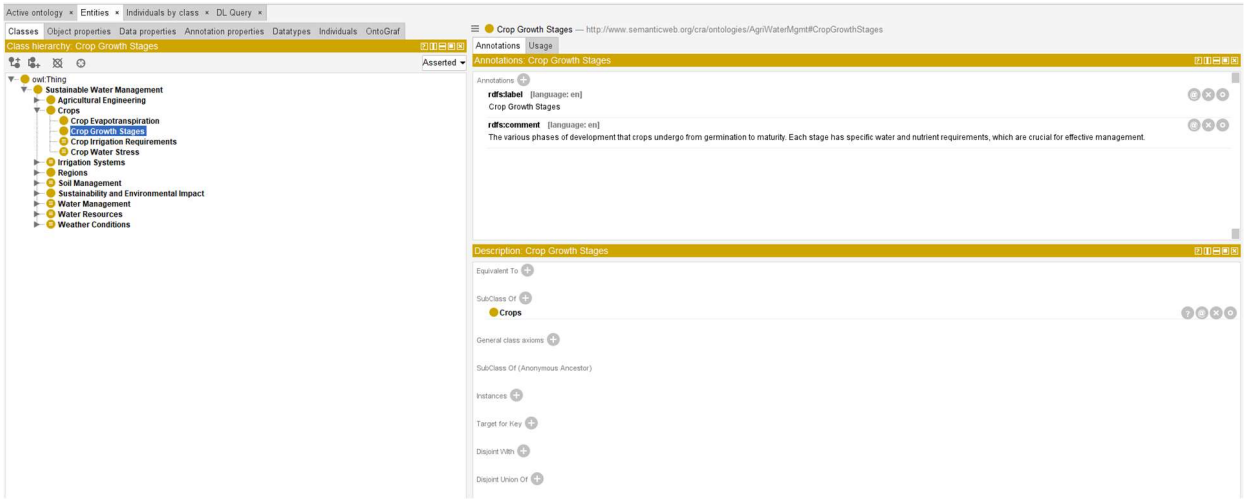

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Tubings
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Accessories
Couplers
Irrigation Scheduling
Irrigation Technology
Precision Agriculture
Pump Unit
Sprinkler Head
Tubings
Water Sensors
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Tubings — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#Tubings
Annotations
Usage
Annotations: Tubings
rdfs:label [language: en]
Tubings
rdfs:comment [language: en]
These include mainline, submains and laterals, which transport water from the source to the sprinkler heads in Sprinkler Irrigation systems.
Description: Tubings
Equivalent To
SubClass Of
'Agricultural Engineering'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

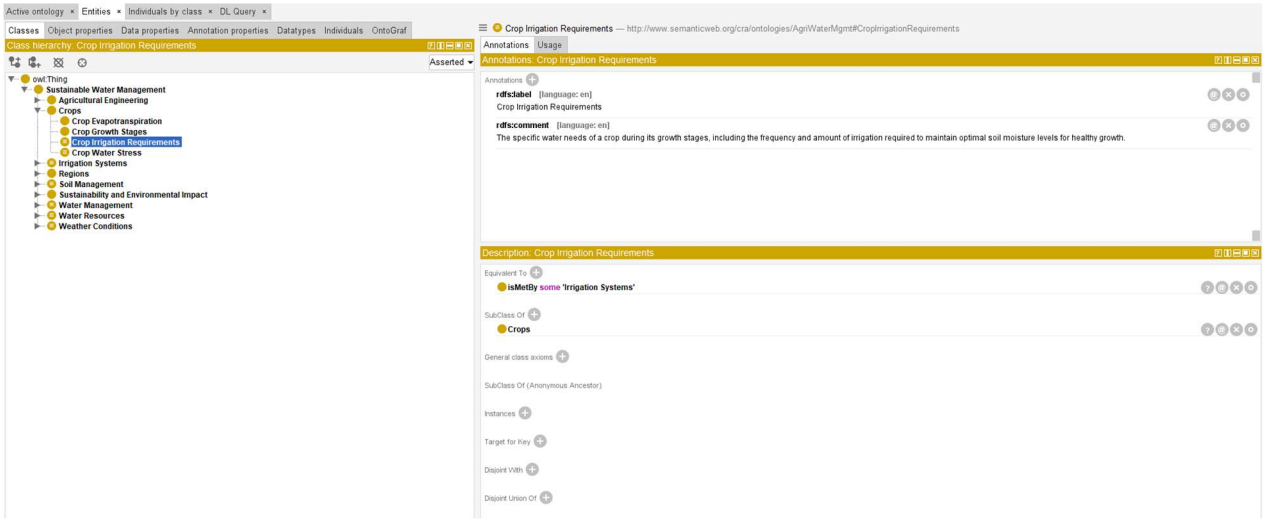


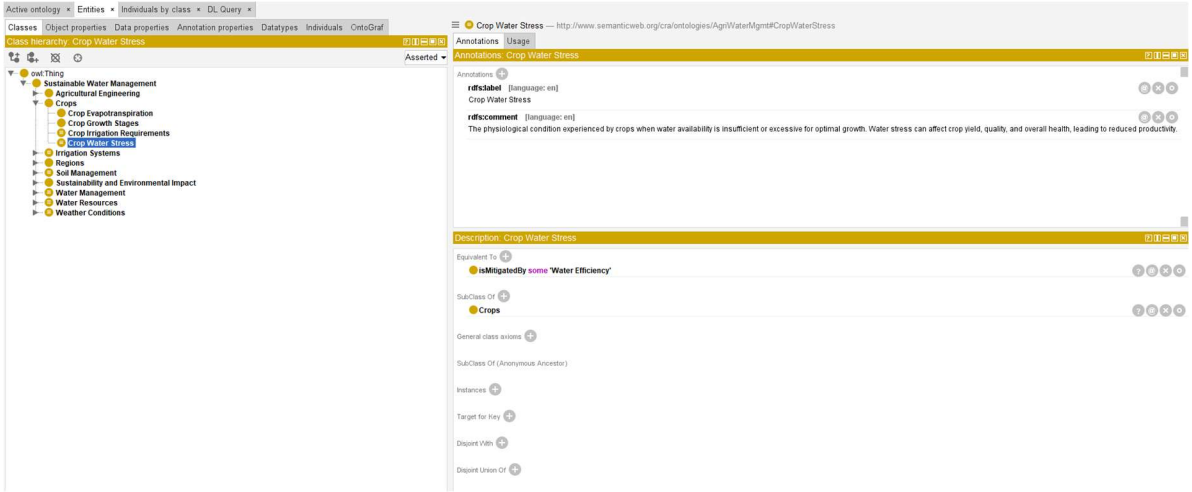
Now we show the class **Crops** and its subclasses:



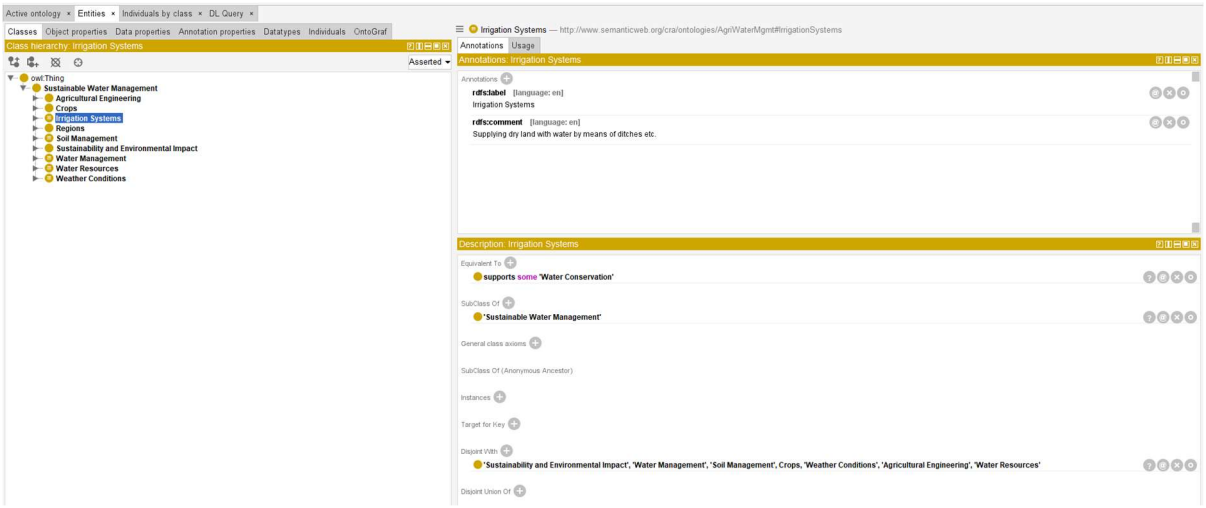


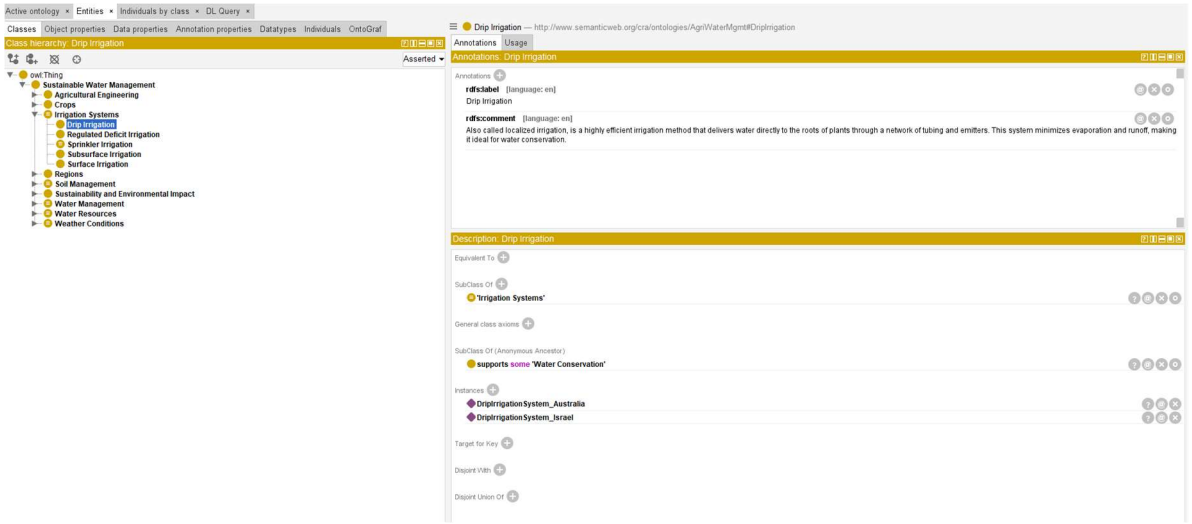


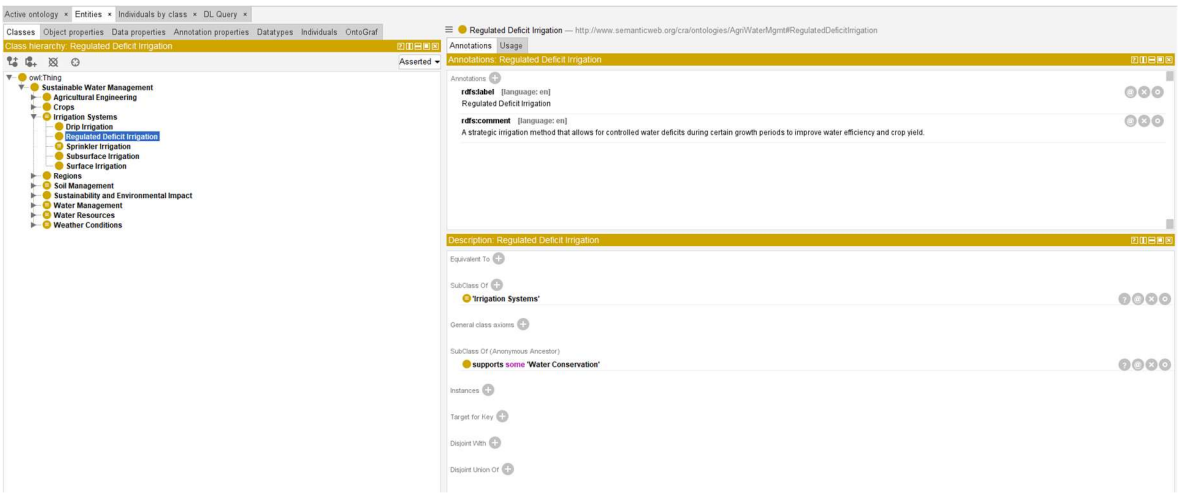


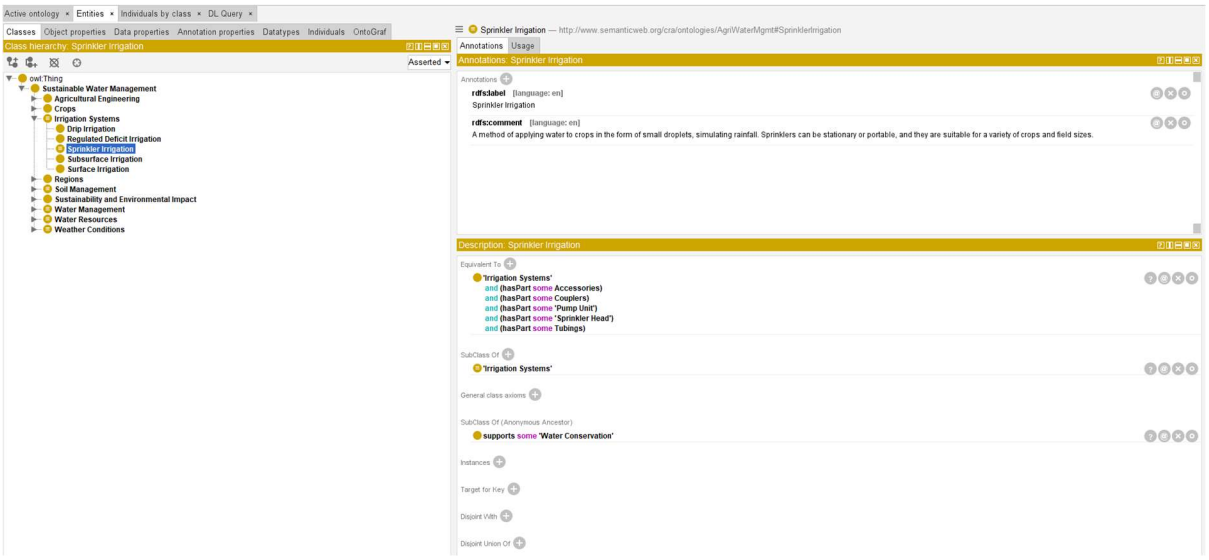


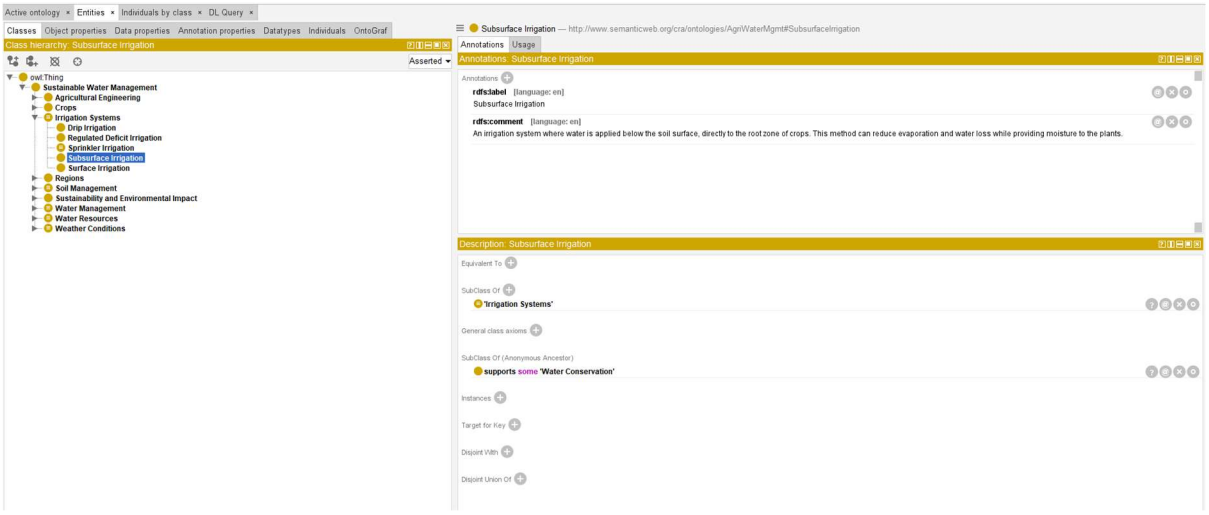
Next, we show the class **Irrigation Systems** and its subclasses:

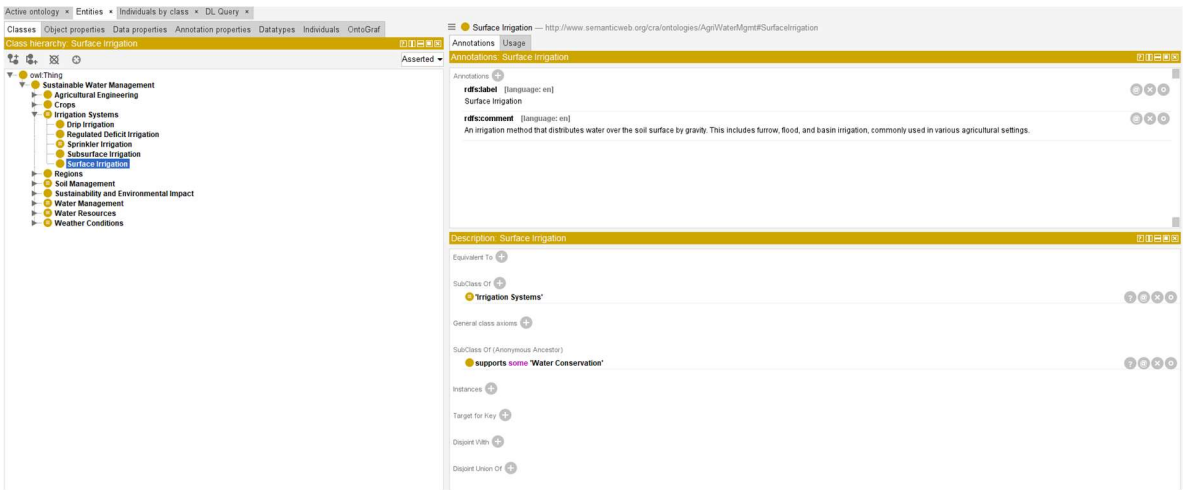

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Irrigation Systems
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Irrigation Systems — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#IrrigationSystems
Annotations Usage
Annotations: Irrigation Systems
rdfs:label [language: en]
Irrigation Systems
rdfs:comment [language: en]
Supplying dry land with water by means of ditches etc.
Description: Irrigation Systems
Equivalent To
supports some 'Water Conservation'
SubClass Of
'Sustainable Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
'Sustainability and Environmental Impact', 'Water Management', 'Soil Management', Crops, 'Weather Conditions', 'Agricultural Engineering', 'Water Resources'
Disjoint Union Of


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Drip Irrigation
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Drip Irrigation
Regulated Deficit Irrigation
Sprinkler Irrigation
Subsurface Irrigation
Surface Irrigation
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Drip Irrigation — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#DripIrrigation
Annotations Usage
Annotations: Drip Irrigation
rdfs:label [language: en]
Drip Irrigation
rdfs:comment [language: en]
Also called localized irrigation, is a highly efficient irrigation method that delivers water directly to the roots of plants through a network of tubing and emitters. This system minimizes evaporation and runoff, making it ideal for water conservation.
Description: Drip Irrigation
Equivalent To
SubClass Of
'Irrigation Systems'
General class axioms
SubClass Of (Anonymous Ancestor)
supports some 'Water Conservation'
Instances
DripIrrigationSystem_Australia
DripIrrigationSystem_Israel
Target for Key
Disjoint With
Disjoint Union Of

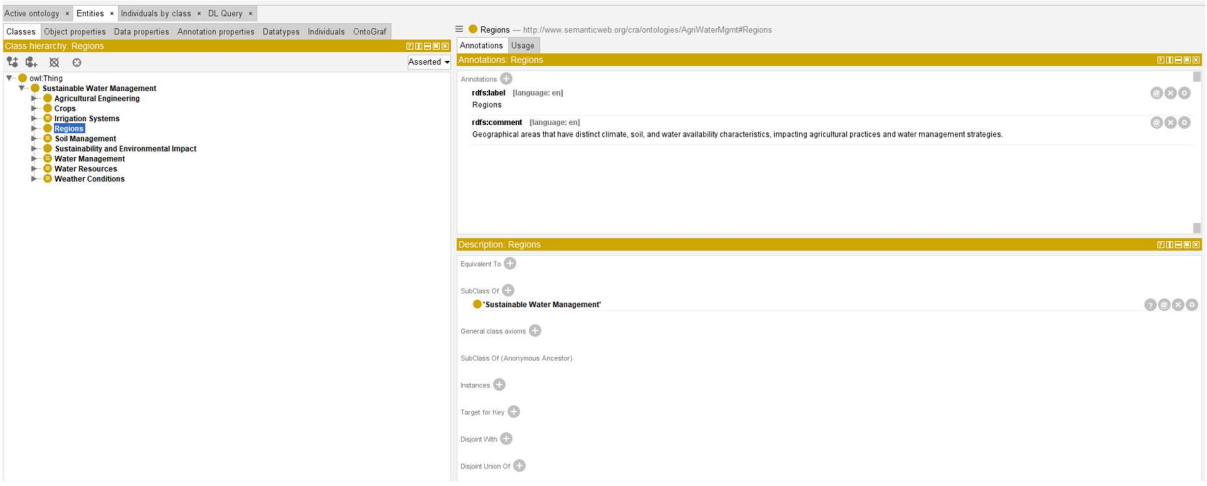

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Regulated Deficit Irrigation
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Drip Irrigation
Regulated Deficit Irrigation
Sprinkler Irrigation
Subsurface Irrigation
Surface Irrigation
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Regulated Deficit Irrigation — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#RegulatedDeficitIrrigation
Annotations Usage
Annotations: Regulated Deficit Irrigation
rdfs:label [language: en]
Regulated Deficit Irrigation
rdfs:comment [language: en]
A strategic irrigation method that allows for controlled water deficits during certain growth periods to improve water efficiency and crop yield.
Description: Regulated Deficit Irrigation
Equivalent To
SubClass Of
'Irrigation Systems'
General class axioms
SubClass Of (Anonymous Ancestor)
supports some 'Water Conservation'
Instances
Target for Key
Disjoint With
Disjoint Union Of

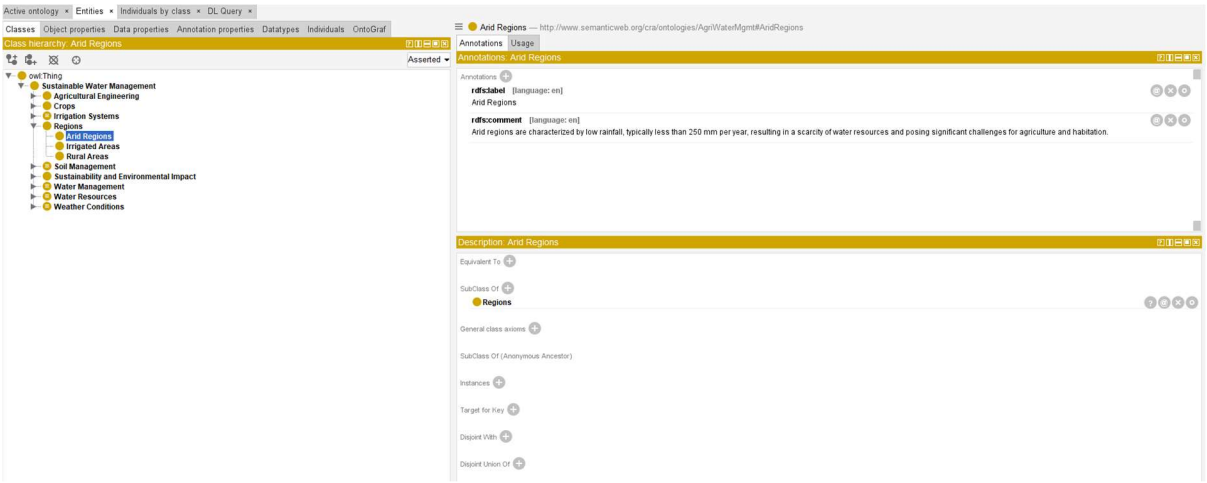


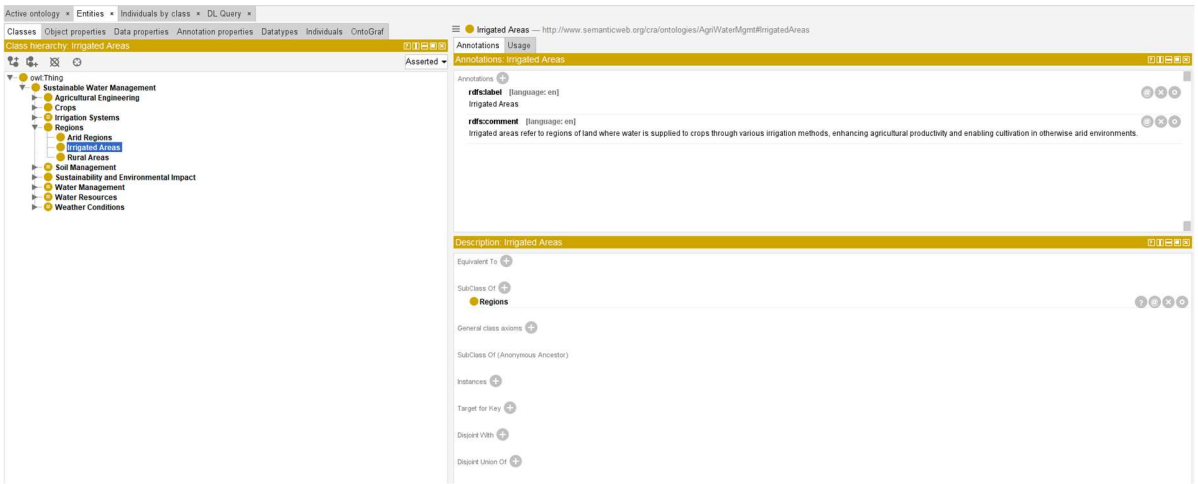


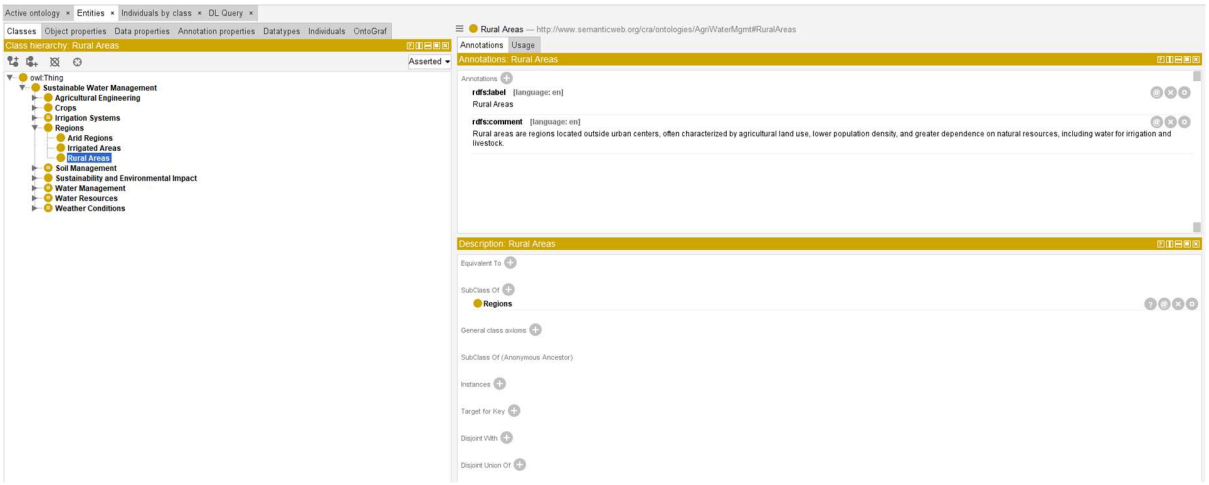


Now we show the class **Regions** and its subclasses:

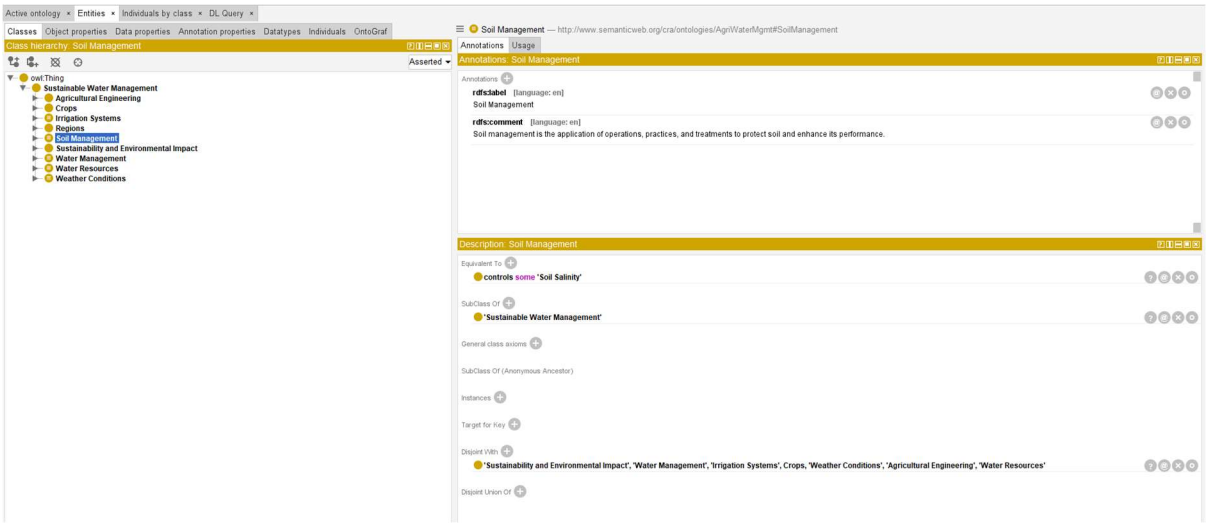

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Regions
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Regions — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#Regions
Annotations Usage
Annotations: Regions
Annotations
rdfs:label [language: en]
Regions
rdfs:comment [language: en]
Geographical areas that have distinct climate, soil, and water availability characteristics, impacting agricultural practices and water management strategies.
Description: Regions
Equivalent To
SubClass Of
'Sustainable Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

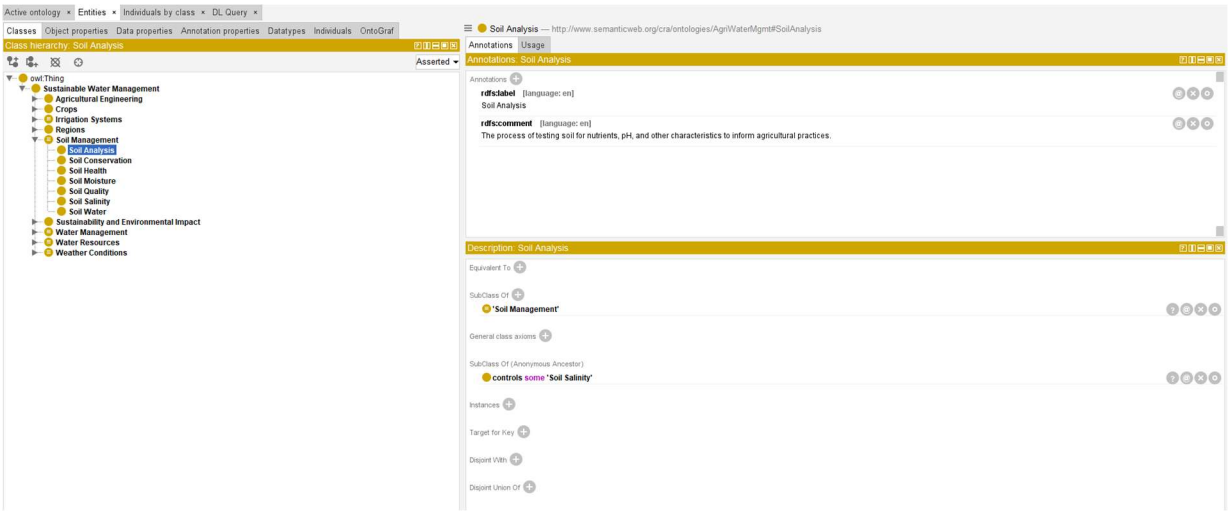

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Arid Regions
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Arid Regions
Irrigated Areas
Rural Areas
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Arid Regions — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#AridRegions
Annotations Usage
Annotations: Arid Regions
Annotations
rdfs:label [language: en]
Arid Regions
rdfs:comment [language: en]
Arid regions are characterized by low rainfall, typically less than 250 mm per year, resulting in a scarcity of water resources and posing significant challenges for agriculture and habitation.
Description: Arid Regions
Equivalent To
SubClass Of
Regions
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

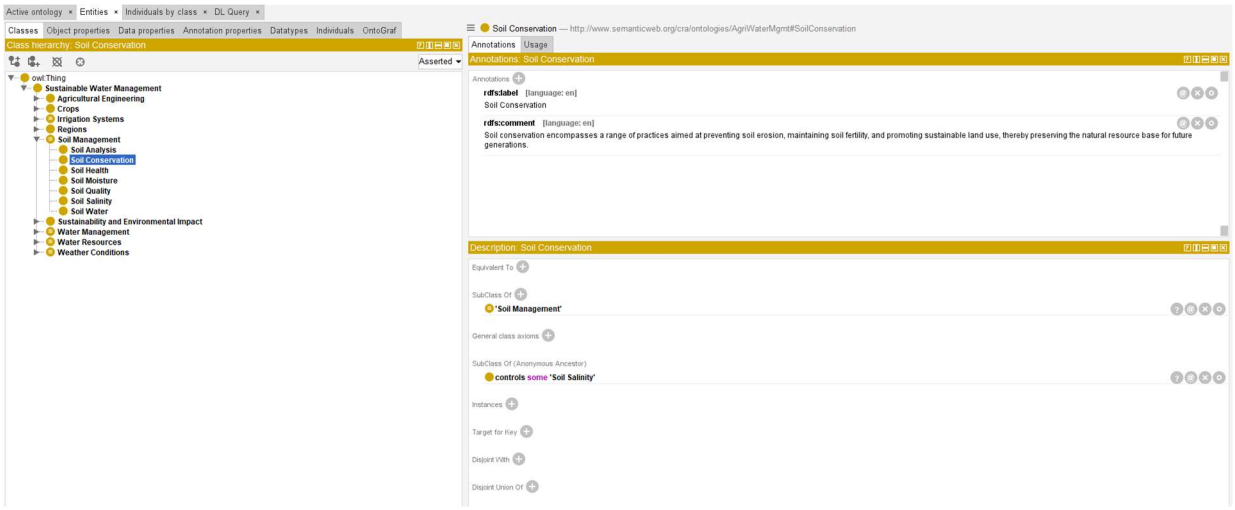

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Irrigated Areas
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Arid Regions
Irrigated Areas
Rural Areas
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Irrigated Areas — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#IrrigatedAreas
Annotations Usage
Annotations: Irrigated Areas
Annotations
rdfs:label [language: en]
Irrigated Areas
rdfs:comment [language: en]
Irrigated areas refer to regions of land where water is supplied to crops through various irrigation methods, enhancing agricultural productivity and enabling cultivation in otherwise arid environments.
Description: Irrigated Areas
Equivalent To
SubClass Of
Regions
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

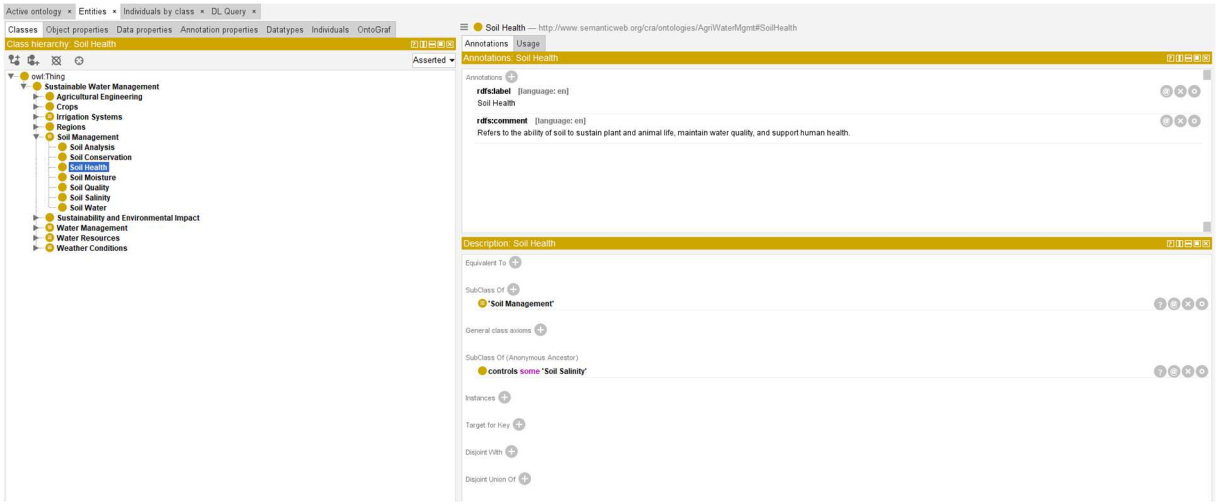


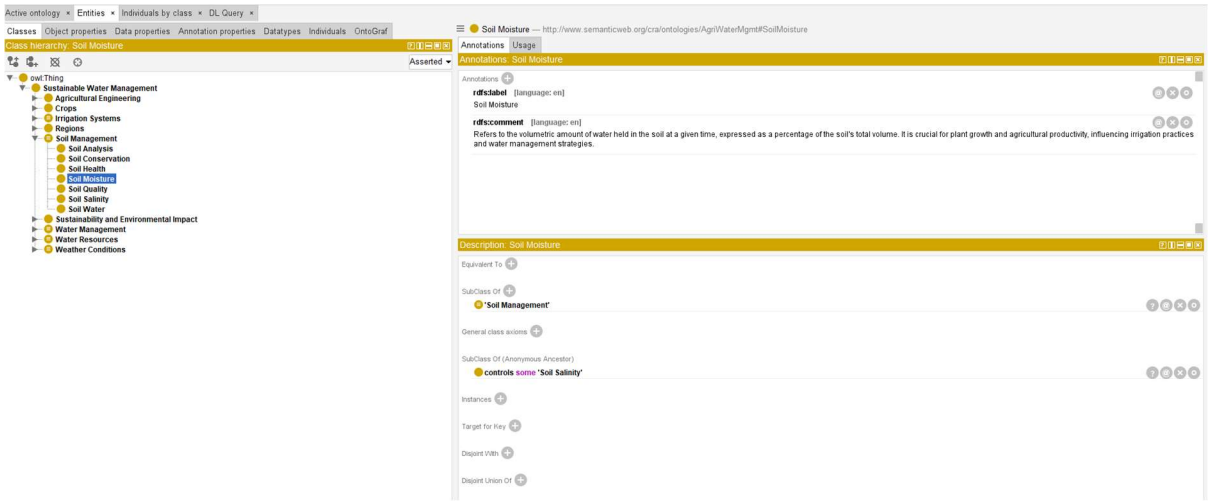
The next class is **Soil Management**:

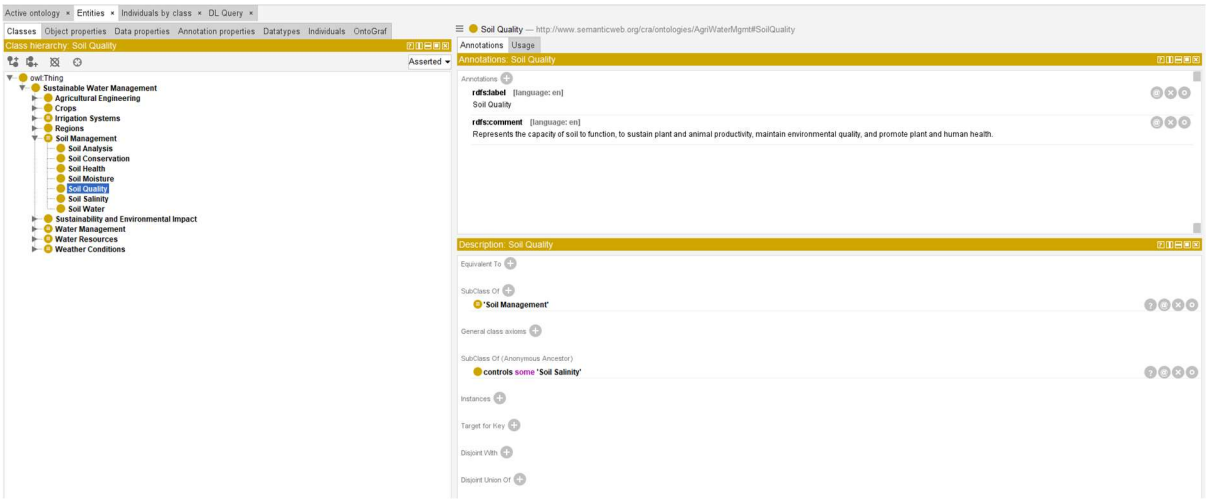


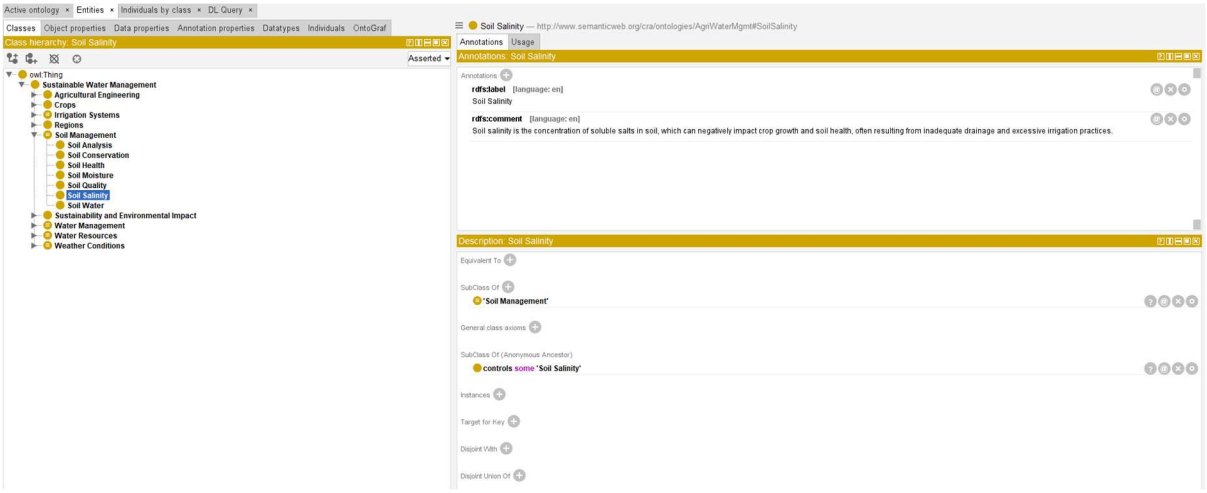


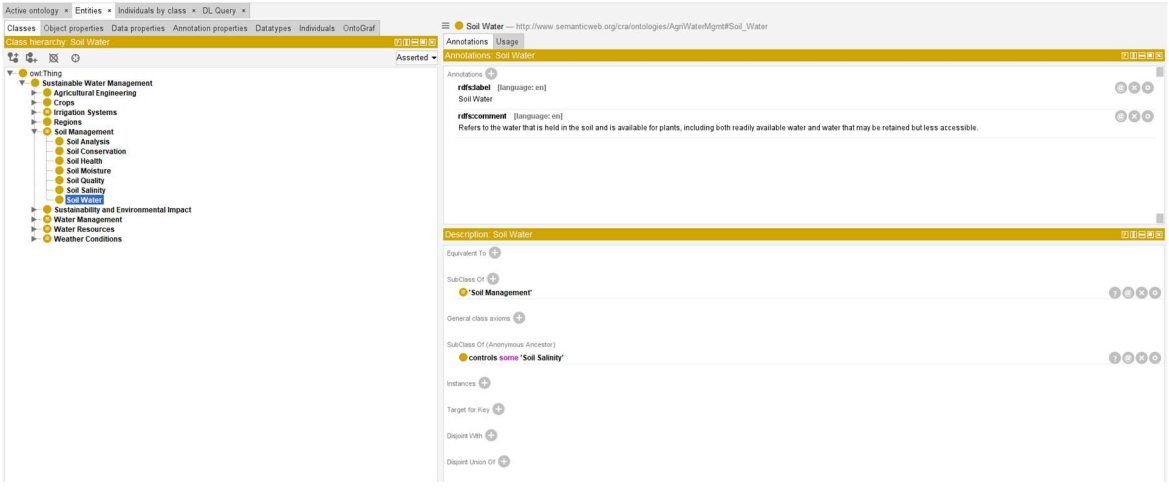

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Soil Conservation
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Soil Analysis
Soil Conservation
Soil Health
Soil Moisture
Soil Quality
Soil Salinity
Soil Water
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Soil Conservation — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#SoilConservation
Annotations Usage
Annotations: Soil Conservation
rdfs:label [language: en]
Soil Conservation
rdfs:comment [language: en]
Soil conservation encompasses a range of practices aimed at preventing soil erosion, maintaining soil fertility, and promoting sustainable land use, thereby preserving the natural resource base for future generations.
Description: Soil Conservation
Equivalent To
SubClass Of
'Soil Management'
General class axioms
SubClass Of (Anonymous Ancestor)
controls some 'Soil Salinity'
Instances
Target for Key
Disjoint With
Disjoint Union Of


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Soil Health
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Soil Analysis
Soil Conservation
Soil Health
Soil Moisture
Soil Quality
Soil Salinity
Soil Water
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Soil Health — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#SoilHealth
Annotations Usage
Annotations: Soil Health
rdfs:label [language: en]
Soil Health
rdfs:comment [language: en]
Refers to the ability of soil to sustain plant and animal life, maintain water quality, and support human health.
Description: Soil Health
Equivalent To
SubClass Of
'Soil Management'
General class axioms
SubClass Of (Anonymous Ancestor)
controls some 'Soil Salinity'
Instances
Target for Key
Disjoint With
Disjoint Union Of

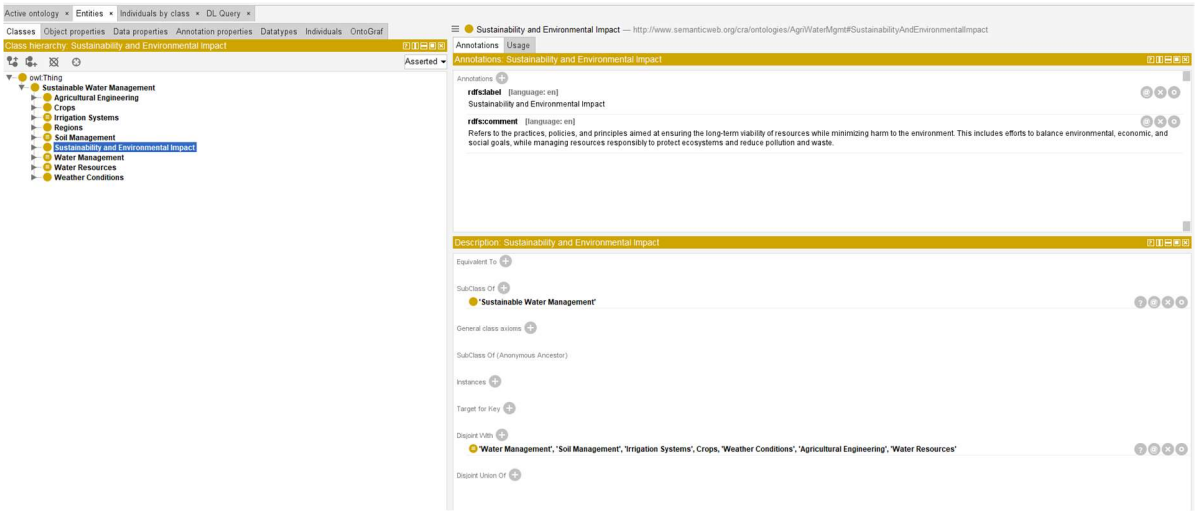

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Soil Moisture
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Soil Analysis
Soil Conservation
Soil Health
Soil Moisture
Soil Quality
Soil Salinity
Soil Water
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Soil Moisture — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#SoilMoisture
Annotations Usage
Annotations: Soil Moisture
rdfs:label [language: en]
Soil Moisture
rdfs:comment [language: en]
Refers to the volumetric amount of water held in the soil at a given time, expressed as a percentage of the soil's total volume. It is crucial for plant growth and agricultural productivity, influencing irrigation practices and water management strategies.
Description: Soil Moisture
Equivalent To
SubClass Of
'Soil Management'
General class axioms
SubClass Of (Anonymous Ancestor)
controls some 'Soil Salinity'
Instances
Target for Key
Disjoint With
Disjoint Union Of

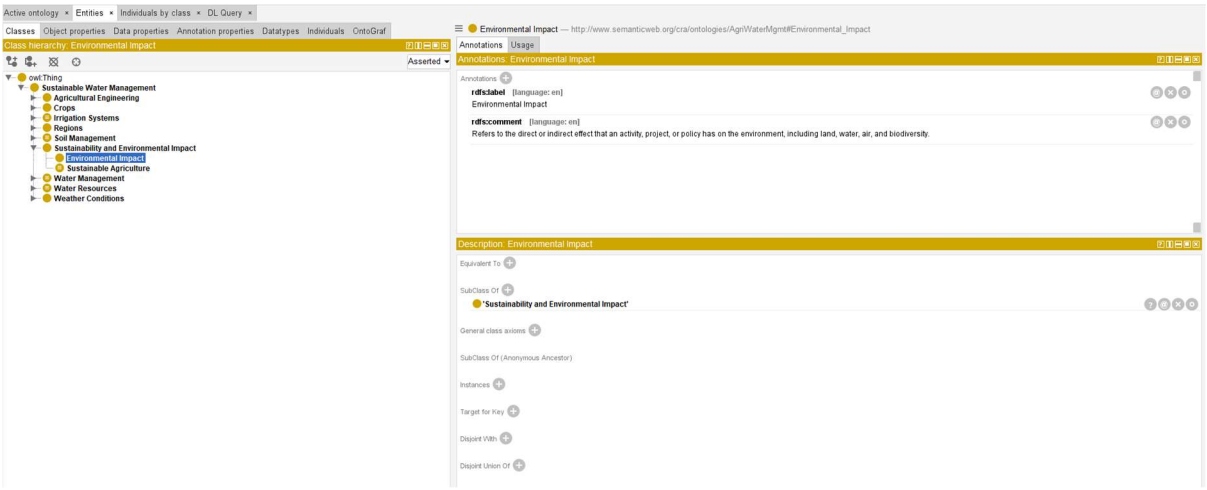


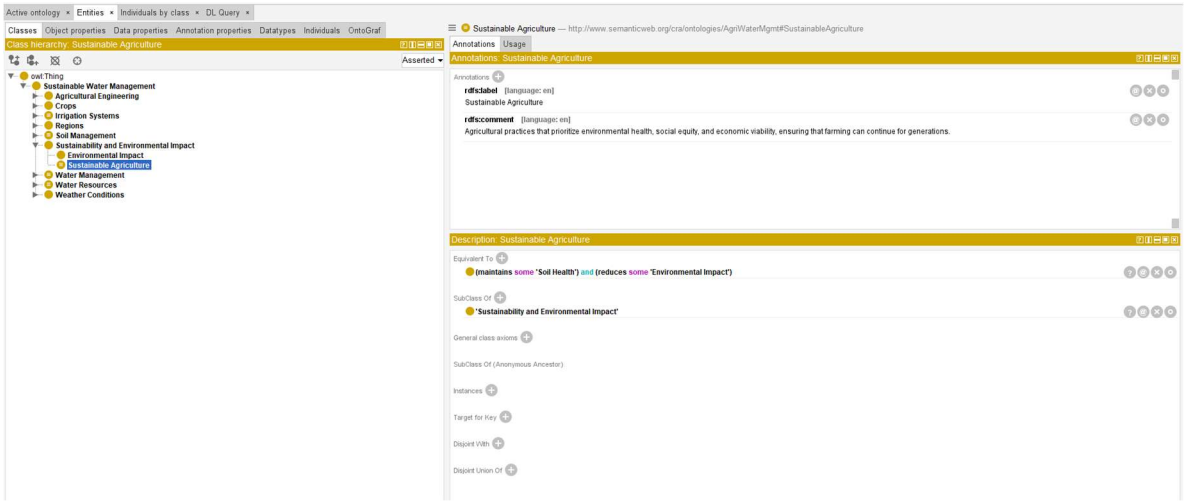




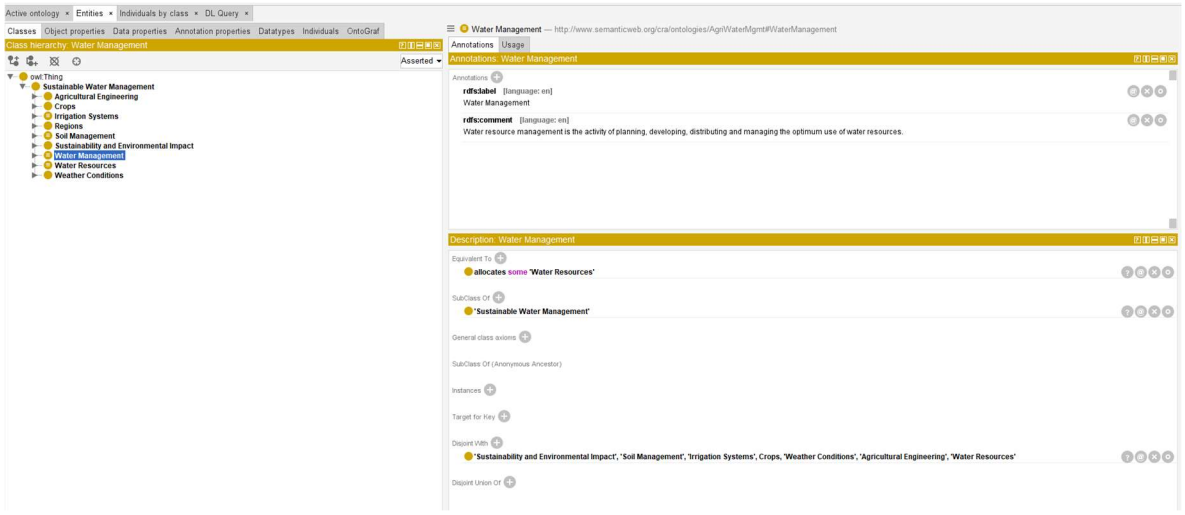
Now we show the class **Sustainability and Environmental Impact** and its corresponding subclasses:

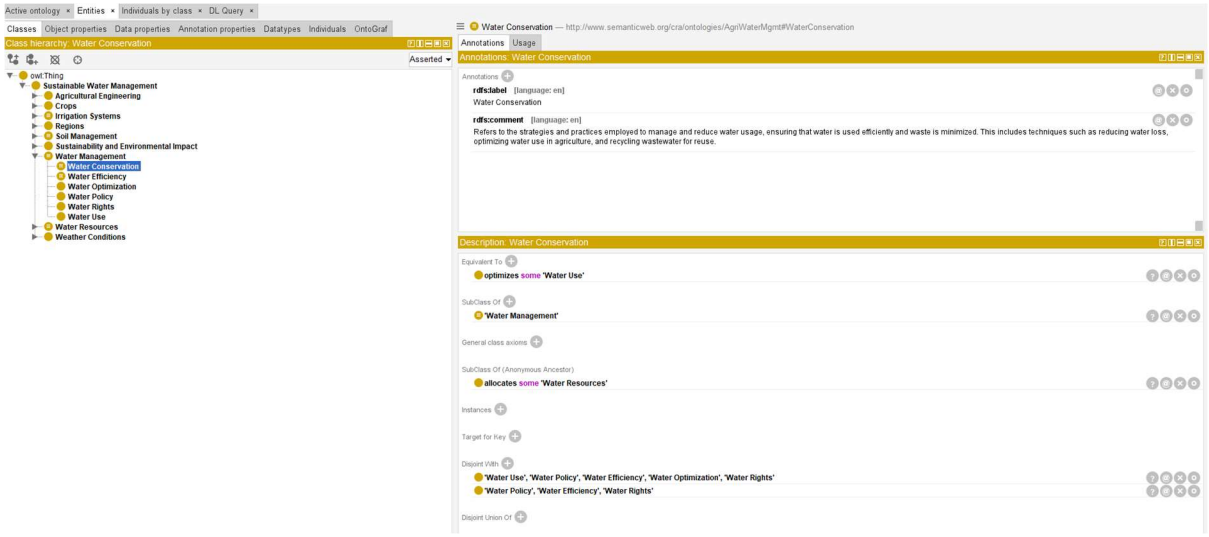


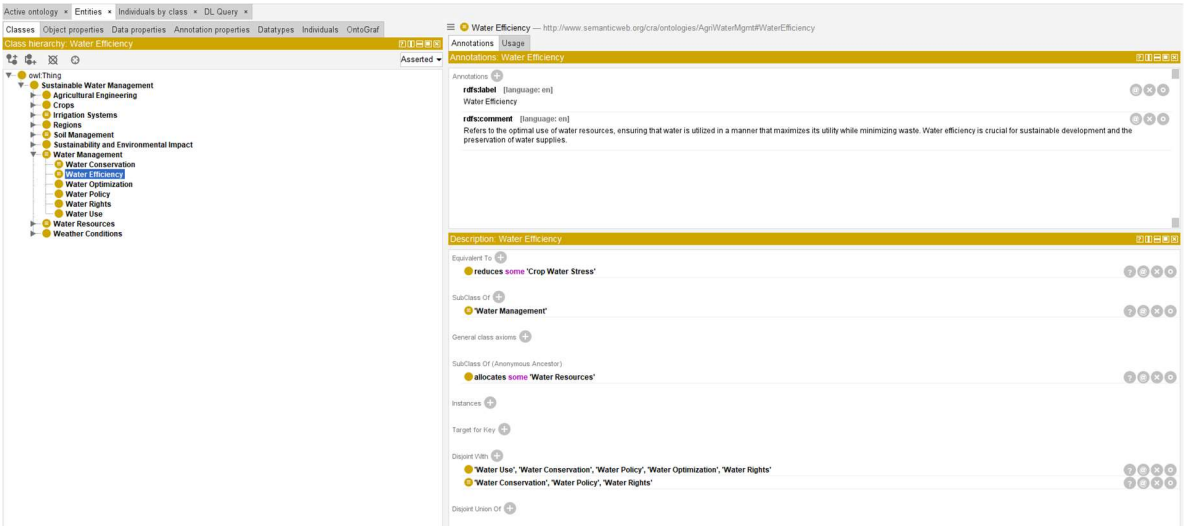


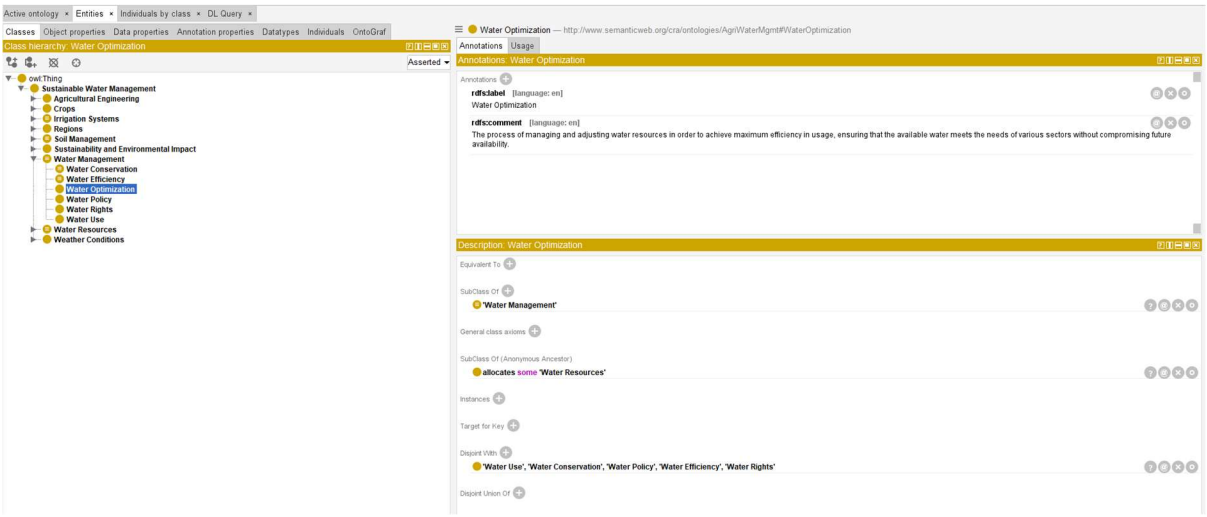


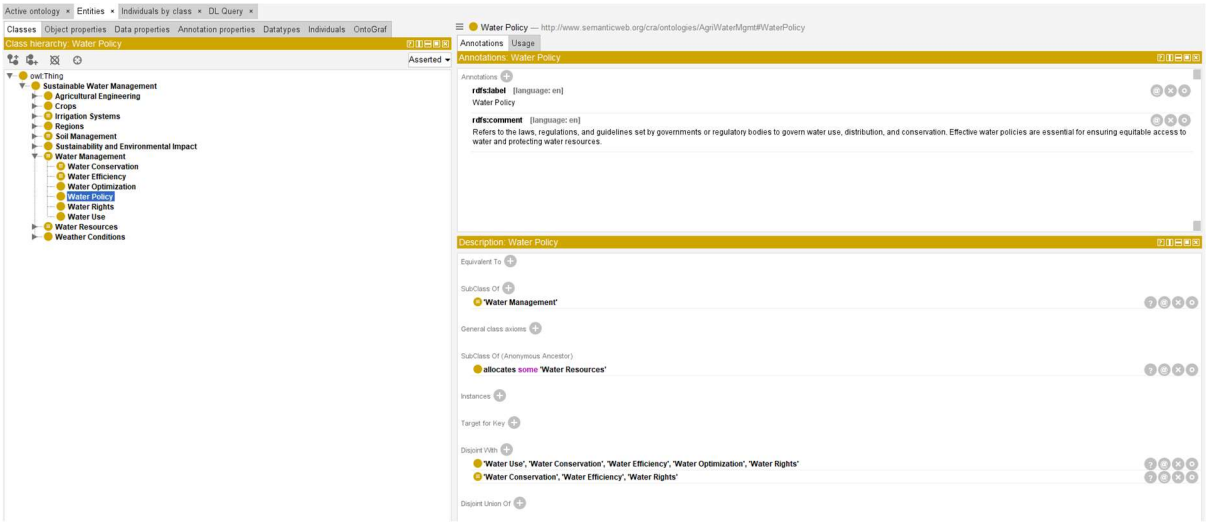
Now we display the class **Water Management** and its subclasses:

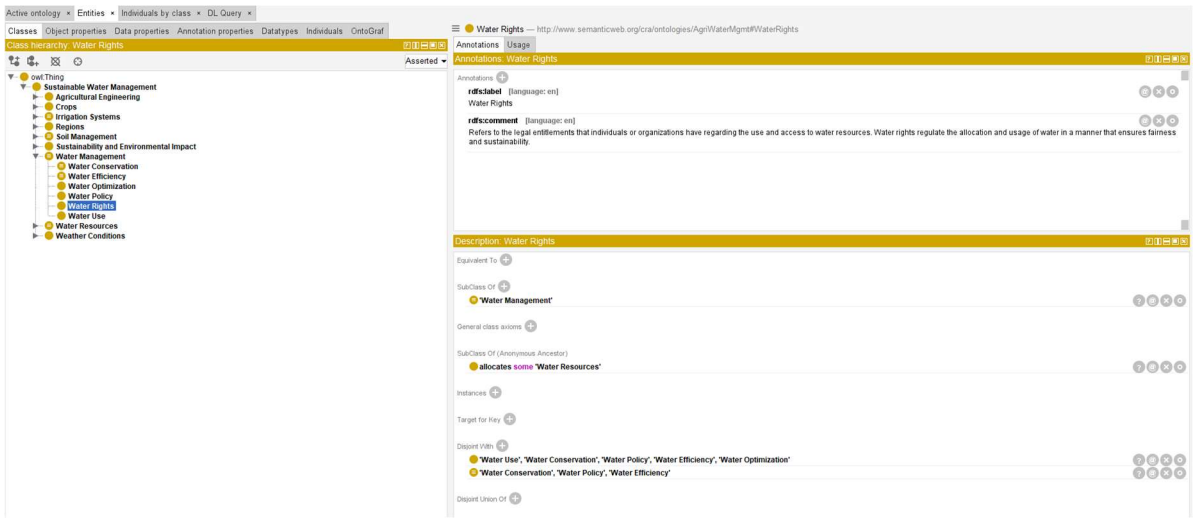

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Water Management
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Water Management — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterManagement
Annotations Usage
Annotations: Water Management
rdfs:label [language: en]
Water Management
rdfs:comment [language: en]
Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources.
Description: Water Management
Equivalent To
allocates some 'Water Resources'
SubClass Of
'Sustainable Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
'Sustainability and Environmental Impact', 'Soil Management', 'Irrigation Systems', Crops, 'Weather Conditions', 'Agricultural Engineering', 'Water Resources'
Disjoint Union Of

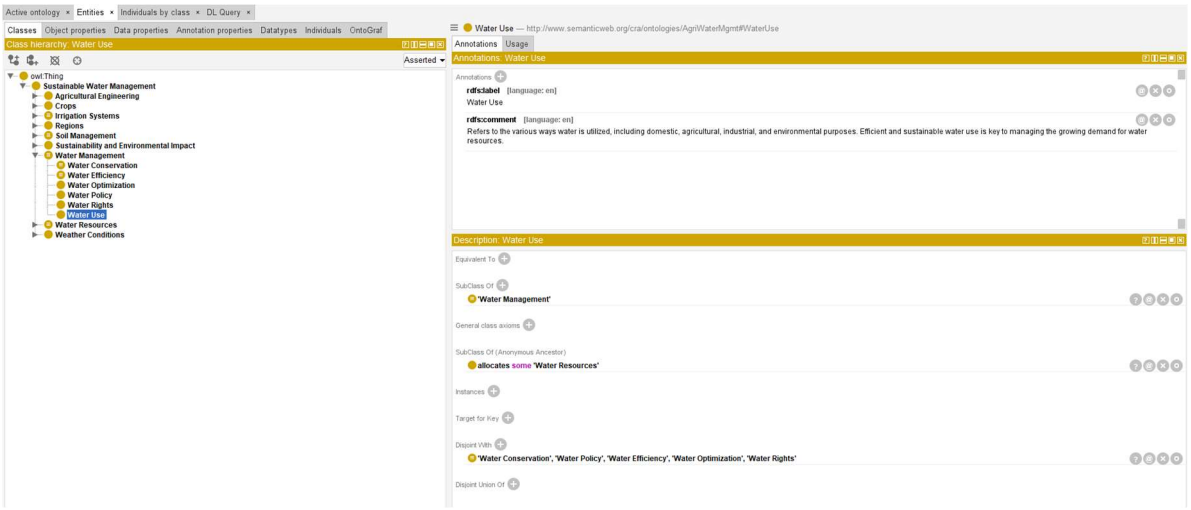

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Water Conservation
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Conservation
Water Efficiency
Water Optimization
Water Policy
Water Rights
Water Use
Water Resources
Weather Conditions
Water Conservation — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterConservation
Annotations Usage
Annotations: Water Conservation
rdfs:label [language: en]
Water Conservation
rdfs:comment [language: en]
Refers to the strategies and practices employed to manage and reduce water usage, ensuring that water is used efficiently and waste is minimized. This includes techniques such as reducing water loss, optimizing water use in agriculture, and recycling wastewater for reuse.
Description: Water Conservation
Equivalent To
optimizes some 'Water Use'
SubClass Of
'Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
allocates some 'Water Resources'
Instances
Target for Key
Disjoint With
'Water Use', 'Water Policy', 'Water Efficiency', 'Water Optimization', 'Water Rights'
'Water Policy', 'Water Efficiency', 'Water Rights'
Disjoint Union Of


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Class hierarchy: Water Efficiency
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Conservation
Water Efficiency
Water Optimization
Water Policy
Water Rights
Water Use
Water Resources
Weather Conditions
Water Efficiency — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterEfficiency
Annotations Usage
Annotations: Water Efficiency
rdfs:label [language: en]
Water Efficiency
rdfs:comment [language: en]
Refers to the optimal use of water resources, ensuring that water is utilized in a manner that maximizes its utility while minimizing waste. Water efficiency is crucial for sustainable development and the preservation of water supplies.
Description: Water Efficiency
Equivalent To
reduces some 'Crop Water Stress'
SubClass Of
'Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
allocates some 'Water Resources'
Instances
Target for Key
Disjoint With
'Water Use', 'Water Conservation', 'Water Policy', 'Water Optimization', 'Water Rights'
'Water Conservation', 'Water Policy', 'Water Rights'
Disjoint Union Of

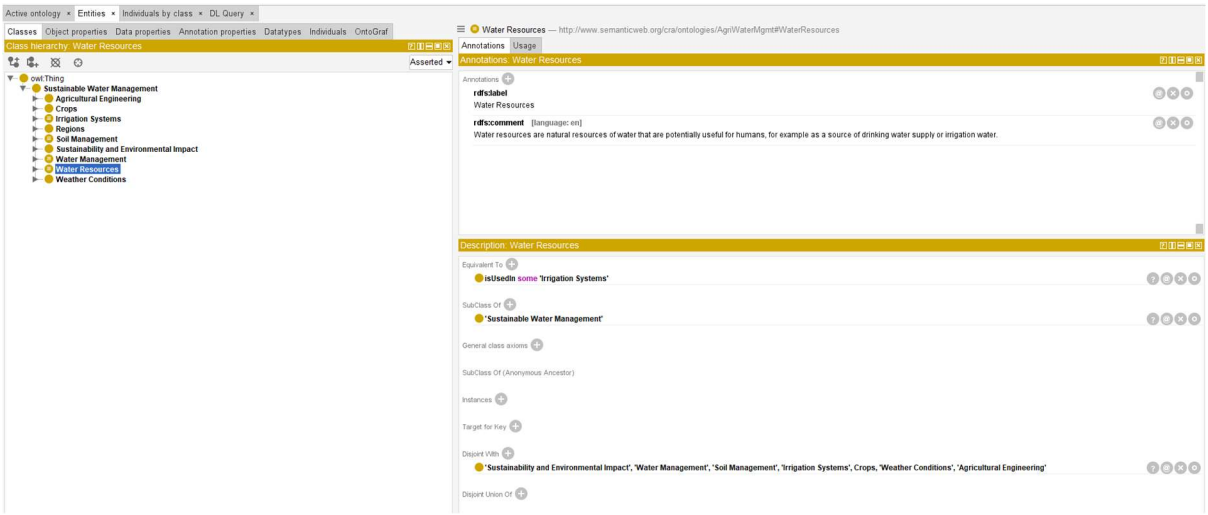

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Water Optimization
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Conservation
Water Efficiency
Water Optimization
Water Policy
Water Rights
Water Use
Water Resources
Weather Conditions
Water Optimization — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterOptimization
Annotations
Usage
Annotations: Water Optimization
rdfs:label [language: en]
Water Optimization
rdfs:comment [language: en]
The process of managing and adjusting water resources in order to achieve maximum efficiency in usage, ensuring that the available water meets the needs of various sectors without compromising future availability.
Description: Water Optimization
Equivalent To
SubClass Of
'Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
allocates some 'Water Resources'
Instances
Target for Key
Disjoint With
'Water Use', 'Water Conservation', 'Water Policy', 'Water Efficiency', 'Water Rights'
Disjoint Union Of

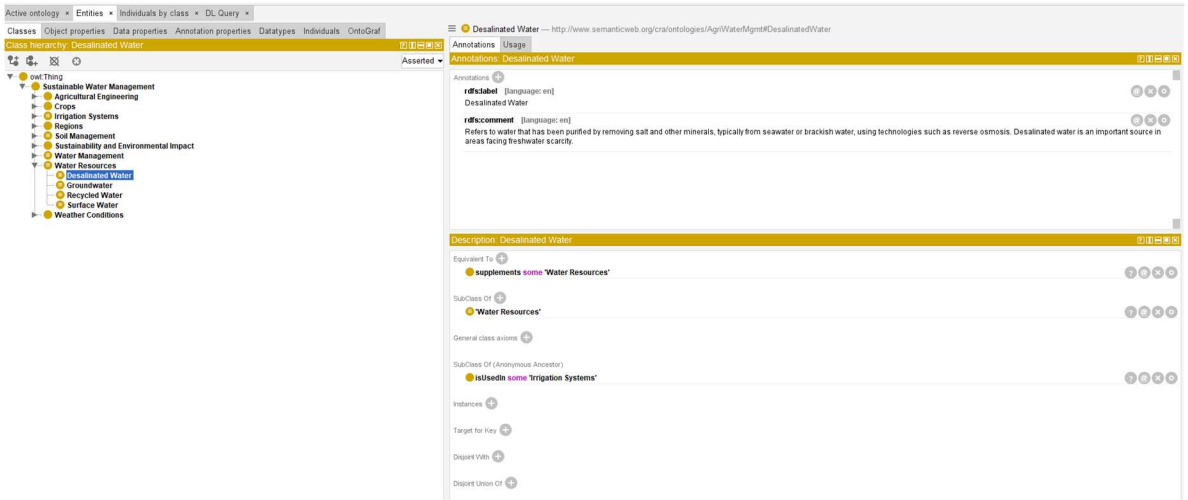

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Water Policy
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Conservation
Water Efficiency
Water Optimization
Water Policy
Water Rights
Water Use
Water Resources
Weather Conditions
Water Policy — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterPolicy
Annotations
Usage
Annotations: Water Policy
rdfs:label [language: en]
Water Policy
rdfs:comment [language: en]
Refers to the laws, regulations, and guidelines set by governments or regulatory bodies to govern water use, distribution, and conservation. Effective water policies are essential for ensuring equitable access to water and protecting water resources.
Description: Water Policy
Equivalent To
SubClass Of
'Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
allocates some 'Water Resources'
Instances
Target for Key
Disjoint With
'Water Use', 'Water Conservation', 'Water Efficiency', 'Water Optimization', 'Water Rights'
'Water Conservation', 'Water Efficiency', 'Water Rights'
Disjoint Union Of

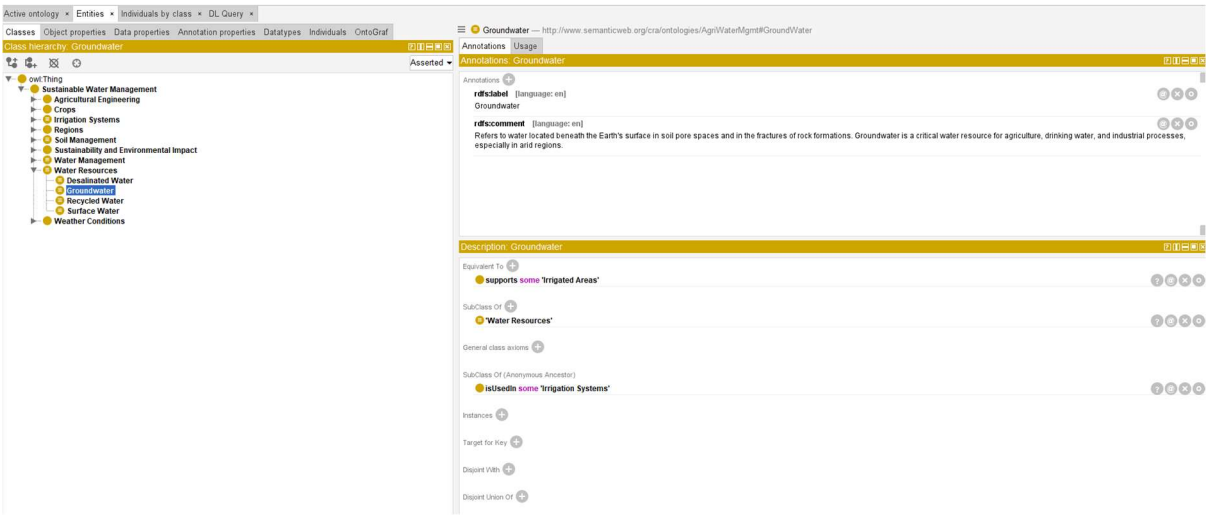

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Water Rights
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Conservation
Water Efficiency
Water Optimization
Water Policy
Water Rights
Water Use
Water Resources
Weather Conditions
Water Rights — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WaterRights
Annotations
Usage
Annotations: Water Rights
rdfs:label [language: en]
Water Rights
rdfs:comment [language: en]
Refers to the legal entitlements that individuals or organizations have regarding the use and access to water resources. Water rights regulate the allocation and usage of water in a manner that ensures fairness and sustainability.
Description: Water Rights
Equivalent To
SubClass Of
'Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
allocates some 'Water Resources'
Instances
Target for Key
Disjoint With
'Water Use', 'Water Conservation', 'Water Policy', 'Water Efficiency', 'Water Optimization'
'Water Conservation', 'Water Policy', 'Water Efficiency'
Disjoint Union Of

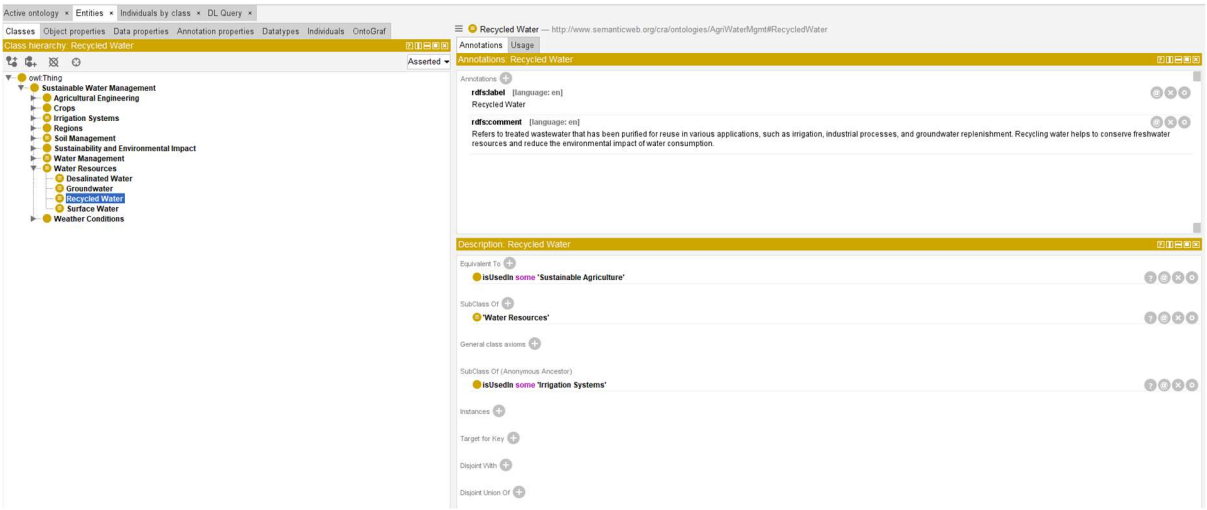


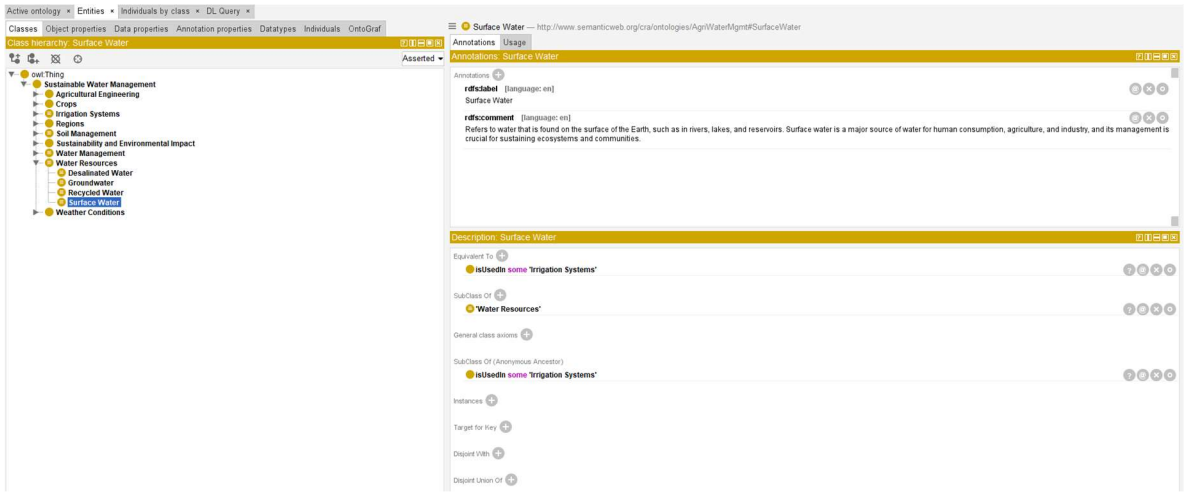
Next, we show **Water Resources** and its subclasses:



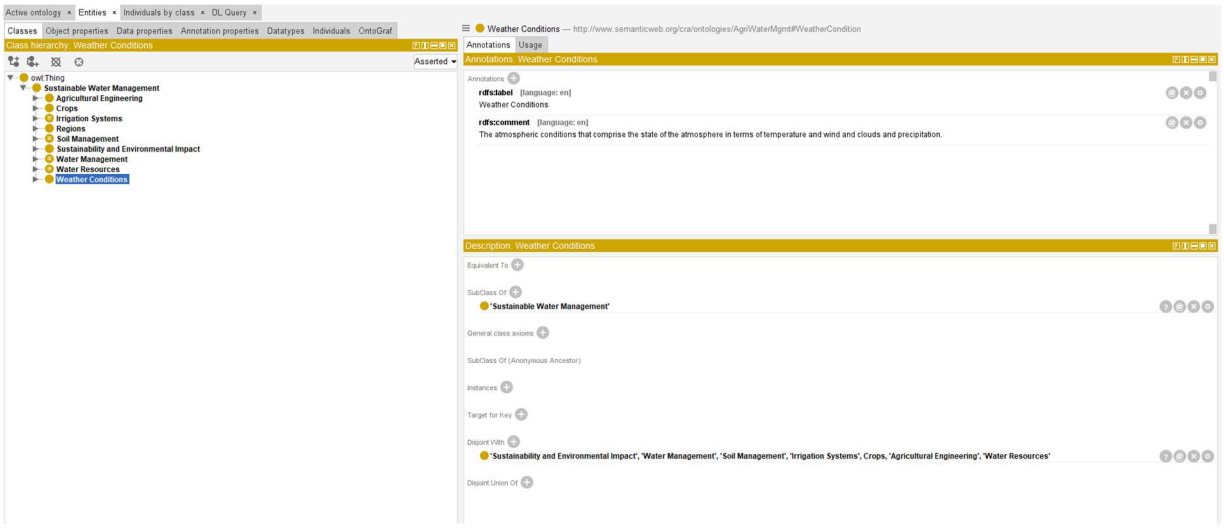


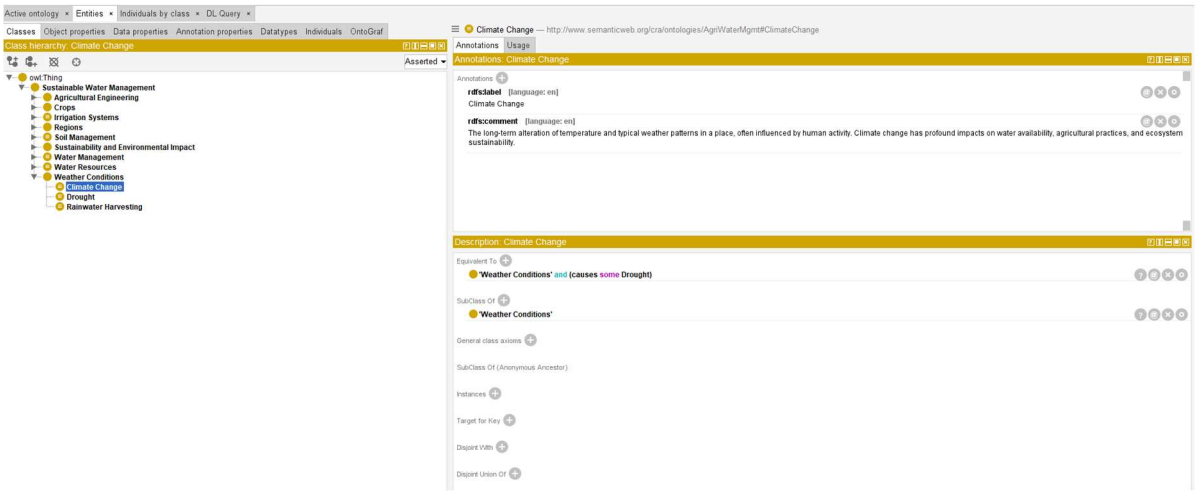


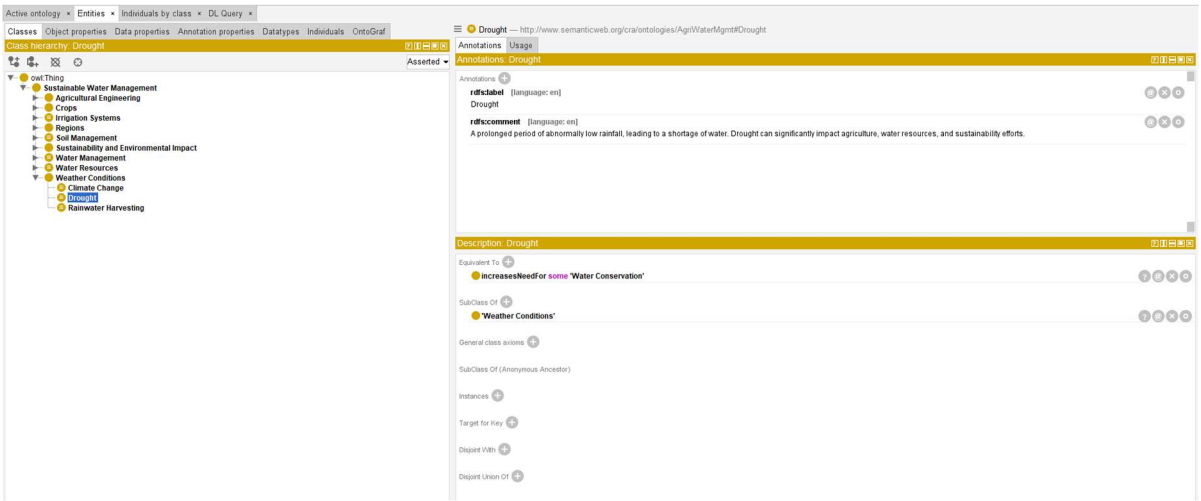


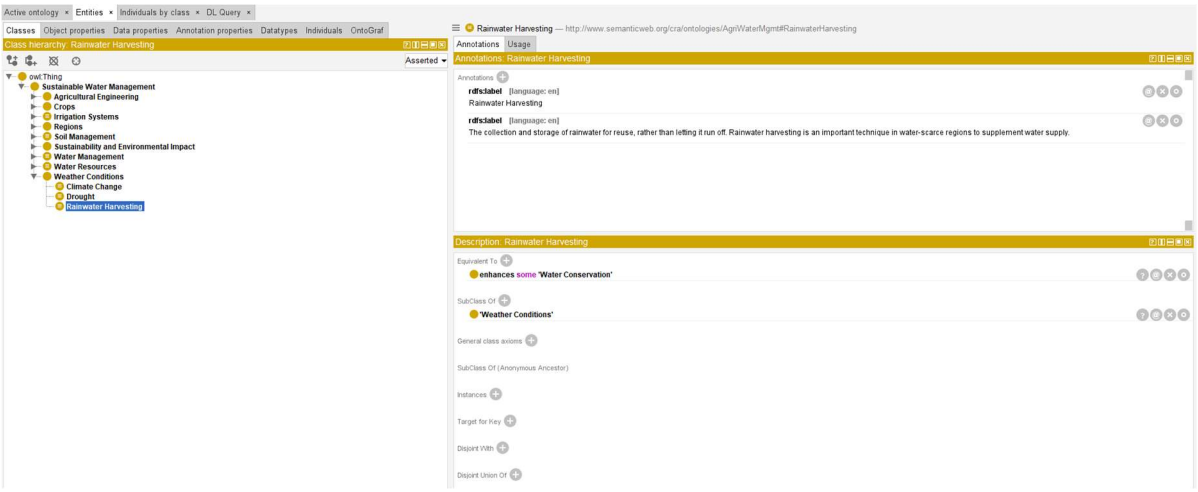


Finally, we show the class **Weather Conditions** and its subclasses:

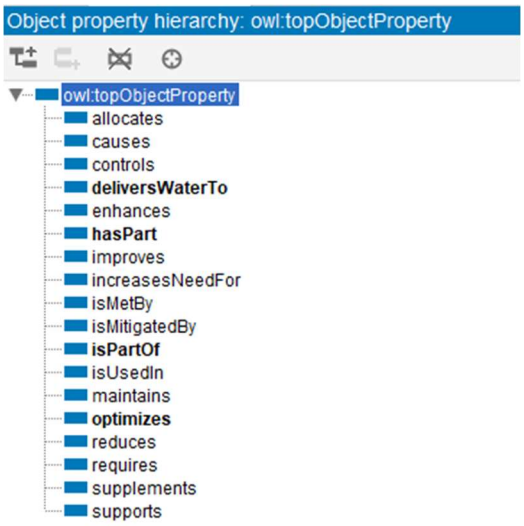

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Weather Conditions
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Weather Conditions — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#WeatherCondition
Annotations
Usage
Annotations: Weather Conditions
rdfs:label [language: en]
Weather Conditions
rdfs:comment [language: en]
The atmospheric conditions that comprise the state of the atmosphere in terms of temperature and wind and clouds and precipitation.
Description: Weather Conditions
Equivalent To
SubClass Of
'Sustainable Water Management'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
'Sustainability and Environmental Impact', 'Water Management', 'Soil Management', 'Irrigation Systems', Crops, 'Agricultural Engineering', 'Water Resources'
Disjoint Union Of


Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Climate Change
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Climate Change
Drought
Rainwater Harvesting
Climate Change — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#ClimateChange
Annotations
Usage
Annotations: Climate Change
rdfs:label [language: en]
Climate Change
rdfs:comment [language: en]
The long-term alteration of temperature and typical weather patterns in a place, often influenced by human activity. Climate change has profound impacts on water availability, agricultural practices, and ecosystem sustainability.
Description: Climate Change
Equivalent To
'Weather Conditions' and (causes some Drought)
SubClass Of
'Weather Conditions'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

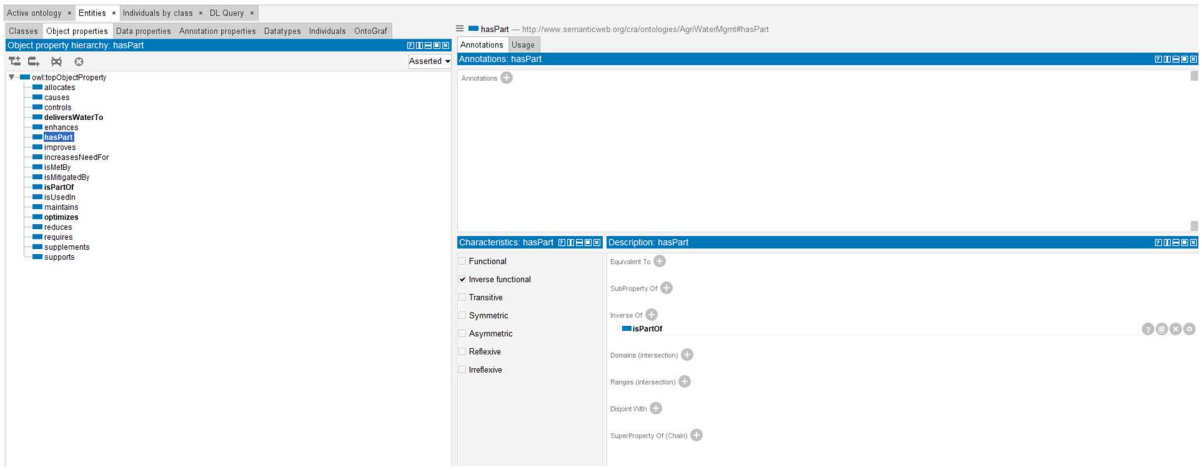

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Class hierarchy: Drought
Asserted
owl:Thing
Sustainable Water Management
Agricultural Engineering
Crops
Irrigation Systems
Regions
Soil Management
Sustainability and Environmental Impact
Water Management
Water Resources
Weather Conditions
Climate Change
Drought
Rainwater Harvesting
Drought — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#Drought
Annotations
Usage
Annotations: Drought
rdfs:label [language: en]
Drought
rdfs:comment [language: en]
A prolonged period of abnormally low rainfall, leading to a shortage of water. Drought can significantly impact agriculture, water resources, and sustainability efforts.
Description: Drought
Equivalent To
increasesNeedFor some 'Water Conservation'
SubClass Of
'Weather Conditions'
General class axioms
SubClass Of (Anonymous Ancestor)
Instances
Target for Key
Disjoint With
Disjoint Union Of

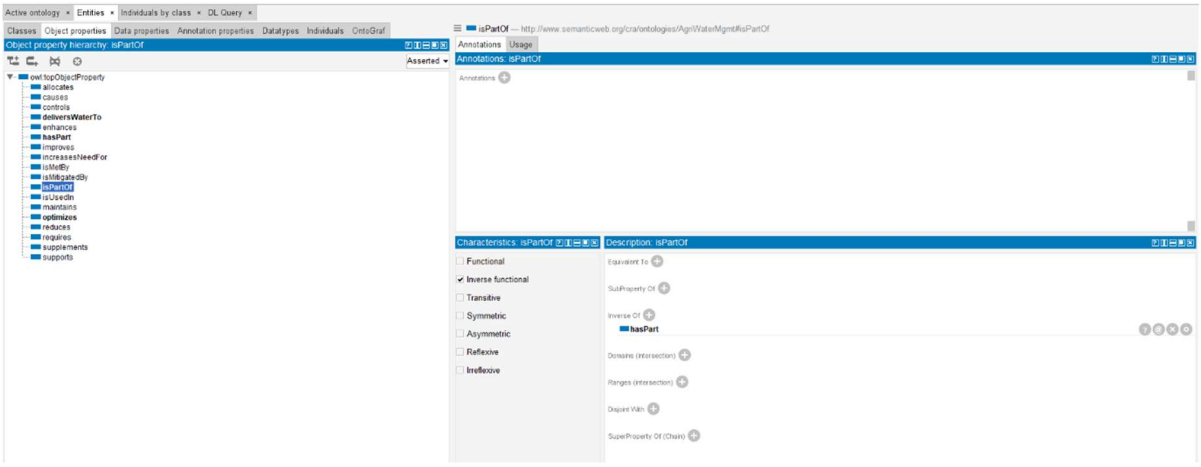


Next, we present the object properties defined in the ontology, which are used to represent the relationships between classes:

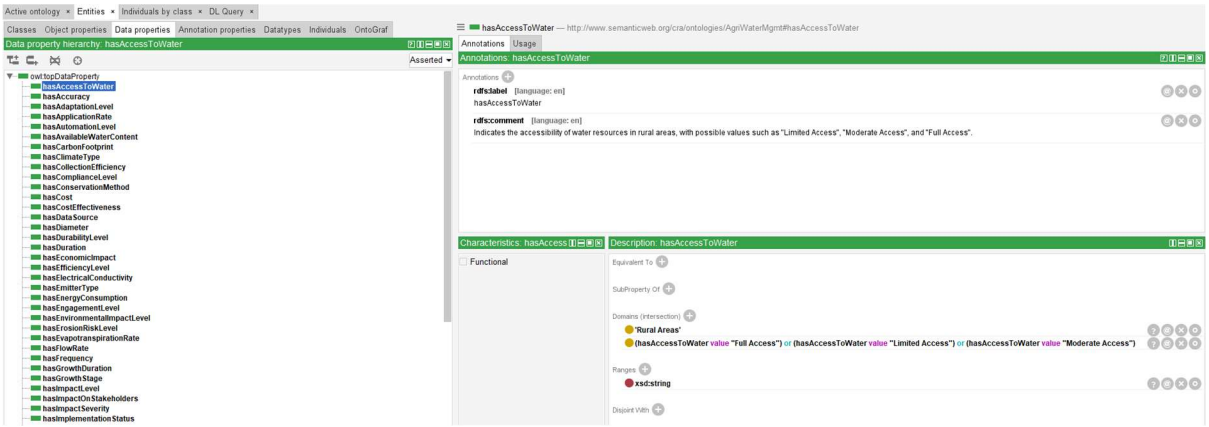


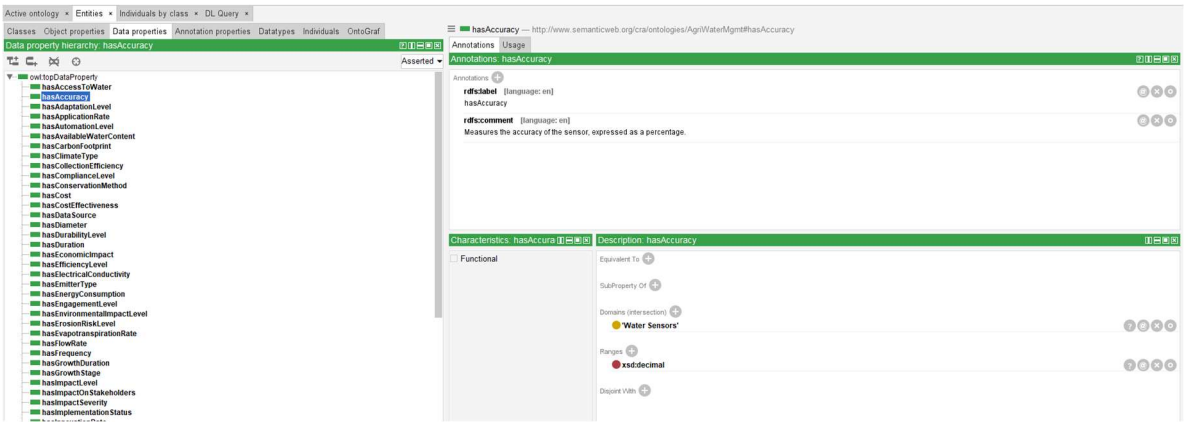
In particular, the property **hasPart**, which is used to define the partonomic sub-ontology, is the inverse of the property **isPartOf**:

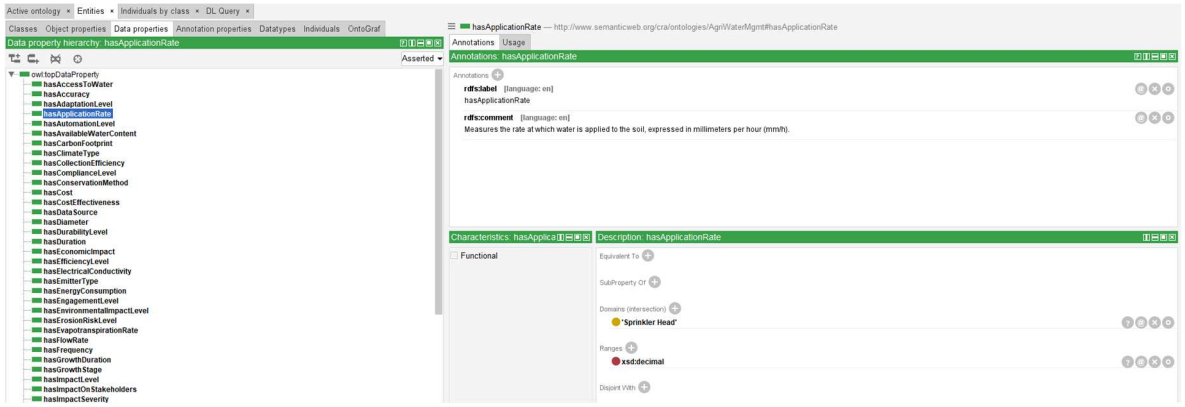


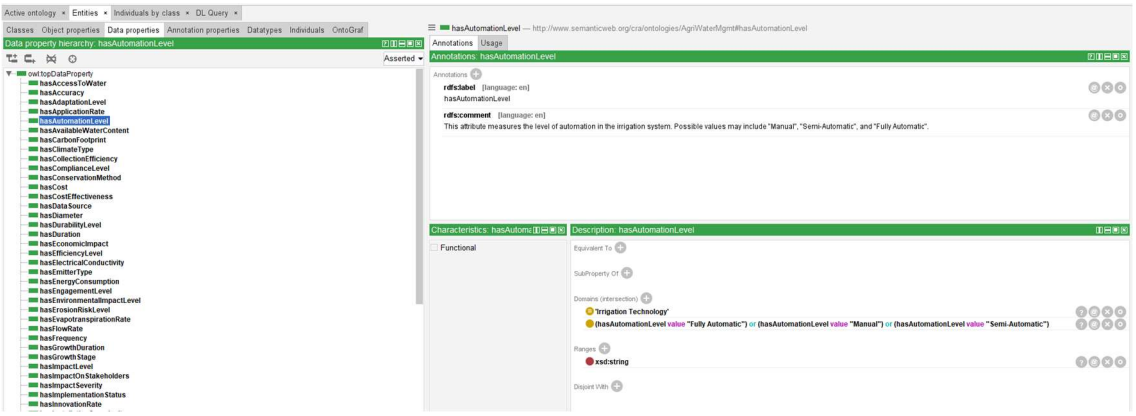


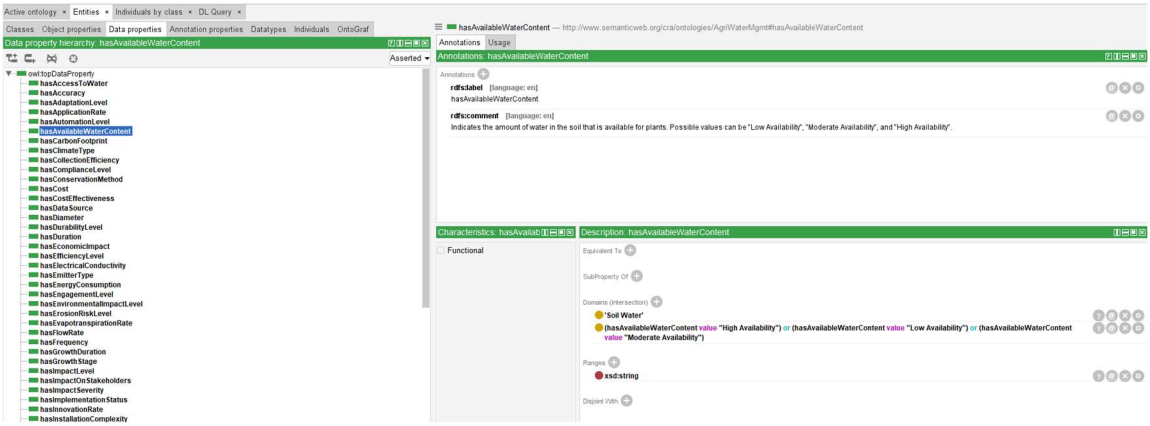
Now we present the data properties defined in the ontology, which describe specific attributes or characteristics of each class. Data properties connect classes to literal values, allowing for detailed information such as levels, quantities, and qualitative measures to be included. Each data property will be displayed with its domain and range.

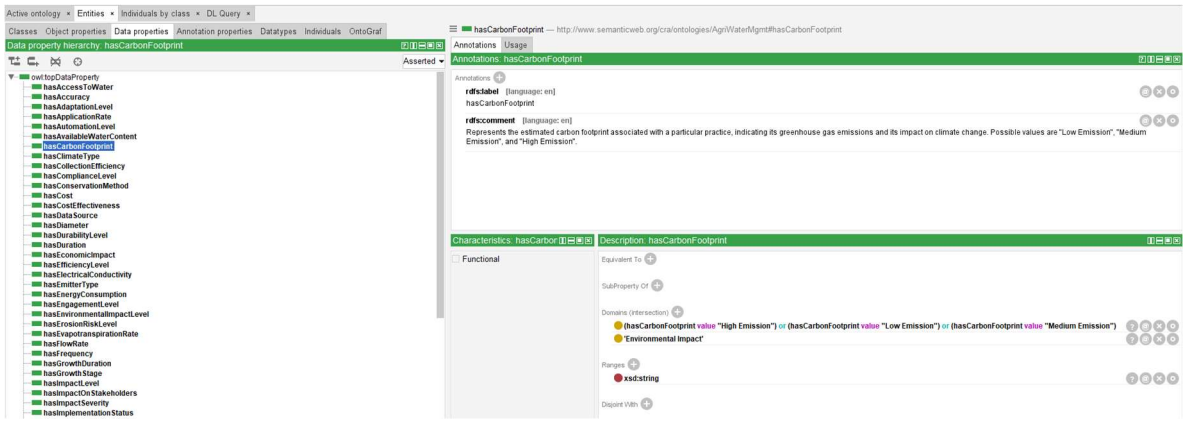


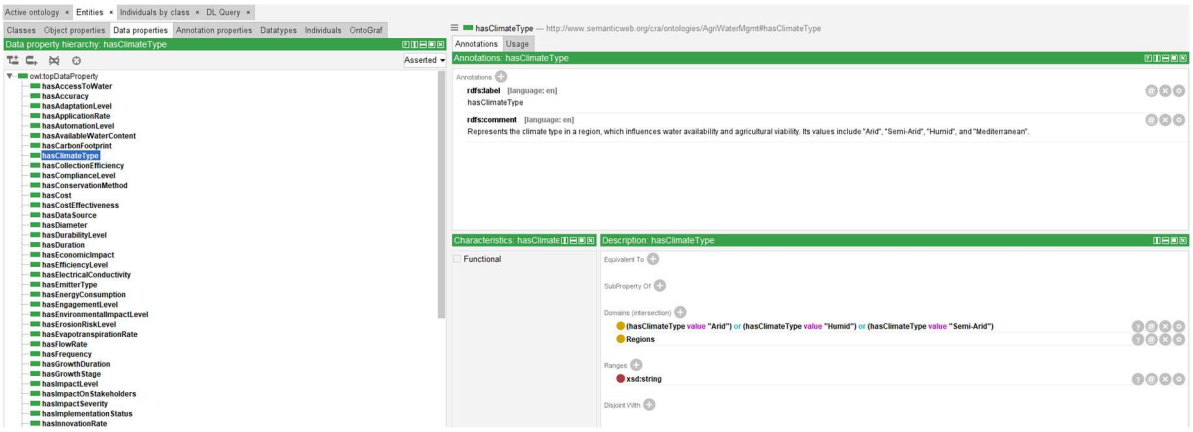

hasAccuracy — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasAccuracy
Annotations: hasAccuracy
rdfs:label [language: en]
hasAccuracy
rdfs:comment [language: en]
Measures the accuracy of the sensor, expressed as a percentage.
Characteristics: hasAccura
Description: hasAccuracy
Functional
'Water Sensors'
xsd:decimal

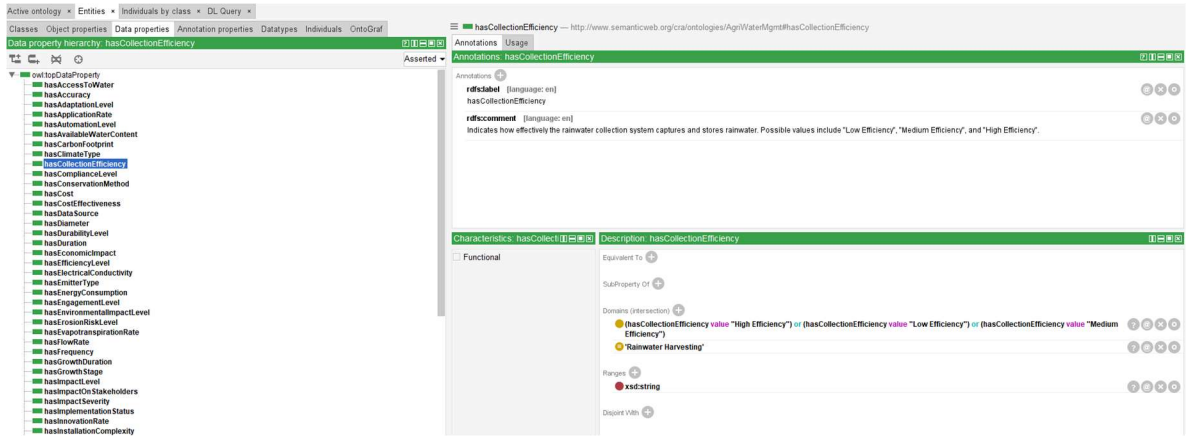

hasApplicationRate — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasApplicationRate
Annotations: hasApplicationRate
rdfs:label [language: en]
hasApplicationRate
rdfs:comment [language: en]
Measures the rate at which water is applied to the soil, expressed in millimeters per hour (mm/h).
Characteristics: hasApplica
Description: hasApplicationRate
Functional
'Sprinkler Head'
xsd:decimal

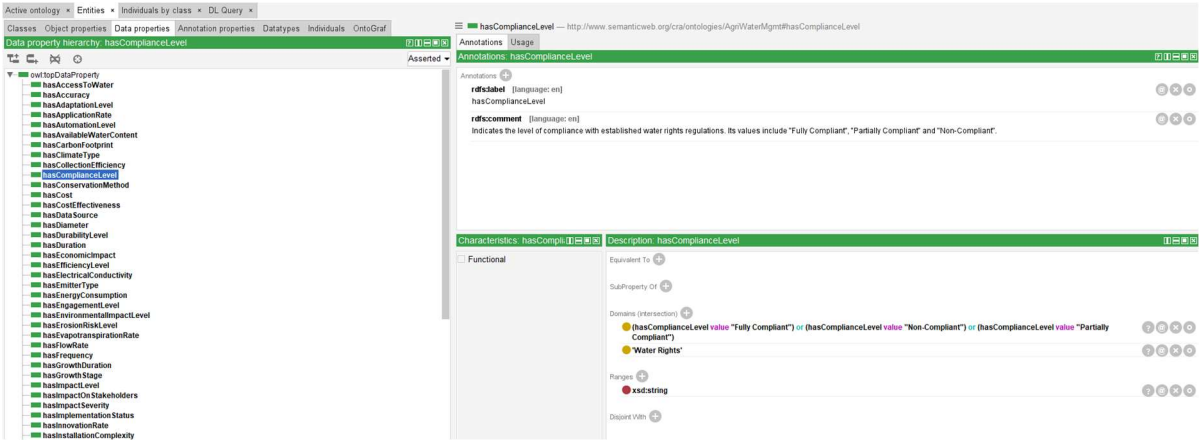

hasAutomationLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasAutomationLevel
Annotations: hasAutomationLevel
rdfs:label [language: en]
hasAutomationLevel
rdfs:comment [language: en]
This attribute measures the level of automation in the irrigation system. Possible values may include "Manual", "Semi-Automatic", and "Fully Automatic".
Characteristics: hasAutomc
Description: hasAutomationLevel
Functional
'Irrigation Technology'
(hasAutomationLevel value "Fully Automatic") or (hasAutomationLevel value "Manual") or (hasAutomationLevel value "Semi-Automatic")
xsd:string

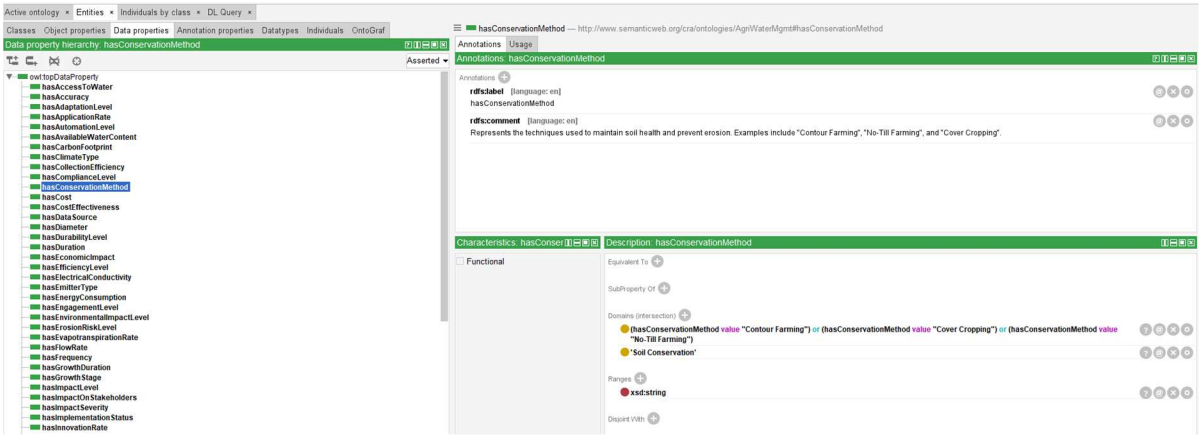

hasAvailableWaterContent — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasAvailableWaterContent
Annotations: hasAvailableWaterContent
rdfs:label [language: en]
hasAvailableWaterContent
rdfs:comment [language: en]
Indicates the amount of water in the soil that is available for plants. Possible values can be "Low Availability", "Moderate Availability", and "High Availability".
Characteristics: hasAvailab
Description: hasAvailableWaterContent
Functional
'Soil Water'
(hasAvailableWaterContent value "High Availability") or (hasAvailableWaterContent value "Low Availability") or (hasAvailableWaterContent value "Moderate Availability")
xsd:string

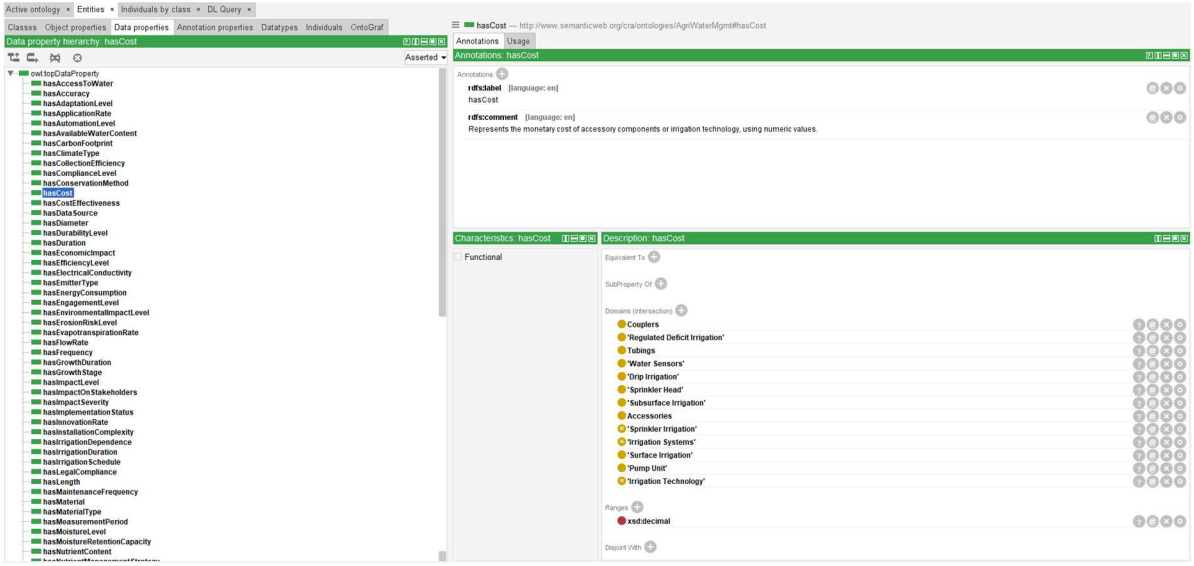

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasCarbonFootprint
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasCarbonFootprint — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasCarbonFootprint
Annotations Usage
Annotations: hasCarbonFootprint
rdfs:label [language: en]
hasCarbonFootprint
rdfs:comment [language: en]
Represents the estimated carbon footprint associated with a particular practice, indicating its greenhouse gas emissions and its impact on climate change. Possible values are "Low Emission", "Medium Emission", and "High Emission".
Characteristics: hasCarbon
Description: hasCarbonFootprint
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasCarbonFootprint value "High Emission") or (hasCarbonFootprint value "Low Emission") or (hasCarbonFootprint value "Medium Emission")
'Environmental Impact'
Ranges
xsd:string
Disjoint With

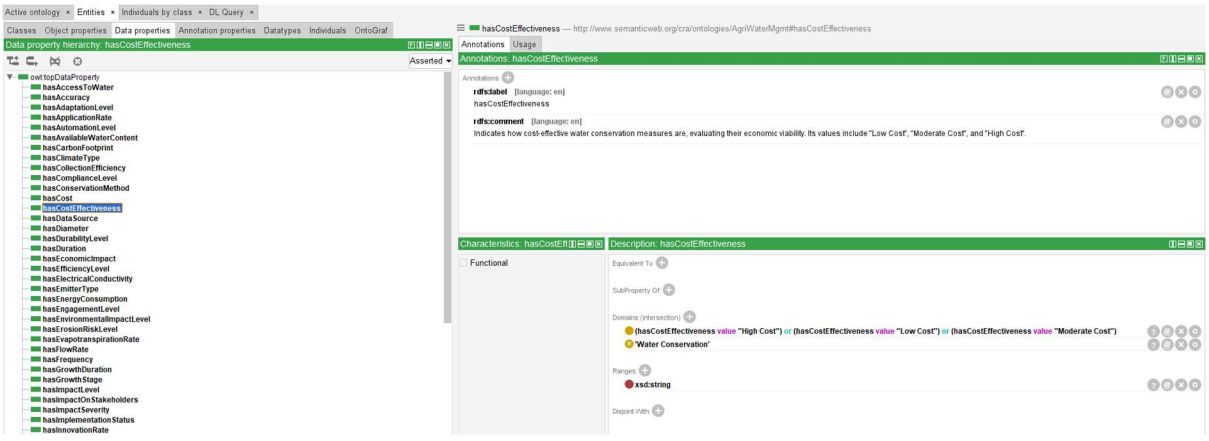

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasClimateType
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasClimateType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasClimateType
Annotations Usage
Annotations: hasClimateType
rdfs:label [language: en]
hasClimateType
rdfs:comment [language: en]
Represents the climate type in a region, which influences water availability and agricultural viability. Its values include "Arid", "Semi-Arid", "Humid", and "Mediterranean".
Characteristics: hasClimate
Description: hasClimateType
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasClimateType value "Arid") or (hasClimateType value "Humid") or (hasClimateType value "Semi-Arid")
Regions
Ranges
xsd:string
Disjoint With

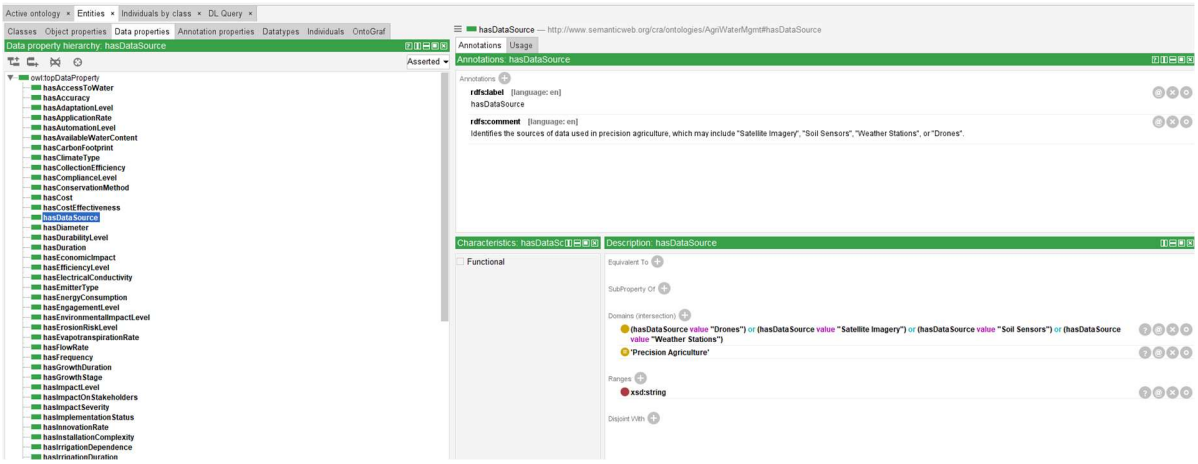

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasCollectionEfficiency
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasCollectionEfficiency — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasCollectionEfficiency
Annotations Usage
Annotations: hasCollectionEfficiency
rdfs:label [language: en]
hasCollectionEfficiency
rdfs:comment [language: en]
Indicates how effectively the rainwater collection system captures and stores rainwater. Possible values include "Low Efficiency", "Medium Efficiency", and "High Efficiency".
Characteristics: hasCollect
Description: hasCollectionEfficiency
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasCollectionEfficiency value "High Efficiency") or (hasCollectionEfficiency value "Low Efficiency") or (hasCollectionEfficiency value "Medium Efficiency")
'Rainwater Harvesting'
Ranges
xsd:string
Disjoint With

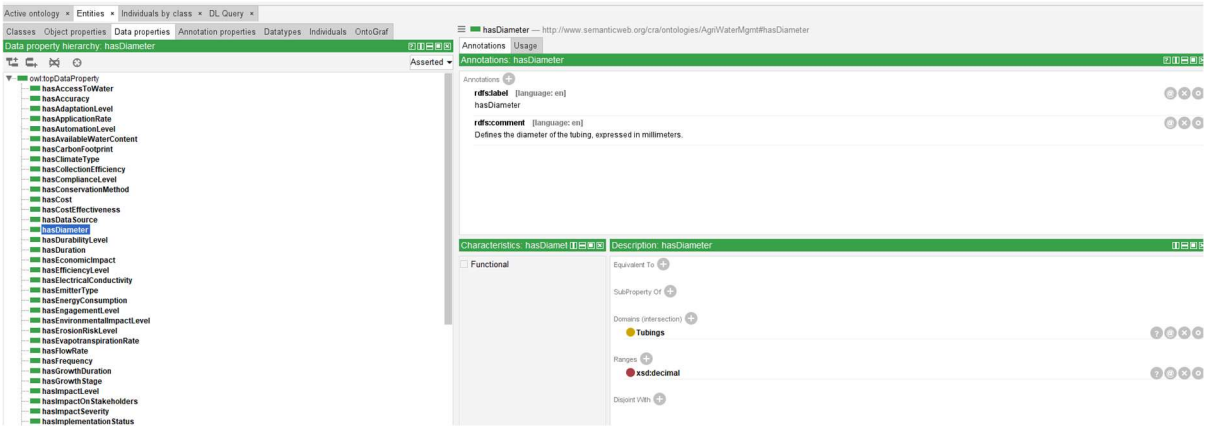

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasComplianceLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasComplianceLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasComplianceLevel
Annotations Usage
Annotations: hasComplianceLevel
rdfs:label [language: en]
hasComplianceLevel
rdfs:comment [language: en]
Indicates the level of compliance with established water rights regulations. Its values include "Fully Compliant", "Partially Compliant" and "Non-Compliant".
Characteristics: hasCompli
Description: hasComplianceLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasComplianceLevel value "Fully Compliant") or (hasComplianceLevel value "Non-Compliant") or (hasComplianceLevel value "Partially Compliant")
'Water Rights'
Ranges
xsd:string
Disjoint With

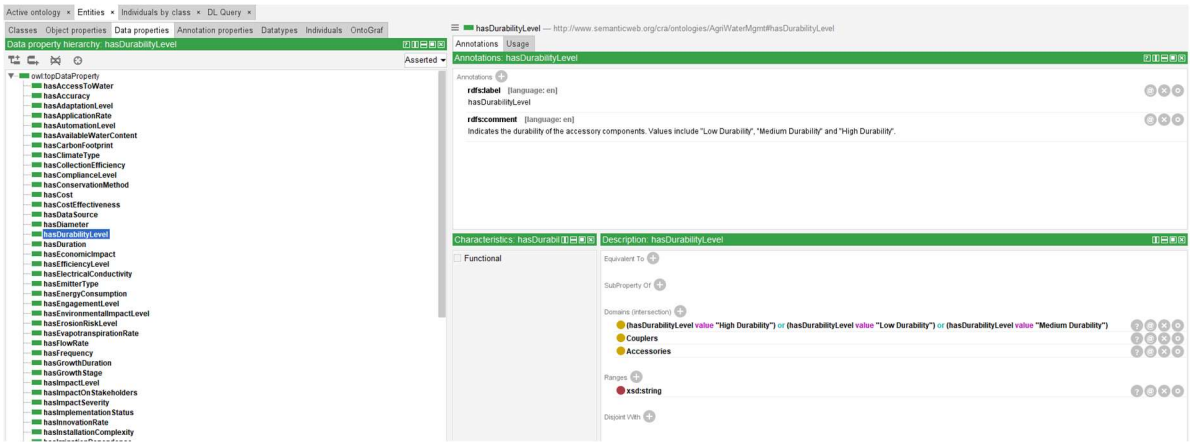

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasConservationMethod
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasConservationMethod — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasConservationMethod
Annotations Usage
Annotations: hasConservationMethod
Annotations
rdfs:label [language: en]
hasConservationMethod
rdfs:comment [language: en]
Represents the techniques used to maintain soil health and prevent erosion. Examples include "Contour Farming", "No-Till Farming", and "Cover Cropping".
Characteristics: hasConser
Functional
Description: hasConservationMethod
Equivalent To
SubProperty Of
Domains (intersection)
(hasConservationMethod value "Contour Farming") or (hasConservationMethod value "Cover Cropping") or (hasConservationMethod value "No-Till Farming")
'Soil Conservation'
Ranges
xsd:string
Disjoint With

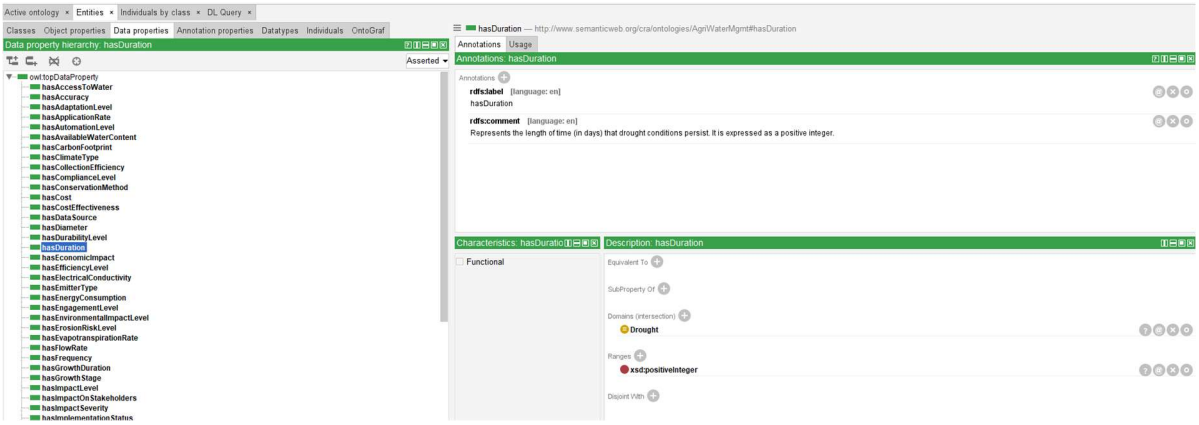

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasCost
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasCost — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasCost
Annotations Usage
Annotations: hasCost
Annotations
rdfs:label [language: en]
hasCost
rdfs:comment [language: en]
Represents the monetary cost of accessory components or irrigation technology, using numeric values.
Characteristics: hasCost
Functional
Description: hasCost
Equivalent To
SubProperty Of
Domains (intersection)
Couplers
'Regulated Deficit Irrigation'
Tubings
'Water Sensors'
'Drip Irrigation'
'Sprinkler Head'
'Subsurface Irrigation'
Accessories
'Sprinkler Irrigation'
'Irrigation Systems'
'Surface Irrigation'
'Pump Unit'
'Irrigation Technology'
Ranges
xsd:decimal
Disjoint With

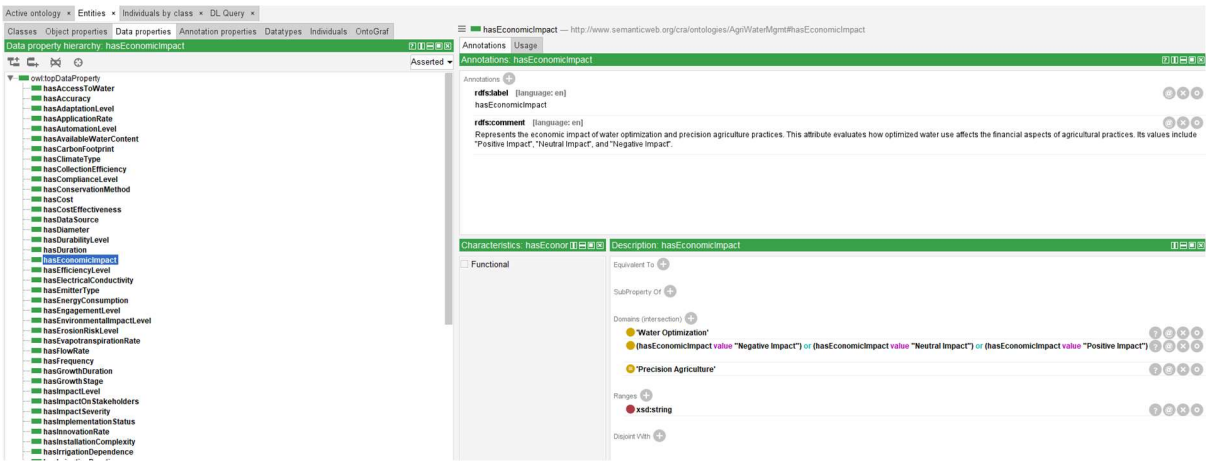

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasCostEffectiveness
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasCostEffectiveness — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasCostEffectiveness
Annotations Usage
Annotations: hasCostEffectiveness
Annotations
rdfs:label [language: en]
hasCostEffectiveness
rdfs:comment [language: en]
Indicates how cost-effective water conservation measures are, evaluating their economic viability. Its values include "Low Cost", "Moderate Cost", and "High Cost".
Characteristics: hasCostEffi
Functional
Description: hasCostEffectiveness
Equivalent To
SubProperty Of
Domains (intersection)
(hasCostEffectiveness value "High Cost") or (hasCostEffectiveness value "Low Cost") or (hasCostEffectiveness value "Moderate Cost")
'Water Conservation'
Ranges
xsd:string
Disjoint With

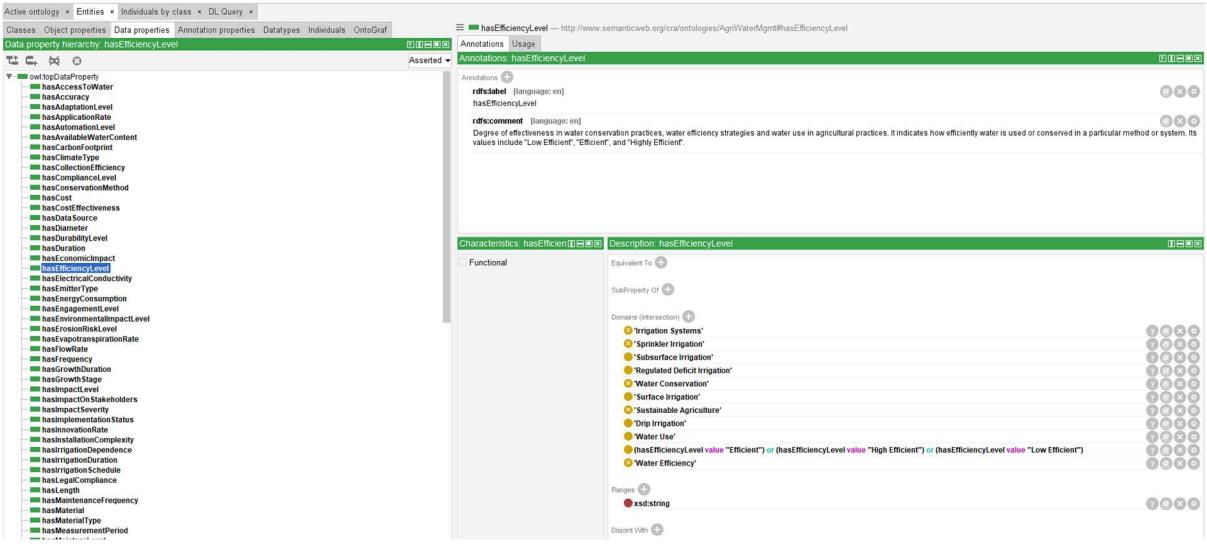

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Data property hierarchy: hasDataSource
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasDataSource — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasDataSource
Annotations
Usage
Annotations: hasDataSource
rdfs:label [language: en]
hasDataSource
rdfs:comment [language: en]
Identifies the sources of data used in precision agriculture, which may include "Satellite Imagery", "Soil Sensors", "Weather Stations", or "Drones".
Characteristics: hasDataSc
Functional
Description: hasDataSource
Equivalent To
SubProperty Of
Domains (intersection)
(hasDataSource value "Drones") or (hasDataSource value "Satellite Imagery") or (hasDataSource value "Soil Sensors") or (hasDataSource value "Weather Stations")
'Precision Agriculture'
Ranges
xsd:string
Disjoint With

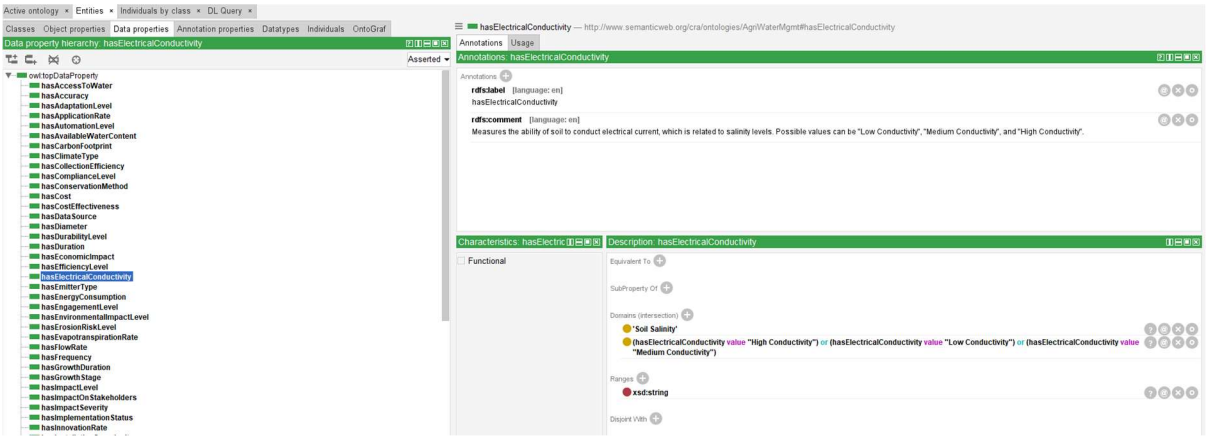

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Data property hierarchy: hasDiameter
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasDiameter — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasDiameter
Annotations
Usage
Annotations: hasDiameter
rdfs:label [language: en]
hasDiameter
rdfs:comment [language: en]
Defines the diameter of the tubing, expressed in millimeters.
Characteristics: hasDiamet
Functional
Description: hasDiameter
Equivalent To
SubProperty Of
Domains (intersection)
Tubings
Ranges
xsd:decimal
Disjoint With

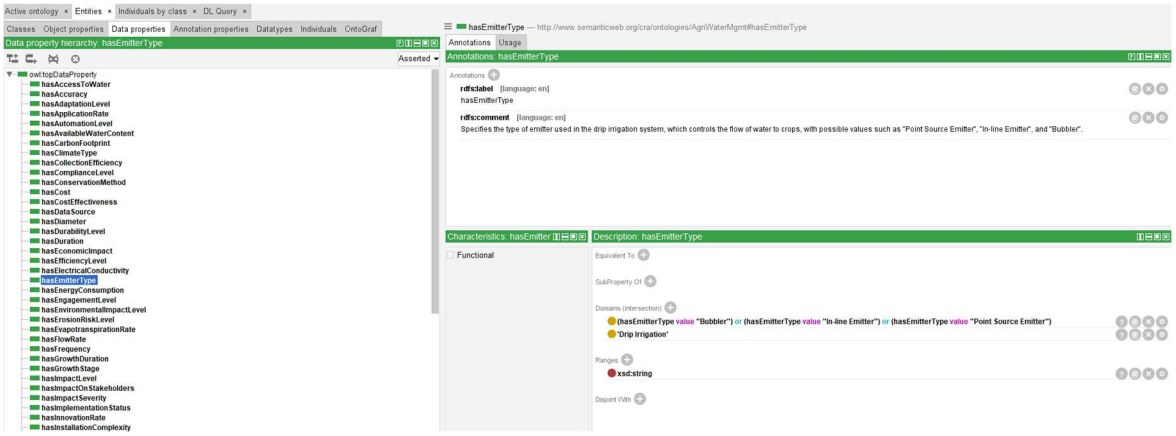

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasDurabilityLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasDurabilityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasDurabilityLevel
Annotations Usage
Annotations: hasDurabilityLevel
rdfs:label [language: en]
hasDurabilityLevel
rdfs:comment [language: en]
Indicates the durability of the accessory components. Values include "Low Durability", "Medium Durability" and "High Durability".
Characteristics: hasDurabil
Description: hasDurabilityLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasDurabilityLevel value "High Durability") or (hasDurabilityLevel value "Low Durability") or (hasDurabilityLevel value "Medium Durability")
Couplers
Accessories
Ranges
xsd:string
Disjoint With

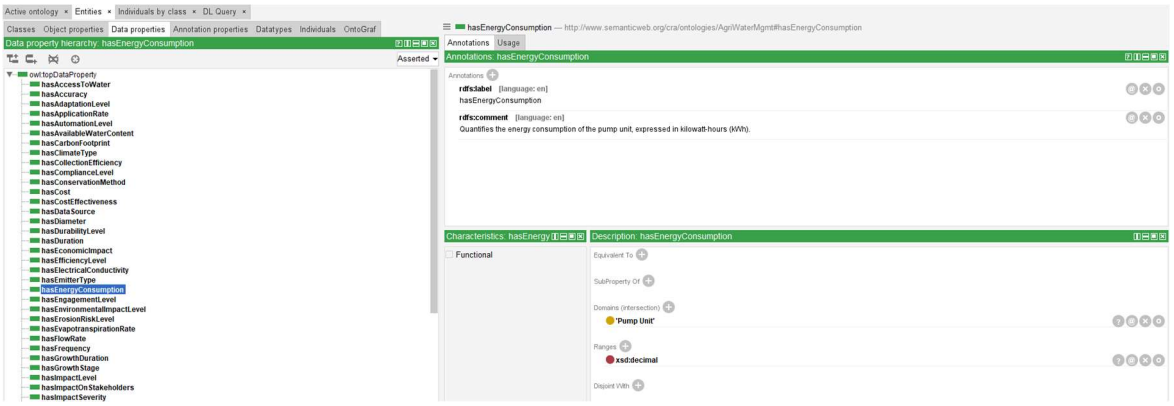

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasDuration
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasDuration — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasDuration
Annotations Usage
Annotations: hasDuration
rdfs:label [language: en]
hasDuration
rdfs:comment [language: en]
Represents the length of time (in days) that drought conditions persist. It is expressed as a positive integer.
Characteristics: hasDuratio
Description: hasDuration
Functional
Equivalent To
SubProperty Of
Domains (intersection)
Drought
Ranges
xsd:positiveInteger
Disjoint With

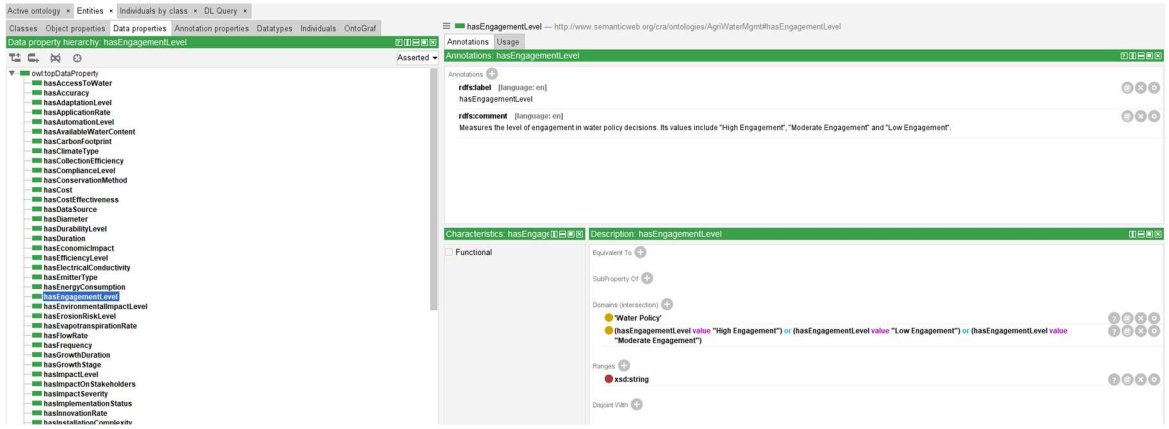

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEconomicImpact
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasEconomicImpact — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEconomicImpact
Annotations Usage
Annotations: hasEconomicImpact
rdfs:label [language: en]
hasEconomicImpact
rdfs:comment [language: en]
Represents the economic impact of water optimization and precision agriculture practices. This attribute evaluates how optimized water use affects the financial aspects of agricultural practices. Its values include "Positive Impact", "Neutral Impact", and "Negative Impact".
Characteristics: hasEconor
Description: hasEconomicImpact
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Water Optimization'
(hasEconomicImpact value "Negative Impact") or (hasEconomicImpact value "Neutral Impact") or (hasEconomicImpact value "Positive Impact")
'Precision Agriculture'
Ranges
xsd:string
Disjoint With

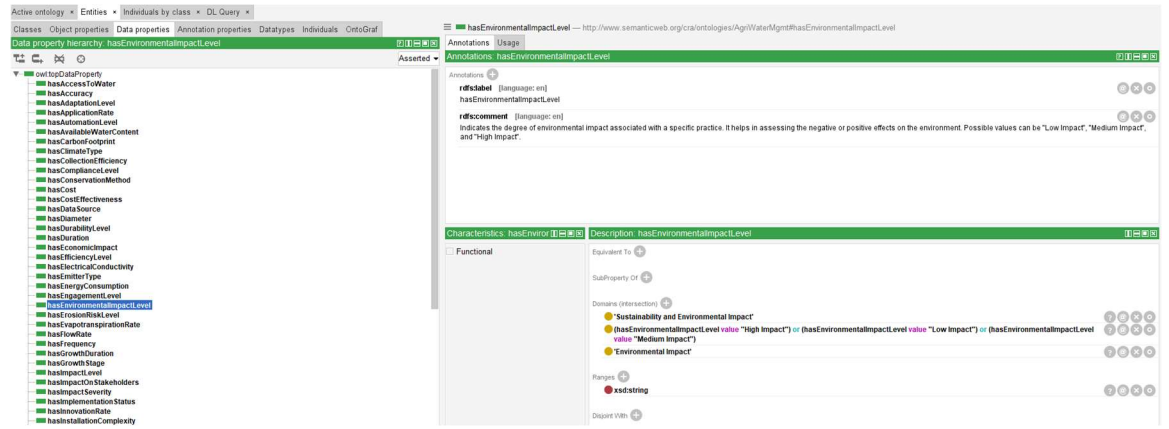

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEfficiencyLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasEfficiencyLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEfficiencyLevel
Annotations Usage
Annotations: hasEfficiencyLevel
rdfs:label [language: en]
hasEfficiencyLevel
rdfs:comment [language: en]
Degree of effectiveness in water conservation practices, water efficiency strategies and water use in agricultural practices. It indicates how efficiently water is used or conserved in a particular method or system. Its values include "Low Efficient", "Efficient", and "Highly Efficient".
Characteristics: hasEfficien
Functional
Description: hasEfficiencyLevel
Equivalent To
SubProperty Of
Domains (intersection)
'Irrigation Systems'
'Sprinkler Irrigation'
'Subsurface Irrigation'
'Regulated Deficit Irrigation'
'Water Conservation'
'Surface Irrigation'
'Sustainable Agriculture'
'Drip Irrigation'
'Water Use'
(hasEfficiencyLevel value "Efficient") or (hasEfficiencyLevel value "High Efficient") or (hasEfficiencyLevel value "Low Efficient")
'Water Efficiency'
Ranges
xsd:string
Disjoint With

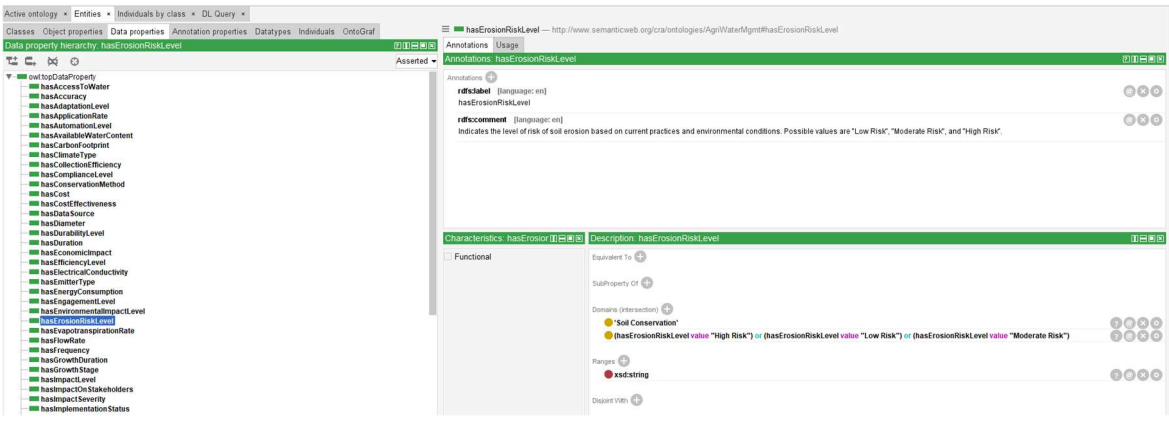

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasElectricalConductivity
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasElectricalConductivity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasElectricalConductivity
Annotations Usage
Annotations: hasElectricalConductivity
rdfs:label [language: en]
hasElectricalConductivity
rdfs:comment [language: en]
Measures the ability of soil to conduct electrical current, which is related to salinity levels. Possible values can be "Low Conductivity", "Medium Conductivity", and "High Conductivity".
Characteristics: hasElectric
Functional
Description: hasElectricalConductivity
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Salinity'
(hasElectricalConductivity value "High Conductivity") or (hasElectricalConductivity value "Low Conductivity") or (hasElectricalConductivity value "Medium Conductivity")
Ranges
xsd:string
Disjoint With

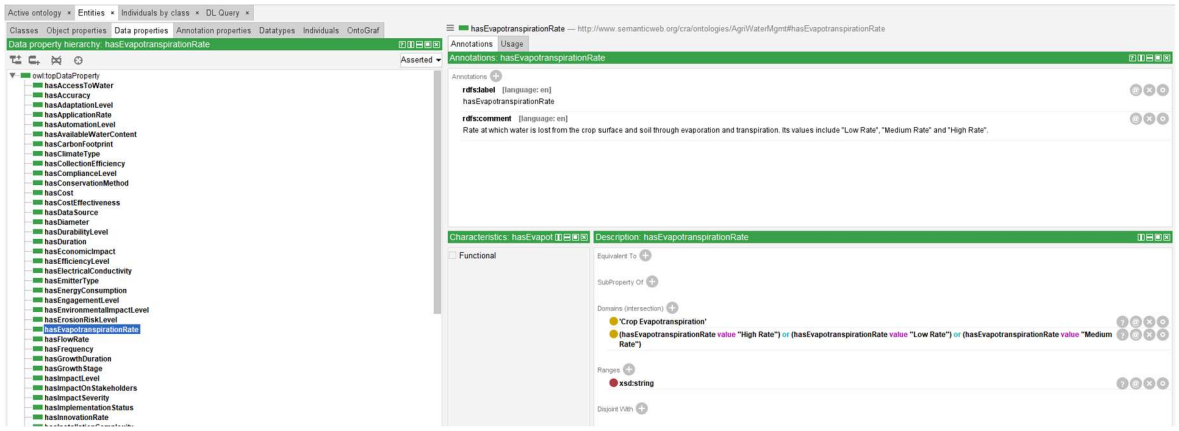

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEmitterType
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasEmitterType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEmitterType
Annotations Usage
Annotations: hasEmitterType
rdfs:label [language: en]
hasEmitterType
rdfs:comment [language: en]
Specifies the type of emitter used in the drip irrigation system, which controls the flow of water to crops, with possible values such as "Point Source Emitter", "In-line Emitter", and "Bubbler".
Characteristics: hasEmitter
Functional
Description: hasEmitterType
Equivalent To
SubProperty Of
Domains (intersection)
(hasEmitterType value "Bubbler") or (hasEmitterType value "In-line Emitter") or (hasEmitterType value "Point Source Emitter")
'Drip Irrigation'
Ranges
xsd:string
Disjoint With

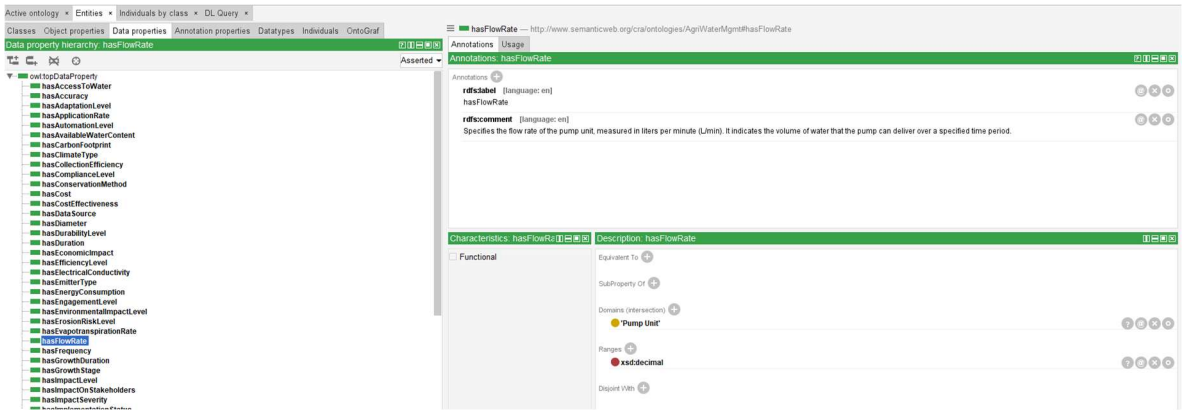

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEnergyConsumption
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasEnergyConsumption — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEnergyConsumption
Annotations Usage
Annotations: hasEnergyConsumption
Annotations
rdfs:label [language: en]
hasEnergyConsumption
rdfs:comment [language: en]
Quantifies the energy consumption of the pump unit, expressed in kilowatt-hours (kWh).
Characteristics: hasEnergy
Description: hasEnergyConsumption
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Pump Unit'
Ranges
xsd:decimal
Disjoint With

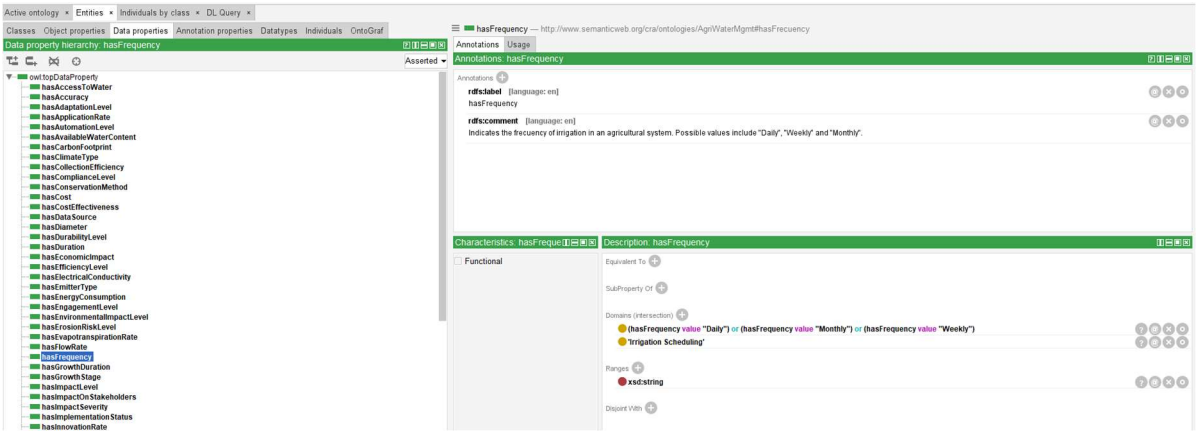

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEngagementLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasEngagementLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEngagementLevel
Annotations Usage
Annotations: hasEngagementLevel
Annotations
rdfs:label [language: en]
hasEngagementLevel
rdfs:comment [language: en]
Measures the level of engagement in water policy decisions. Its values include "High Engagement", "Moderate Engagement" and "Low Engagement".
Characteristics: hasEngagr
Description: hasEngagementLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Water Policy'
(hasEngagementLevel value "High Engagement") or (hasEngagementLevel value "Low Engagement") or (hasEngagementLevel value "Moderate Engagement")
Ranges
xsd:string
Disjoint With

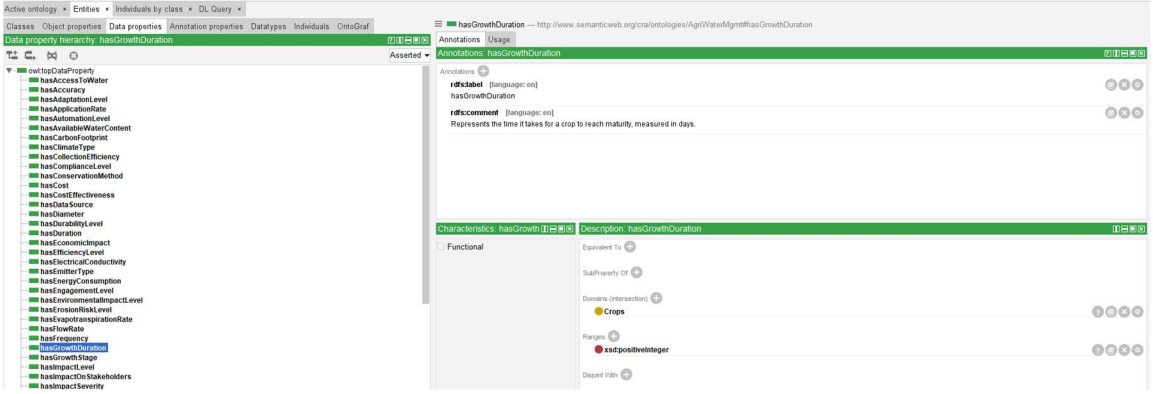

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEnvironmentalImpactLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasEnvironmentalImpactLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEnvironmentalImpactLevel
Annotations Usage
Annotations: hasEnvironmentalImpactLevel
Annotations
rdfs:label [language: en]
hasEnvironmentalImpactLevel
rdfs:comment [language: en]
Indicates the degree of environmental impact associated with a specific practice. It helps in assessing the negative or positive effects on the environment. Possible values can be "Low Impact", "Medium Impact", and "High Impact".
Characteristics: hasEnvironr
Description: hasEnvironmentalImpactLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Sustainability and Environmental Impact'
(hasEnvironmentalImpactLevel value "High Impact") or (hasEnvironmentalImpactLevel value "Low Impact") or (hasEnvironmentalImpactLevel value "Medium Impact")
'Environmental Impact'
Ranges
xsd:string
Disjoint With

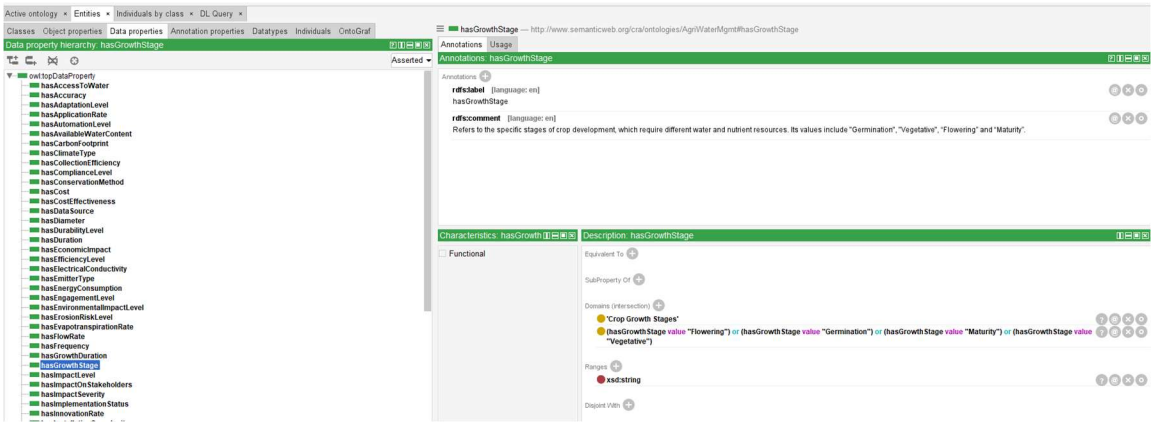

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasErosionRiskLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasErosionRiskLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasErosionRiskLevel
Annotations Usage
Annotations: hasErosionRiskLevel
Annotations
rdfs:label [language: en]
hasErosionRiskLevel
rdfs:comment [language: en]
Indicates the level of risk of soil erosion based on current practices and environmental conditions. Possible values are "Low Risk", "Moderate Risk", and "High Risk".
Characteristics: hasErosior
Description: hasErosionRiskLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Conservation'
(hasErosionRiskLevel value "High Risk") or (hasErosionRiskLevel value "Low Risk") or (hasErosionRiskLevel value "Moderate Risk")
Ranges
xsd:string
Disjoint With

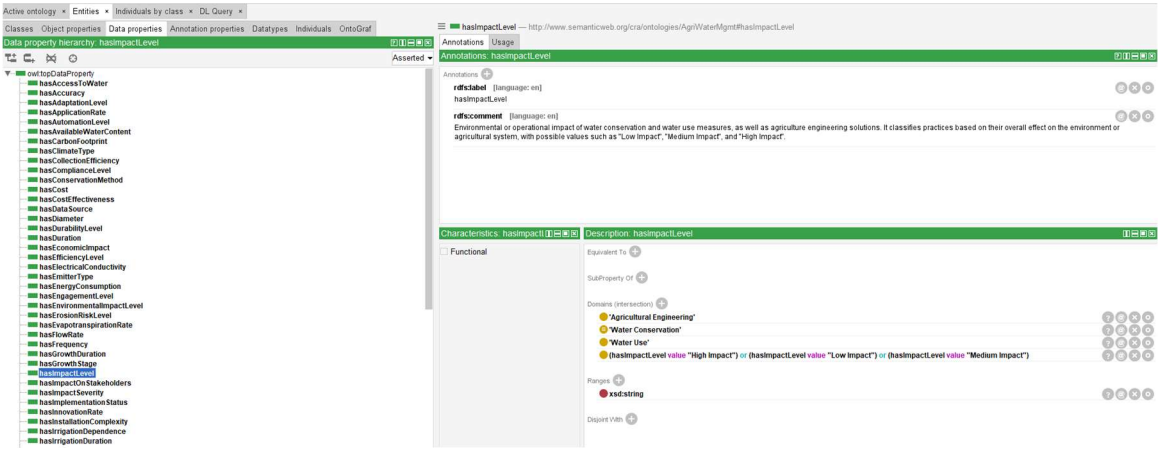

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasEvapotranspirationRate
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasEvapotranspirationRate — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasEvapotranspirationRate
Annotations Usage
Annotations: hasEvapotranspirationRate
rdfs:label [language: en]
hasEvapotranspirationRate
rdfs:comment [language: en]
Rate at which water is lost from the crop surface and soil through evaporation and transpiration. Its values include "Low Rate", "Medium Rate" and "High Rate".
Characteristics: hasEvapot
Functional
Description: hasEvapotranspirationRate
Equivalent To
SubProperty Of
Domains (intersection)
'Crop Evapotranspiration'
(hasEvapotranspirationRate value "High Rate") or (hasEvapotranspirationRate value "Low Rate") or (hasEvapotranspirationRate value "Medium Rate")
Ranges
xsd:string
Disjoint With

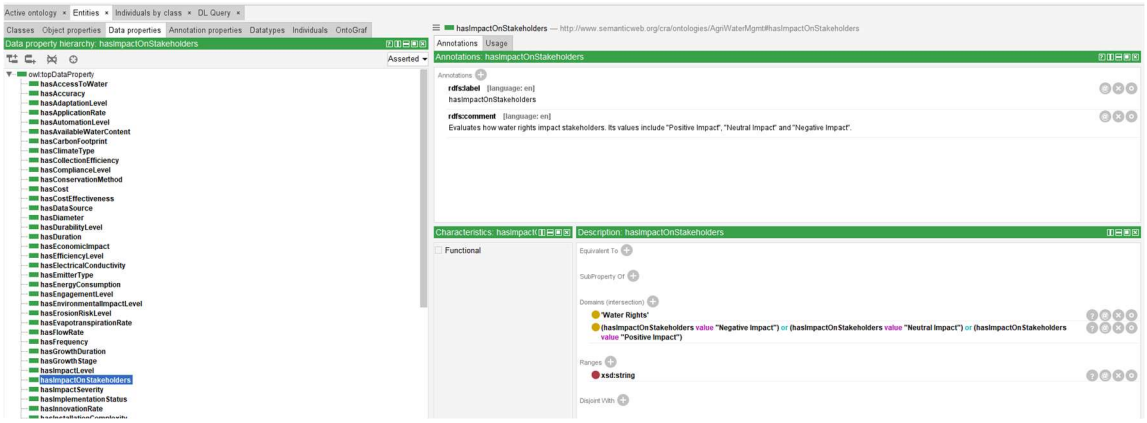

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasFlowRate
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasFlowRate — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasFlowRate
Annotations Usage
Annotations: hasFlowRate
rdfs:label [language: en]
hasFlowRate
rdfs:comment [language: en]
Specifies the flow rate of the pump unit, measured in liters per minute (L/min). It indicates the volume of water that the pump can deliver over a specified time period.
Characteristics: hasFlowRa
Functional
Description: hasFlowRate
Equivalent To
SubProperty Of
Domains (intersection)
'Pump Unit'
Ranges
xsd:decimal
Disjoint With

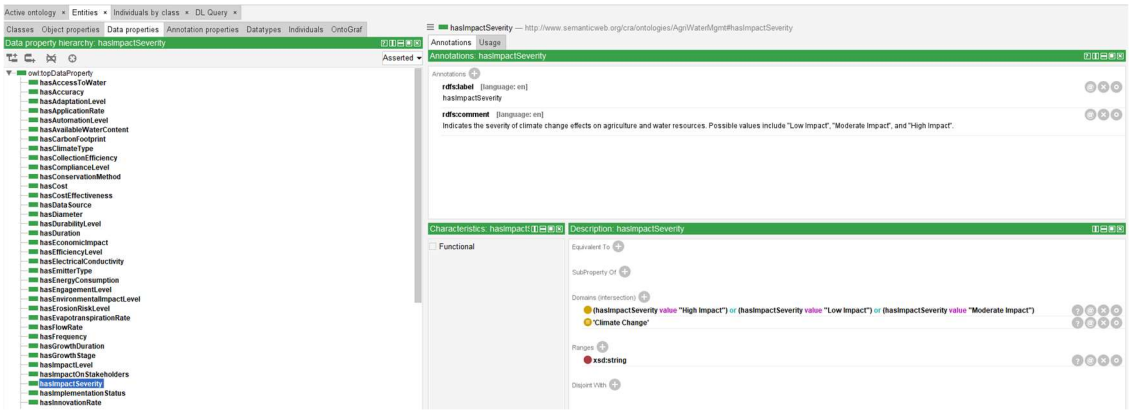

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasFrequency
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasFrequency — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasFrecuency
Annotations Usage
Annotations: hasFrequency
rdfs:label [language: en]
hasFrequency
rdfs:comment [language: en]
Indicates the frecuency of irrigation in an agricultural system. Possible values include "Daily", "Weekly" and "Monthly".
Characteristics: hasFreque
Functional
Description: hasFrequency
Equivalent To
SubProperty Of
Domains (intersection)
(hasFrequency value "Daily") or (hasFrequency value "Monthly") or (hasFrequency value "Weekly")
'Irrigation Scheduling'
Ranges
xsd:string
Disjoint With

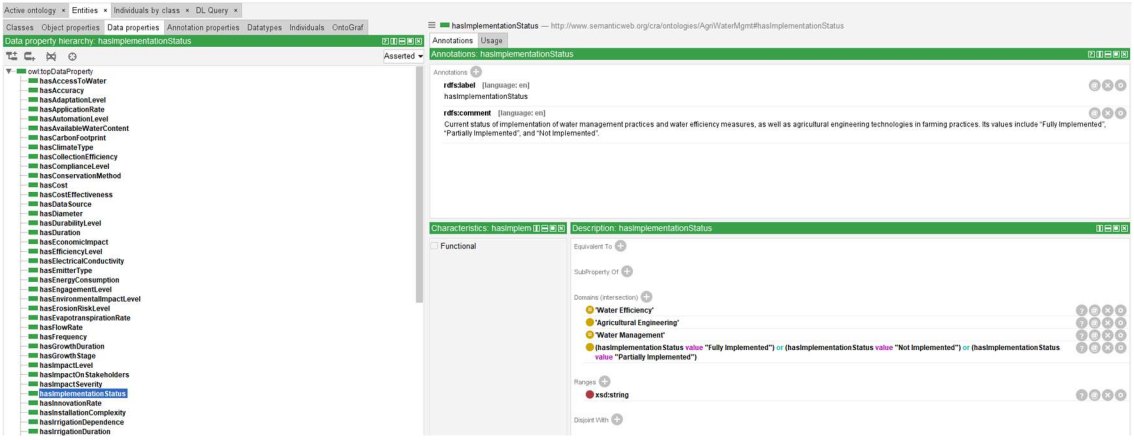

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasGrowthDuration
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasGrowthDuration — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasGrowthDuration
Annotations Usage
Annotations: hasGrowthDuration
rdfs:label [language: en]
hasGrowthDuration
rdfs:comment [language: en]
Represents the time it takes for a crop to reach maturity, measured in days.
Characteristics: hasGrowth
Functional
Description: hasGrowthDuration
Equivalent To
SubProperty Of
Domains (intersection)
Crops
Ranges
xsd:positiveInteger
Disjoint With

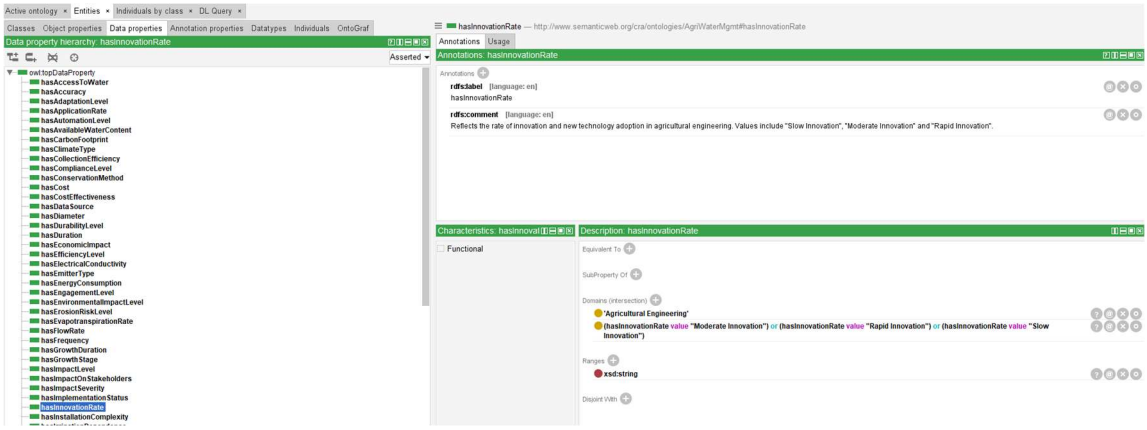

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasGrowthStage
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasGrowthStage — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasGrowthStage
Annotations Usage
Annotations: hasGrowthStage
rdfs:label [language: en]
hasGrowthStage
rdfs:comment [language: en]
Refers to the specific stages of crop development, which require different water and nutrient resources. Its values include "Germination", "Vegetative", "Flowering" and "Maturity".
Characteristics: hasGrowth
Functional
Description: hasGrowthStage
Equivalent To
SubProperty Of
Domains (intersection)
'Crop Growth Stages'
(hasGrowthStage value "Flowering") or (hasGrowthStage value "Germination") or (hasGrowthStage value "Maturity") or (hasGrowthStage value "Vegetative")
Ranges
xsd:string
Disjoint With

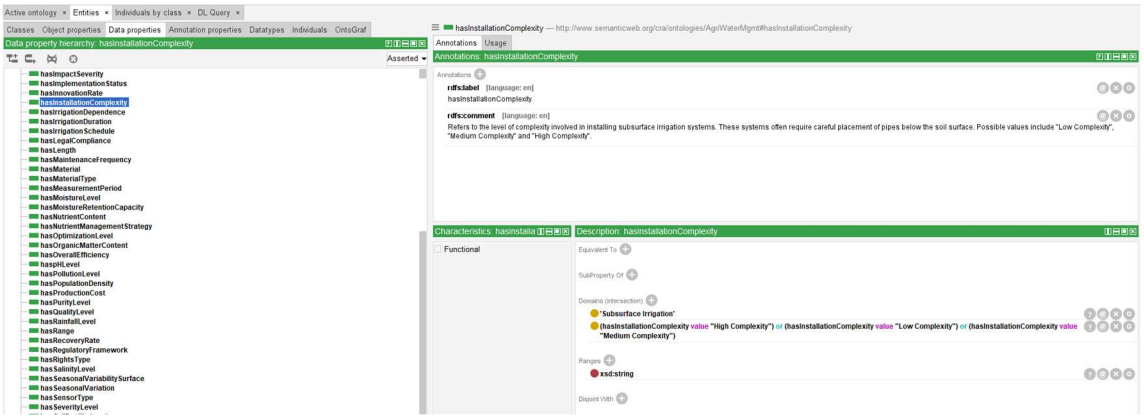

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasImpactLevel
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasImpactLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasImpactLevel
Annotations Usage
Annotations: hasImpactLevel
rdfs:label [language: en]
hasImpactLevel
rdfs:comment [language: en]
Environmental or operational impact of water conservation and water use measures, as well as agriculture engineering solutions. It classifies practices based on their overall effect on the environment or agricultural system, with possible values such as "Low Impact", "Medium Impact", and "High Impact".
Characteristics: hasImpactL
Functional
Description: hasImpactLevel
Equivalent To
SubProperty Of
Domains (intersection)
'Agricultural Engineering'
'Water Conservation'
'Water Use'
(hasImpactLevel value "High Impact") or (hasImpactLevel value "Low Impact") or (hasImpactLevel value "Medium Impact")
Ranges
xsd:string
Disjoint With

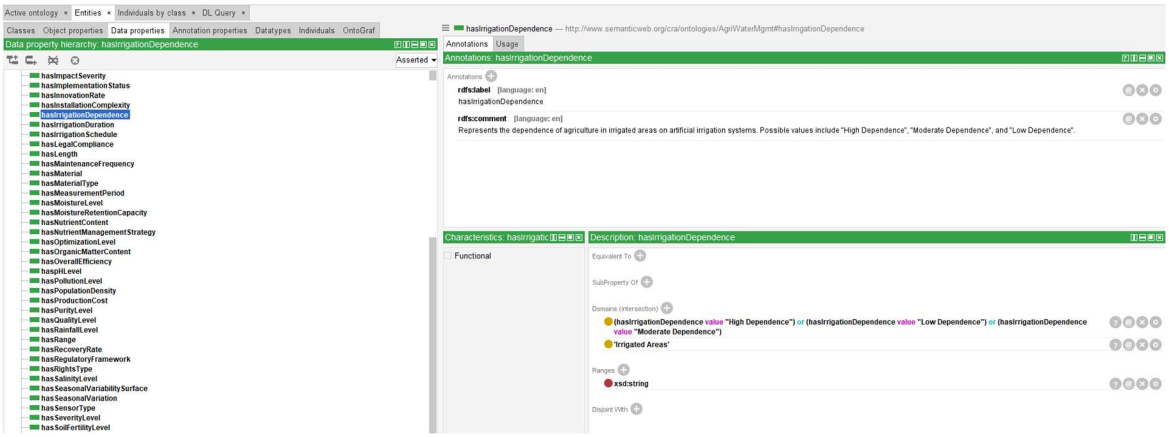

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasImpactOnStakeholders
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasImpactOnStakeholders — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasImpactOnStakeholders
Annotations Usage
Annotations: hasImpactOnStakeholders
rdfs:label [language: en]
hasImpactOnStakeholders
rdfs:comment [language: en]
Evaluates how water rights impact stakeholders. Its values include "Positive Impact", "Neutral Impact" and "Negative Impact".
Characteristics: hasImpactO
Functional
Description: hasImpactOnStakeholders
Equivalent To
SubProperty Of
Domains (intersection)
'Water Rights'
(hasImpactOnStakeholders value "Negative Impact") or (hasImpactOnStakeholders value "Neutral Impact") or (hasImpactOnStakeholders value "Positive Impact")
Ranges
xsd:string
Disjoint With

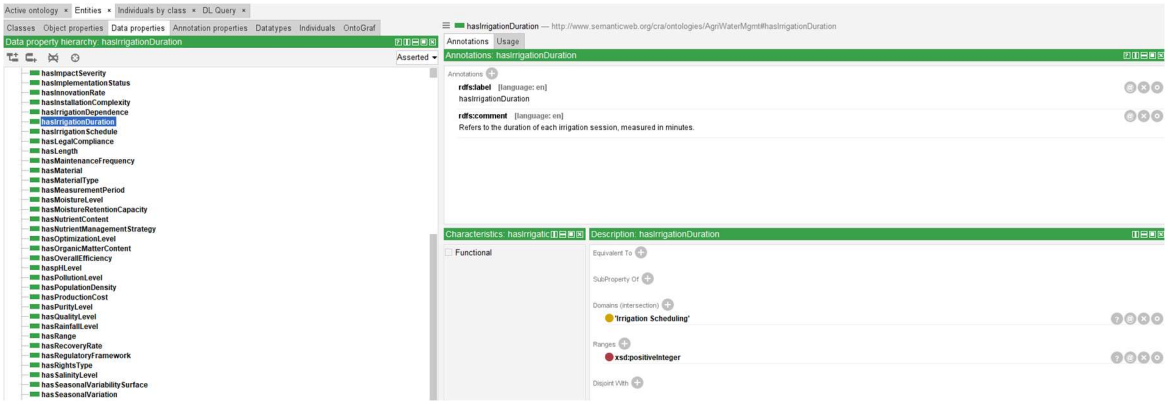

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasImpactSeverity
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasImpactSeverity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasImpactSeverity
Annotations Usage
Annotations: hasImpactSeverity
rdfs:label [language: en]
hasImpactSeverity
rdfs:comment [language: en]
Indicates the severity of climate change effects on agriculture and water resources. Possible values include "Low Impact", "Moderate Impact", and "High Impact".
Characteristics: hasImpact
Description: hasImpactSeverity
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasImpactSeverity value "High Impact") or (hasImpactSeverity value "Low Impact") or (hasImpactSeverity value "Moderate Impact")
'Climate Change'
Ranges
xsd:string
Disjoint With

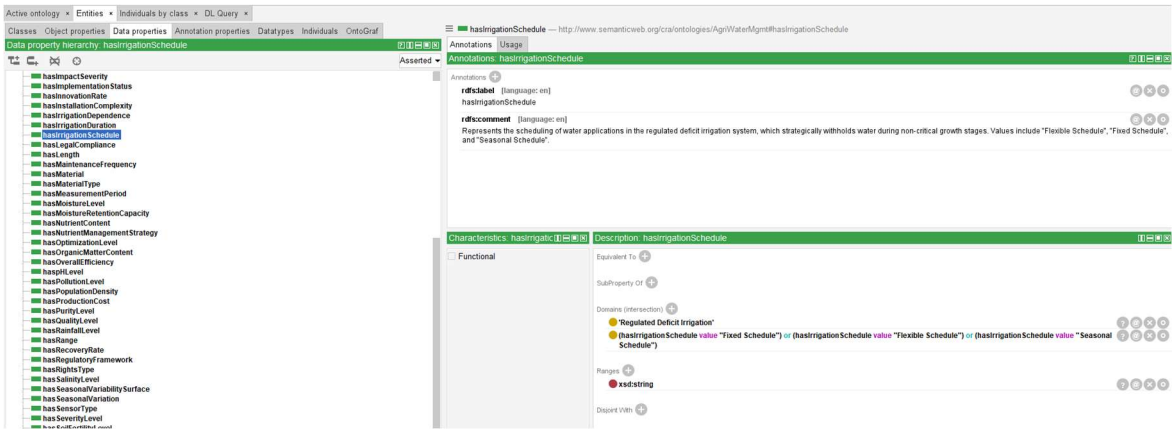

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasImplementationStatus
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasImplementationStatus — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasImplementationStatus
Annotations Usage
Annotations: hasImplementationStatus
rdfs:label [language: en]
hasImplementationStatus
rdfs:comment [language: en]
Current status of implementation of water management practices and water efficiency measures, as well as agricultural engineering technologies in farming practices. Its values include "Fully Implemented", "Partially Implemented", and "Not Implemented".
Characteristics: hasImplem
Description: hasImplementationStatus
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Water Efficiency'
'Agricultural Engineering'
'Water Management'
(hasImplementationStatus value "Fully Implemented") or (hasImplementationStatus value "Not Implemented") or (hasImplementationStatus value "Partially Implemented")
Ranges
xsd:string
Disjoint With

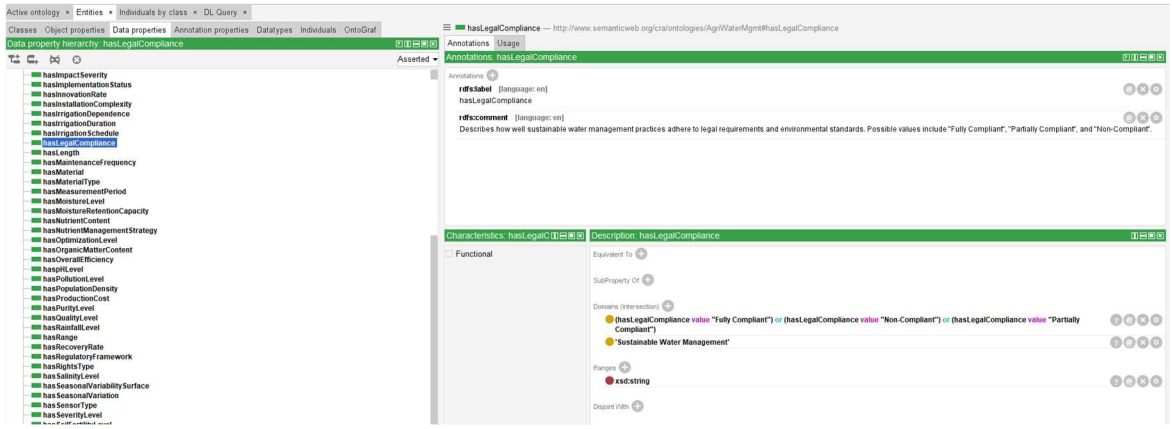

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasInnovationRate
Asserted
owl:topDataProperty
hasAccessToWater
hasAccuracy
hasAdaptationLevel
hasApplicationRate
hasAutomationLevel
hasAvailableWaterContent
hasCarbonFootprint
hasClimateType
hasCollectionEfficiency
hasComplianceLevel
hasConservationMethod
hasCost
hasCostEffectiveness
hasDataSource
hasDiameter
hasDurabilityLevel
hasDuration
hasEconomicImpact
hasEfficiencyLevel
hasElectricalConductivity
hasEmitterType
hasEnergyConsumption
hasEngagementLevel
hasEnvironmentalImpactLevel
hasErosionRiskLevel
hasEvapotranspirationRate
hasFlowRate
hasFrequency
hasGrowthDuration
hasGrowthStage
hasImpactLevel
hasImpactOnStakeholders
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasInnovationRate — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasInnovationRate
Annotations Usage
Annotations: hasInnovationRate
rdfs:label [language: en]
hasInnovationRate
rdfs:comment [language: en]
Reflects the rate of innovation and new technology adoption in agricultural engineering. Values include "Slow Innovation", "Moderate Innovation" and "Rapid Innovation".
Characteristics: hasInnoval
Description: hasInnovationRate
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Agricultural Engineering'
(hasInnovationRate value "Moderate Innovation") or (hasInnovationRate value "Rapid Innovation") or (hasInnovationRate value "Slow Innovation")
Ranges
xsd:string
Disjoint With

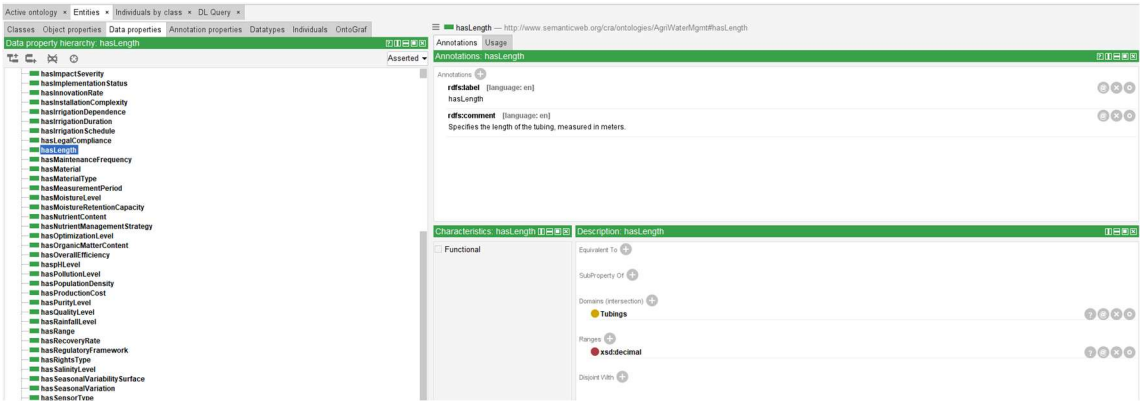

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasInstallationComplexity
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasInstallationComplexity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasInstallationComplexity
Annotations Usage
Annotations: hasInstallationComplexity
rdfs:label [language: en]
hasInstallationComplexity
rdfs:comment [language: en]
Refers to the level of complexity involved in installing subsurface irrigation systems. These systems often require careful placement of pipes below the soil surface. Possible values include "Low Complexity", "Medium Complexity" and "High Complexity".
Characteristics: hasInstalla
Functional
Description: hasInstallationComplexity
Equivalent To
SubProperty Of
Domains (intersection)
'Subsurface Irrigation'
(hasInstallationComplexity value "High Complexity") or (hasInstallationComplexity value "Low Complexity") or (hasInstallationComplexity value "Medium Complexity")
Ranges
xsd:string
Disjoint With

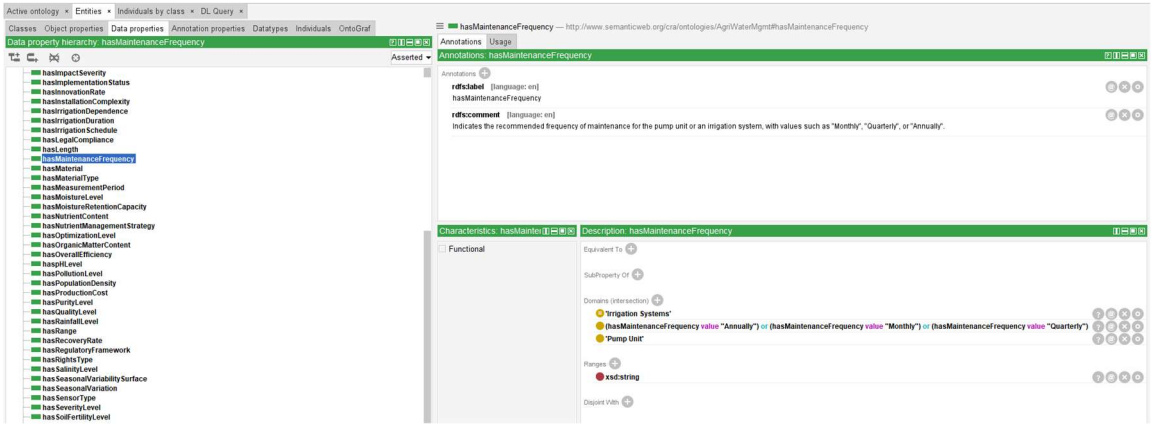

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasIrrigationDependence
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasIrrigationDependence — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasIrrigationDependence
Annotations Usage
Annotations: hasIrrigationDependence
rdfs:label [language: en]
hasIrrigationDependence
rdfs:comment [language: en]
Represents the dependence of agriculture in irrigated areas on artificial irrigation systems. Possible values include "High Dependence", "Moderate Dependence", and "Low Dependence".
Characteristics: hasIrrigatic
Functional
Description: hasIrrigationDependence
Equivalent To
SubProperty Of
Domains (intersection)
(hasIrrigationDependence value "High Dependence") or (hasIrrigationDependence value "Low Dependence") or (hasIrrigationDependence value "Moderate Dependence")
'Irrigated Areas'
Ranges
xsd:string
Disjoint With

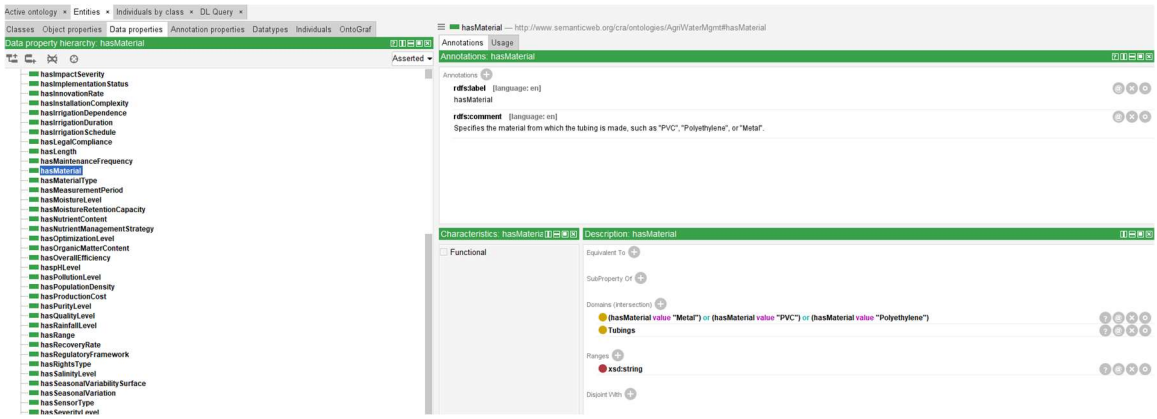

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasIrrigationDuration
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasIrrigationDuration — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasIrrigationDuration
Annotations Usage
Annotations: hasIrrigationDuration
rdfs:label [language: en]
hasIrrigationDuration
rdfs:comment [language: en]
Refers to the duration of each irrigation session, measured in minutes.
Characteristics: hasIrrigatic
Functional
Description: hasIrrigationDuration
Equivalent To
SubProperty Of
Domains (intersection)
'Irrigation Scheduling'
Ranges
xsd:positiveInteger
Disjoint With

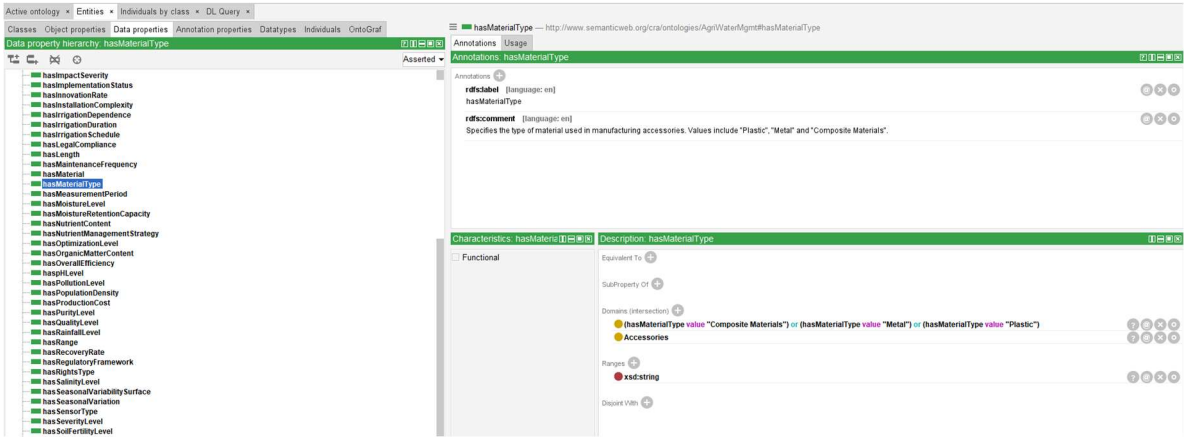

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasIrrigationSchedule
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasIrrigationSchedule — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasIrrigationSchedule
Annotations Usage
Annotations: hasIrrigationSchedule
rdfs:label [language: en]
hasIrrigationSchedule
rdfs:comment [language: en]
Represents the scheduling of water applications in the regulated deficit irrigation system, which strategically withholds water during non-critical growth stages. Values include "Flexible Schedule", "Fixed Schedule", and "Seasonal Schedule".
Characteristics: hasIrrigatic
Functional
Description: hasIrrigationSchedule
Equivalent To
SubProperty Of
Domains (intersection)
'Regulated Deficit Irrigation'
(hasIrrigationSchedule value "Fixed Schedule") or (hasIrrigationSchedule value "Flexible Schedule") or (hasIrrigationSchedule value "Seasonal Schedule")
Ranges
xsd:string
Disjoint With

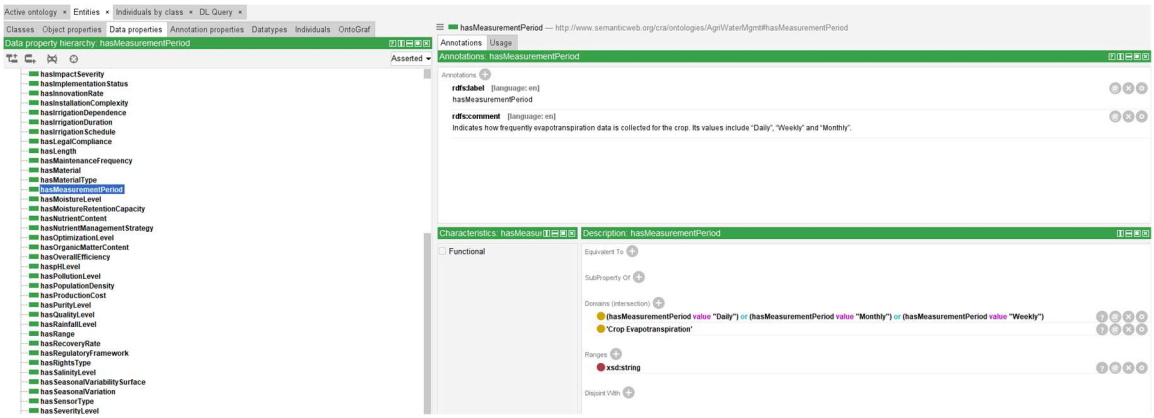

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasLegalCompliance
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasLegalCompliance — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasLegalCompliance
Annotations Usage
Annotations: hasLegalCompliance
rdfs:label [language: en]
hasLegalCompliance
rdfs:comment [language: en]
Describes how well sustainable water management practices adhere to legal requirements and environmental standards. Possible values include "Fully Compliant", "Partially Compliant", and "Non-Compliant".
Characteristics: hasLegalC
Functional
Description: hasLegalCompliance
Equivalent To
SubProperty Of
Domains (intersection)
(hasLegalCompliance value "Fully Compliant") or (hasLegalCompliance value "Non-Compliant") or (hasLegalCompliance value "Partially Compliant")
'Sustainable Water Management'
Ranges
xsd:string
Disjoint With

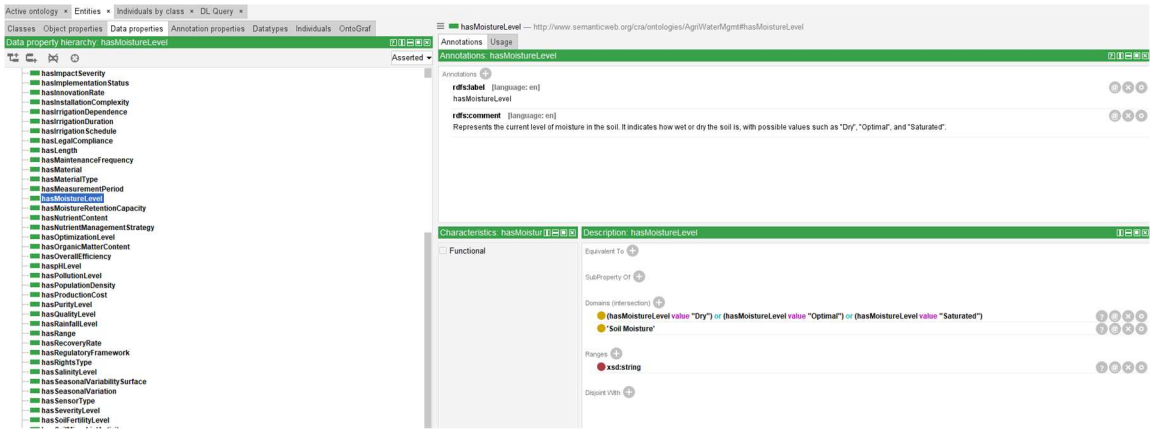

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasLength
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasLength — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasLength
Annotations Usage
Annotations: hasLength
rdfs:label [language: en]
hasLength
rdfs:comment [language: en]
Specifies the length of the tubing, measured in meters.
Characteristics: hasLength
Functional
Description: hasLength
Equivalent To
SubProperty Of
Domains (intersection)
Tubings
Ranges
xsd:decimal
Disjoint With

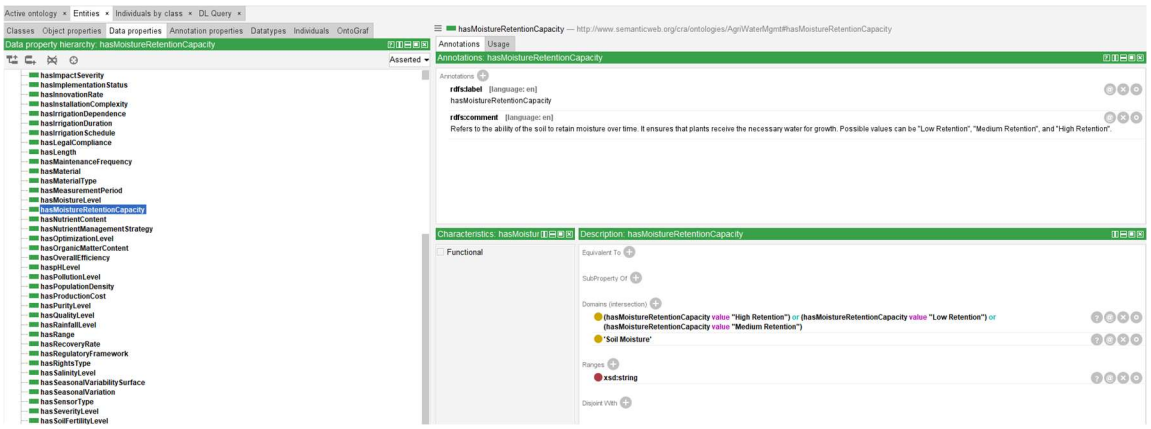

hasMaintenanceFrequency
Data property hierarchy: hasMaintenanceFrequency
Annotations: hasMaintenanceFrequency
rdfs:label [language: en]
hasMaintenanceFrequency
rdfs:comment [language: en]
Indicates the recommended frequency of maintenance for the pump unit or an irrigation system, with values such as "Monthly", "Quarterly", or "Annually".
Description: hasMaintenanceFrequency
Functional
'Irrigation Systems'
(hasMaintenanceFrequency value "Annually") or (hasMaintenanceFrequency value "Monthly") or (hasMaintenanceFrequency value "Quarterly")
'Pump Unit'
xsd:string

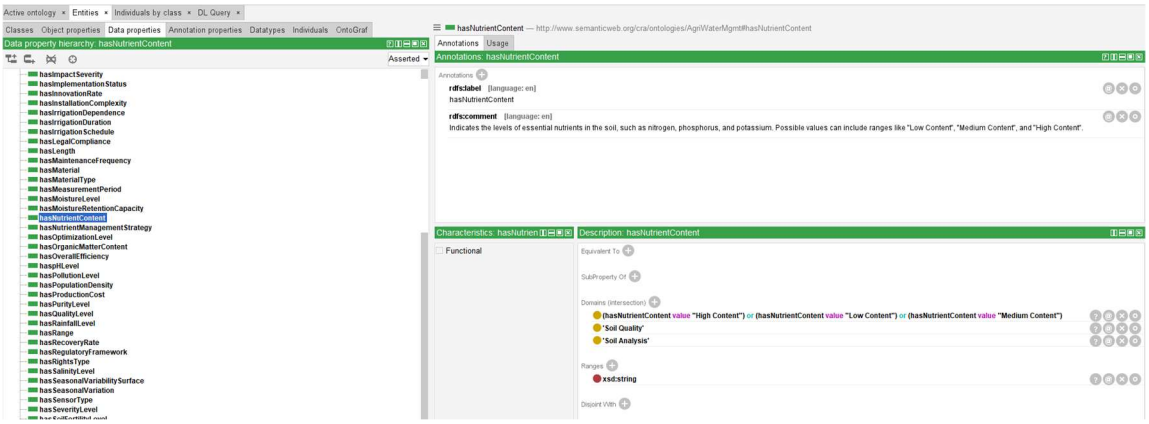

hasMaterial
Data property hierarchy: hasMaterial
Annotations: hasMaterial
rdfs:label [language: en]
hasMaterial
rdfs:comment [language: en]
Specifies the material from which the tubing is made, such as "PVC", "Polyethylene", or "Metal".
Description: hasMaterial
Functional
(hasMaterial value "Metal") or (hasMaterial value "PVC") or (hasMaterial value "Polyethylene")
Tubings
xsd:string

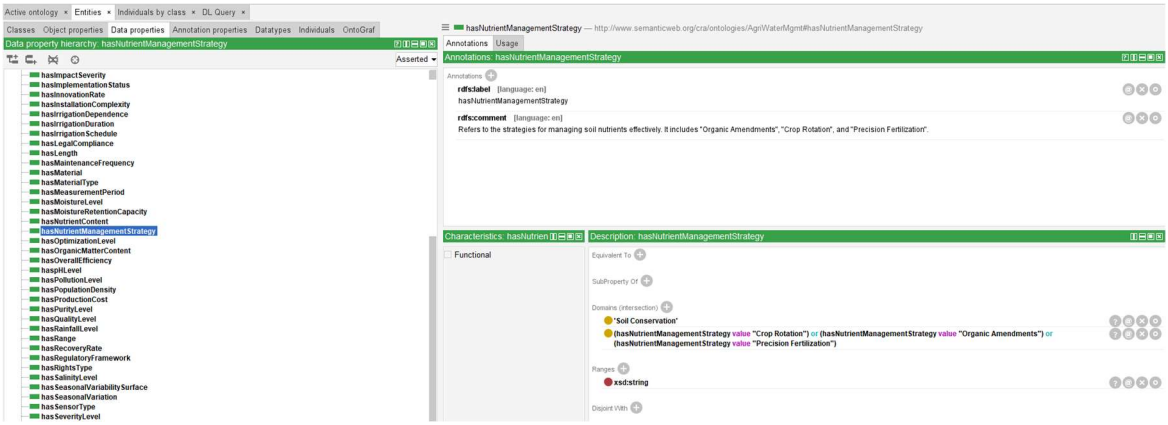

hasMaterialType
Data property hierarchy: hasMaterialType
Annotations: hasMaterialType
rdfs:label [language: en]
hasMaterialType
rdfs:comment [language: en]
Specifies the type of material used in manufacturing accessories. Values include "Plastic", "Metal" and "Composite Materials".
Description: hasMaterialType
Functional
(hasMaterialType value "Composite Materials") or (hasMaterialType value "Metal") or (hasMaterialType value "Plastic")
Accessories
xsd:string

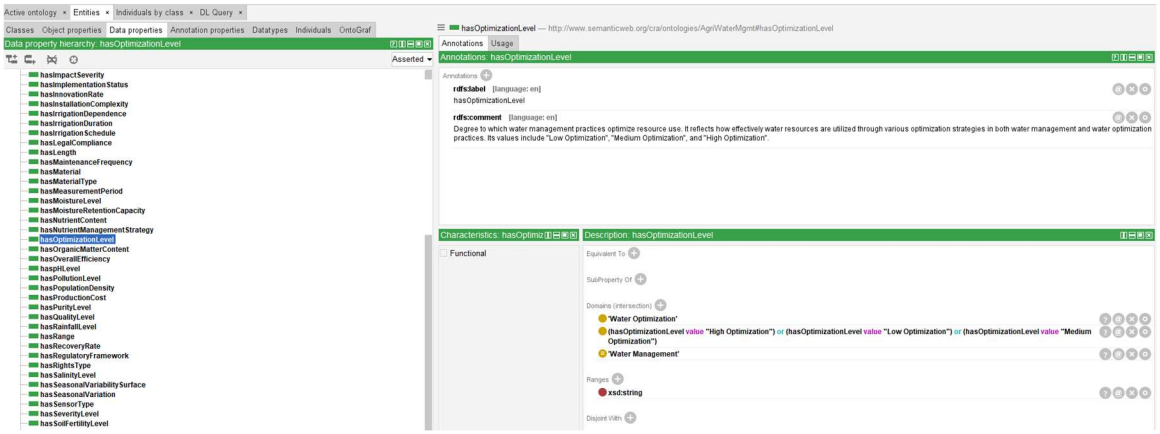

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasMeasurementPeriod
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasMeasurementPeriod — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasMeasurementPeriod
Annotations Usage
Annotations: hasMeasurementPeriod
rdfs:label [language: en]
hasMeasurementPeriod
rdfs:comment [language: en]
Indicates how frequently evapotranspiration data is collected for the crop. Its values include "Daily", "Weekly" and "Monthly".
Characteristics: hasMeasur
Description: hasMeasurementPeriod
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasMeasurementPeriod value "Daily") or (hasMeasurementPeriod value "Monthly") or (hasMeasurementPeriod value "Weekly")
'Crop Evapotranspiration'
Ranges
xsd:string
Disjoint With

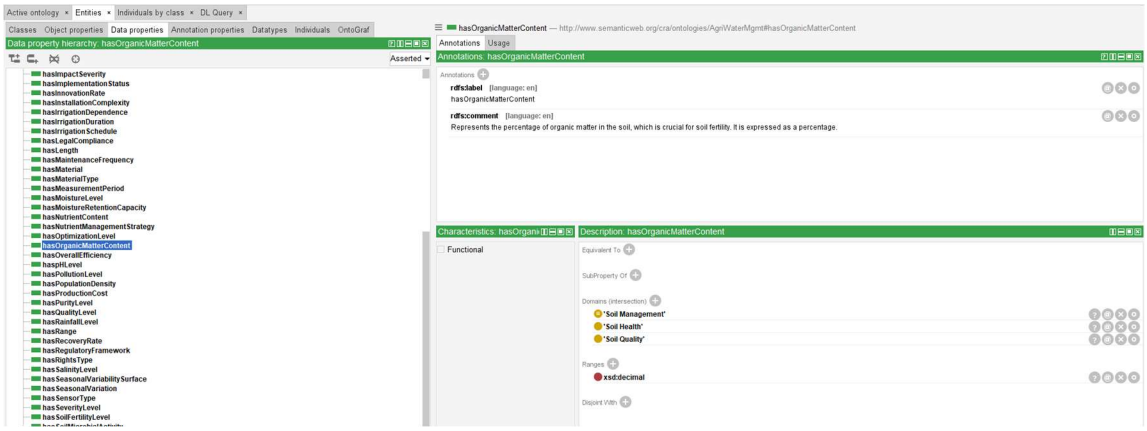

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasMoistureLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasMoistureLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasMoistureLevel
Annotations Usage
Annotations: hasMoistureLevel
rdfs:label [language: en]
hasMoistureLevel
rdfs:comment [language: en]
Represents the current level of moisture in the soil. It indicates how wet or dry the soil is, with possible values such as "Dry", "Optimal", and "Saturated".
Characteristics: hasMoistur
Description: hasMoistureLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasMoistureLevel value "Dry") or (hasMoistureLevel value "Optimal") or (hasMoistureLevel value "Saturated")
'Soil Moisture'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasMoistureRetentionCapacity
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasMoistureRetentionCapacity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasMoistureRetentionCapacity
Annotations Usage
Annotations: hasMoistureRetentionCapacity
rdfs:label [language: en]
hasMoistureRetentionCapacity
rdfs:comment [language: en]
Refers to the ability of the soil to retain moisture over time. It ensures that plants receive the necessary water for growth. Possible values can be "Low Retention", "Medium Retention", and "High Retention".
Characteristics: hasMoistur
Description: hasMoistureRetentionCapacity
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasMoistureRetentionCapacity value "High Retention") or (hasMoistureRetentionCapacity value "Low Retention") or (hasMoistureRetentionCapacity value "Medium Retention")
'Soil Moisture'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasNutrientContent
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasNutrientContent — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasNutrientContent
Annotations Usage
Annotations: hasNutrientContent
rdfs:label [language: en]
hasNutrientContent
rdfs:comment [language: en]
Indicates the levels of essential nutrients in the soil, such as nitrogen, phosphorus, and potassium. Possible values can include ranges like "Low Content", "Medium Content", and "High Content".
Characteristics: hasNutrien
Description: hasNutrientContent
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasNutrientContent value "High Content") or (hasNutrientContent value "Low Content") or (hasNutrientContent value "Medium Content")
'Soil Quality'
'Soil Analysis'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasNutrientManagementStrategy
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasNutrientManagementStrategy — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasNutrientManagementStrategy
Annotations Usage
Annotations: hasNutrientManagementStrategy
rdfs:label [language: en]
hasNutrientManagementStrategy
rdfs:comment [language: en]
Refers to the strategies for managing soil nutrients effectively. It includes "Organic Amendments", "Crop Rotation", and "Precision Fertilization".
Characteristics: hasNutrien
Description: hasNutrientManagementStrategy
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Conservation'
(hasNutrientManagementStrategy value "Crop Rotation") or (hasNutrientManagementStrategy value "Organic Amendments") or (hasNutrientManagementStrategy value "Precision Fertilization")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasOptimizationLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasOptimizationLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasOptimizationLevel
Annotations Usage
Annotations: hasOptimizationLevel
rdfs:label [language: en]
hasOptimizationLevel
rdfs:comment [language: en]
Degree to which water management practices optimize resource use. It reflects how effectively water resources are utilized through various optimization strategies in both water management and water optimization practices. Its values include "Low Optimization", "Medium Optimization", and "High Optimization".
Characteristics: hasOptimiz
Description: hasOptimizationLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Water Optimization'
(hasOptimizationLevel value "High Optimization") or (hasOptimizationLevel value "Low Optimization") or (hasOptimizationLevel value "Medium Optimization")
'Water Management'
Ranges
xsd:string
Disjoint With


Active ontology
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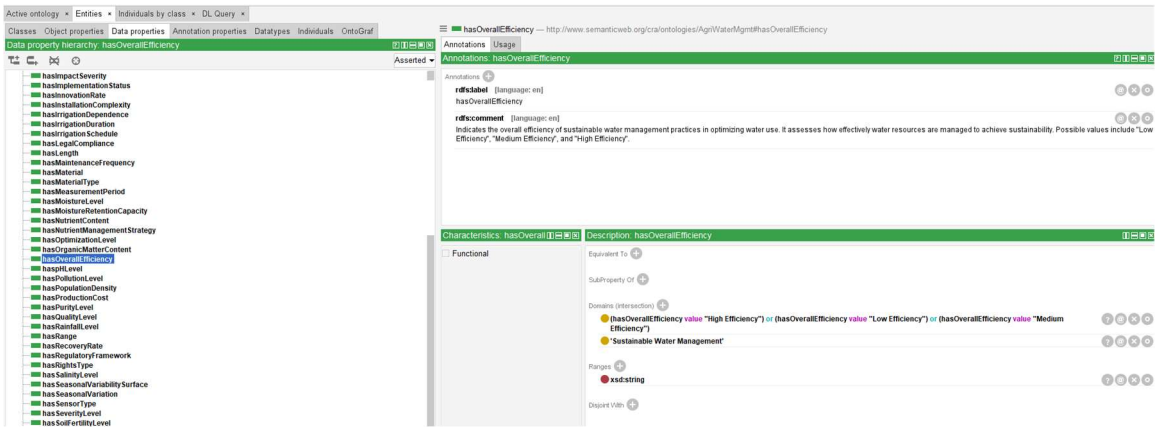
Data property hierarchy: hasOrganicMatterContent
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasOrganicMatterContent — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasOrganicMatterContent
Annotations
Usage
Annotations: hasOrganicMatterContent
rdfs:label [language: en]
hasOrganicMatterContent
rdfs:comment [language: en]
Represents the percentage of organic matter in the soil, which is crucial for soil fertility. It is expressed as a percentage.
Characteristics: hasOrganic
Description: hasOrganicMatterContent
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Management'
'Soil Health'
'Soil Quality'
Ranges
xsd:decimal
Disjoint With


Active ontology
Entities
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Annotation properties
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Individuals
OntoGraf
Data property hierarchy: hasOverallEfficiency
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
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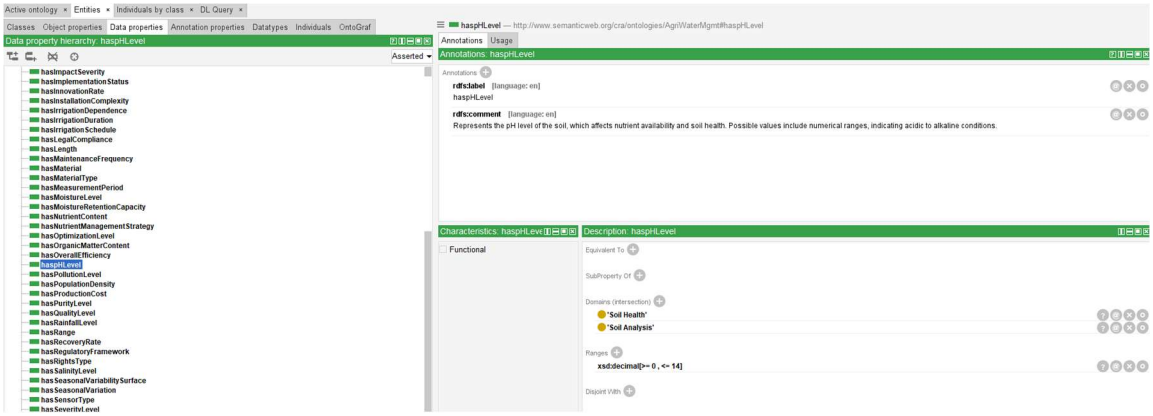
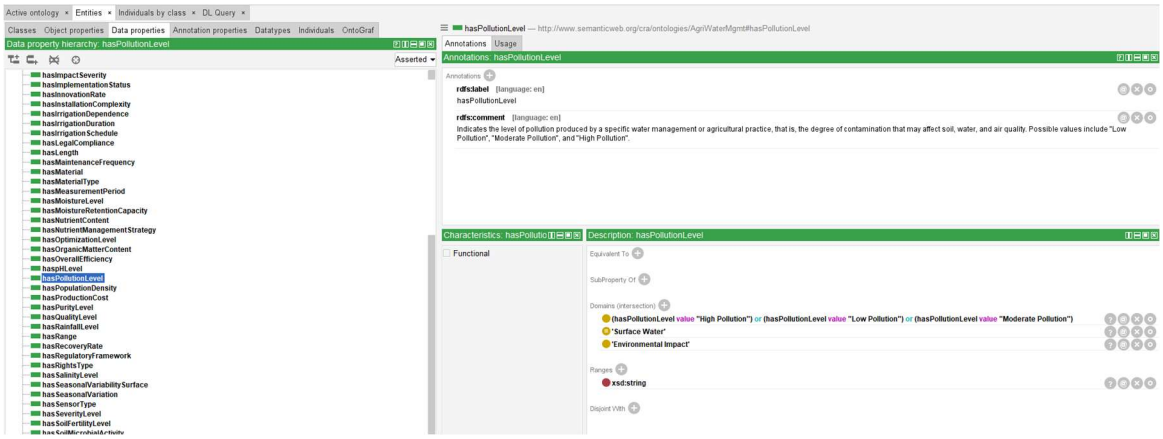
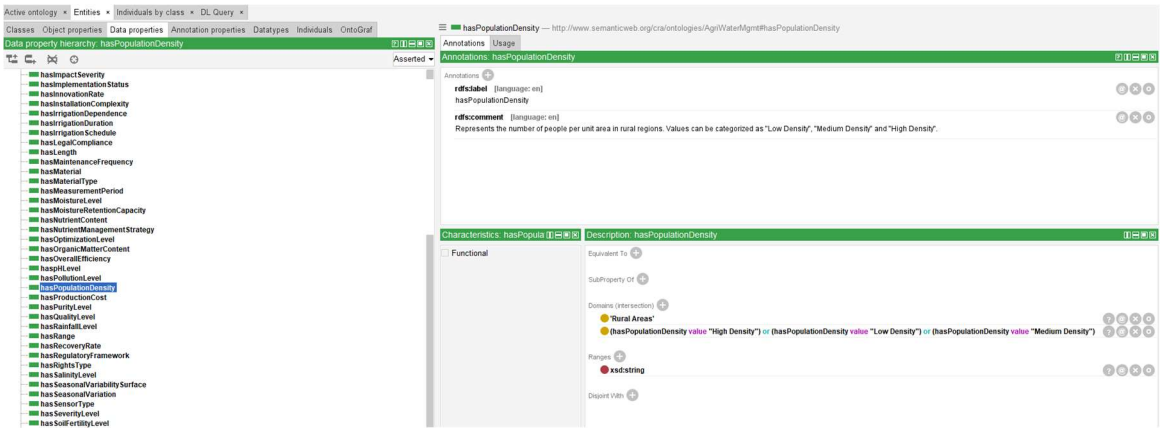
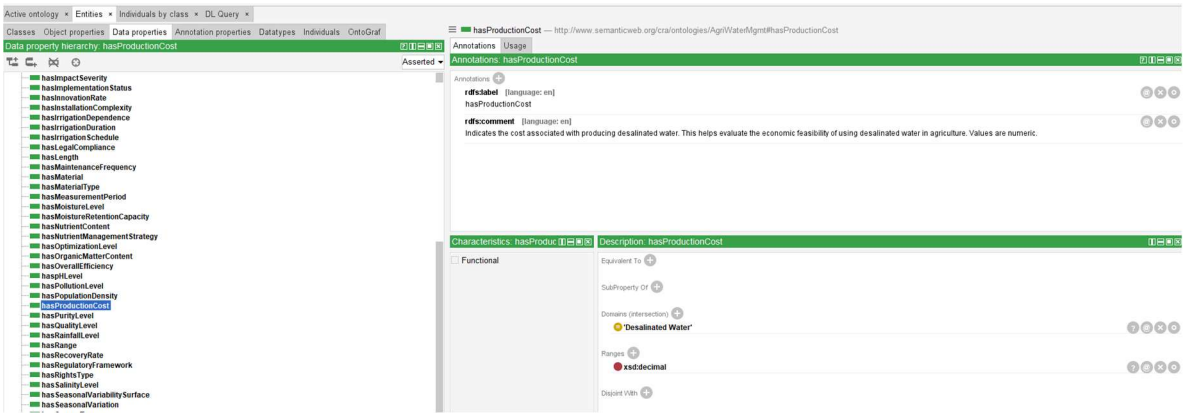
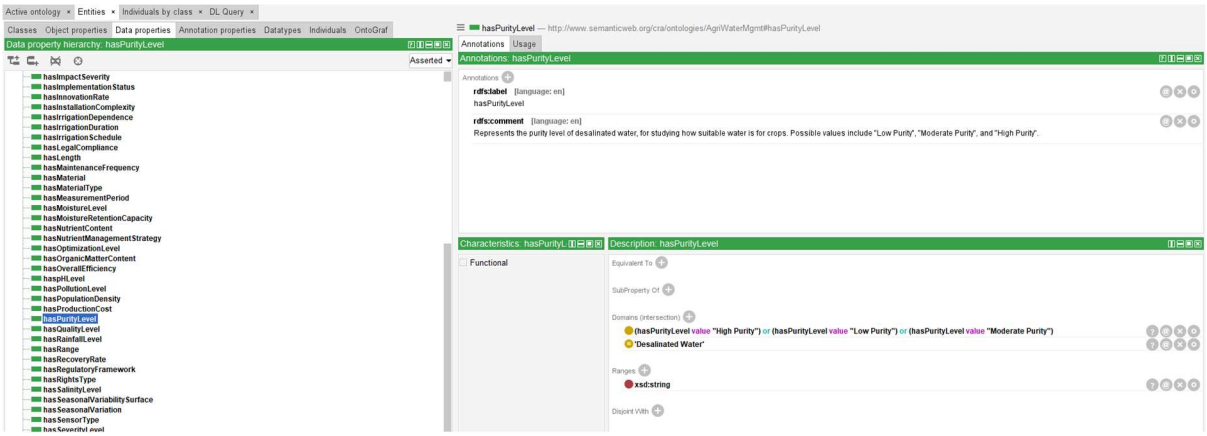
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasOverallEfficiency — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasOverallEfficiency
Annotations
Usage
Annotations: hasOverallEfficiency
rdfs:label [language: en]
hasOverallEfficiency
rdfs:comment [language: en]
Indicates the overall efficiency of sustainable water management practices in optimizing water use. It assesses how effectively water resources are managed to achieve sustainability. Possible values include "Low Efficiency", "Medium Efficiency", and "High Efficiency".
Characteristics: hasOverall
Description: hasOverallEfficiency
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasOverallEfficiency value "High Efficiency") or (hasOverallEfficiency value "Low Efficiency") or (hasOverallEfficiency value "Medium Efficiency")
'Sustainable Water Management'
Ranges
xsd:string
Disjoint With

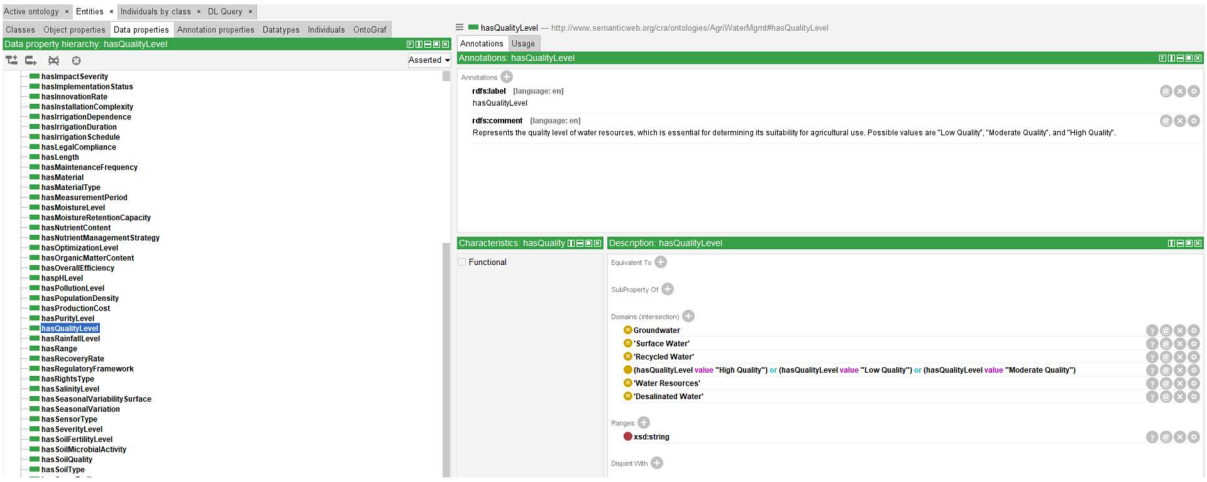

Active ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
OntoGraf
Data property hierarchy: hasPHLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasPhLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasPhLevel
Annotations
Usage
Annotations: hasPhLevel
rdfs:label [language: en]
hasPhLevel
rdfs:comment [language: en]
Represents the pH level of the soil, which affects nutrient availability and soil health. Possible values include numerical ranges, indicating acidic to alkaline conditions.
Characteristics: hasPhLevel
Description: hasPhLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Health'
'Soil Analysis'
Ranges
xsd:decimal[>= 0 , <= 14]
Disjoint With

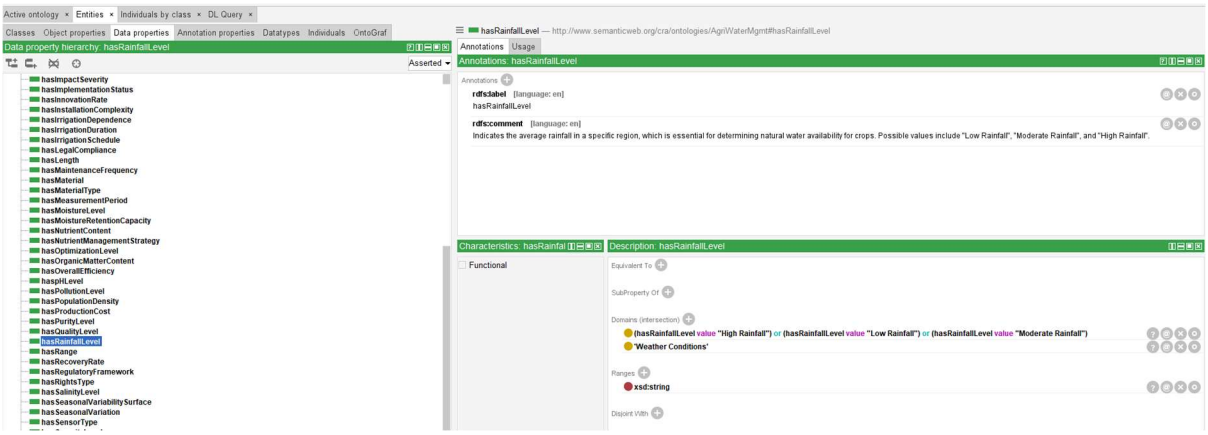

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasPollutionLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasPollutionLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasPollutionLevel
Annotations Usage
Annotations: hasPollutionLevel
Annotations
rdfs:label [language: en]
hasPollutionLevel
rdfs:comment [language: en]
Indicates the level of pollution produced by a specific water management or agricultural practice, that is, the degree of contamination that may affect soil, water, and air quality. Possible values include "Low Pollution", "Moderate Pollution", and "High Pollution".
Characteristics: hasPollutio
Description: hasPollutionLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasPollutionLevel value "High Pollution") or (hasPollutionLevel value "Low Pollution") or (hasPollutionLevel value "Moderate Pollution")
'Surface Water'
'Environmental Impact'
Ranges
xsd:string
Disjoint With

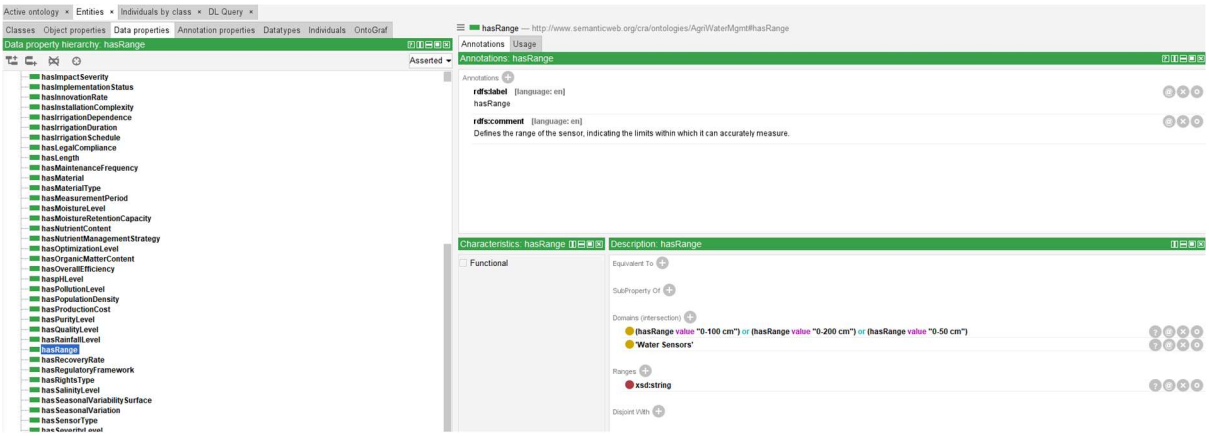

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasPopulationDensity
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasPopulationDensity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasPopulationDensity
Annotations Usage
Annotations: hasPopulationDensity
Annotations
rdfs:label [language: en]
hasPopulationDensity
rdfs:comment [language: en]
Represents the number of people per unit area in rural regions. Values can be categorized as "Low Density", "Medium Density" and "High Density".
Characteristics: hasPopula
Description: hasPopulationDensity
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Rural Areas'
(hasPopulationDensity value "High Density") or (hasPopulationDensity value "Low Density") or (hasPopulationDensity value "Medium Density")
Ranges
xsd:string
Disjoint With

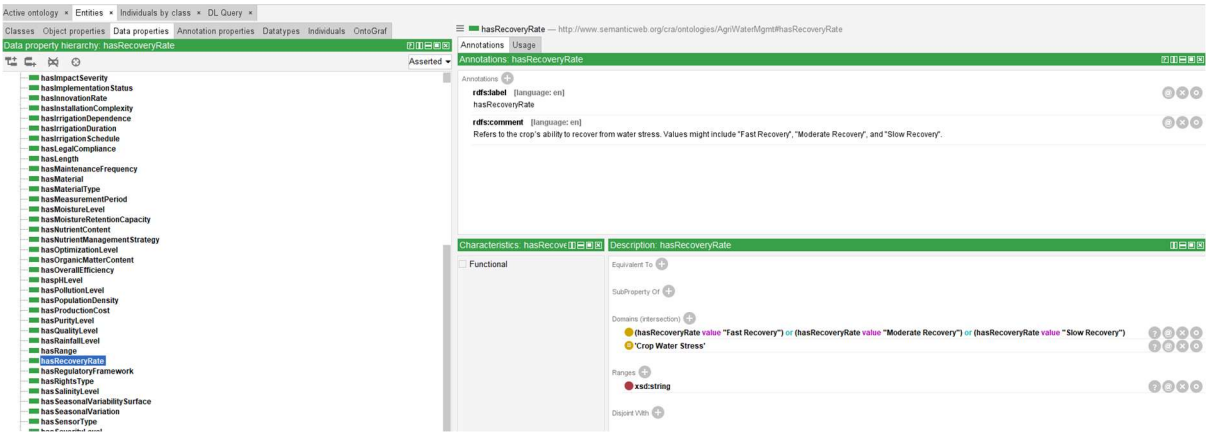

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasProductionCost
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasProductionCost — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasProductionCost
Annotations Usage
Annotations: hasProductionCost
Annotations
rdfs:label [language: en]
hasProductionCost
rdfs:comment [language: en]
Indicates the cost associated with producing desalinated water. This helps evaluate the economic feasibility of using desalinated water in agriculture. Values are numeric.
Characteristics: hasProduc
Description: hasProductionCost
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Desalinated Water'
Ranges
xsd:decimal
Disjoint With

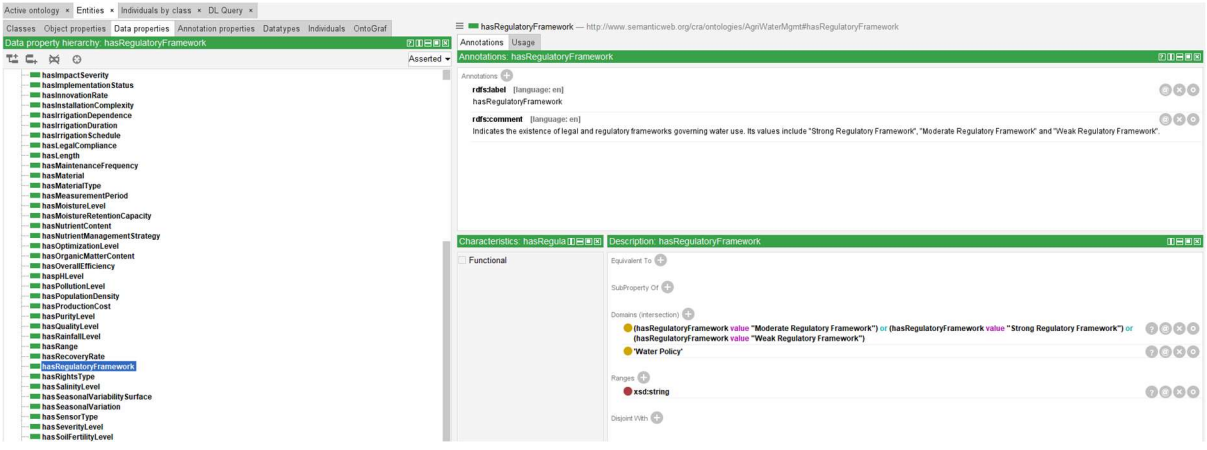

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasPurityLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasPurityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasPurityLevel
Annotations Usage
Annotations: hasPurityLevel
rdfs:label [language: en]
hasPurityLevel
rdfs:comment [language: en]
Represents the purity level of desalinated water, for studying how suitable water is for crops. Possible values include "Low Purity", "Moderate Purity", and "High Purity".
Characteristics: hasPurityL
Description: hasPurityLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasPurityLevel value "High Purity") or (hasPurityLevel value "Low Purity") or (hasPurityLevel value "Moderate Purity")
'Desalinated Water'
Ranges
xsd:string
Disjoint With

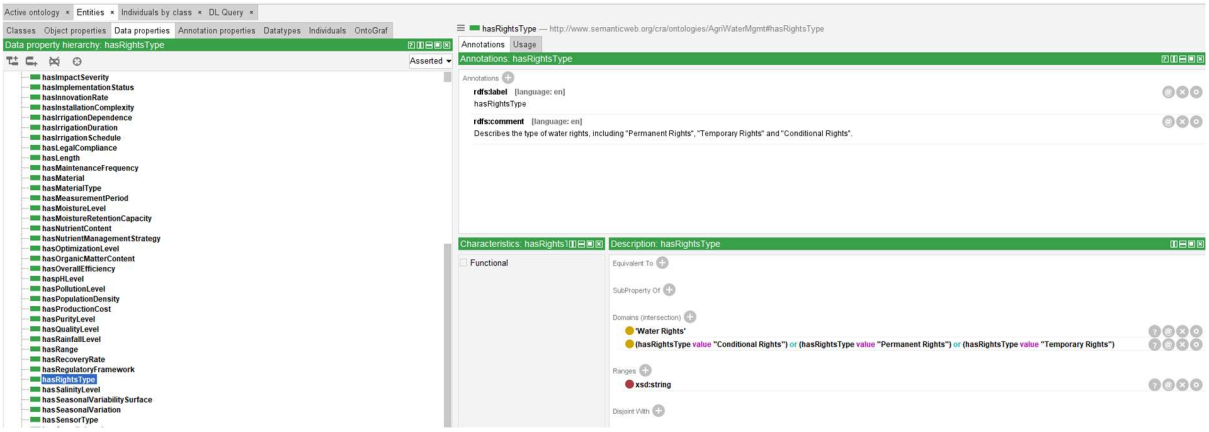

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasQualityLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasQualityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasQualityLevel
Annotations Usage
Annotations: hasQualityLevel
rdfs:label [language: en]
hasQualityLevel
rdfs:comment [language: en]
Represents the quality level of water resources, which is essential for determining its suitability for agricultural use. Possible values are "Low Quality", "Moderate Quality", and "High Quality".
Characteristics: hasQuality
Description: hasQualityLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
Groundwater
'Surface Water'
'Recycled Water'
(hasQualityLevel value "High Quality") or (hasQualityLevel value "Low Quality") or (hasQualityLevel value "Moderate Quality")
'Water Resources'
'Desalinated Water'
Ranges
xsd:string
Disjoint With

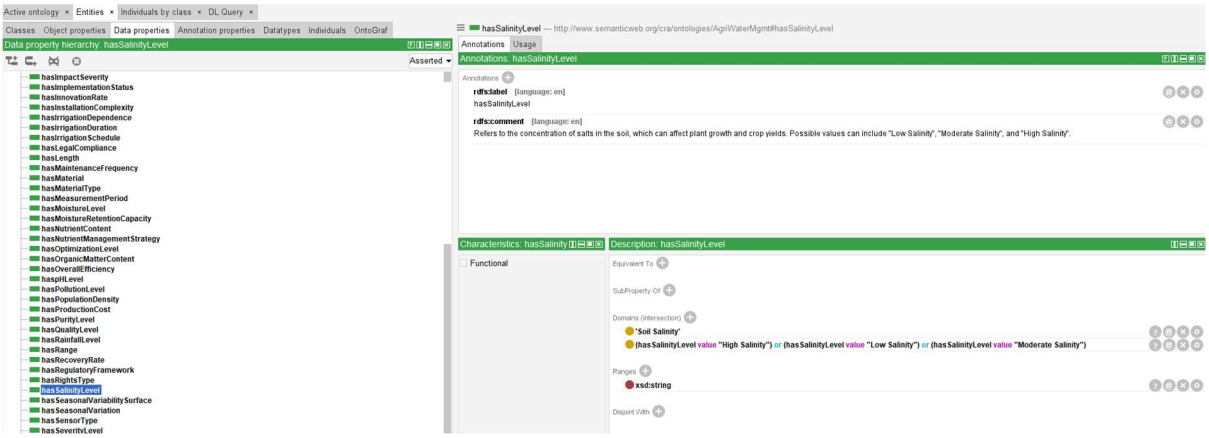

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasRainfallLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasRainfallLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasRainfallLevel
Annotations Usage
Annotations: hasRainfallLevel
rdfs:label [language: en]
hasRainfallLevel
rdfs:comment [language: en]
Indicates the average rainfall in a specific region, which is essential for determining natural water availability for crops. Possible values include "Low Rainfall", "Moderate Rainfall", and "High Rainfall".
Characteristics: hasRainfal
Description: hasRainfallLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasRainfallLevel value "High Rainfall") or (hasRainfallLevel value "Low Rainfall") or (hasRainfallLevel value "Moderate Rainfall")
'Weather Conditions'
Ranges
xsd:string
Disjoint With

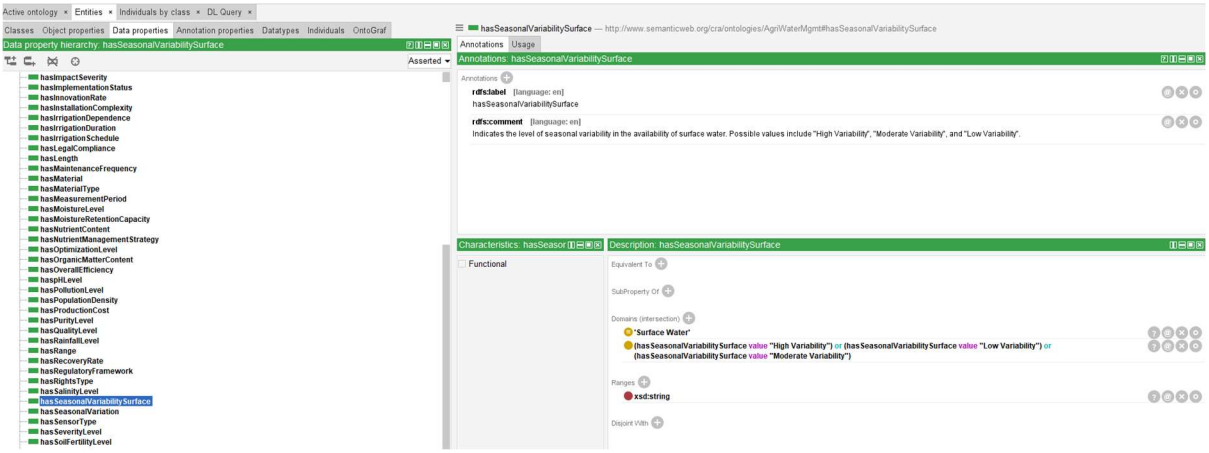

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasRange
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasRange — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasRange
Annotations Usage
Annotations: hasRange
rdfs:label [language: en]
hasRange
rdfs:comment [language: en]
Defines the range of the sensor, indicating the limits within which it can accurately measure.
Characteristics: hasRange
Functional
Description: hasRange
Equivalent To
SubProperty Of
Domains (intersection)
(hasRange value "0-100 cm") or (hasRange value "0-200 cm") or (hasRange value "0-50 cm")
'Water Sensors'
Ranges
xsd:string
Disjoint With

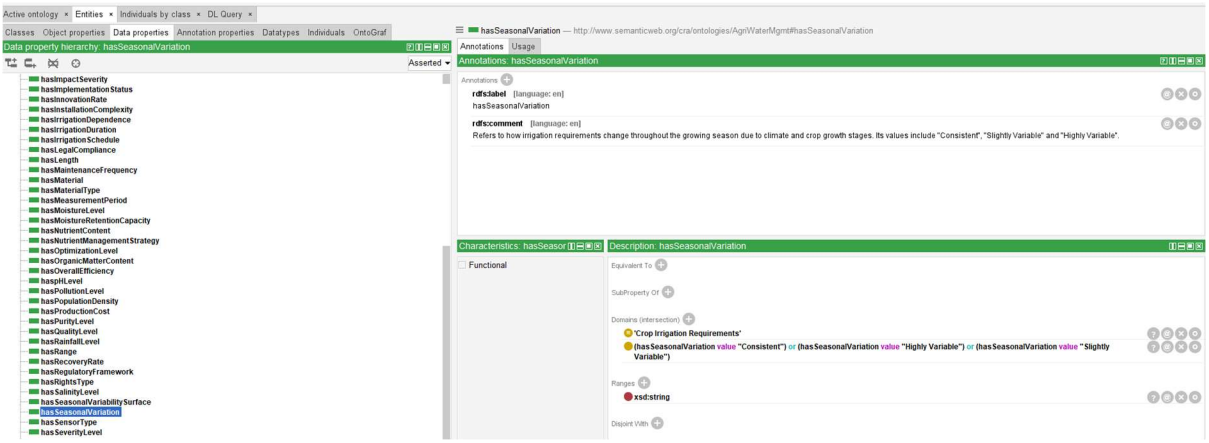

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasRecoveryRate
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasRecoveryRate — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasRecoveryRate
Annotations Usage
Annotations: hasRecoveryRate
rdfs:label [language: en]
hasRecoveryRate
rdfs:comment [language: en]
Refers to the crop's ability to recover from water stress. Values might include "Fast Recovery", "Moderate Recovery", and "Slow Recovery".
Characteristics: hasRecove
Functional
Description: hasRecoveryRate
Equivalent To
SubProperty Of
Domains (intersection)
(hasRecoveryRate value "Fast Recovery") or (hasRecoveryRate value "Moderate Recovery") or (hasRecoveryRate value "Slow Recovery")
'Crop Water Stress'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasRegulatoryFramework
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasRegulatoryFramework — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasRegulatoryFramework
Annotations Usage
Annotations: hasRegulatoryFramework
rdfs:label [language: en]
hasRegulatoryFramework
rdfs:comment [language: en]
Indicates the existence of legal and regulatory frameworks governing water use. Its values include "Strong Regulatory Framework", "Moderate Regulatory Framework" and "Weak Regulatory Framework".
Characteristics: hasRegula
Functional
Description: hasRegulatoryFramework
Equivalent To
SubProperty Of
Domains (intersection)
(hasRegulatoryFramework value "Moderate Regulatory Framework") or (hasRegulatoryFramework value "Strong Regulatory Framework") or (hasRegulatoryFramework value "Weak Regulatory Framework")
'Water Policy'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasRightsType
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasRightsType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasRightsType
Annotations Usage
Annotations: hasRightsType
Annotations
rdfs:label [language: en]
hasRightsType
rdfs:comment [language: en]
Describes the type of water rights, including "Permanent Rights", "Temporary Rights" and "Conditional Rights".
Characteristics: hasRights
Functional
Description: hasRightsType
Equivalent To
SubProperty Of
Domains (intersection)
'Water Rights'
(hasRightsType value "Conditional Rights") or (hasRightsType value "Permanent Rights") or (hasRightsType value "Temporary Rights")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSalinityLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSalinityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSalinityLevel
Annotations Usage
Annotations: hasSalinityLevel
Annotations
rdfs:label [language: en]
hasSalinityLevel
rdfs:comment [language: en]
Refers to the concentration of salts in the soil, which can affect plant growth and crop yields. Possible values can include "Low Salinity", "Moderate Salinity", and "High Salinity".
Characteristics: hasSalinity
Functional
Description: hasSalinityLevel
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Salinity'
(hasSalinityLevel value "High Salinity") or (hasSalinityLevel value "Low Salinity") or (hasSalinityLevel value "Moderate Salinity")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSeasonalVariabilitySurface
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSeasonalVariabilitySurface — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSeasonalVariabilitySurface
Annotations Usage
Annotations: hasSeasonalVariabilitySurface
Annotations
rdfs:label [language: en]
hasSeasonalVariabilitySurface
rdfs:comment [language: en]
Indicates the level of seasonal variability in the availability of surface water. Possible values include "High Variability", "Moderate Variability", and "Low Variability".
Characteristics: hasSeasor
Functional
Description: hasSeasonalVariabilitySurface
Equivalent To
SubProperty Of
Domains (intersection)
'Surface Water'
(hasSeasonalVariabilitySurface value "High Variability") or (hasSeasonalVariabilitySurface value "Low Variability") or
(hasSeasonalVariabilitySurface value "Moderate Variability")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSeasonalVariation
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
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hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
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hasOverallEfficiency
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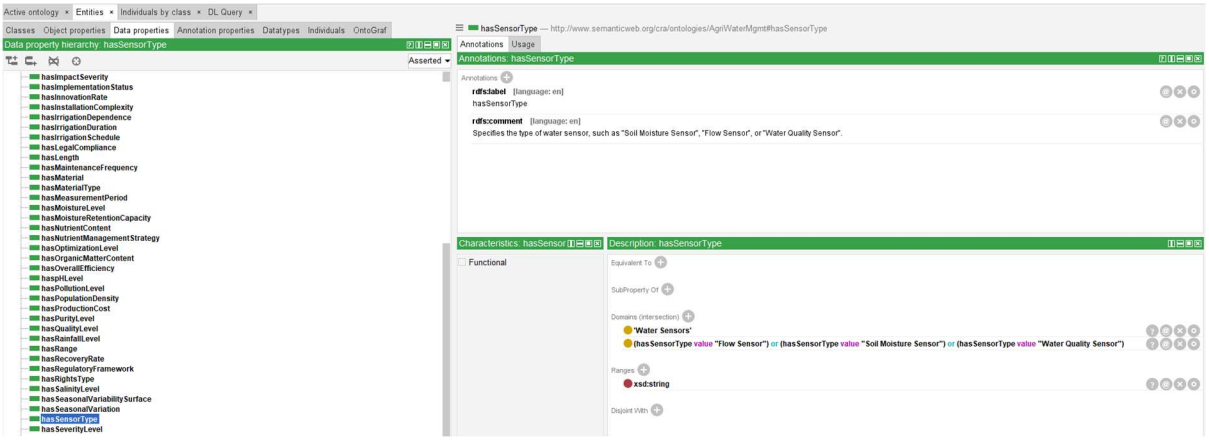
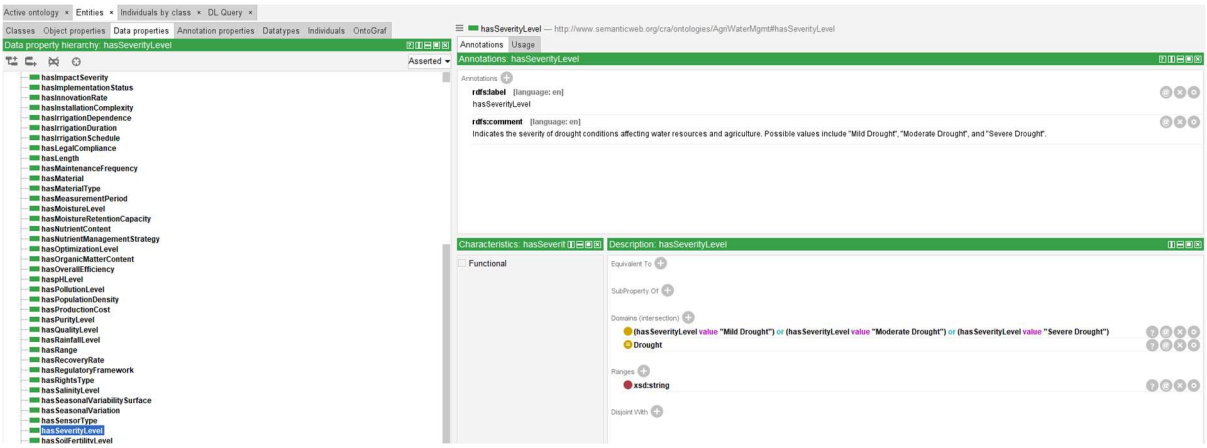
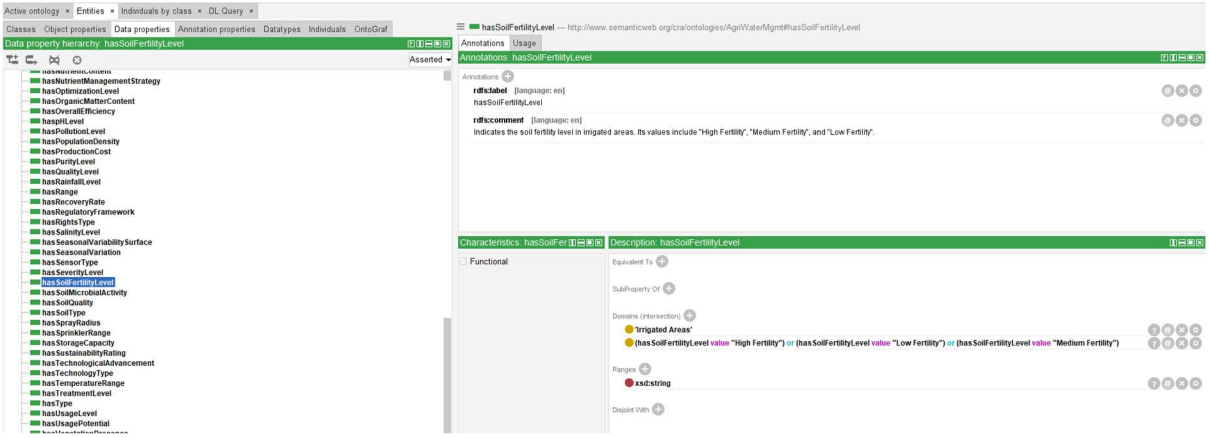
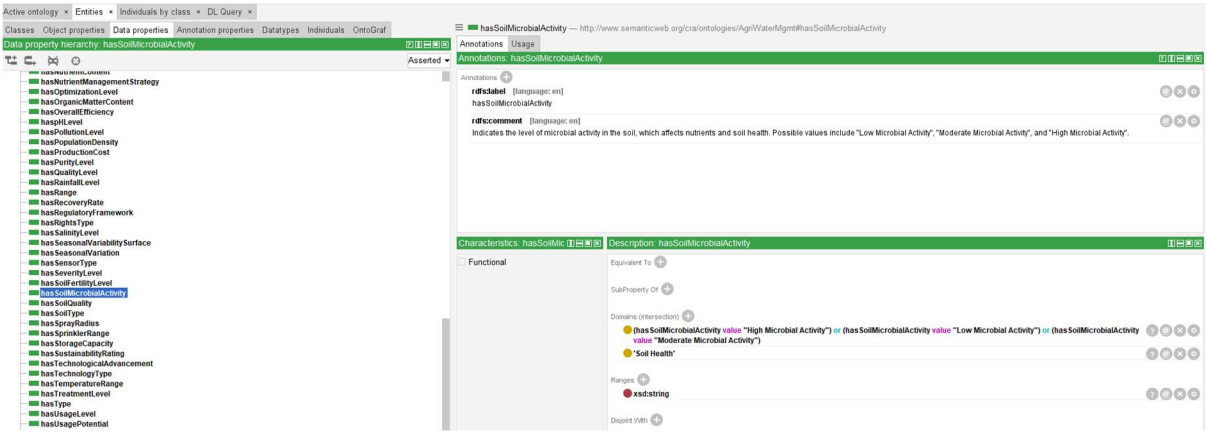
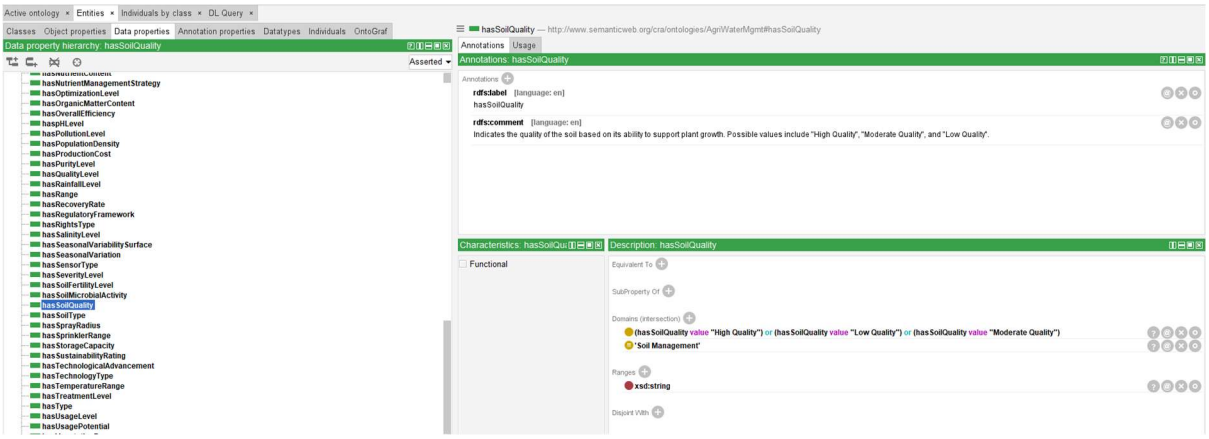
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSeasonalVariation — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSeasonalVariation
Annotations Usage
Annotations: hasSeasonalVariation
Annotations
rdfs:label [language: en]
hasSeasonalVariation
rdfs:comment [language: en]
Refers to how irrigation requirements change throughout the growing season due to climate and crop growth stages. Its values include "Consistent", "Slightly Variable" and "Highly Variable".
Characteristics: hasSeasor
Functional
Description: hasSeasonalVariation
Equivalent To
SubProperty Of
Domains (intersection)
'Crop Irrigation Requirements'
(hasSeasonalVariation value "Consistent") or (hasSeasonalVariation value "Highly Variable") or (hasSeasonalVariation value "Slightly Variable")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSensorType
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSensorType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSensorType
Annotations Usage
Annotations: hasSensorType
Annotations
rdfs:label [language: en]
hasSensorType
rdfs:comment [language: en]
Specifies the type of water sensor, such as "Soil Moisture Sensor", "Flow Sensor", or "Water Quality Sensor".
Characteristics: hasSensor
Functional
Description: hasSensorType
Equivalent To
SubProperty Of
Domains (intersection)
'Water Sensors'
(hasSensorType value "Flow Sensor") or (hasSensorType value "Soil Moisture Sensor") or (hasSensorType value "Water Quality Sensor")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSeverityLevel
Asserted
hasImpactSeverity
hasImplementationStatus
hasInnovationRate
hasInstallationComplexity
hasIrrigationDependence
hasIrrigationDuration
hasIrrigationSchedule
hasLegalCompliance
hasLength
hasMaintenanceFrequency
hasMaterial
hasMaterialType
hasMeasurementPeriod
hasMoistureLevel
hasMoistureRetentionCapacity
hasNutrientContent
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasphLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSeverityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSeverityLevel
Annotations Usage
Annotations: hasSeverityLevel
Annotations
rdfs:label [language: en]
hasSeverityLevel
rdfs:comment [language: en]
Indicates the severity of drought conditions affecting water resources and agriculture. Possible values include "Mild Drought", "Moderate Drought", and "Severe Drought".
Characteristics: hasSeverit
Functional
Description: hasSeverityLevel
Equivalent To
SubProperty Of
Domains (intersection)
(hasSeverityLevel value "Mild Drought") or (hasSeverityLevel value "Moderate Drought") or (hasSeverityLevel value "Severe Drought")
Drought
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSoilFertilityLevel
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasphLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasSoilFertilityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSoilFertilityLevel
Annotations Usage
Annotations: hasSoilFertilityLevel
Annotations
rdfs:label [language: en]
hasSoilFertilityLevel
rdfs:comment [language: en]
Indicates the soil fertility level in irrigated areas. Its values include "High Fertility", "Medium Fertility", and "Low Fertility".
Characteristics: hasSoilFer
Functional
Description: hasSoilFertilityLevel
Equivalent To
SubProperty Of
Domains (intersection)
'Irrigated Areas'
(hasSoilFertilityLevel value "High Fertility") or (hasSoilFertilityLevel value "Low Fertility") or (hasSoilFertilityLevel value "Medium Fertility")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasSoilMicrobialActivity
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasphLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasSoilMicrobialActivity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSoilMicrobialActivity
Annotations Usage
Annotations: hasSoilMicrobialActivity
Annotations
rdfs:label [language: en]
hasSoilMicrobialActivity
rdfs:comment [language: en]
Indicates the level of microbial activity in the soil, which affects nutrients and soil health. Possible values include "Low Microbial Activity", "Moderate Microbial Activity", and "High Microbial Activity".
Characteristics: hasSoilMic
Functional
Description: hasSoilMicrobialActivity
Equivalent To
SubProperty Of
Domains (intersection)
(hasSoilMicrobialActivity value "High Microbial Activity") or (hasSoilMicrobialActivity value "Low Microbial Activity") or (hasSoilMicrobialActivity value "Moderate Microbial Activity")
'Soil Health'
Ranges
xsd:string
Disjoint With


Active ontology
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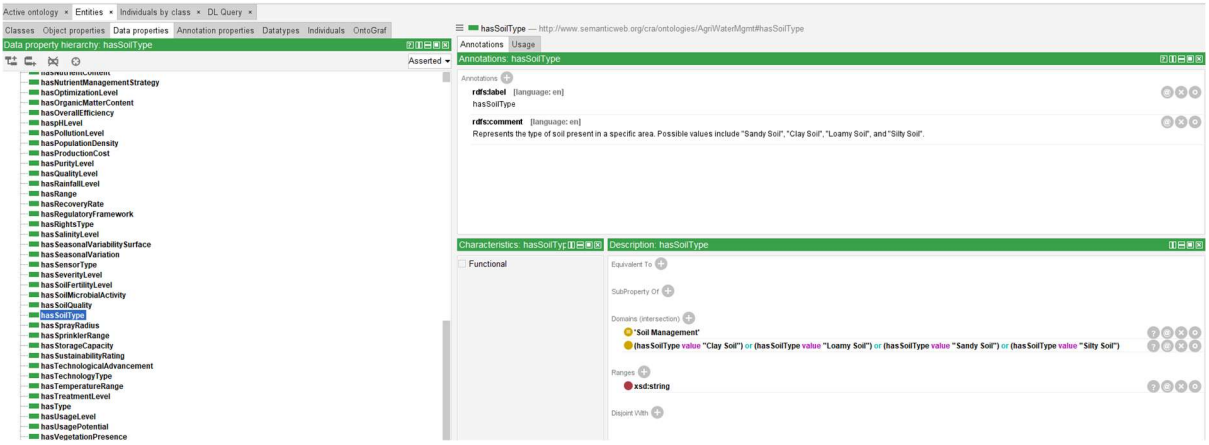
OntoGraf
Data property hierarchy: hasSoilQuality
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasSoilQuality — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSoilQuality
Annotations
Usage
Annotations: hasSoilQuality
rdfs:label [language: en]
hasSoilQuality
rdfs:comment [language: en]
Indicates the quality of the soil based on its ability to support plant growth. Possible values include "High Quality", "Moderate Quality", and "Low Quality".
Characteristics: hasSoilQuality
Description: hasSoilQuality
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasSoilQuality value "High Quality") or (hasSoilQuality value "Low Quality") or (hasSoilQuality value "Moderate Quality")
'Soil Management'
Ranges
xsd:string
Disjoint With


Active ontology
Entities
Individuals by class
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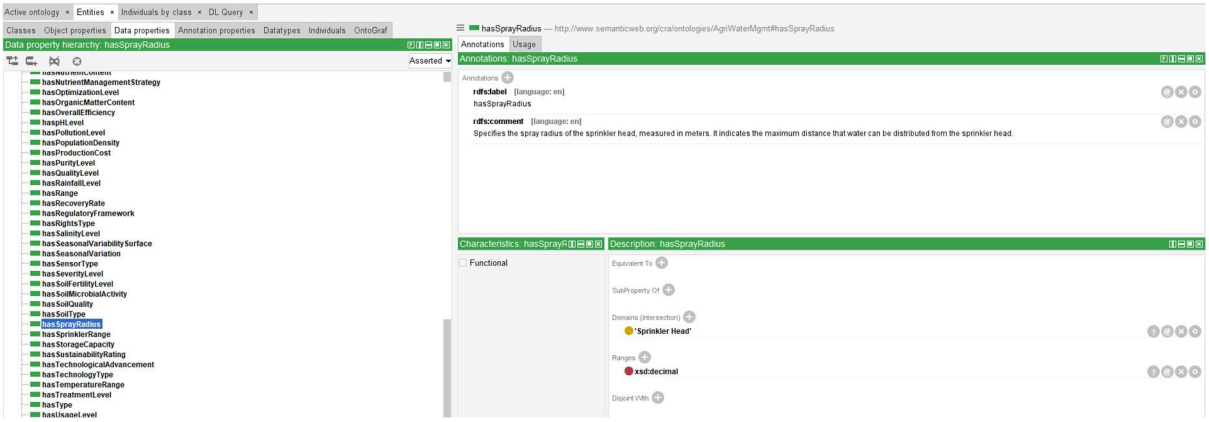
OntoGraf
Data property hierarchy: hasSoilType
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasSoilType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSoilType
Annotations
Usage
Annotations: hasSoilType
rdfs:label [language: en]
hasSoilType
rdfs:comment [language: en]
Represents the type of soil present in a specific area. Possible values include "Sandy Soil", "Clay Soil", "Loamy Soil", and "Silty Soil".
Characteristics: hasSoilType
Description: hasSoilType
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Management'
(hasSoilType value "Clay Soil") or (hasSoilType value "Loamy Soil") or (hasSoilType value "Sandy Soil") or (hasSoilType value "Silty Soil")
Ranges
xsd:string
Disjoint With


Active ontology
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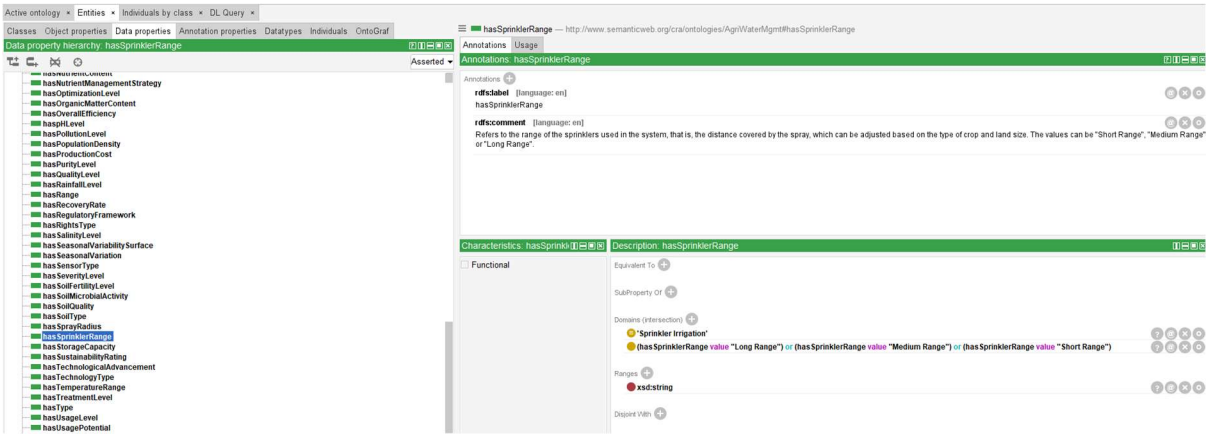
Data property hierarchy: hasSprayRadius
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasSprayRadius — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSprayRadius
Annotations
Usage
Annotations: hasSprayRadius
rdfs:label [language: en]
hasSprayRadius
rdfs:comment [language: en]
Specifies the spray radius of the sprinkler head, measured in meters. It indicates the maximum distance that water can be distributed from the sprinkler head.
Characteristics: hasSprayRadius
Description: hasSprayRadius
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Sprinkler Head'
Ranges
xsd:decimal
Disjoint With


Active ontology
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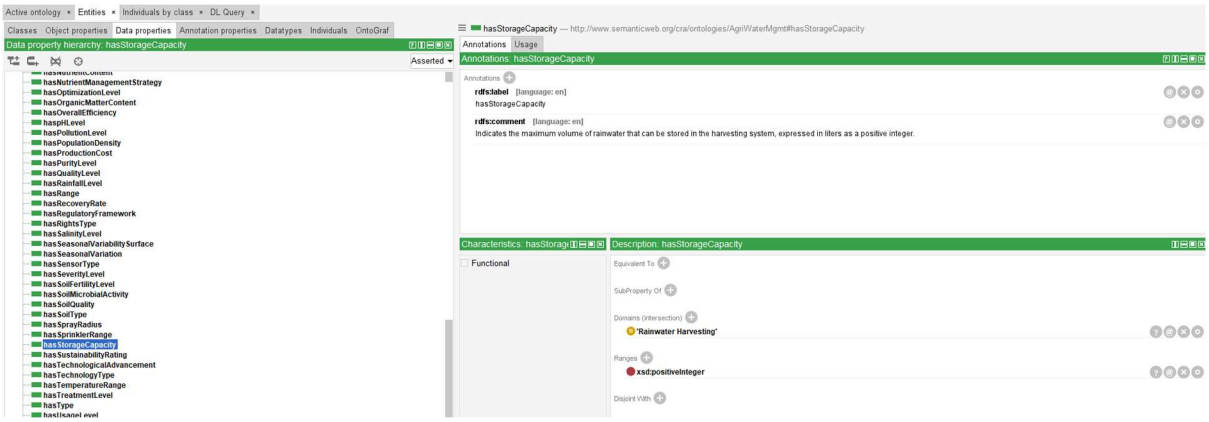
Data property hierarchy: hasSprinklerRange
Asserted
hasSprinklerRange — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSprinklerRange
Annotations
Usage
Annotations: hasSprinklerRange
rdfs:label [language: en]
hasSprinklerRange
rdfs:comment [language: en]
Refers to the range of the sprinklers used in the system, that is, the distance covered by the spray, which can be adjusted based on the type of crop and land size. The values can be "Short Range", "Medium Range" or "Long Range".
Characteristics: hasSprinkl
Description: hasSprinklerRange
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Sprinkler Irrigation'
(hasSprinklerRange value "Long Range") or (hasSprinklerRange value "Medium Range") or (hasSprinklerRange value "Short Range")
Ranges
xsd:string
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential


Active ontology
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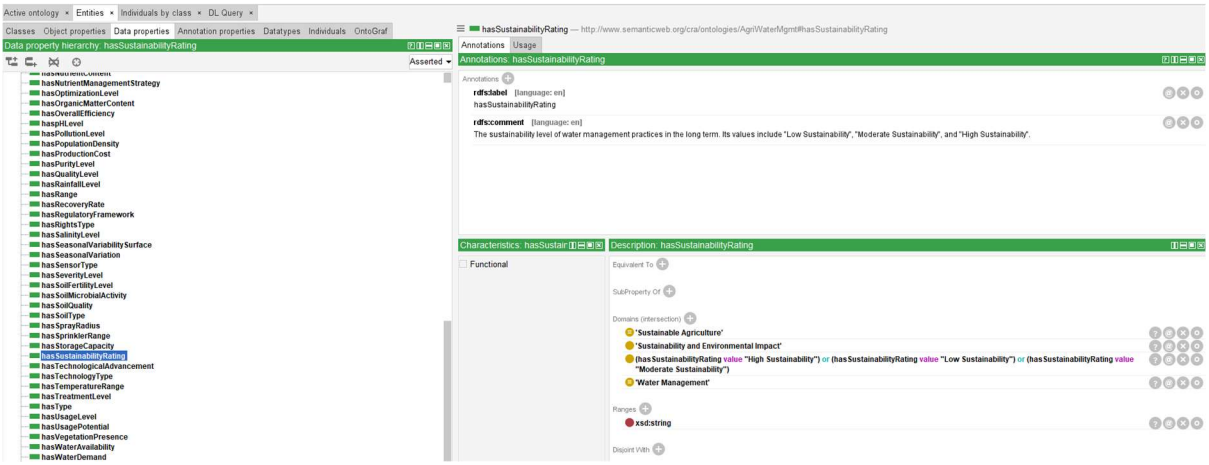
Data property hierarchy: hasStorageCapacity
Asserted
hasStorageCapacity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasStorageCapacity
Annotations
Usage
Annotations: hasStorageCapacity
rdfs:label [language: en]
hasStorageCapacity
rdfs:comment [language: en]
Indicates the maximum volume of rainwater that can be stored in the harvesting system, expressed in liters as a positive integer.
Characteristics: hasStoragi
Description: hasStorageCapacity
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Rainwater Harvesting'
Ranges
xsd:positiveInteger
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType


Active ontology
Entities
Individuals by class
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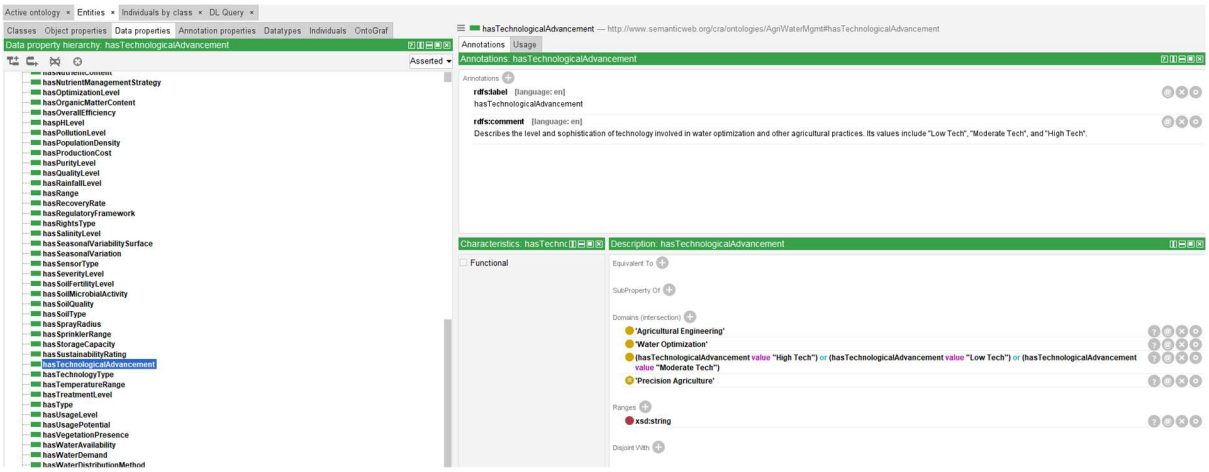
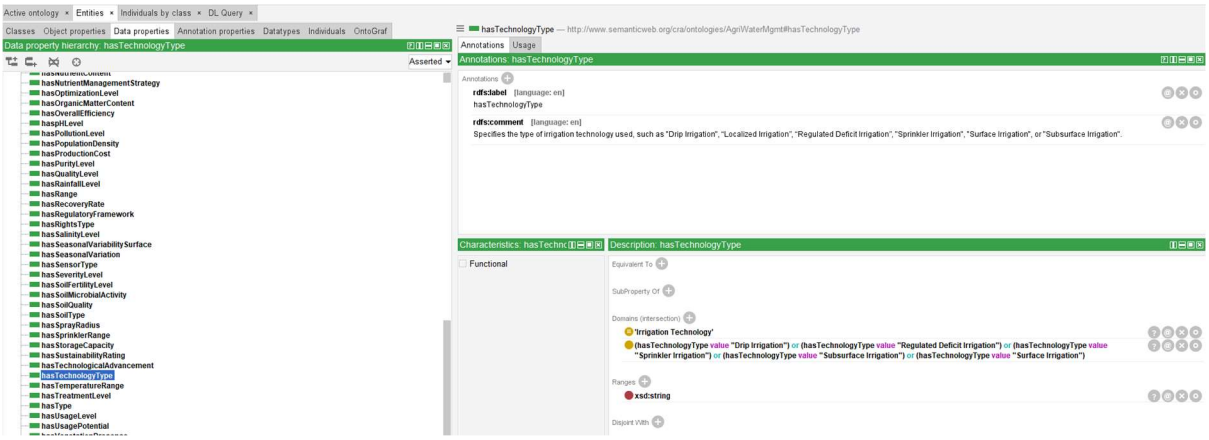
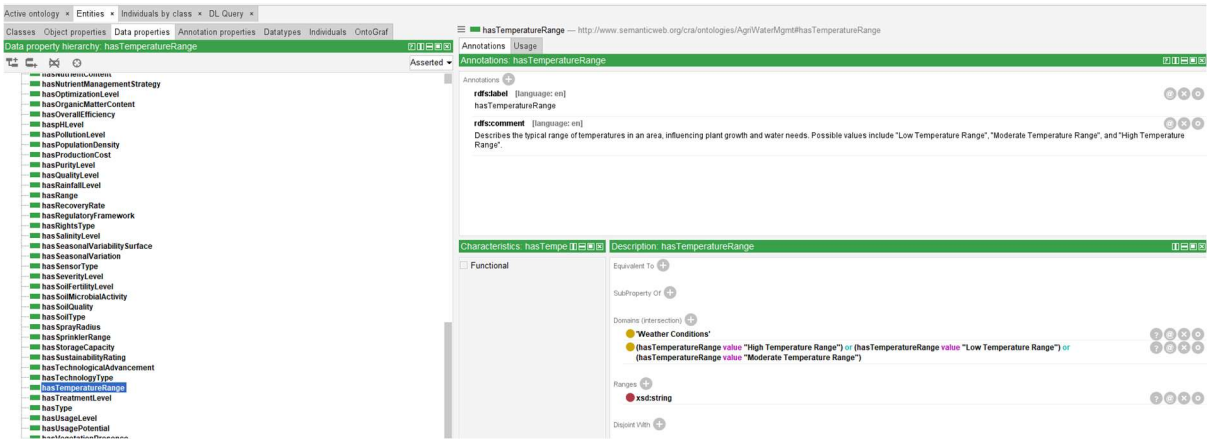
Data property hierarchy: hasSustainabilityRating
Asserted
hasSustainabilityRating — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasSustainabilityRating
Annotations
Usage
Annotations: hasSustainabilityRating
rdfs:label [language: en]
hasSustainabilityRating
rdfs:comment [language: en]
The sustainability level of water management practices in the long term. Its values include "Low Sustainability", "Moderate Sustainability", and "High Sustainability".
Characteristics: hasSustain
Description: hasSustainabilityRating
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Sustainable Agriculture'
'Sustainability and Environmental Impact'
(hasSustainabilityRating value "High Sustainability") or (hasSustainabilityRating value "Low Sustainability") or (hasSustainabilityRating value "Moderate Sustainability")
'Water Management'
Ranges
xsd:string
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasTechnologicalAdvancement
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
haSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasTechnologicalAdvancement — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasTechnologicalAdvancement
Annotations Usage
Annotations: hasTechnologicalAdvancement
rdfs:label [language: en]
hasTechnologicalAdvancement
rdfs:comment [language: en]
Describes the level and sophistication of technology involved in water optimization and other agricultural practices. Its values include "Low Tech", "Moderate Tech", and "High Tech".
Characteristics: hasTechnc
Functional
Description: hasTechnologicalAdvancement
Equivalent To
SubProperty Of
Domains (intersection)
'Agricultural Engineering'
'Water Optimization'
(hasTechnologicalAdvancement value "High Tech") or (hasTechnologicalAdvancement value "Low Tech") or (hasTechnologicalAdvancement value "Moderate Tech")
'Precision Agriculture'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasTechnologyType
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
haSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasTechnologyType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasTechnologyType
Annotations Usage
Annotations: hasTechnologyType
rdfs:label [language: en]
hasTechnologyType
rdfs:comment [language: en]
Specifies the type of irrigation technology used, such as "Drip Irrigation", "Localized Irrigation", "Regulated Deficit Irrigation", "Sprinkler Irrigation", "Surface Irrigation", or "Subsurface Irrigation".
Characteristics: hasTechnc
Functional
Description: hasTechnologyType
Equivalent To
SubProperty Of
Domains (intersection)
'Irrigation Technology'
(hasTechnologyType value "Drip Irrigation") or (hasTechnologyType value "Regulated Deficit Irrigation") or (hasTechnologyType value "Sprinkler Irrigation") or (hasTechnologyType value "Subsurface Irrigation") or (hasTechnologyType value "Surface Irrigation")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasTemperatureRange
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
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hasRightsType
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hasSeasonalVariation
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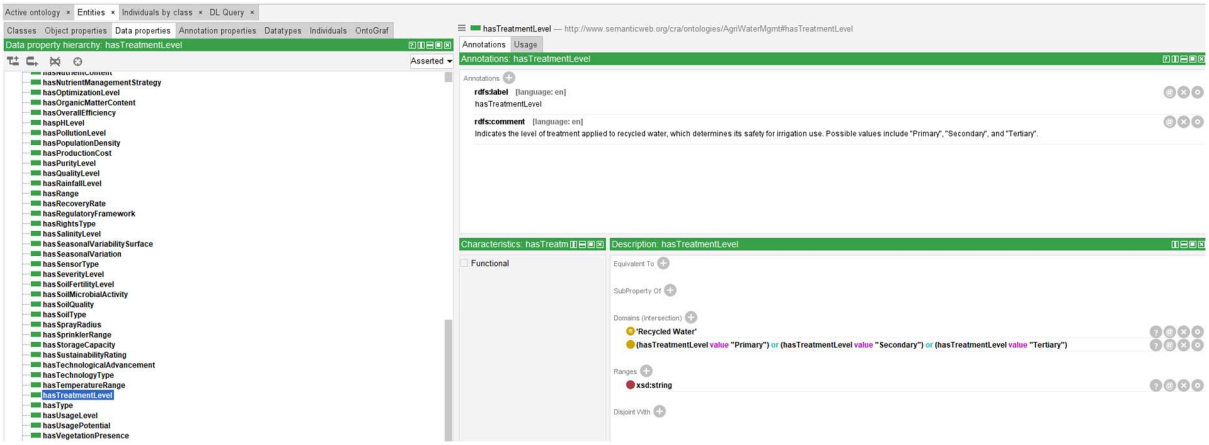
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
haSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasTemperatureRange — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasTemperatureRange
Annotations Usage
Annotations: hasTemperatureRange
rdfs:label [language: en]
hasTemperatureRange
rdfs:comment [language: en]
Describes the typical range of temperatures in an area, influencing plant growth and water needs. Possible values include "Low Temperature Range", "Moderate Temperature Range", and "High Temperature Range".
Characteristics: hasTempe
Functional
Description: hasTemperatureRange
Equivalent To
SubProperty Of
Domains (intersection)
'Weather Conditions'
(hasTemperatureRange value "High Temperature Range") or (hasTemperatureRange value "Low Temperature Range") or (hasTemperatureRange value "Moderate Temperature Range")
Ranges
xsd:string
Disjoint With


Active ontology
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Data property hierarchy: hasTreatmentLevel
Asserted
hasTreatmentLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasTreatmentLevel
Annotations
Usage
Annotations: hasTreatmentLevel
rdfs:label [language: en]
hasTreatmentLevel
rdfs:comment [language: en]
Indicates the level of treatment applied to recycled water, which determines its safety for irrigation use. Possible values include "Primary", "Secondary", and "Tertiary".
Characteristics: hasTreatm
Description: hasTreatmentLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Recycled Water'
(hasTreatmentLevel value "Primary") or (hasTreatmentLevel value "Secondary") or (hasTreatmentLevel value "Tertiary")
Ranges
xsd:string
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
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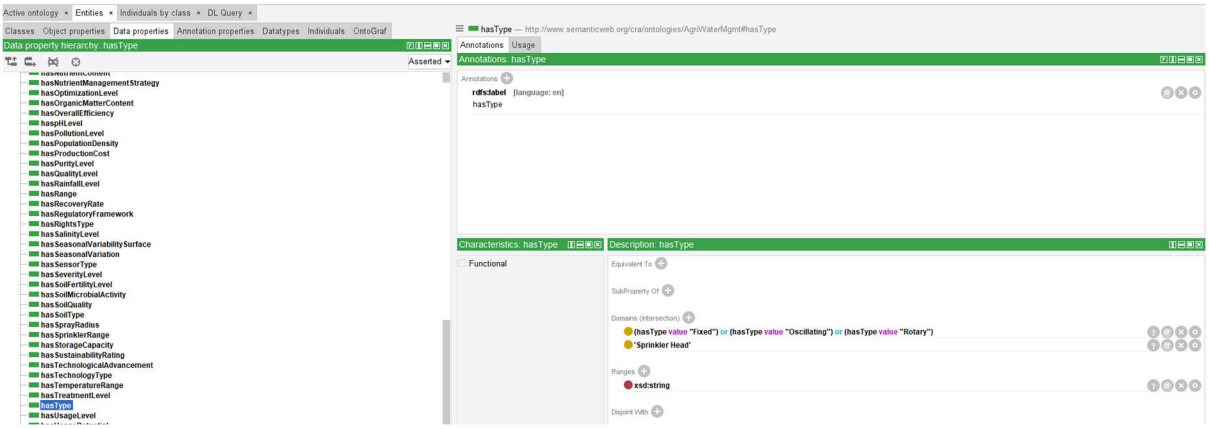
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence


Active ontology
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Data property hierarchy: hasType
Asserted
hasType — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasType
Annotations
Usage
Annotations: hasType
rdfs:label [language: en]
hasType
Characteristics: hasType
Description: hasType
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasType value "Fixed") or (hasType value "Oscillating") or (hasType value "Rotary")
'Sprinkler Head'
Ranges
xsd:string
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
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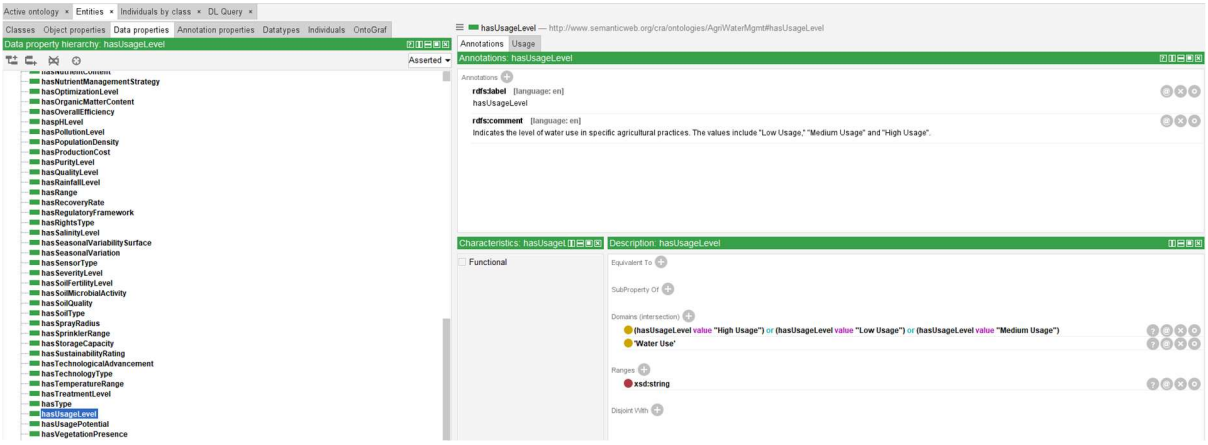
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel


Active ontology
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OntoGraf
Data property hierarchy: hasUsageLevel
Asserted
hasUsageLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasUsageLevel
Annotations
Usage
Annotations: hasUsageLevel
rdfs:label [language: en]
hasUsageLevel
rdfs:comment [language: en]
Indicates the level of water use in specific agricultural practices. The values include "Low Usage," "Medium Usage" and "High Usage".
Characteristics: hasUsageL
Description: hasUsageLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
(hasUsageLevel value "High Usage") or (hasUsageLevel value "Low Usage") or (hasUsageLevel value "Medium Usage")
'Water Use'
Ranges
xsd:string
Disjoint With
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
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hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
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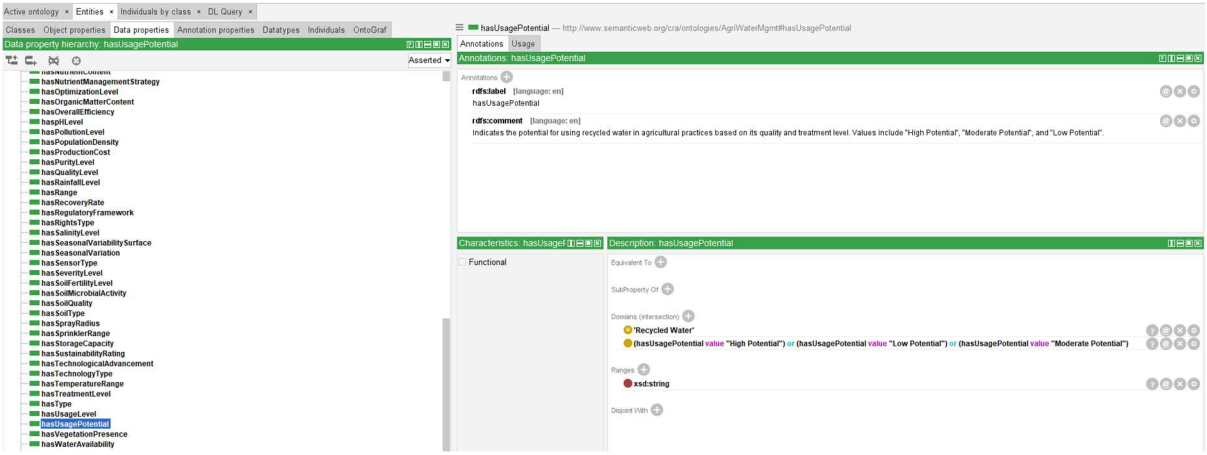
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasUsagePotential
Asserted
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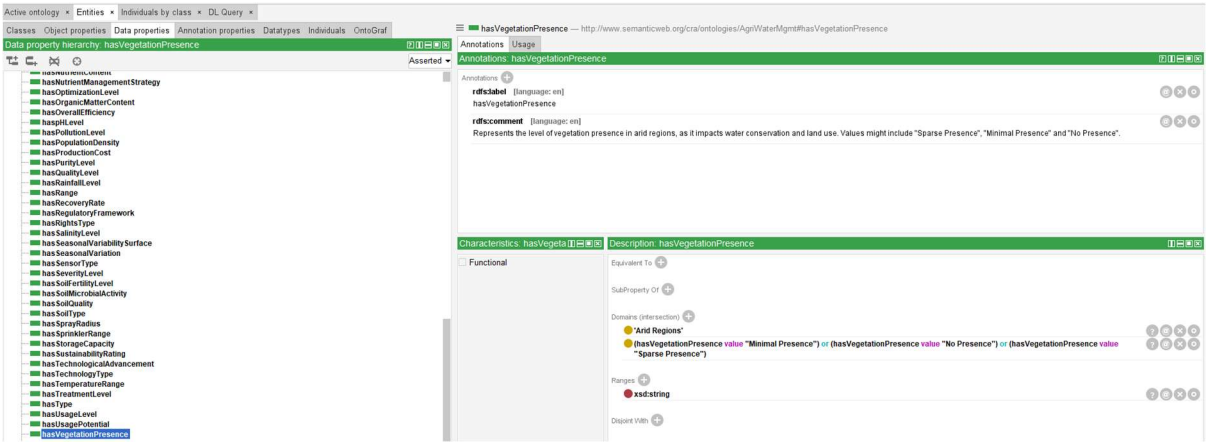
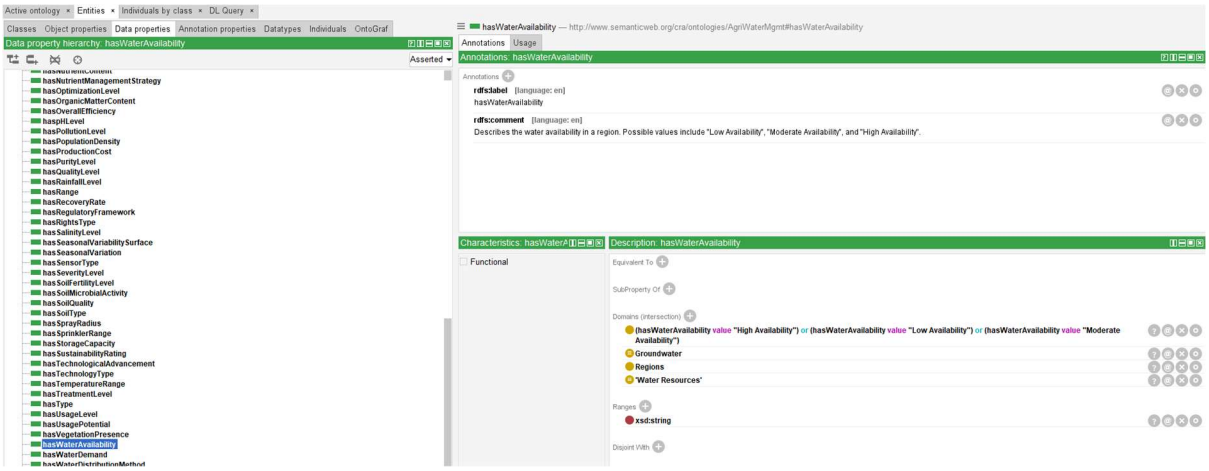
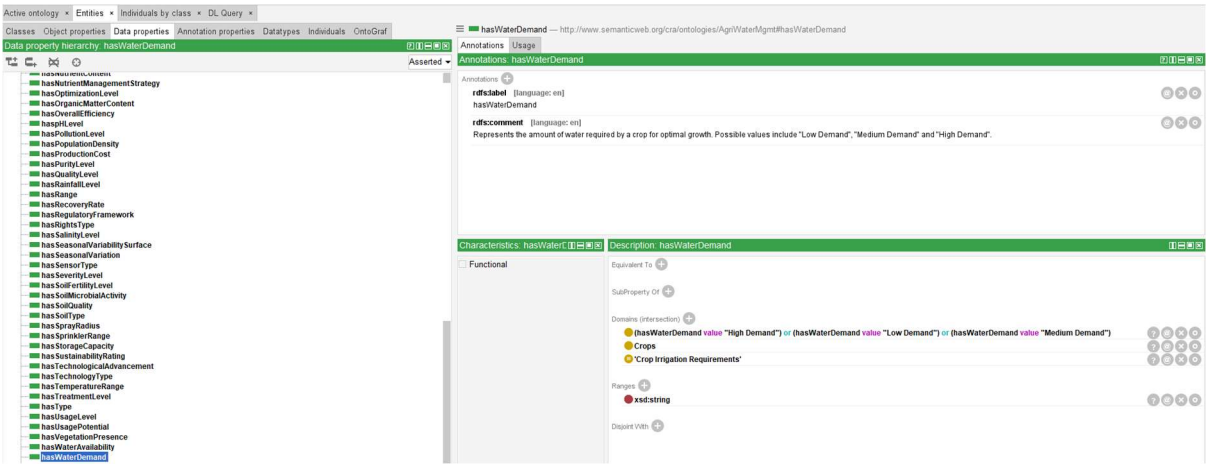
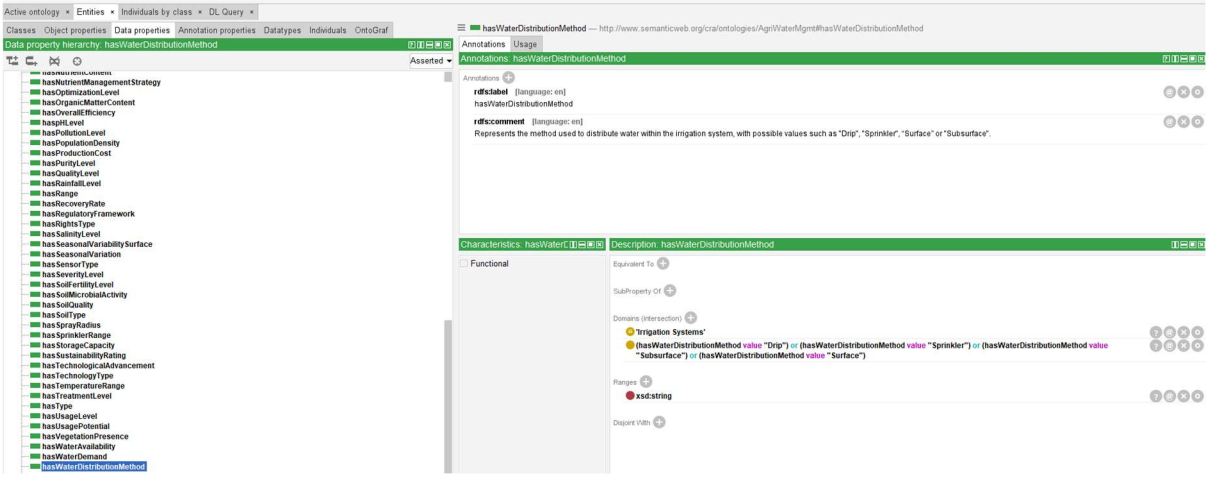
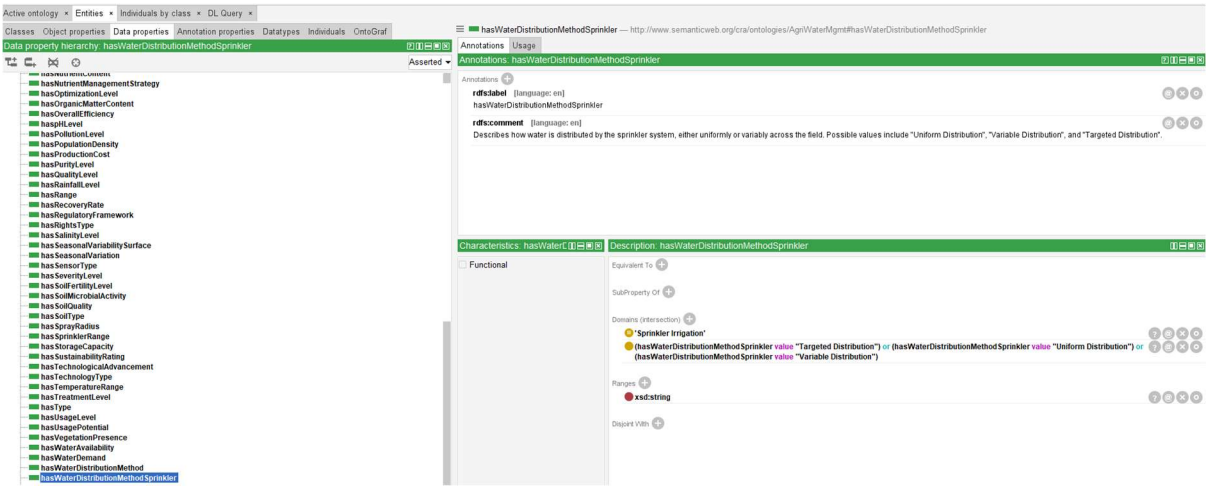
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasUsagePotential — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasUsagePotential
Annotations Usage
Annotations: hasUsagePotential
rdfs:label [language: en]
hasUsagePotential
rdfs:comment [language: en]
Indicates the potential for using recycled water in agricultural practices based on its quality and treatment level. Values include "High Potential", "Moderate Potential", and "Low Potential".
Characteristics: hasUsageP
Functional
Description: hasUsagePotential
Equivalent To
SubProperty Of
Domains (intersection)
'Recycled Water'
(hasUsagePotential value "High Potential") or (hasUsagePotential value "Low Potential") or (hasUsagePotential value "Moderate Potential")
Ranges
xsd:string
Disjoint With

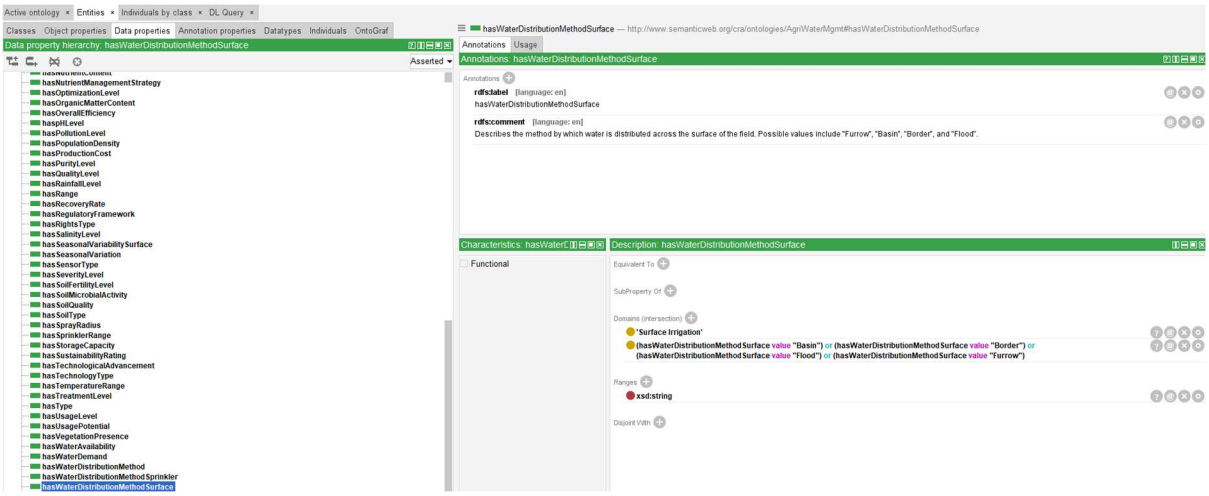

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasVegetationPresence
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasVegetationPresence — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasVegetationPresence
Annotations Usage
Annotations: hasVegetationPresence
rdfs:label [language: en]
hasVegetationPresence
rdfs:comment [language: en]
Represents the level of vegetation presence in arid regions, as it impacts water conservation and land use. Values might include "Sparse Presence", "Minimal Presence" and "No Presence".
Characteristics: hasVegeta
Functional
Description: hasVegetationPresence
Equivalent To
SubProperty Of
Domains (intersection)
'Arid Regions'
(hasVegetationPresence value "Minimal Presence") or (hasVegetationPresence value "No Presence") or (hasVegetationPresence value "Sparse Presence")
Ranges
xsd:string
Disjoint With

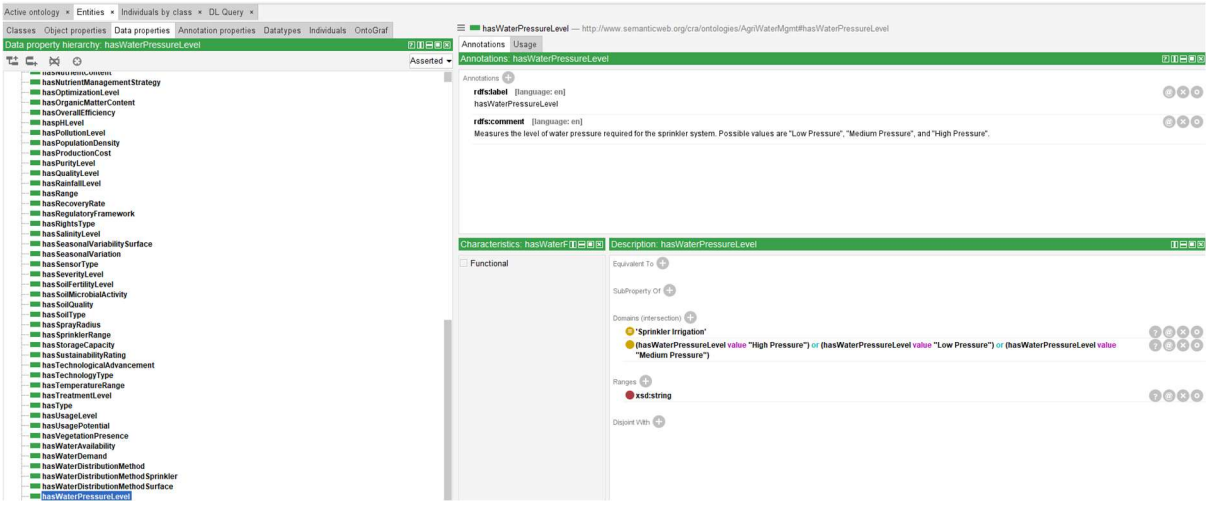

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterAvailability
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterAvailability — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterAvailability
Annotations Usage
Annotations: hasWaterAvailability
rdfs:label [language: en]
hasWaterAvailability
rdfs:comment [language: en]
Describes the water availability in a region. Possible values include "Low Availability", "Moderate Availability", and "High Availability".
Characteristics: hasWaterA
Functional
Description: hasWaterAvailability
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterAvailability value "High Availability") or (hasWaterAvailability value "Low Availability") or (hasWaterAvailability value "Moderate Availability")
Groundwater
Regions
'Water Resources'
Ranges
xsd:string
Disjoint With

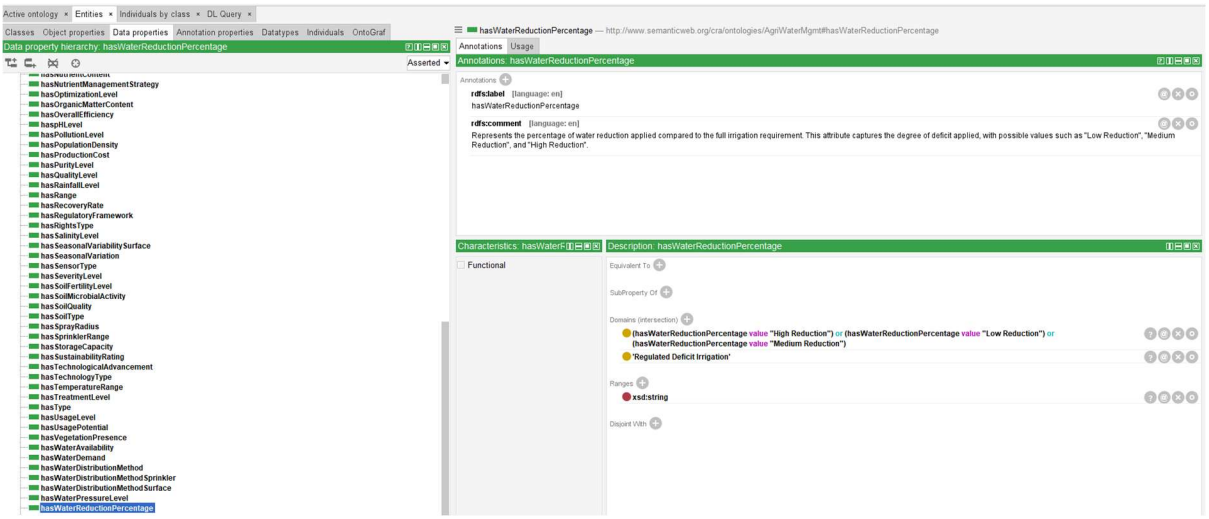

Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterDemand
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDemand — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterDemand
Annotations Usage
Annotations: hasWaterDemand
rdfs:label [language: en]
hasWaterDemand
rdfs:comment [language: en]
Represents the amount of water required by a crop for optimal growth. Possible values include "Low Demand", "Medium Demand" and "High Demand".
Characteristics: hasWaterD
Functional
Description: hasWaterDemand
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterDemand value "High Demand") or (hasWaterDemand value "Low Demand") or (hasWaterDemand value "Medium Demand")
Crops
'Crop Irrigation Requirements'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterDistributionMethod
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethod — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterDistributionMethod
Annotations Usage
Annotations: hasWaterDistributionMethod
rdfs:label [language: en]
hasWaterDistributionMethod
rdfs:comment [language: en]
Represents the method used to distribute water within the irrigation system, with possible values such as "Drip", "Sprinkler", "Surface" or "Subsurface".
Characteristics: hasWaterD
Functional
Description: hasWaterDistributionMethod
Equivalent To
SubProperty Of
Domains (intersection)
'Irrigation Systems'
(hasWaterDistributionMethod value "Drip") or (hasWaterDistributionMethod value "Sprinkler") or (hasWaterDistributionMethod value "Subsurface") or (hasWaterDistributionMethod value "Surface")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterDistributionMethodSprinkler
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
haspHLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSprinkler — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterDistributionMethodSprinkler
Annotations Usage
Annotations: hasWaterDistributionMethodSprinkler
rdfs:label [language: en]
hasWaterDistributionMethodSprinkler
rdfs:comment [language: en]
Describes how water is distributed by the sprinkler system, either uniformly or variably across the field. Possible values include "Uniform Distribution", "Variable Distribution", and "Targeted Distribution".
Characteristics: hasWaterD
Functional
Description: hasWaterDistributionMethodSprinkler
Equivalent To
SubProperty Of
Domains (intersection)
'Sprinkler Irrigation'
(hasWaterDistributionMethodSprinkler value "Targeted Distribution") or (hasWaterDistributionMethodSprinkler value "Uniform Distribution") or (hasWaterDistributionMethodSprinkler value "Variable Distribution")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterDistributionMethodSurface
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterDistributionMethodSurface — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterDistributionMethodSurface
Annotations Usage
Annotations: hasWaterDistributionMethodSurface
rdfs:label [language: en]
hasWaterDistributionMethodSurface
rdfs:comment [language: en]
Describes the method by which water is distributed across the surface of the field. Possible values include "Furrow", "Basin", "Border", and "Flood".
Characteristics: hasWaterE
Functional
Description: hasWaterDistributionMethodSurface
Equivalent To
SubProperty Of
Domains (intersection)
'Surface Irrigation'
(hasWaterDistributionMethodSurface value "Basin") or (hasWaterDistributionMethodSurface value "Border") or (hasWaterDistributionMethodSurface value "Flood") or (hasWaterDistributionMethodSurface value "Furrow")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterPressureLevel
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterPressureLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterPressureLevel
Annotations Usage
Annotations: hasWaterPressureLevel
rdfs:label [language: en]
hasWaterPressureLevel
rdfs:comment [language: en]
Measures the level of water pressure required for the sprinkler system. Possible values are "Low Pressure", "Medium Pressure", and "High Pressure".
Characteristics: hasWaterF
Functional
Description: hasWaterPressureLevel
Equivalent To
SubProperty Of
Domains (intersection)
'Sprinkler Irrigation'
(hasWaterPressureLevel value "High Pressure") or (hasWaterPressureLevel value "Low Pressure") or (hasWaterPressureLevel value "Medium Pressure")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterReductionPercentage
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
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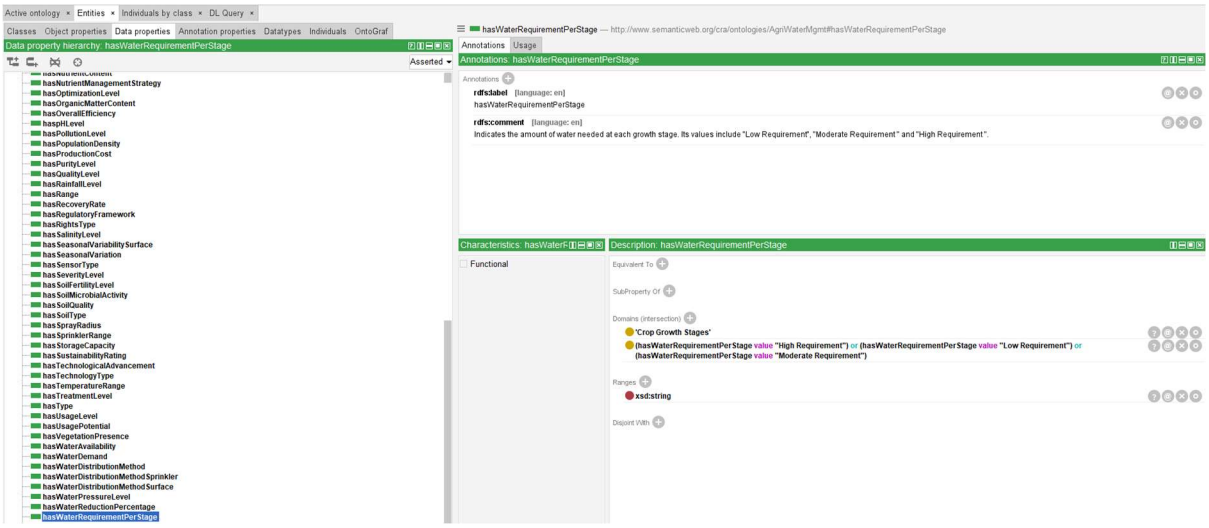
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterReductionPercentage — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterReductionPercentage
Annotations Usage
Annotations: hasWaterReductionPercentage
rdfs:label [language: en]
hasWaterReductionPercentage
rdfs:comment [language: en]
Represents the percentage of water reduction applied compared to the full irrigation requirement. This attribute captures the degree of deficit applied, with possible values such as "Low Reduction", "Medium Reduction", and "High Reduction".
Characteristics: hasWaterF
Functional
Description: hasWaterReductionPercentage
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterReductionPercentage value "High Reduction") or (hasWaterReductionPercentage value "Low Reduction") or (hasWaterReductionPercentage value "Medium Reduction")
'Regulated Deficit Irrigation'
Ranges
xsd:string
Disjoint With


Active ontology
Entities
Individuals by class
DL Query
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Data property hierarchy: hasWaterRequirementPerStage
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
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hasRightsType
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hasSeasonalVariation
hasSensorType
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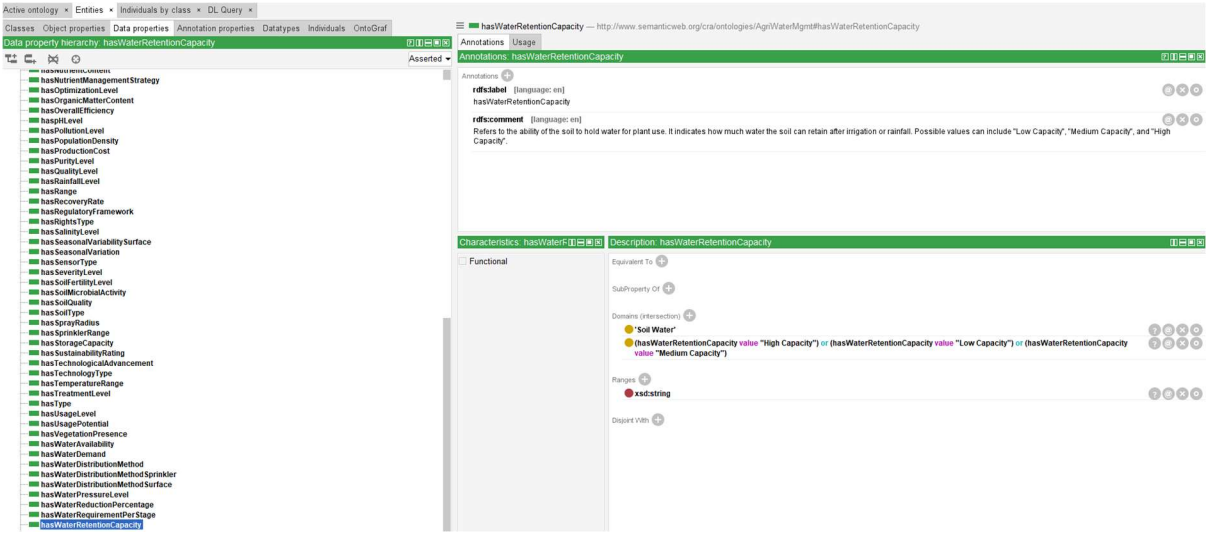
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRequirementPerStage — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterRequirementPerStage
Annotations
Usage
Annotations: hasWaterRequirementPerStage
rdfs:label [language: en]
hasWaterRequirementPerStage
rdfs:comment [language: en]
Indicates the amount of water needed at each growth stage. Its values include "Low Requirement", "Moderate Requirement " and "High Requirement ".
Characteristics: hasWaterR
Description: hasWaterRequirementPerStage
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Crop Growth Stages'
(hasWaterRequirementPerStage value "High Requirement") or (hasWaterRequirementPerStage value "Low Requirement") or (hasWaterRequirementPerStage value "Moderate Requirement")
Ranges
xsd:string
Disjoint With


Active ontology
Entities
Individuals by class
DL Query
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Annotation properties
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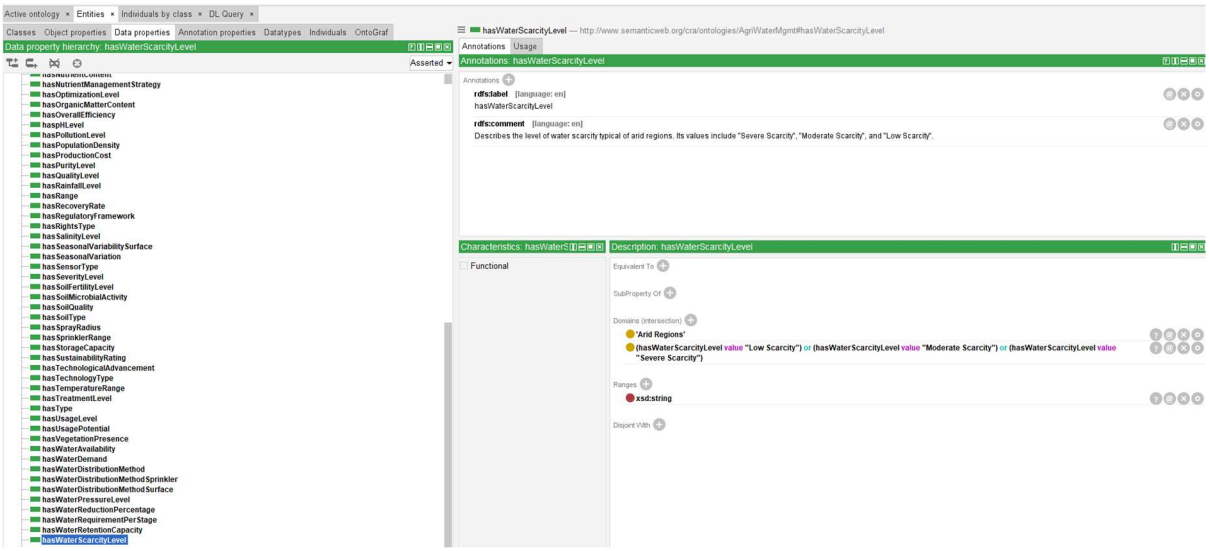
Data property hierarchy: hasWaterRetentionCapacity
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRetentionCapacity
hasWaterRetentionCapacity — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterRetentionCapacity
Annotations
Usage
Annotations: hasWaterRetentionCapacity
rdfs:label [language: en]
hasWaterRetentionCapacity
rdfs:comment [language: en]
Refers to the ability of the soil to hold water for plant use. It indicates how much water the soil can retain after irrigation or rainfall. Possible values can include "Low Capacity", "Medium Capacity", and "High Capacity".
Characteristics: hasWaterR
Description: hasWaterRetentionCapacity
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Soil Water'
(hasWaterRetentionCapacity value "High Capacity") or (hasWaterRetentionCapacity value "Low Capacity") or (hasWaterRetentionCapacity value "Medium Capacity")
Ranges
xsd:string
Disjoint With


Active ontology
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Annotation properties
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Individuals
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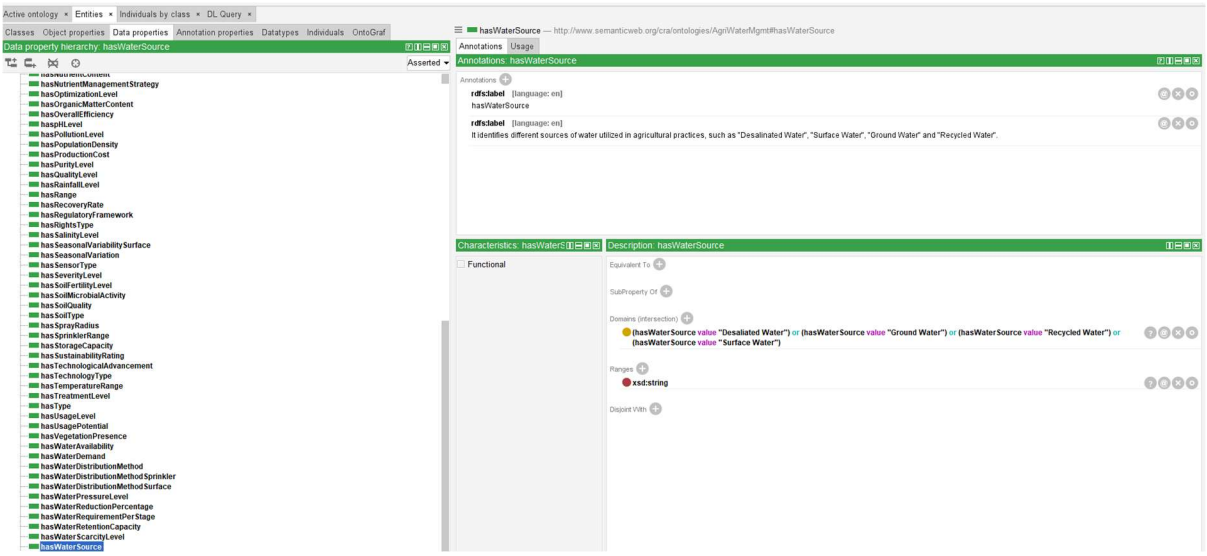
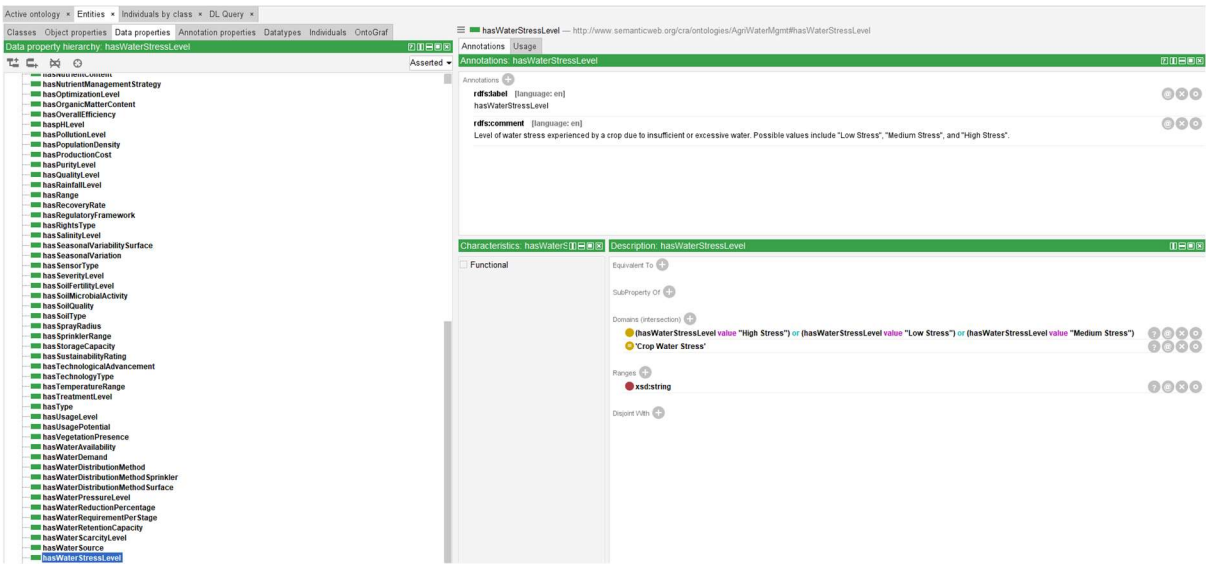
Data property hierarchy: hasWaterScarcityLevel
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRetentionCapacity
hasWaterScarcityLevel
hasWaterScarcityLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterScarcityLevel
Annotations
Usage
Annotations: hasWaterScarcityLevel
rdfs:label [language: en]
hasWaterScarcityLevel
rdfs:comment [language: en]
Describes the level of water scarcity typical of arid regions. Its values include "Severe Scarcity", "Moderate Scarcity", and "Low Scarcity".
Characteristics: hasWaterS
Description: hasWaterScarcityLevel
Functional
Equivalent To
SubProperty Of
Domains (intersection)
'Arid Regions'
(hasWaterScarcityLevel value "Low Scarcity") or (hasWaterScarcityLevel value "Moderate Scarcity") or (hasWaterScarcityLevel value "Severe Scarcity")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterSource
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRetentionCapacity
hasWaterScarcityLevel
hasWaterSource
hasWaterSource — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterSource
Annotations Usage
Annotations: hasWaterSource
Annotations
rdfs:label [language: en]
hasWaterSource
rdfs:label [language: en]
It identifies different sources of water utilized in agricultural practices, such as "Desalinated Water", "Surface Water", "Ground Water" and "Recycled Water".
Characteristics: hasWaterS
Functional
Description: hasWaterSource
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterSource value "Desaliated Water") or (hasWaterSource value "Ground Water") or (hasWaterSource value "Recycled Water") or (hasWaterSource value "Surface Water")
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterStressLevel
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
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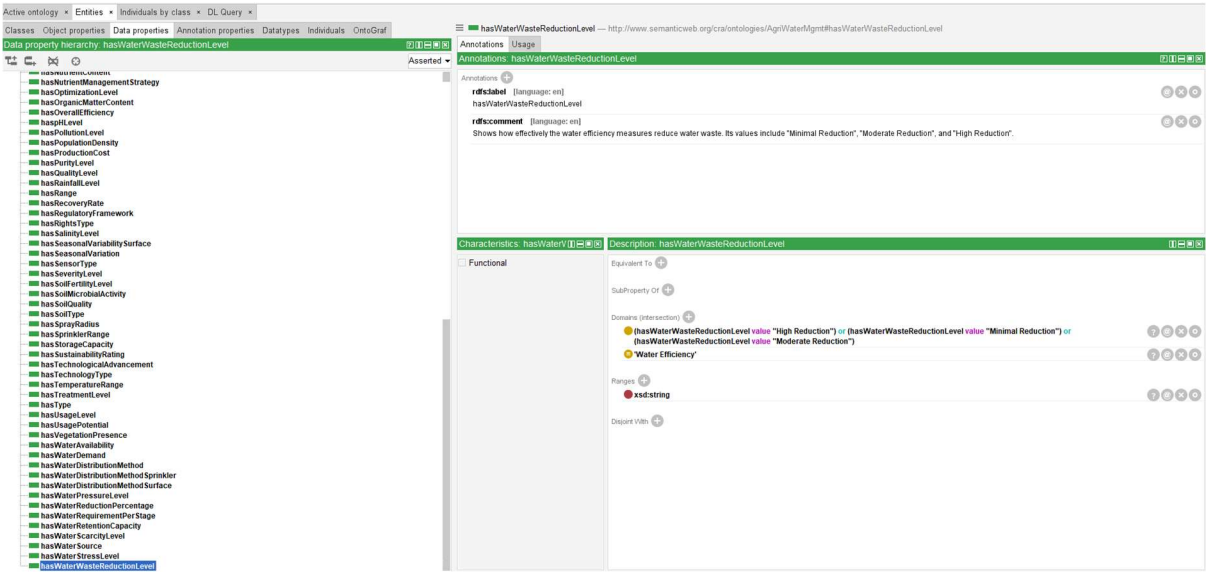
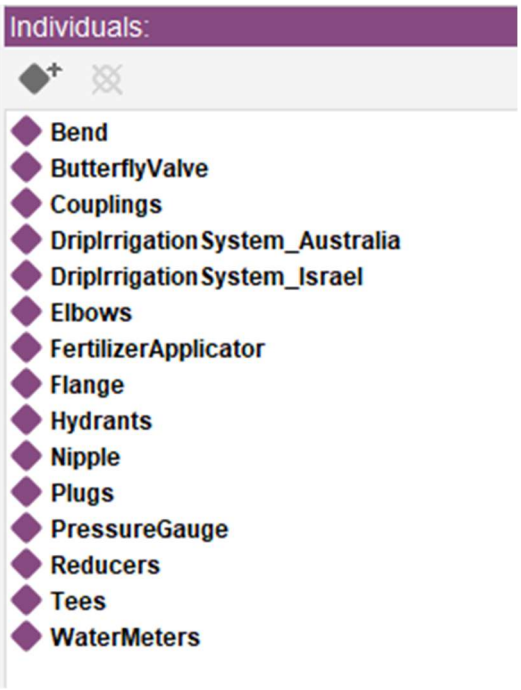
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRetentionCapacity
hasWaterScarcityLevel
hasWaterSource
hasWaterStressLevel
hasWaterStressLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterStressLevel
Annotations Usage
Annotations: hasWaterStressLevel
Annotations
rdfs:label [language: en]
hasWaterStressLevel
rdfs:comment [language: en]
Level of water stress experienced by a crop due to insufficient or excessive water. Possible values include "Low Stress", "Medium Stress", and "High Stress".
Characteristics: hasWaterS
Functional
Description: hasWaterStressLevel
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterStressLevel value "High Stress") or (hasWaterStressLevel value "Low Stress") or (hasWaterStressLevel value "Medium Stress")
'Crop Water Stress'
Ranges
xsd:string
Disjoint With


Active ontology × Entities × Individuals by class × DL Query ×
Classes Object properties Data properties Annotation properties Datatypes Individuals OntoGraf
Data property hierarchy: hasWaterWasteReductionLevel
Asserted
hasNutrientManagementStrategy
hasOptimizationLevel
hasOrganicMatterContent
hasOverallEfficiency
hasPhLevel
hasPollutionLevel
hasPopulationDensity
hasProductionCost
hasPurityLevel
hasQualityLevel
hasRainfallLevel
hasRange
hasRecoveryRate
hasRegulatoryFramework
hasRightsType
hasSalinityLevel
hasSeasonalVariabilitySurface
hasSeasonalVariation
hasSensorType
hasSeverityLevel
hasSoilFertilityLevel
hasSoilMicrobialActivity
hasSoilQuality
hasSoilType
hasSprayRadius
hasSprinklerRange
hasStorageCapacity
hasSustainabilityRating
hasTechnologicalAdvancement
hasTechnologyType
hasTemperatureRange
hasTreatmentLevel
hasType
hasUsageLevel
hasUsagePotential
hasVegetationPresence
hasWaterAvailability
hasWaterDemand
hasWaterDistributionMethod
hasWaterDistributionMethodSprinkler
hasWaterDistributionMethodSurface
hasWaterPressureLevel
hasWaterReductionPercentage
hasWaterRequirementPerStage
hasWaterRetentionCapacity
hasWaterScarcityLevel
hasWaterSource
hasWaterStressLevel
hasWaterWasteReductionLevel
hasWaterWasteReductionLevel — http://www.semanticweb.org/cra/ontologies/AgriWaterMgmt#hasWaterWasteReductionLevel
Annotations Usage
Annotations: hasWaterWasteReductionLevel
Annotations
rdfs:label [language: en]
hasWaterWasteReductionLevel
rdfs:comment [language: en]
Shows how effectively the water efficiency measures reduce water waste. Its values include "Minimal Reduction", "Moderate Reduction", and "High Reduction".
Characteristics: hasWaterV
Functional
Description: hasWaterWasteReductionLevel
Equivalent To
SubProperty Of
Domains (intersection)
(hasWaterWasteReductionLevel value "High Reduction") or (hasWaterWasteReductionLevel value "Minimal Reduction") or (hasWaterWasteReductionLevel value "Moderate Reduction")
'Water Efficiency'
Ranges
xsd:string
Disjoint With

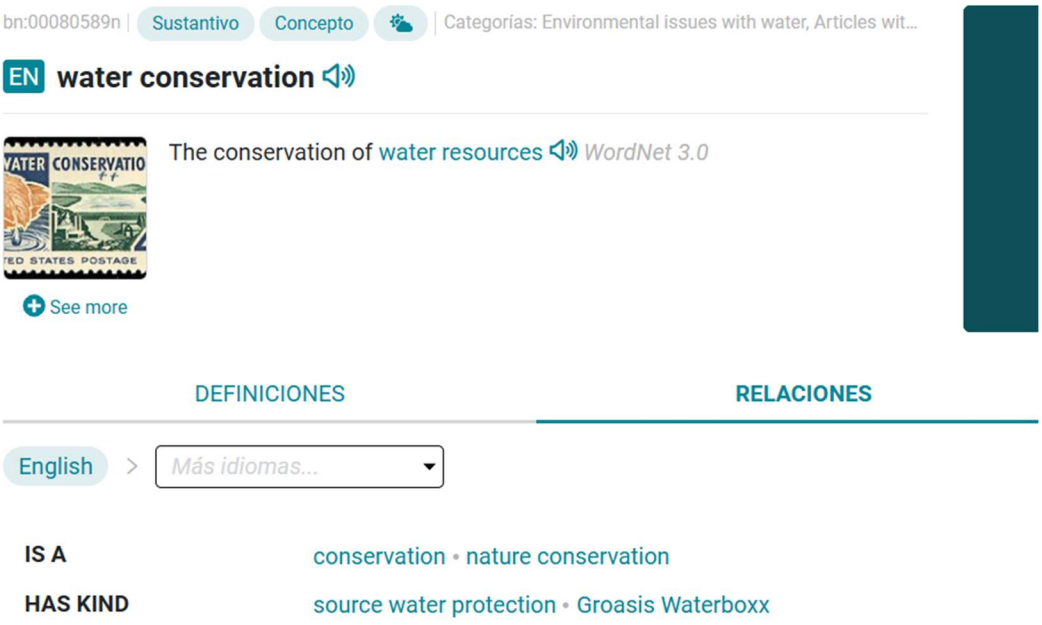
Finally, we show the individuals within the ontology, which represent specific instances of the defined classes. These individuals illustrate real-world examples or entities that bring the conceptual model into practical context.



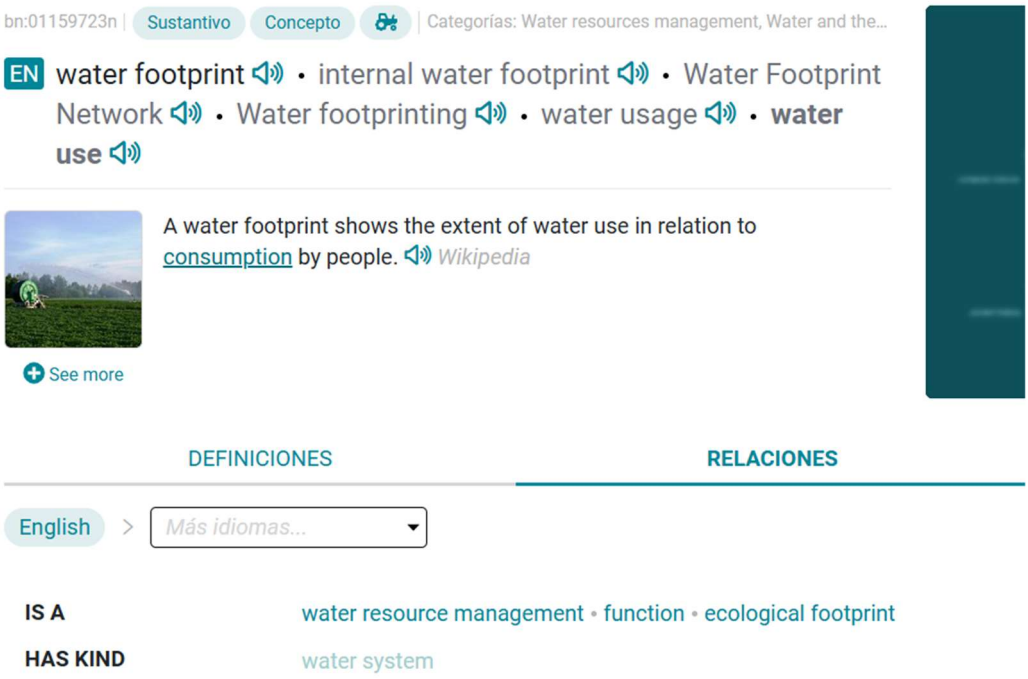
4.2. Consistency Check of Axioms Using Babelnet

In this section, in order to verify the consistency of the axioms in BabelNet, we will analyse the relationship between the concepts used in each axiom, based on what BabelNet shows about their respective categories and suggested relationships.

1. ∀x (WaterConservation(x) → ∃y (optimizes(y) ∧ WaterUse(y)))



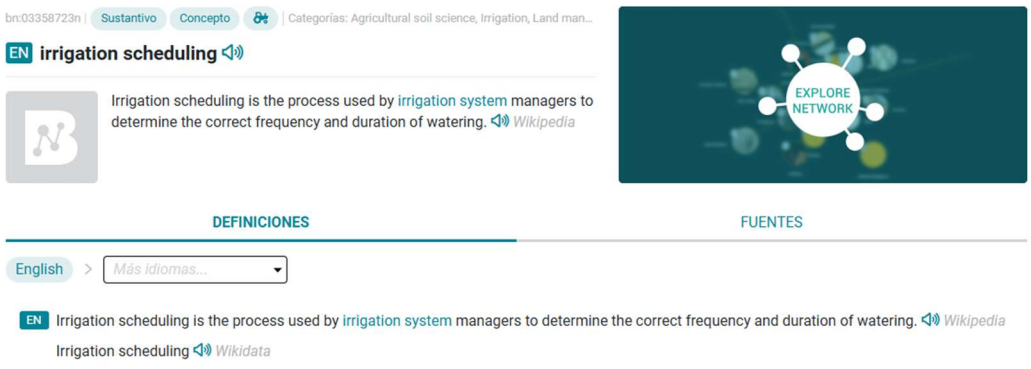
- "Water Conservation" in BabelNet is classified as a type of **conservation** and more specifically related to **nature conservation**. This means that **water conservation** is understood as part of the conservation of natural resources, which aligns with the idea of reducing or making efficient use of water.
- Additionally, in **HAS KIND**, it mentions terms like "**source water protection**" and "**Groasis Waterboxx**", which are tools or strategies for the protection and conservation of water sources. This suggests that "Water Conservation" involves practices that optimize the preservation of water, aligning with the idea of optimizing its use.



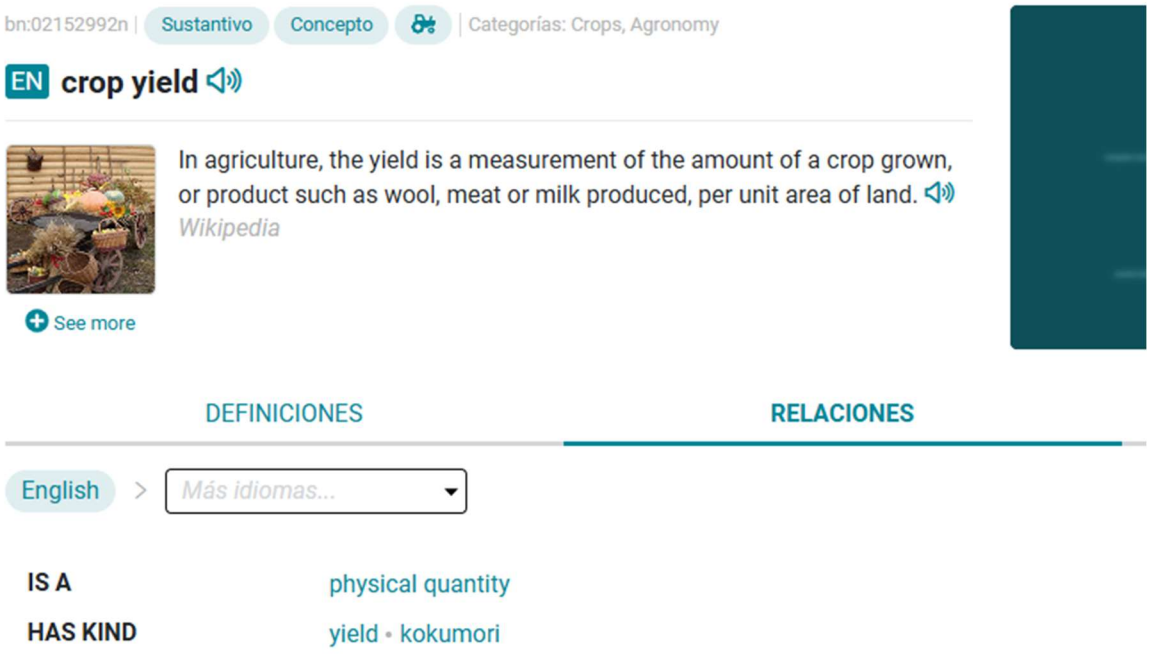
- "Water Use" is considered a **water resource management**. This implies that there are methodologies designed to manage (and optimize) how water is used.
- The association with **"ecological footprint"** reinforces the idea that water use is measured and managed to reduce environmental impact, which aligns with optimization and conservation practices.

Conclusion: Although BabelNet does not provide a direct relationship between "Water Conservation" and "Water Use", it suggests that both concepts are related through water resource management and the protection of water sources.

2. ∀x (IrrigationScheduling(x) → ∃y (increases(y) ∧ CropYield(y)))



- There are no relationships in BabelNet. However, the definition states that **Irrigation Scheduling** is the process used by irrigation system managers to determine the correct frequency and duration of watering.
- It is categorized under **"Agricultural soil science," "Irrigation,"** and **"Land management"**, which indicates that it is essential in the management of agricultural resources and systems.
- It is deduced that proper irrigation scheduling is crucial for maximizing the efficiency of water use in agriculture, which is related to crop production.

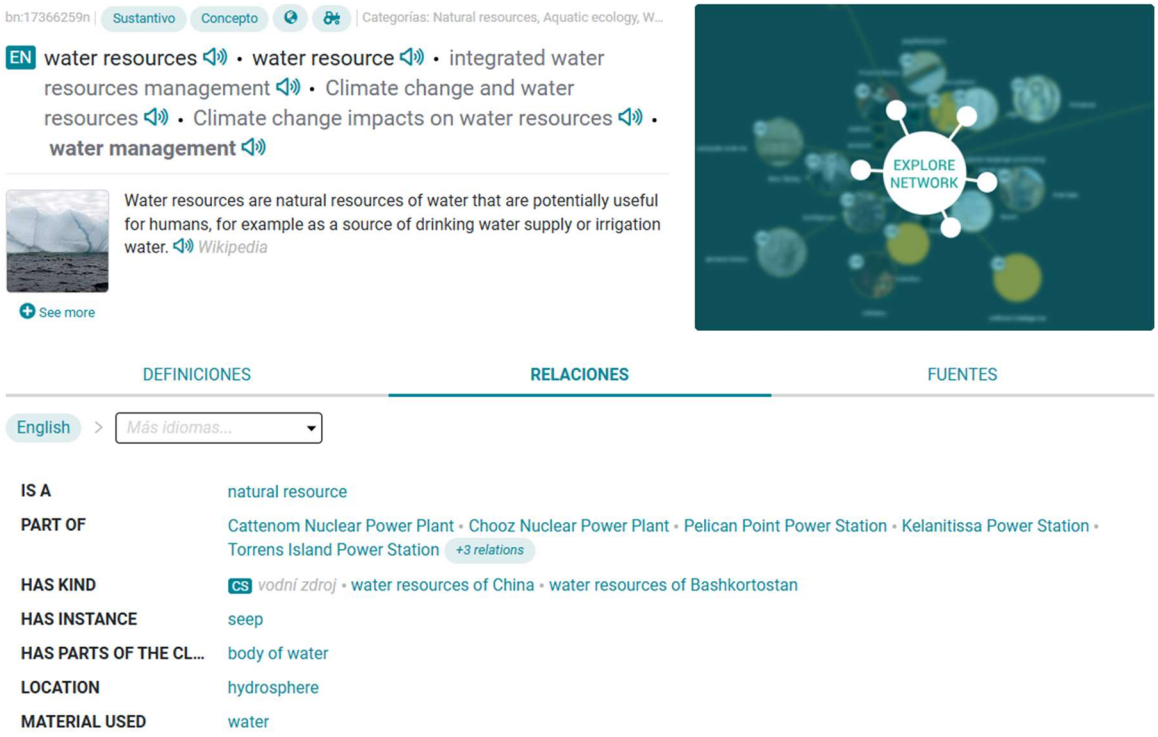


- "Crop Yield" is classified as a **physical quantity**, specifically referring to the amount of crop produced per unit area of land.
- Its categorization under **"Crops"** and **"Agronomy"** indicates that it is a fundamental concept in agriculture, directly related to agricultural productivity.
- The definition provided indicates that crop yield is a measurement critical to agricultural success, which indicates that increasing yield is a primary goal of effective agricultural practices.

Conclusion: Even though there are no relationships listed for "Irrigation Scheduling", this process falls under categories such as "Agricultural soil science," "Irrigation," and "Land management", which suggest that effective irrigation scheduling is linked to maximizing crop

production. Furthermore, "Crop Yield" is classified as a physical quantity related to agricultural output. This indicates that increased irrigation efficiency through scheduling is likely to contribute to higher yields, validating the relationship proposed in the axiom.

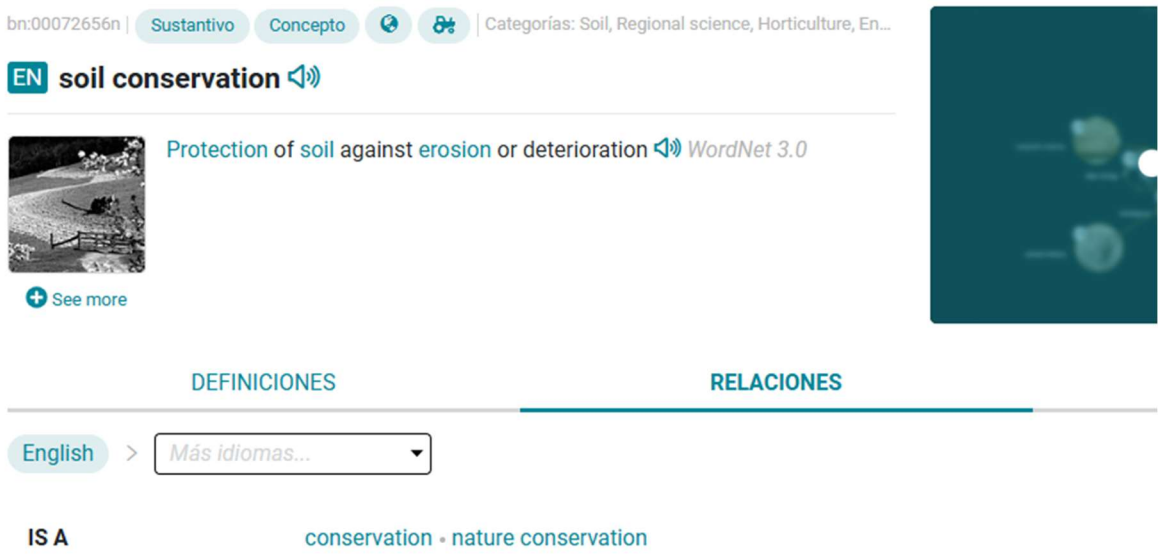
3. ∀x (WaterManagement(x) → ∃y (allocates(y) ∧ WaterResources(y)))



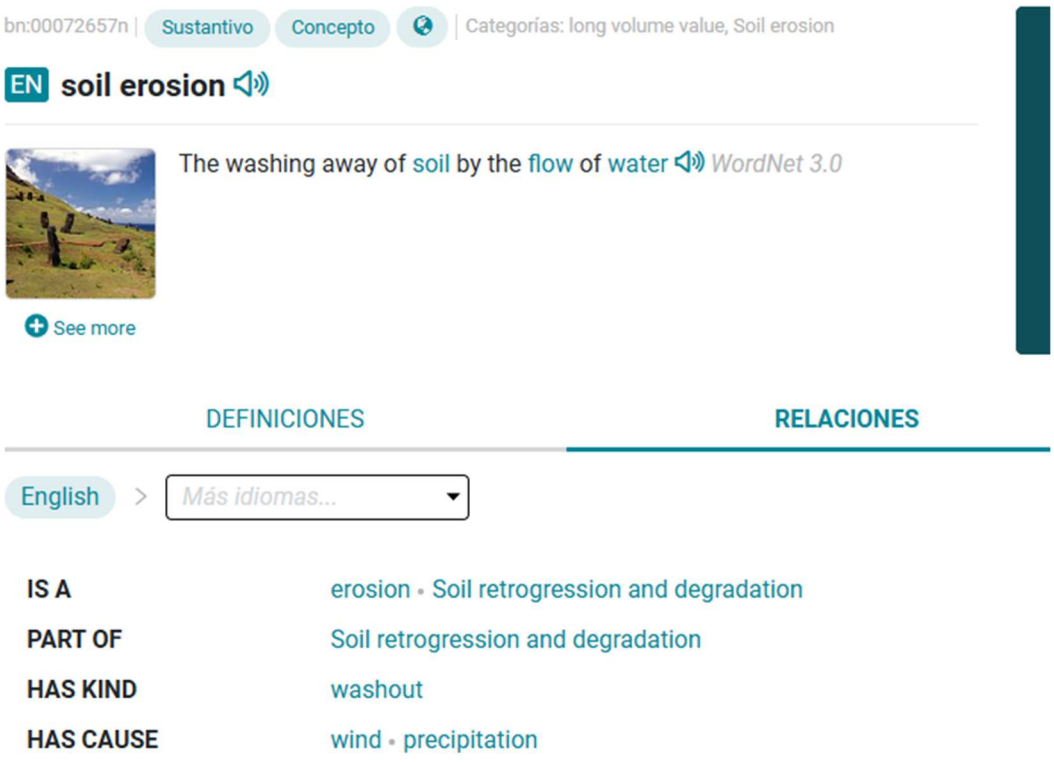
- Both concepts "Water Management" and "Water Resources" appear together in BabelNet and are categorized under **Natural resources, Aquatic ecology,** and **Water resources management**, indicating that they are interrelated.
- The information suggests that w**ater resources** are part of the hydrosphere and are a source for various applications, such as drinking water supply and irrigation, reinforcing their importance in water management practices.

Conclusion: Since both concepts appear together, and effective water management practices are used to optimize the use and distribution of water resources for various human needs, this relationship validates the consistency of the axiom.

4. ∀x (SoilConservation(x) → ∃y (prevents(y) ∧ SoilErosion(y)))



- The definition of **Soil Conservation** explicitly states its goal of **protecting soil against erosion**, which means that any instance of soil conservation is inherently aimed at preventing soil erosion.

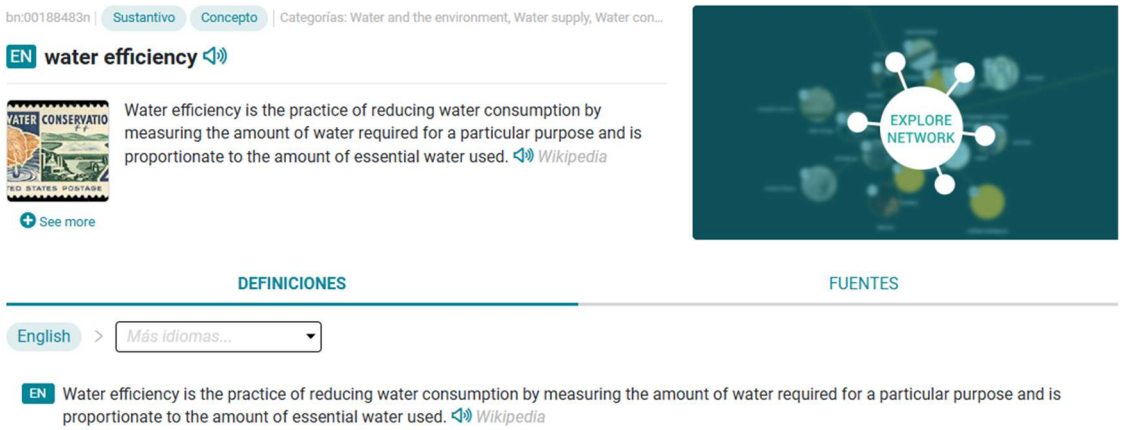


- The definition of **Soil Erosion** indicates that erosion is the process that soil conservation practices seek to mitigate. Therefore, preventing soil erosion is a direct consequence of effective soil conservation practices.

Conclusion: The verification of the axiom is a direct consequence of the definitions provided in BabelNet. The definition of Soil Conservation indicates that it involves "protection of soil against erosion or deterioration," which aligns perfectly with the axiom's claim that soil conservation practices will involve actions that prevent soil erosion.

5. ∀x (CropWaterStress(x) → ∃y (isMitigatedBy(y) ∧ WaterEfficiency(y)))

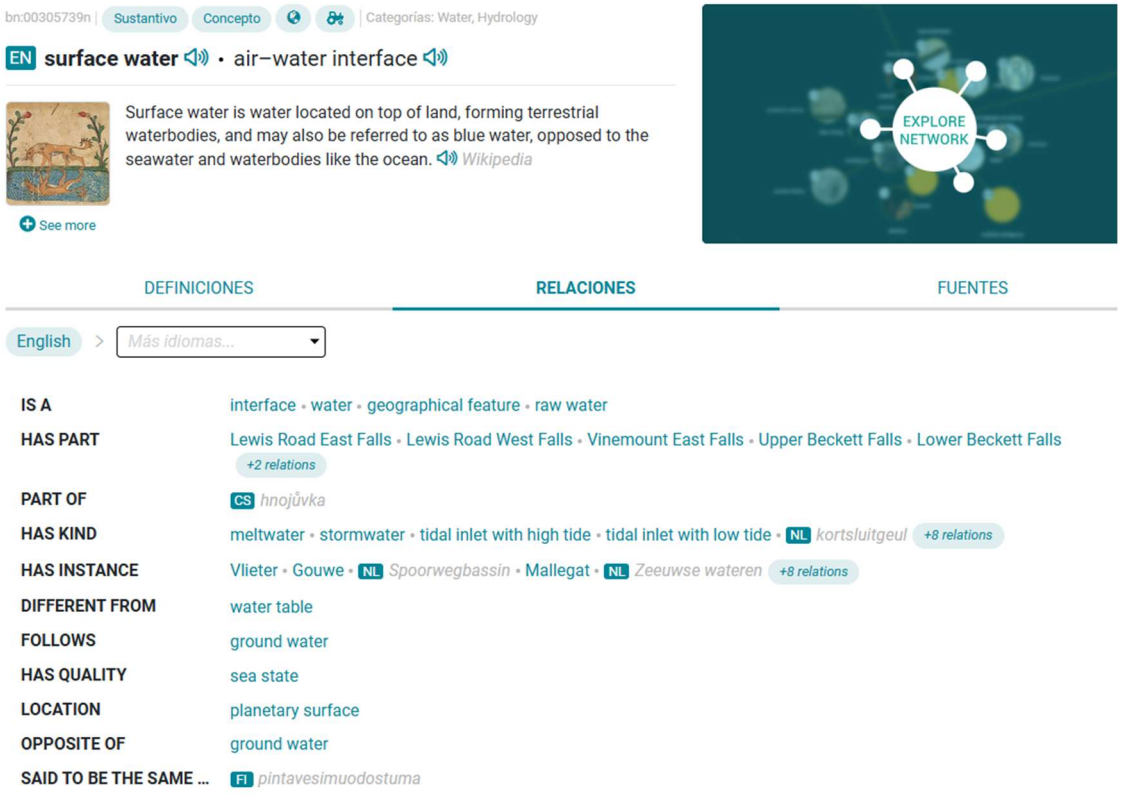
- "Crop Water Stress" does not appear in BabelNet. However, we know that it refers to the lack of enough water for crops, leading to reduced growth and yield.



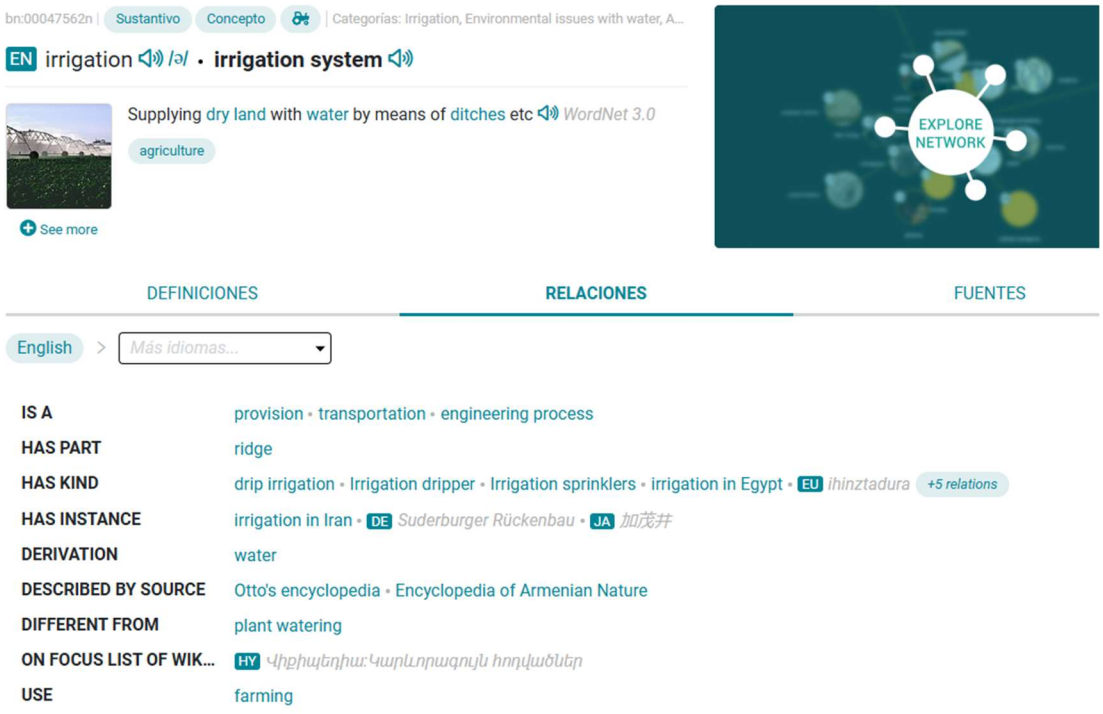
- The definition claims that water efficiency is the practice of reducing water consumption by measuring the amount of water required, that is, ensuring that essential water needs are met.

Conclusion: Despite "Crop Water Stress" not being listed in BabelNet, from the definition of "Water Efficiency" it follows that if crops are experiencing water stress, practices that implement water efficiency will help to mitigate that stress.

6. ∀x (SurfaceWater(x) → ∃y (usedIn(y) ∧ IrrigationSystem(y)))



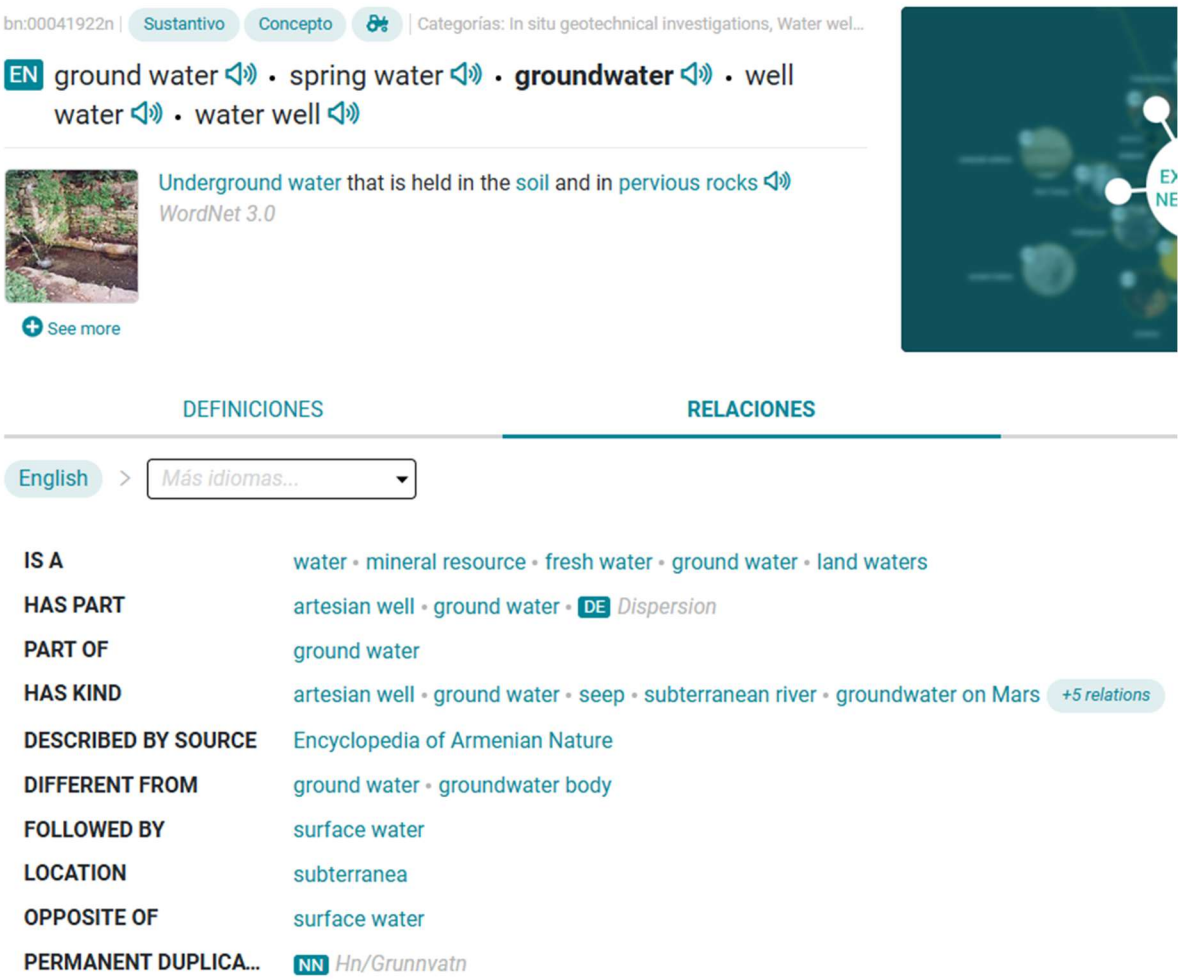
- The definition of "Surface Water" indicates that it includes water located on top of lands, such as rivers or lakes, which can be used for irrigation.



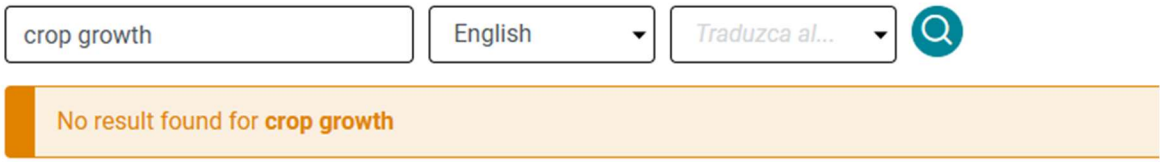
- By the definition, an irrigation system is used for supplying dry land with water, which can be sourced from surface water bodies, indicating that surface water is used in irrigation practices.

Conclusion: The axiom is verified by the definitions provided in BabelNet. The definition of "Surface Water" describes it as water located on top of the land, which can be used for various practices, including irrigation, while the definition of "Irrigation System" highlights its role in supplying water to dry land. It follows that surface water will be used in irrigation systems.

7. $\forall x (Groundwater(x) \rightarrow \exists y (supports(y) \land CropGrowth(y)))$



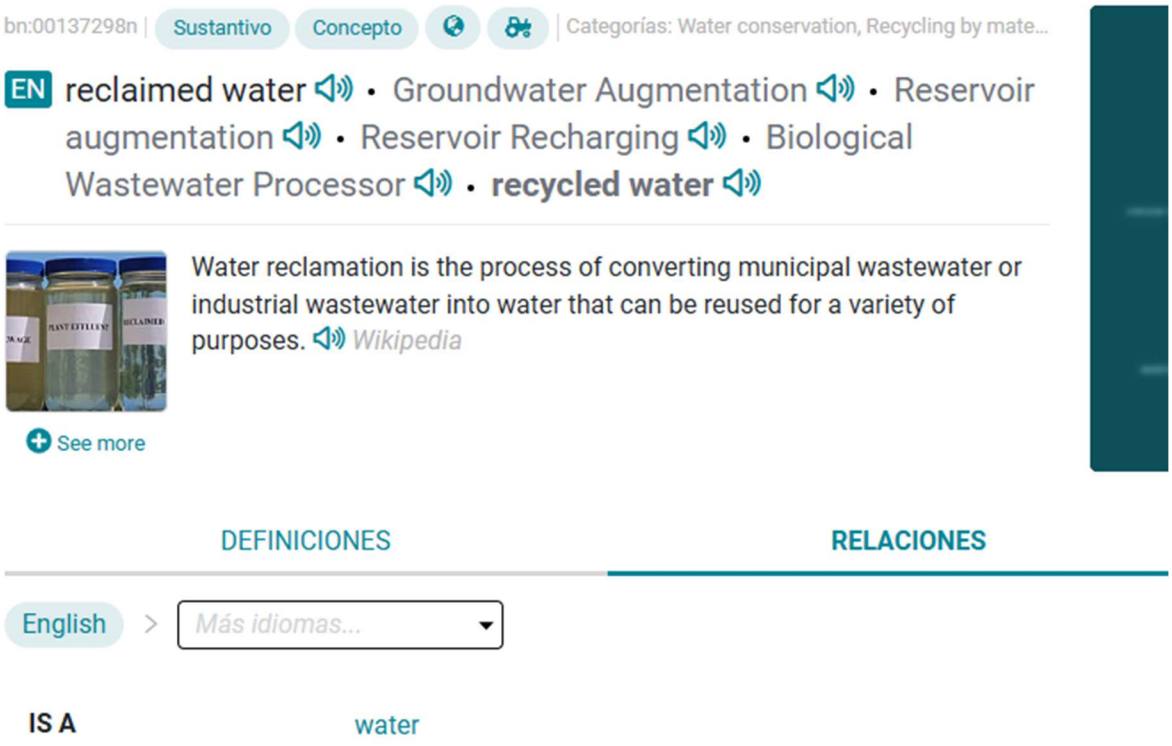
- **Groundwater** is underground water that is held in the soil and in rocks, and as such, is a **primary water source for irrigation** systems, which are vital to maintaining crop health and growth.



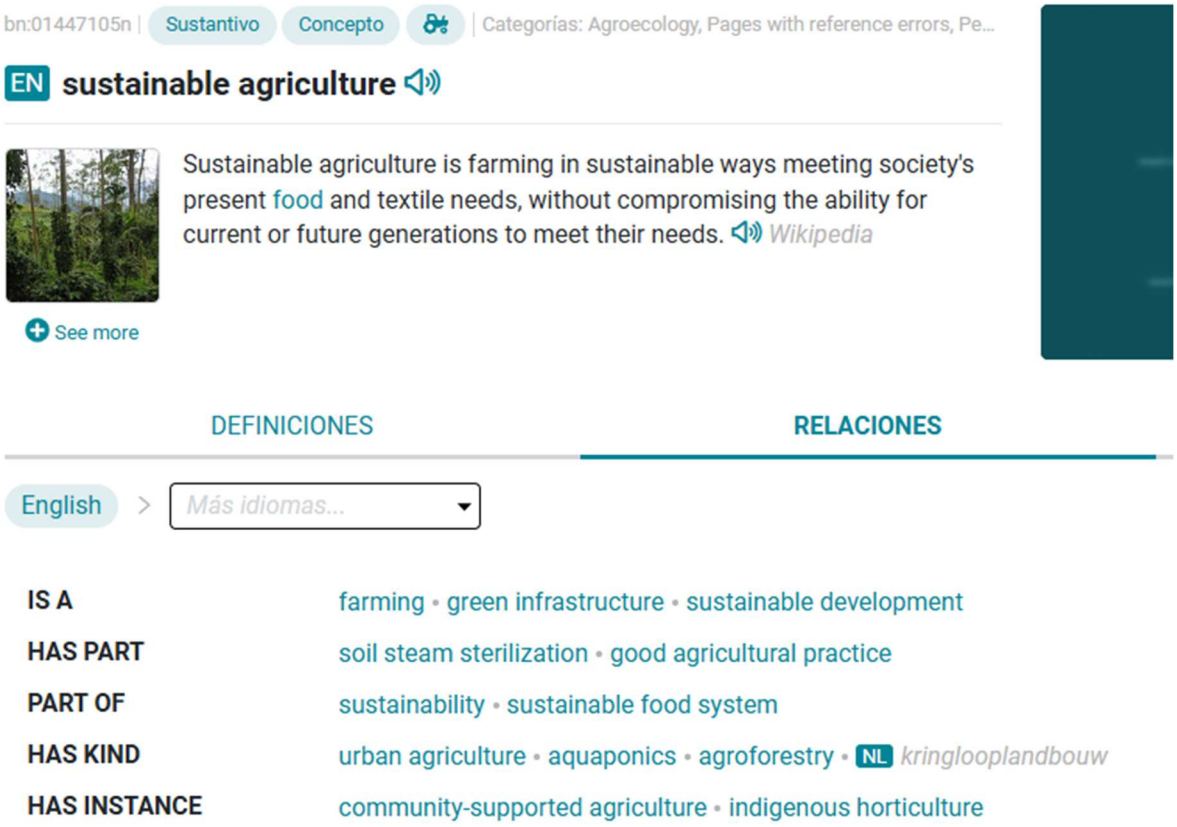
- Even though **Crop Growth** does not appear in BabelNet, the importance of groundwater for irrigation supports the idea that it **"supports"** or sustains crops, particularly during dry seasons.

Conclusion: The definition of "Groundwater" indicates it is water stored underground in soil and rocks, where it serves as a vital resource for irrigation. Irrigation is essential for sustaining crop growth. Although "Crop Growth" is not explicitly defined in BabelNet, the relationship between groundwater and agricultural water needs clearly implies that groundwater supports crop growth, confirming the validity of this axiom.

8. ∀x (RecycledWater(x) → ∃y (usedIn(y) ∧ SustainableAgriculture(y)))



- **Recycled Water** is a resource obtained from converting wastewater into water that can be reused, which directly supports sustainability by conserving natural water resources.

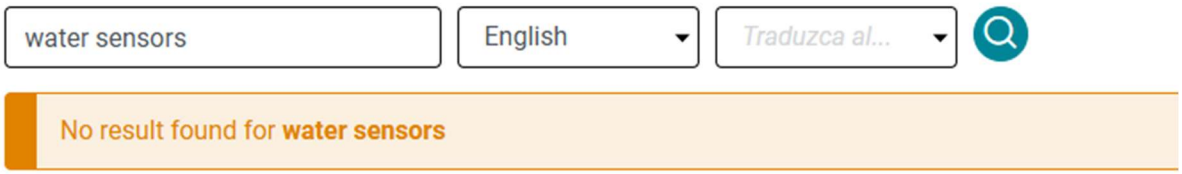


- **Sustainable Agriculture** aims to meet agricultural needs in sustainable ways, without compromising current or future capacity. Using recycled water fits into this model, as it reduces dependency on fresh water, promotes conservation, and helps ensure resources are available long-term.

Conclusion: By the definitions, since sustainable agriculture focuses on farming methods that do not compromise future resources, this aligns with the use of recycled water to optimize water use and support sustainability.

9. $\forall x (PrecisionAgriculture(x) \rightarrow \exists y (requires(y) \land WaterSensors(y)))$

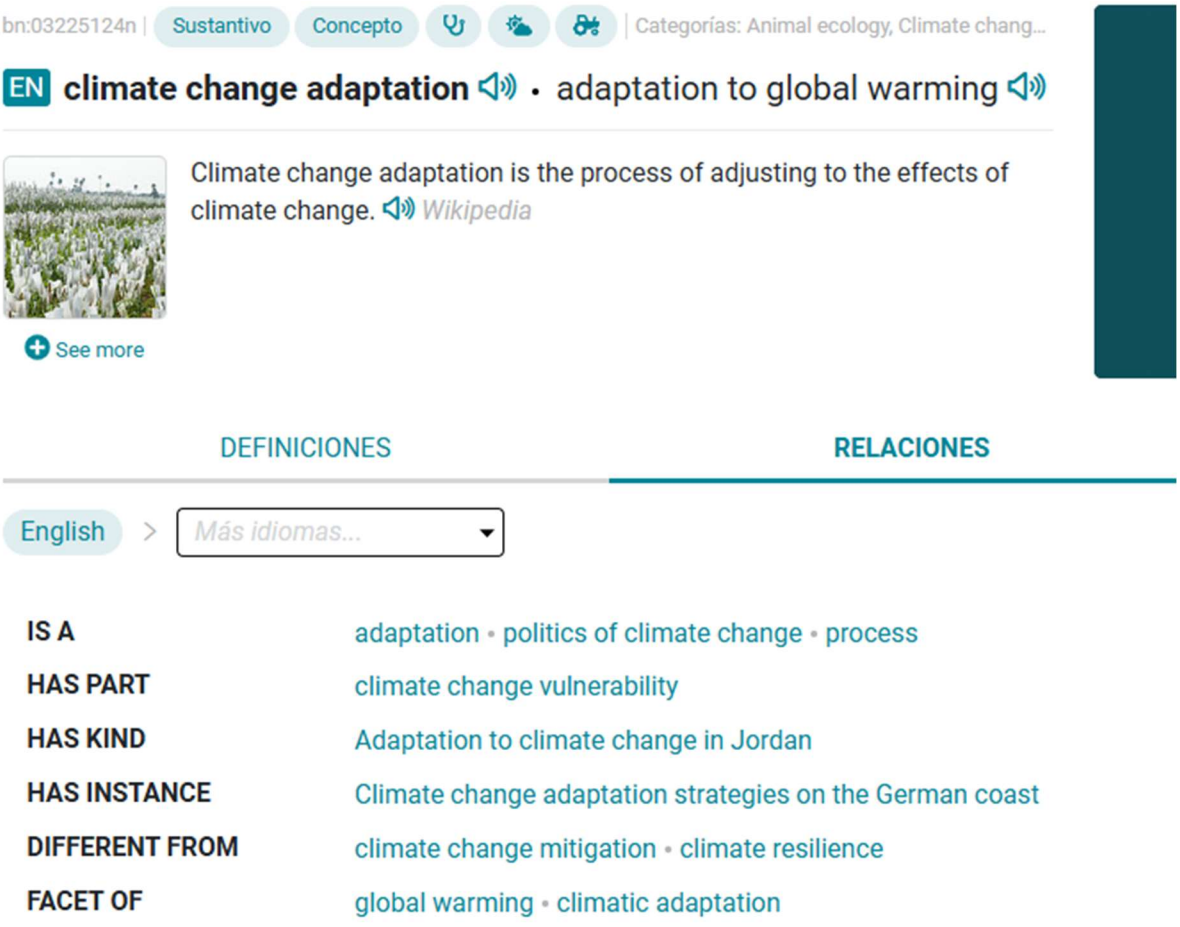
- By definition, “Precision agriculture” is a farming management strategy based on observing, measuring, and responding to temporal and spatial variability to improve agricultural production sustainability.



- Although “Water Sensors” is not listed in BabelNet, they help monitor soil moisture levels and water conditions, which minimizes water waste.

Conclusion: While the concept “Water Sensors” does not appear in BabelNet, by monitoring water conditions, water sensors support precision agriculture's goal to respond to spatial and temporal variability efficiently.

10. $\forall x\,(\text{ClimateChangeAdaptation}(x) \rightarrow \exists y\,(\text{involves}(y) \wedge \text{IrrigationPlanning}(y)))$

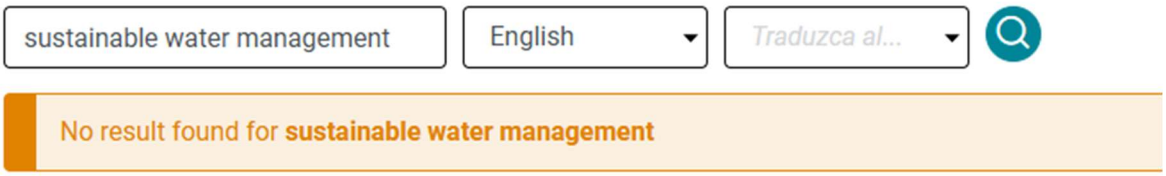


- Climate change adaptation involves adjusting systems and practices to respond to the effects of climate change, such as water scarcity, changing rainfall patterns, and extreme weather.

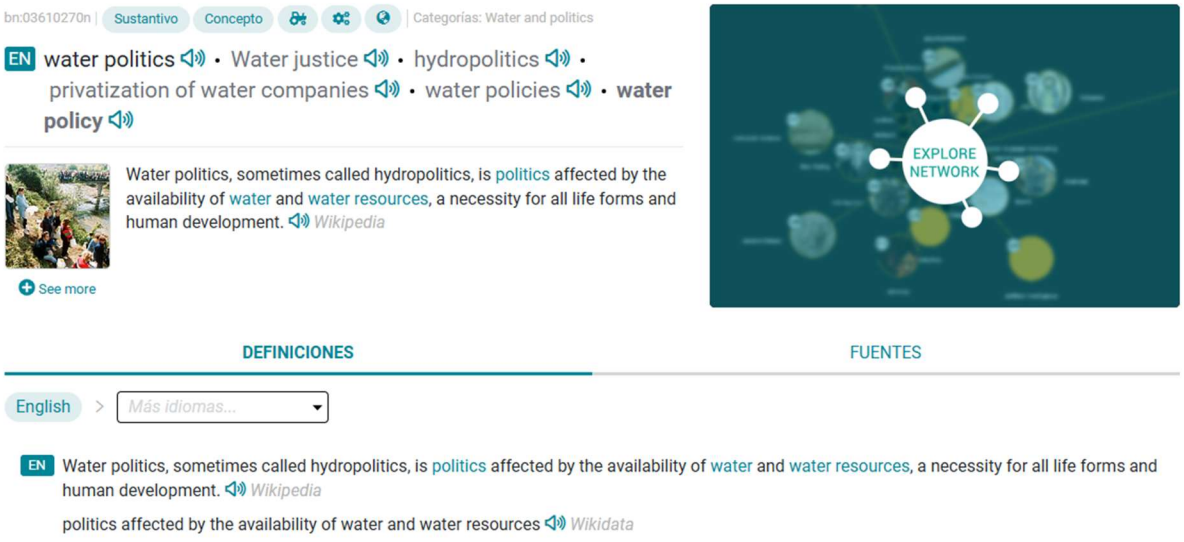
- Although **Irrigation Planning** isn't explicitly listed in BabelNet, effective irrigation planning is essential for managing water efficiently, especially in the face of reduced water availability and increased drought risks.

Conclusion: Water management, especially irrigation, is a crucial aspect for adapting agricultural practices to climate conditions that are becoming less predictable. Then, effective irrigation planning is necessary for managing and adapting to climate change.

11. ∀x (SustainableWaterManagement(x) → ∃y (regulatedBy(y) ∧ WaterPolicy(y)))



- Although "**Sustainable Water Management"** isn't directly defined in BabelNet, the concept generally refers to managing water resources in ways that meet current needs without compromising future availability. It includes practices that optimize water use, prevent waste, and protect water ecosystems.

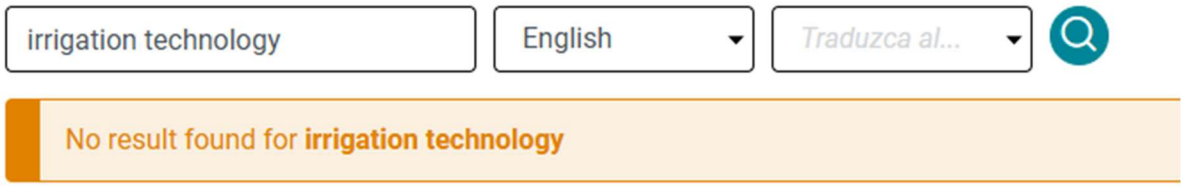


- "Water Policy" is about political decisions and frameworks that influence water availability and access, indicating the regulatory role of policy in managing water resources.

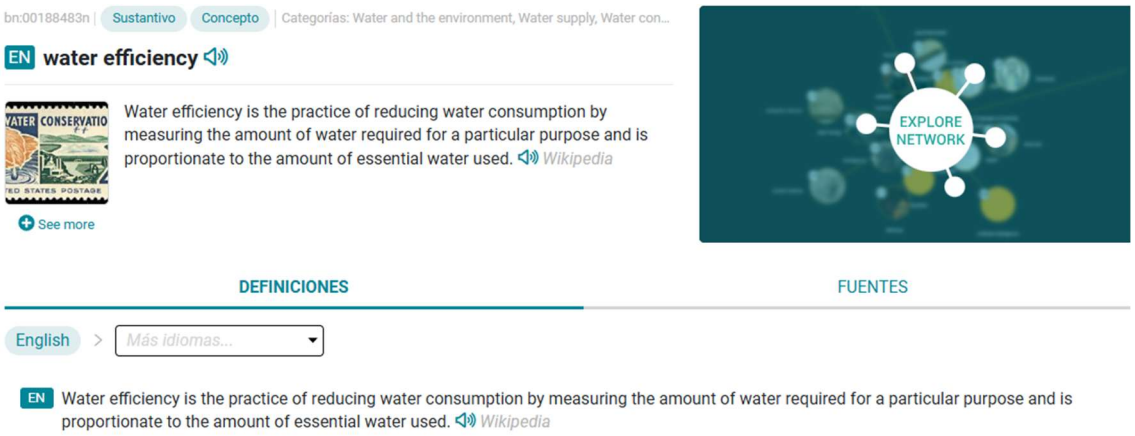
Conclusion: Sustainable water management typically requires regulation to ensure that water is conserved and used efficiently. It is logical to conclude that sustainable water management

is regulated by water policy, as policy structures provide essential controls that ensure sustainable practices.

12. ∀x (IrrigationTechnology(x) → ∃y (improves(y) ∧ WaterEfficiency(y)))



- Although "**Irrigation Technology"** is not directly available in BabelNet, it generally refers to tools, systems, and methods developed to apply water more effectively and reduce water loss in agricultural areas.

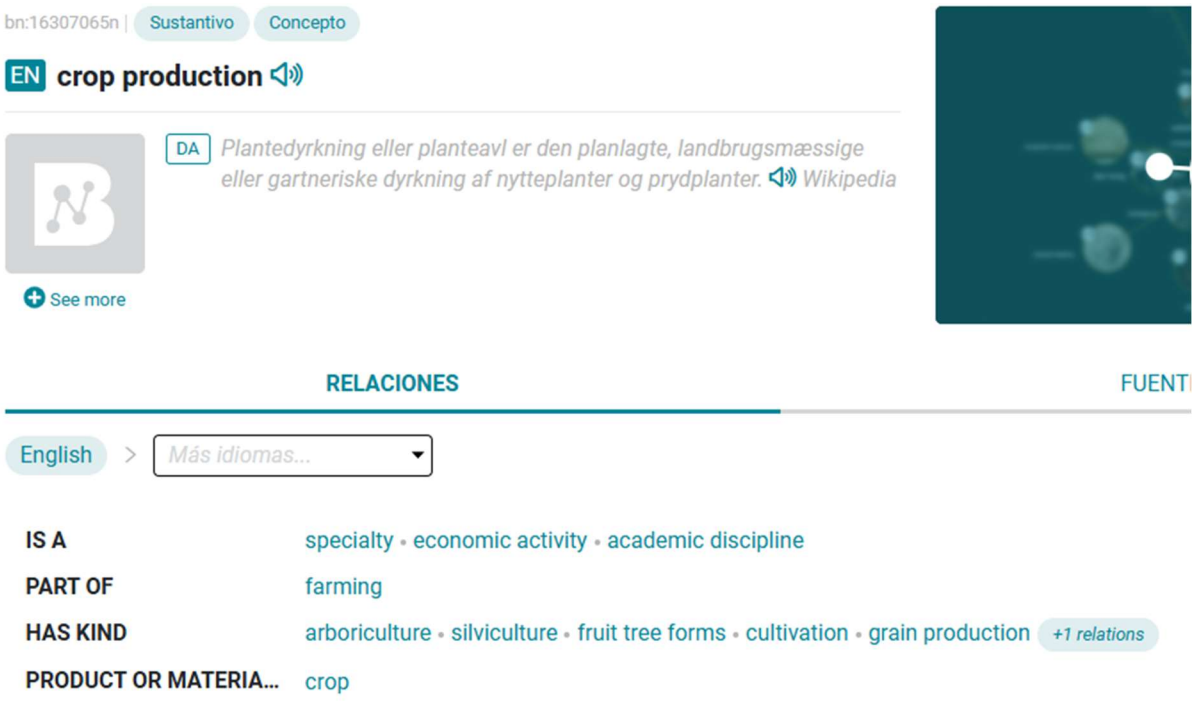


- Water efficiency involves practices that ensure water is used only to the extent needed by measuring the amount required, reducing water waste and conserving resources.

Conclusion: The axiom is conceptually supported by the definition of "Water Efficiency" in BabelNet, which describes water efficiency as reducing water consumption through careful measurement and use. Although "Irrigation Technology" is not explicitly defined, it consists of tools and methods specifically designed to minimize water waste, aligning closely with the objectives of water efficiency.

13. ∀x (SoilManagement(x) → ∃y (enhances(y) ∧ CropProduction(y)))

- The definition claims that soil management is the application of operations, practices, and treatments to protect soil and enhance its performance, which directly benefits crop productivity.

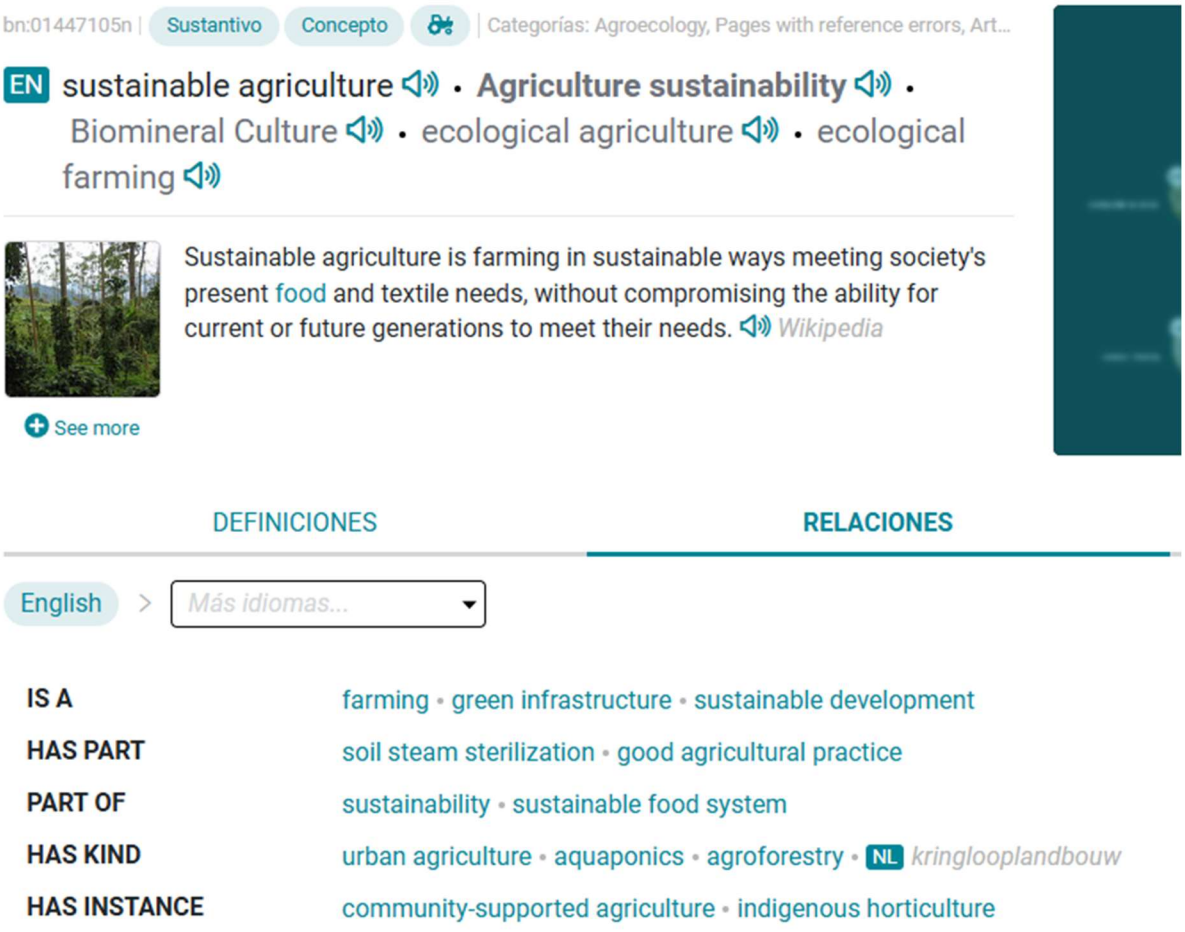


- "Crop Production" is classified as an economic activity which aims to produce and cultivate crops.

Conclusion: The axiom is supported by the information in BabelNet. "Soil Management" is described as the application of practices to improve soil performance, and "Crop Production" is defined as the process of cultivating crops, a process heavily dependent on soil quality. Since "Soil Management" aims to optimize soil conditions, and "Crop Production" relies on these conditions for optimal growth, the two are logically connected.

14. ∀x (WaterScarcity(x) → ∃y (affects(y) ∧ AgriculturalSustainability(y)))

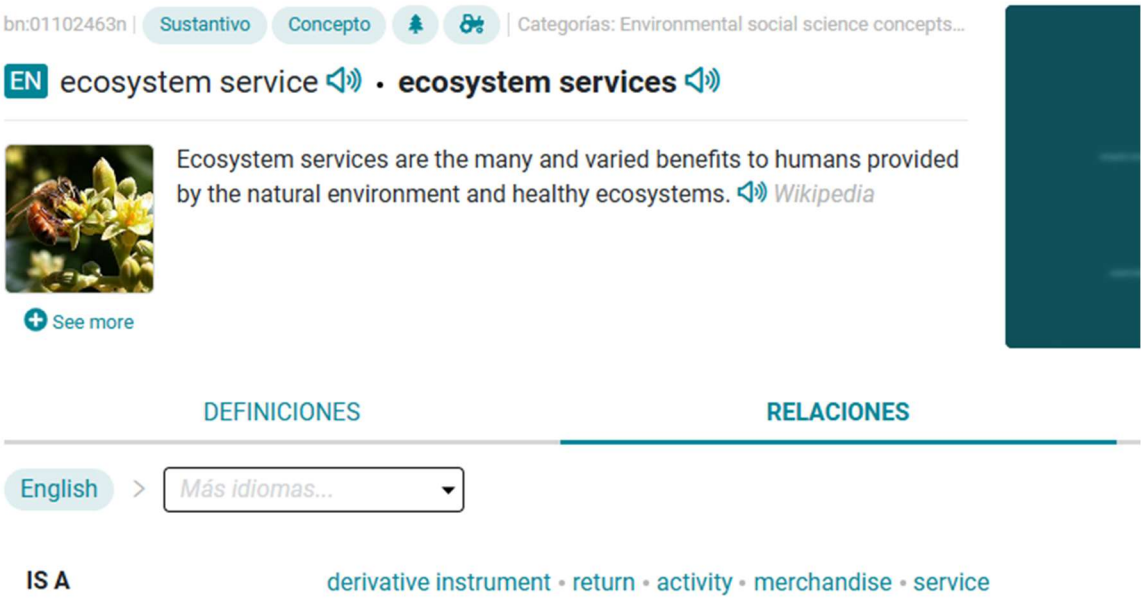
- By definition, "Water Scarcity" is the lack of fresh water resources to meet the standard water demand.
- Identified as a type of scarcity and closely associated with water stress, which refers to difficulty in obtaining fresh water.



- Sustainable agriculture focuses on farming practices that meet current societal needs without compromising resources for future generations.

Conclusion: Water scarcity challenges agricultural sustainability by reducing the water available for critical functions like irrigation, soil management, and crop health, thus limiting the ability to maintain sustainable agricultural practices.

15. $\forall x\,(\text{EcosystemServices}(x) \rightarrow \exists y\,(\text{supports}(y) \wedge \text{SustainableAgriculture}(y)))$



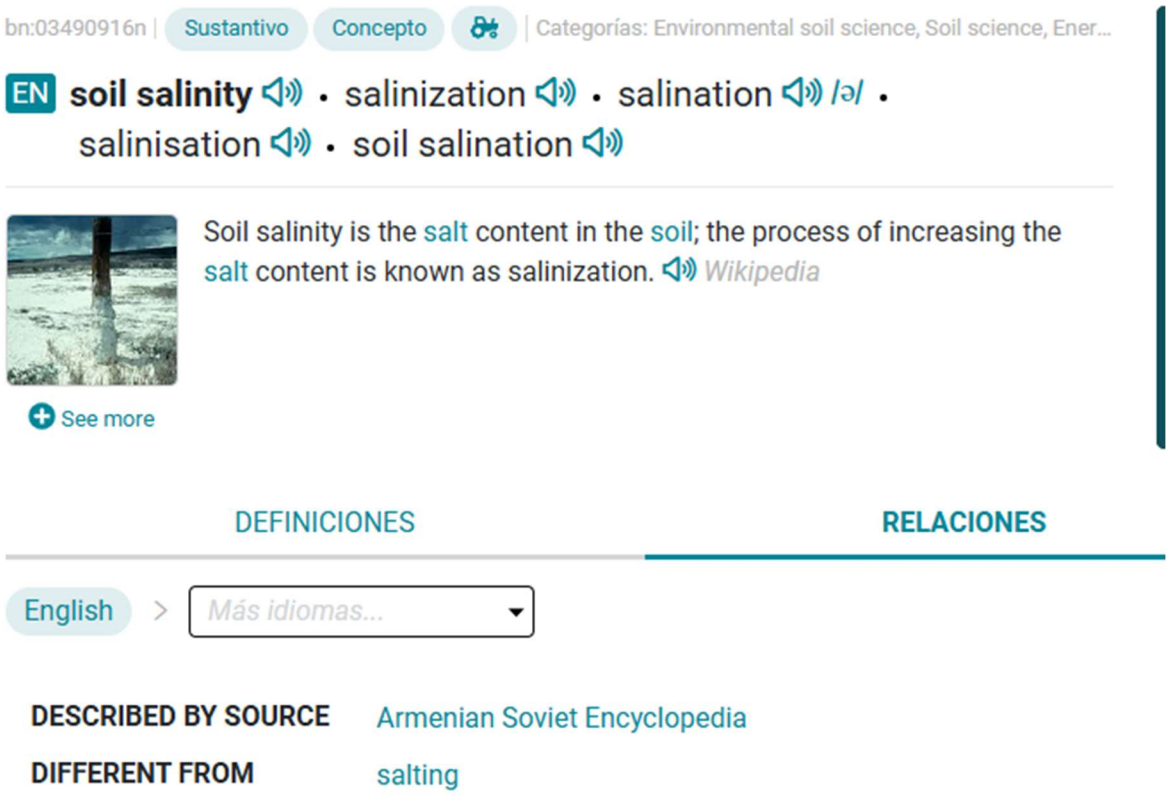
- Ecosystem services are defined as "the many and varied benefits to humans provided by the natural environment and healthy ecosystems".

- Sustainable agriculture is defined as “farming in sustainable ways meeting society's present needs, without compromising the ability for current or future generations to meet their needs”.

Conclusion: Ecosystem services provide support to sustainable agriculture by maintaining the health and productivity of natural resources, including soil fertility, water availability, and pest control. They provide resources that reduce the need for non-renewable inputs, ensure ongoing productivity and minimize environmental impact, which is essential for sustainable agriculture.

16. ∀x (SoilManagement(x) → ∃y (controls(y) ∧ SoilSalinity(y)))

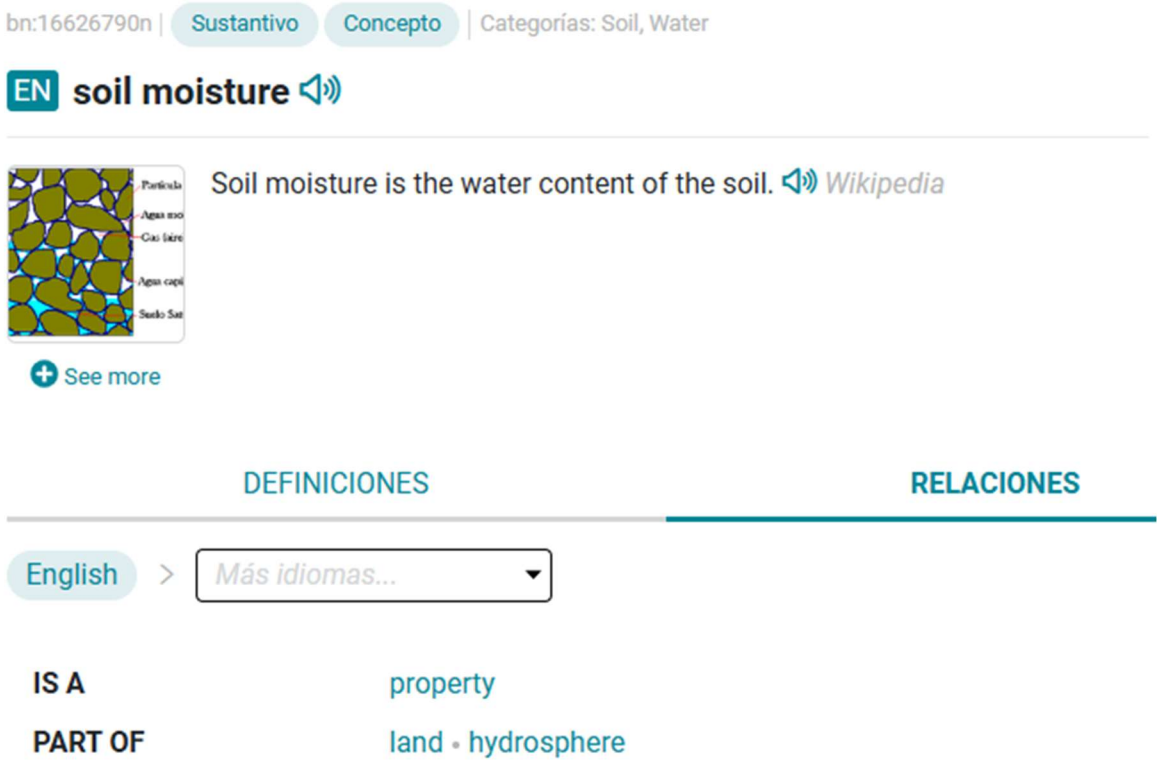
- Soil management is defined as “the application of operations, practices, and treatments to protect soil and enhance its performance.”
- Through practices that control water flow, fertilization, and soil structure, soil management can prevent or reduce soil salinization.



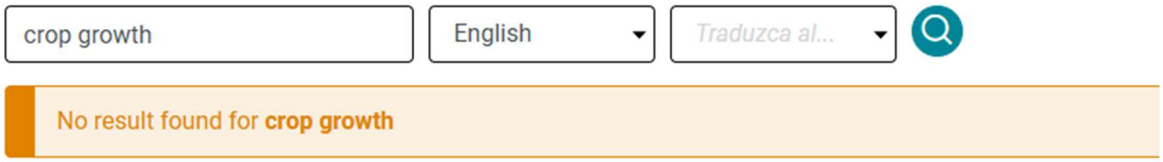
- The definition says that “Soil Salinity” is the salt content in the soil.
- Soil salinity management is crucial in agriculture, as excess salts can inhibit plant growth and reduce soil fertility.

Conclusion: Soil management is defined as the application of methods to protect and enhance soil, which includes controlling soil salinity levels to prevent soil degradation.

17. ∀x (SoilMoisture(x) → ∃y (supports(y) ∧ CropGrowth(y)))



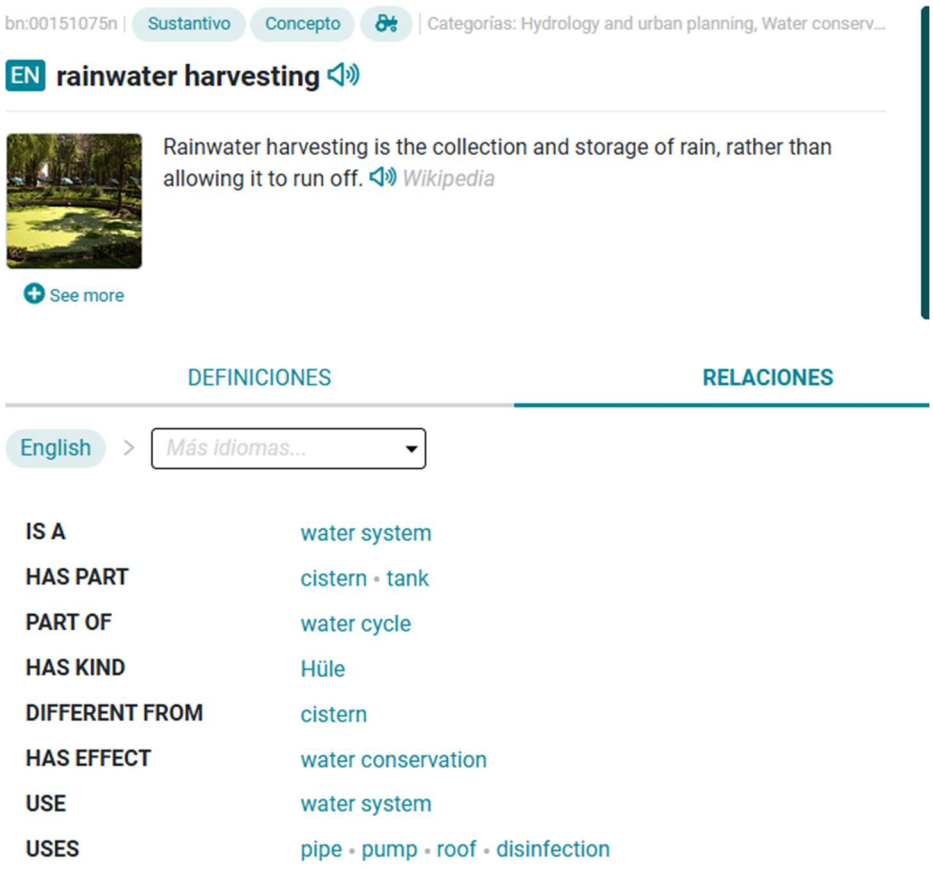
- Soil moisture is the water content held in the soil.



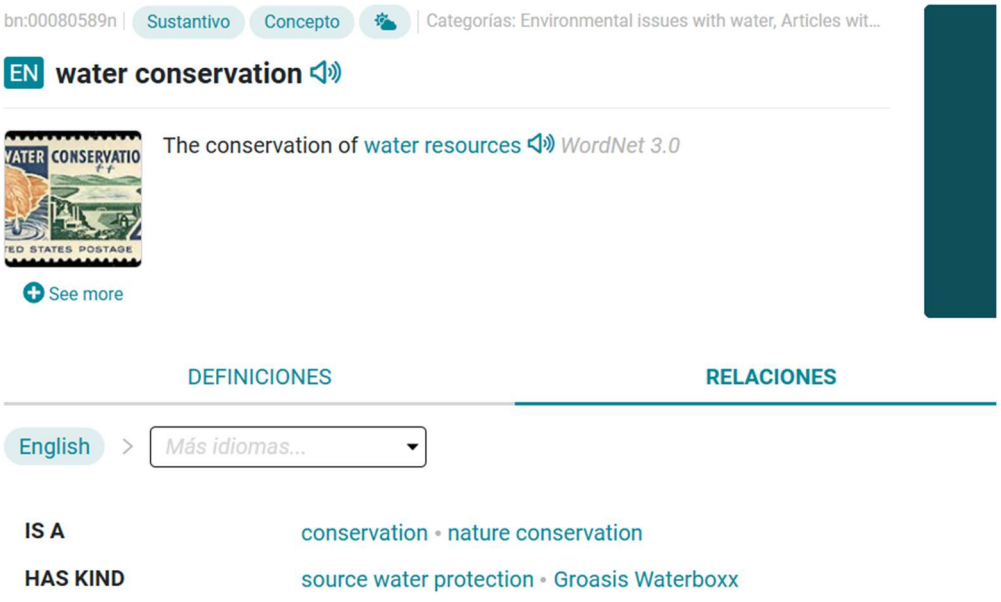
- While the specific term "Crop Growth" does not appear in BabelNet, it refers to the development of plants and needs several factors, including soil quality, nutrients, and particularly water availability.

Conclusion: Soil moisture is critical for crop growth because it provides the necessary water for plants to grow.

18. $\forall x (RainwaterHarvesting(x) \rightarrow \exists y (enhances(y) \land WaterConservation(y)))$



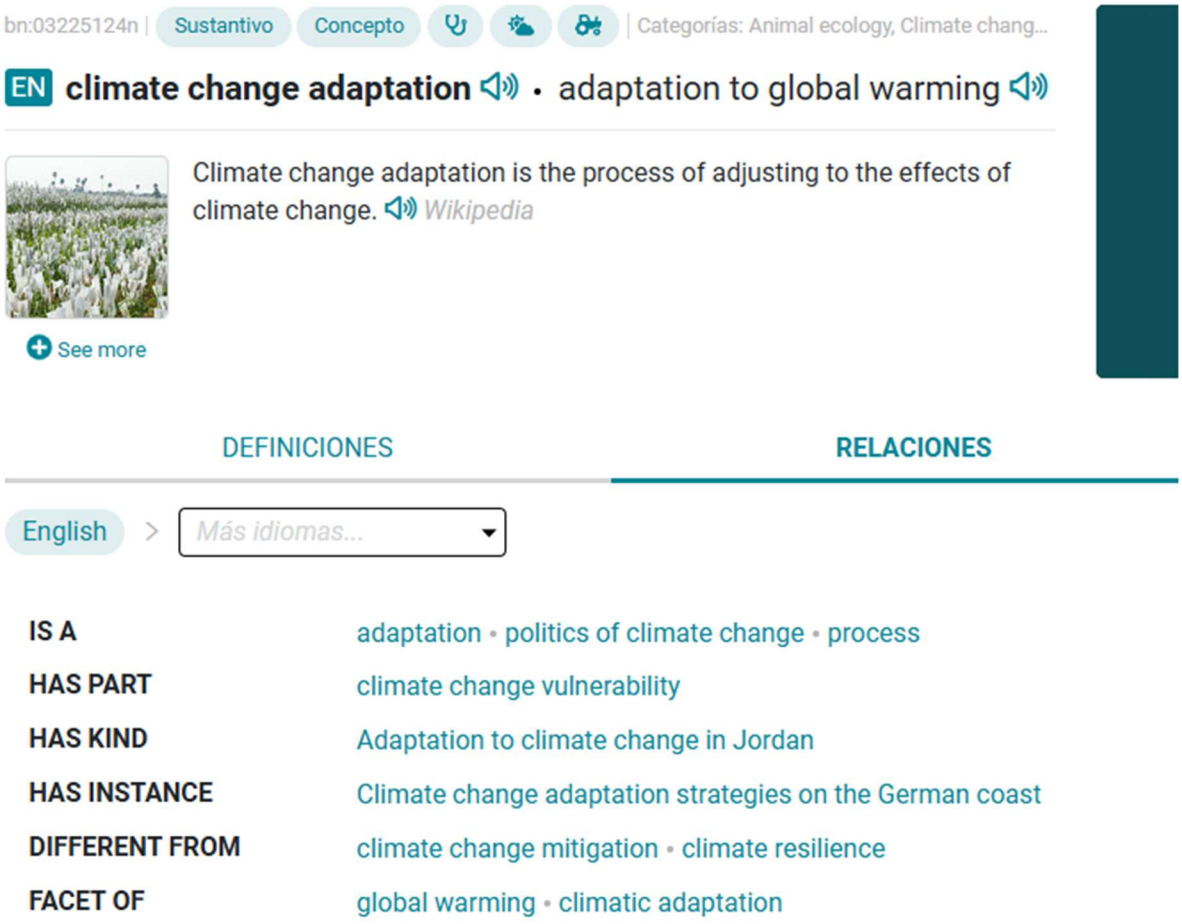
- Rainwater harvesting refers to the practice of collecting and storing rainwater instead of allowing it to run off.



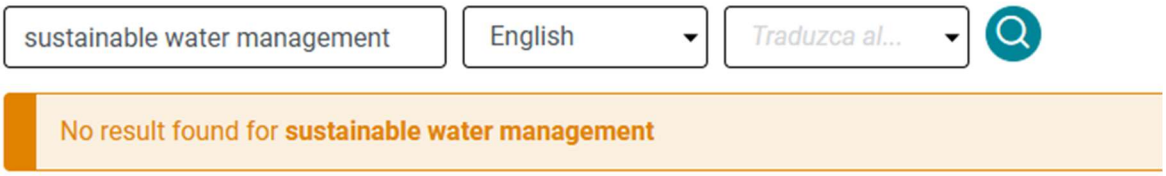
- Water conservation refers to the practice of managing water resources to prevent waste.

Conclusion: Water conservation strategies aim to reduce water consumption and maximize efficiency. Rainwater harvesting is a direct method to enhance water conservation efforts by providing an alternative source of water. It contributes to Water conservation by capturing and utilizing rainwater that would otherwise be lost as runoff.

19. ∀x (ClimateChangeAdaptation(x) → ∃y (involves(y) ∧ SustainableWaterManagement(y)))



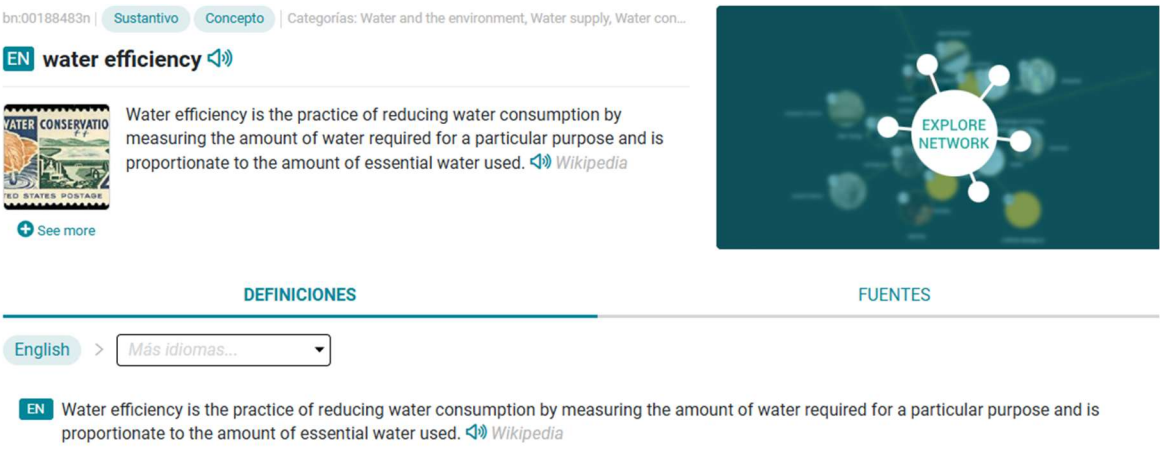
- Climate change adaptation refers to the process of adjusting to the impacts and effects of climate change, allowing individuals and systems to cope with the changes. This can include a wide range of strategies to mitigate adverse impacts.
- It is classified as an **adaptation** process and relates to the **politics of climate change**. Key components include understanding vulnerability and developing strategies that respond to climate change.



- While the exact term "Sustainable Water Management" is not present in BabelNet, it typically refers to the planning and management of water resources to ensure sustainability for current and future generations.

Conclusion: Sustainable water management is crucial in the context of climate change, as it addresses the challenges posed by changing weather patterns, scarcity of water resources, and increased demand for water. Effective water management can help communities adapt to climate impacts, such as droughts or floods.

20. ∀x (WaterEfficiency(x) → ∃y (reduces(y) ∧ CropWaterStress(y)))

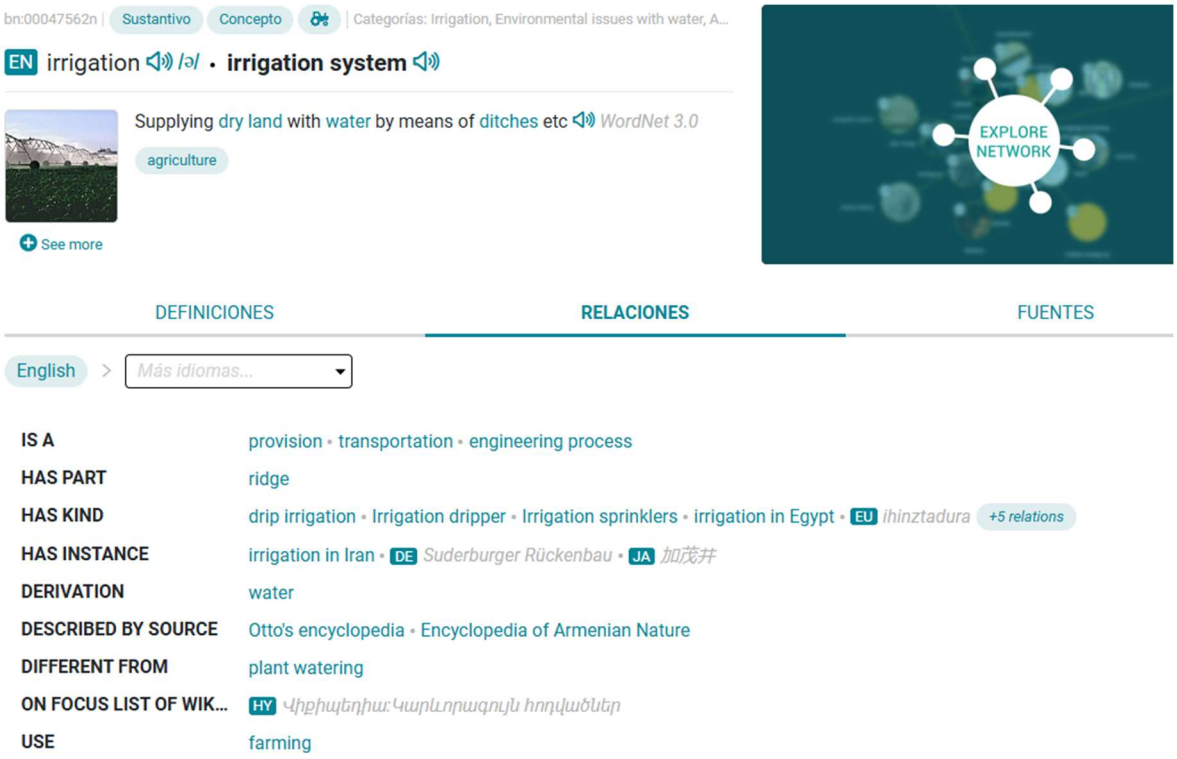


- “Water Efficiency” is about reducing the amount of water used while achieving a desired purpose, which involves calculating the necessary water and minimizing waste.

- "Crop Water Stress" does not appear in BabelNet. However, we know that it refers to the lack of enough water for crops, leading to reduced growth and yield.

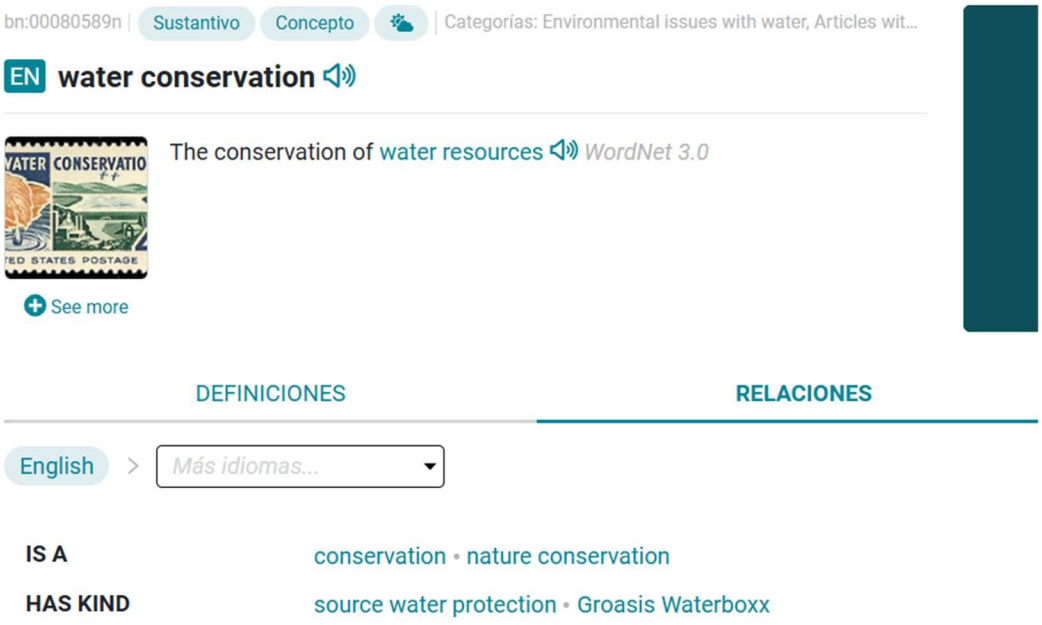
Conclusion: By making water use more efficient, there is less likelihood of water shortages, since crops are more likely to receive adequate water even under limited water conditions. This can reduce the water stress faced by crops.

21. ∀x (IrrigationSystem(x) → ∃y (supports(y) ∧ WaterConservation(y)))



- An irrigation system supplies water to dry land through various means, such as ditches, drip irrigation or sprinklers.

- The use of irrigation systems like drip irrigation is well-recognized in agriculture as a way to conserve water by delivering precise amounts directly to plants, minimizing runoff and evaporation.

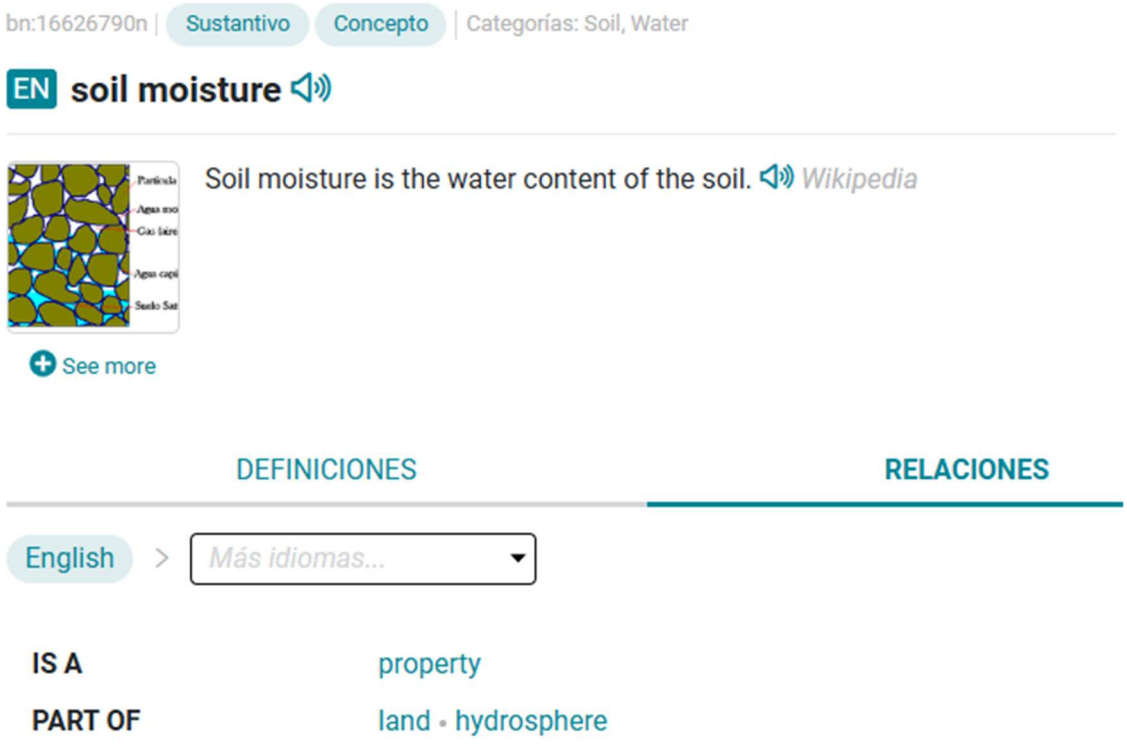


- "Water Conservation" is defined as the conservation of water resources.

Conclusion: Irrigation systems, particularly efficient types such as drip and sprinkler systems, are designed to provide water in a controlled and precise manner, which supports the conservation of water resources.

22. ∀x (DripIrrigation(x) → ∃y (maintains(y) ∧ SoilMoisture(y)))

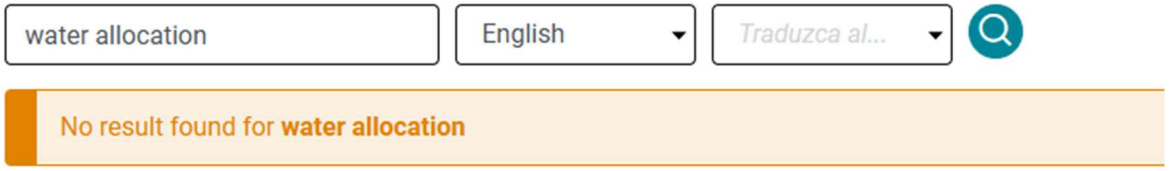
- "Drip Irrigation" is defined as an irrigation system designed to deliver water slowly to the roots of plants, either from above the soil surface or below the surface which is effective at saving water and nutrients.



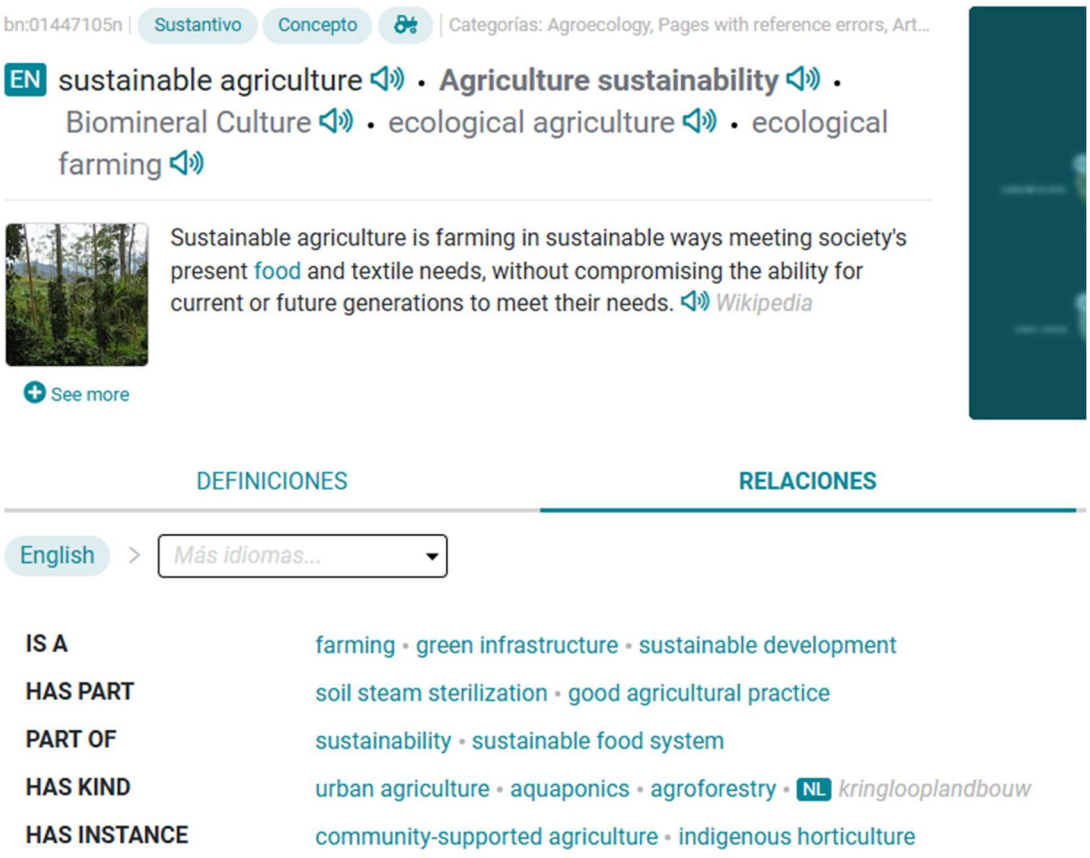
- "Soil Moisture" is defined as the water content of the soil.

Conclusion: Drip irrigation is explicitly designed to maintain soil moisture by delivering a controlled amount of water directly to the soil around plant roots. This slow-release method is effective in preserving optimal moisture levels.

23. ∀x (WaterAllocation(x) → ∃y (ensures(y) ∧ AgriculturalSustainability(y)))



- Although "Water Allocation" does not appear in BabelNet, it generally refers to the systematic distribution of water resources to various sectors, including agriculture, to meet the needs of each.



- "Sustainable Agriculture" is defined as farming in sustainable ways meeting society's present needs, without compromising the ability for current or future generations to meet their needs.

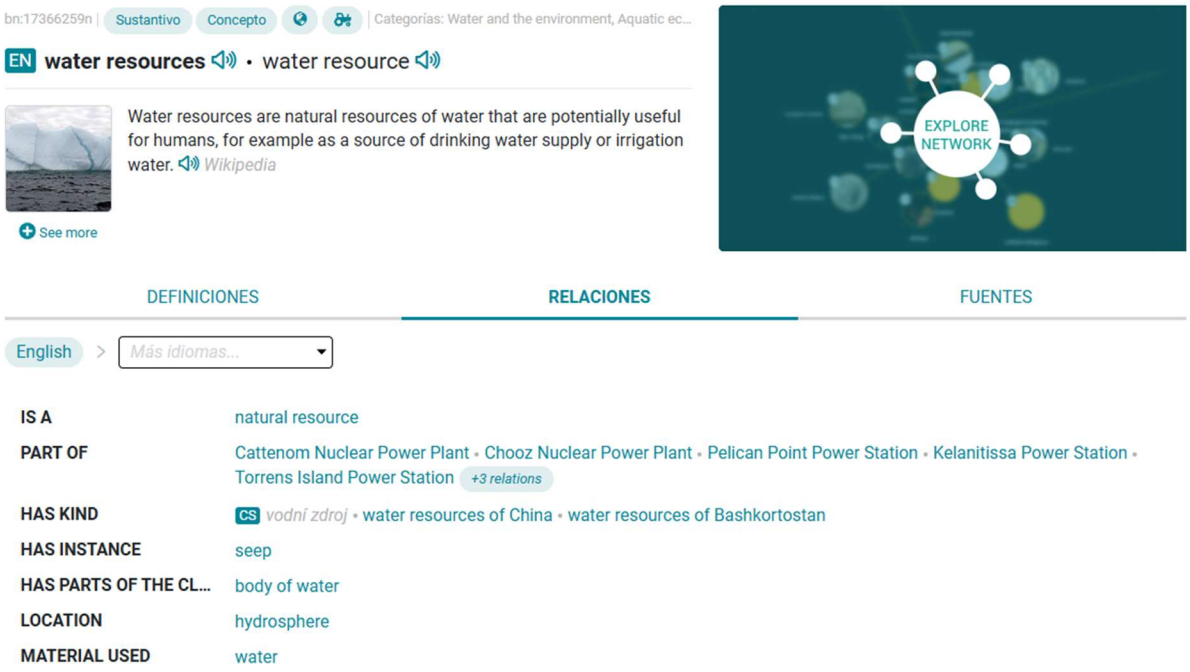
Conclusion: In agriculture, water allocation plays a critical role in sustaining crops and ensuring that water is used efficiently, especially in regions prone to drought or limited water supply. This is necessary for long-term agricultural sustainability, aligning with BabelNet's definition of sustainable agriculture as farming in ways using available resources without compromising future needs.

24. ∀x (CropWaterRequirements(x) → ∃y (guides(y) ∧ IrrigationPlanning(y)))

Since neither "**Crop Water Requirements"** nor "**Irrigation Planning"** are found in BabelNet, we are unable to verify the conceptual consistency of this axiom through BabelNet's data.

25. ∀x (EcosystemServices(x) → ∃y (dependOn(y) ∧ WaterResources(y)))

- In BabelNet, Ecosystem Services are defined as the various benefits provided to humans by a healthy ecosystem and natural environment.

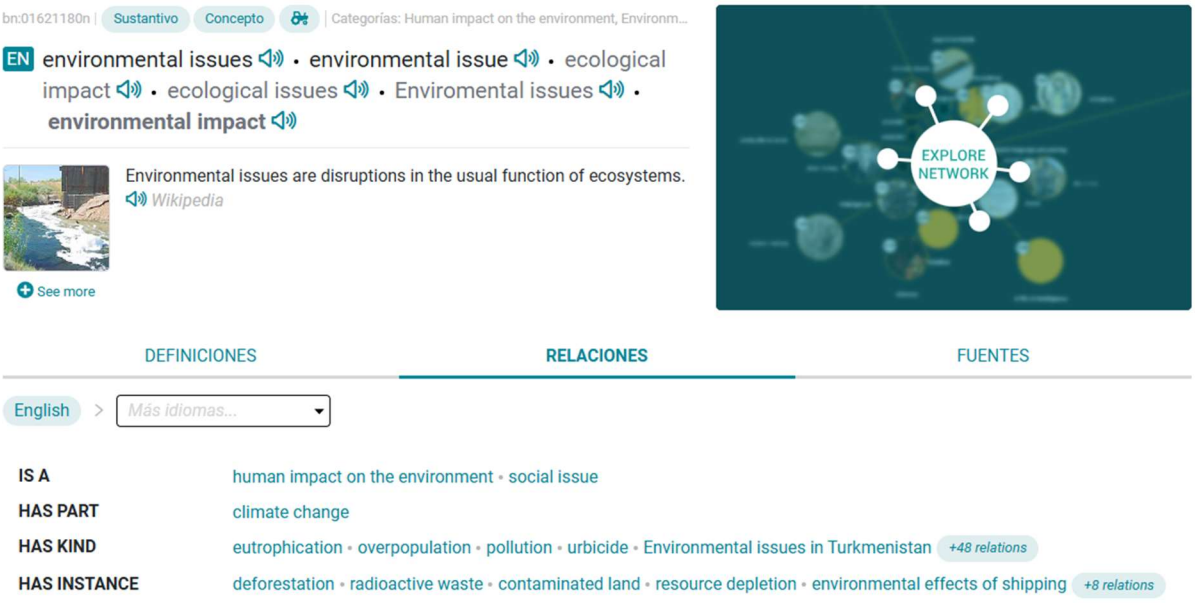


- "Water Resources" are identified as natural resources of water that are vital for human use, such as for drinking and irrigation.

Conclusion: Although BabelNet does not explicitly state a dependency between "Ecosystem Services" and "Water Resources", it recognizes the fundamental environmental benefits of ecosystem services and the significance of water as a resource. This supports the axiom's logical connection that ecosystem services indeed depend on water resources.

26. ∀x (SustainableAgriculture(x) → ∃y (reduces(y) ∧ EnvironmentalImpact(y)))

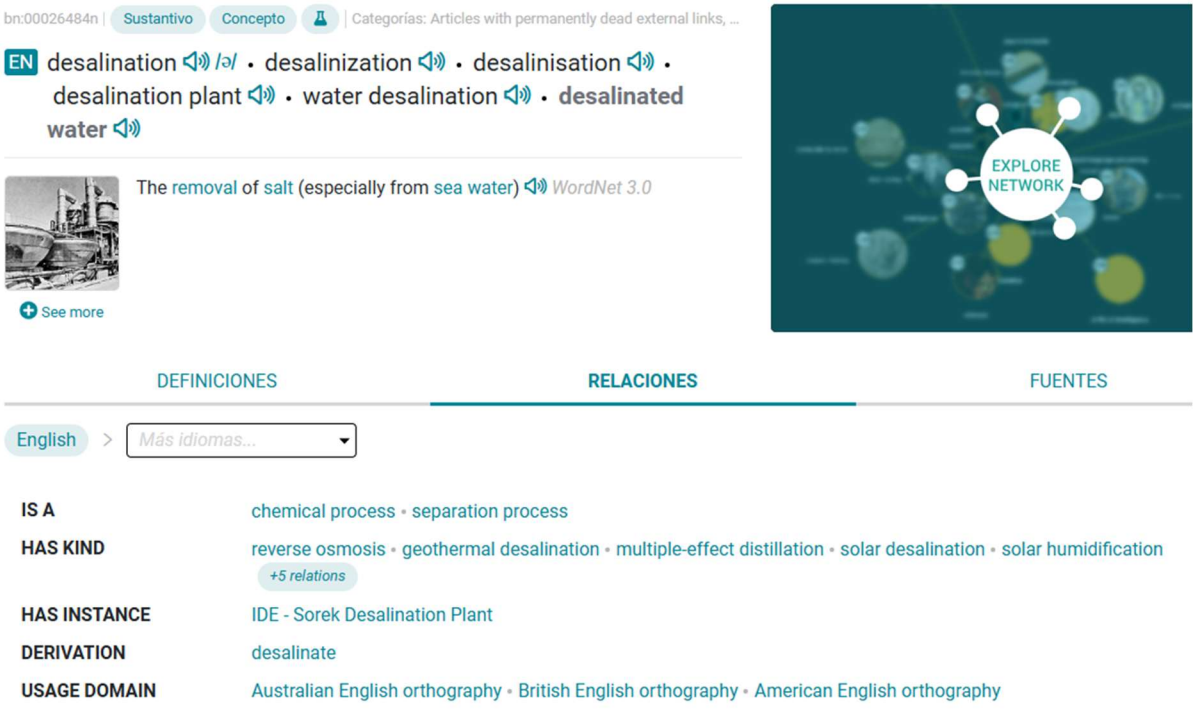
- In BabelNet, "Sustainable Agriculture" is described as a farming approach designed to fulfill current demands for food and textiles without compromising the needs of future generations.



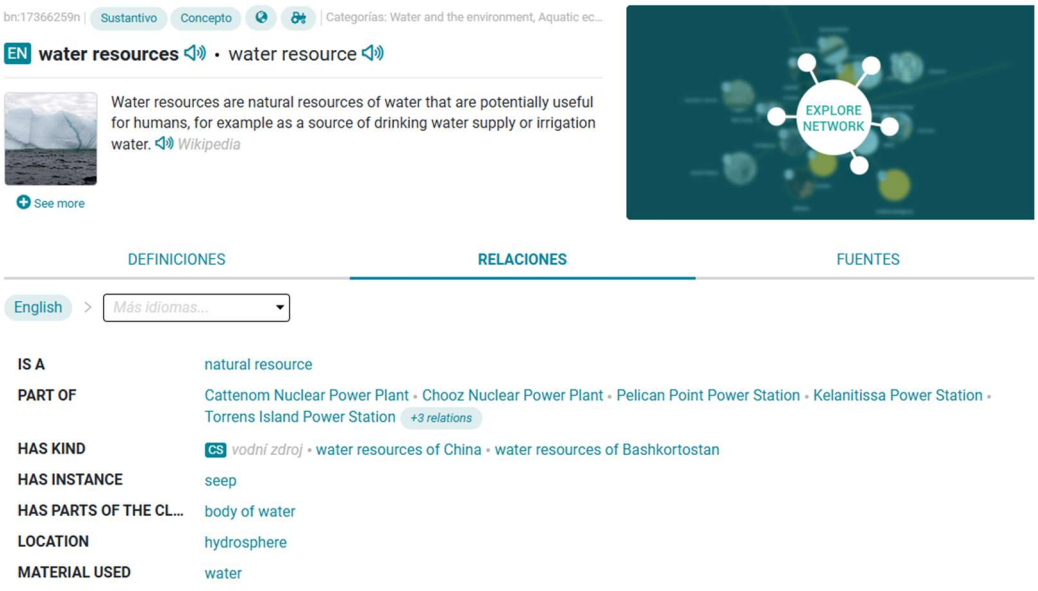
- "Environmental issues" are described as disruptions in the usual function of ecosystems due to human activities, including pollution, eutrophication, and climate change.
- It is categorized as a form of **human impact on the environment**.

Conclusion: Although there is no explicit relationship between sustainable agriculture and environmental impact in BabelNet, the descriptions suggest an implicit alignment with the axiom, supporting the premise that sustainable agricultural practices aim to minimize negative effects on the environment.

27. $\forall x\,(\text{DesalinatedWater}(x) \rightarrow \exists y\,(\text{supplements}(y) \wedge \text{WaterResources}(y)))$



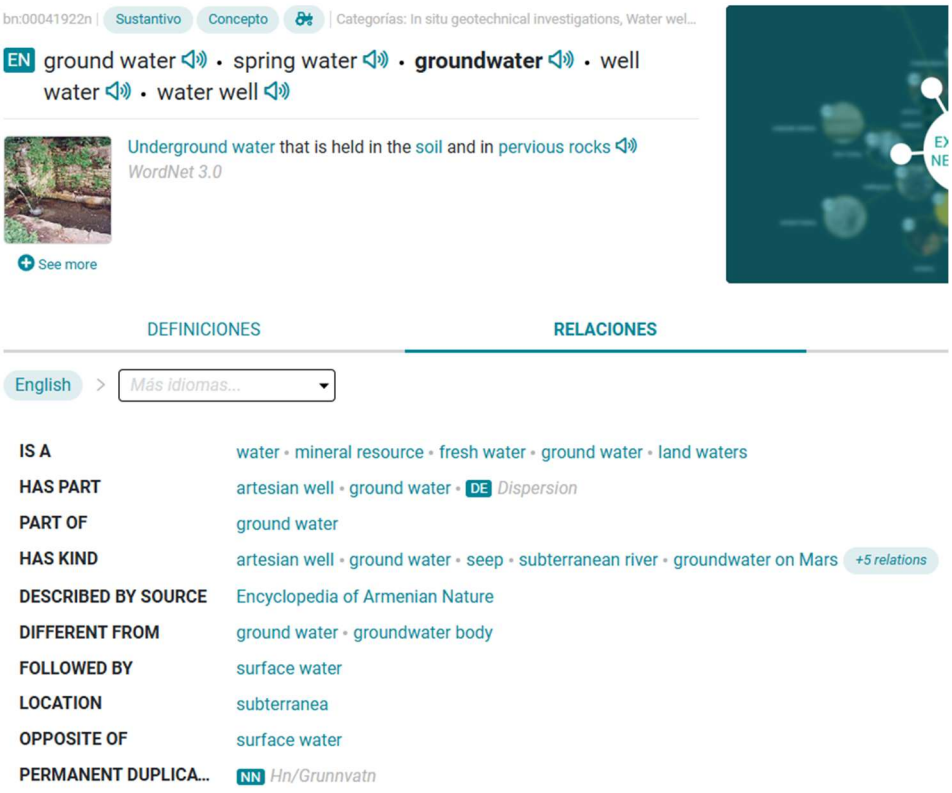
- In BabelNet, "Desalinated Water" is defined as water from which salt has been removed. This desalination produces fresh water.



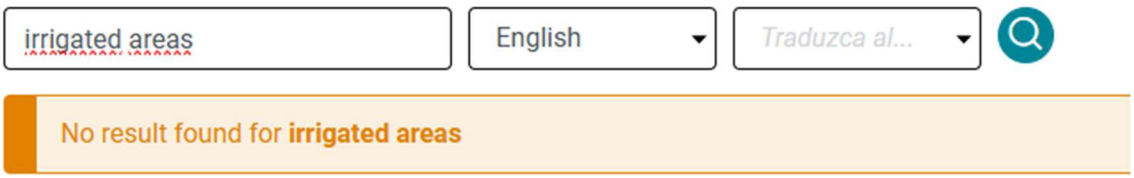
- Water resources are described as natural water sources essential for human needs, such as drinking water and irrigation.

Conclusion: Desalination processes aim to increase the availability of potable and usable water, which means that desalinated water serves to supplement natural water resources.

28. ∀x (Groundwater(x) → ∃y (supports(y) ∧ IrrigatedAreas(y)))



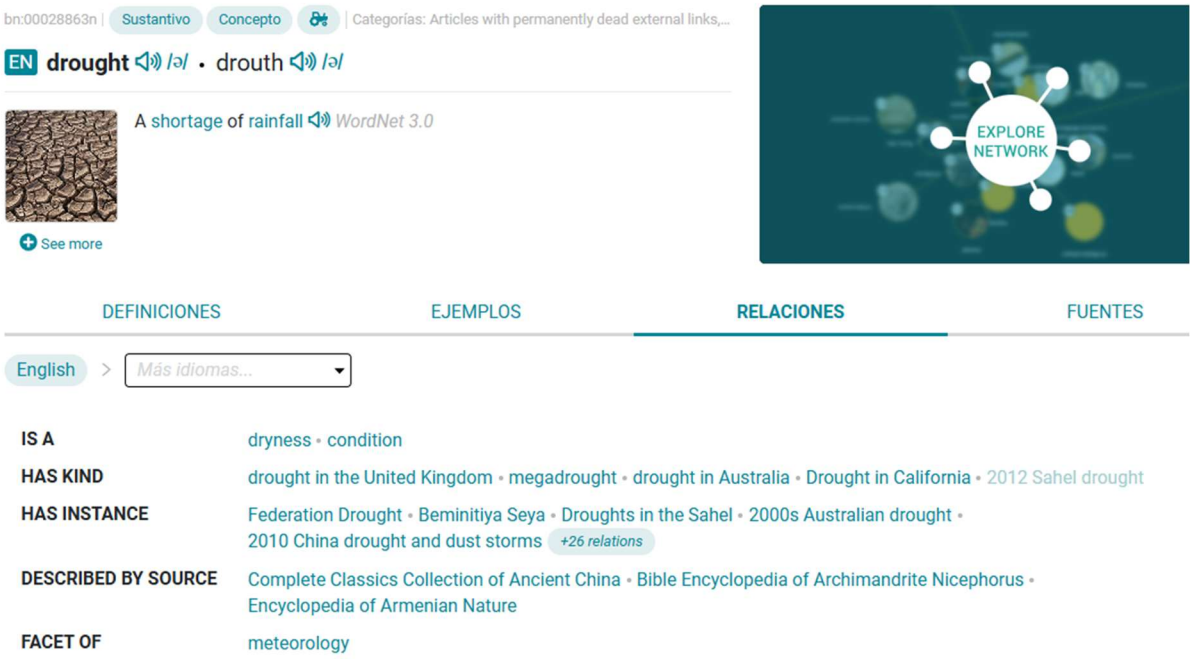
- In BabelNet, “Groundwater” is defined as water stored underground, held in soil or in rocks.



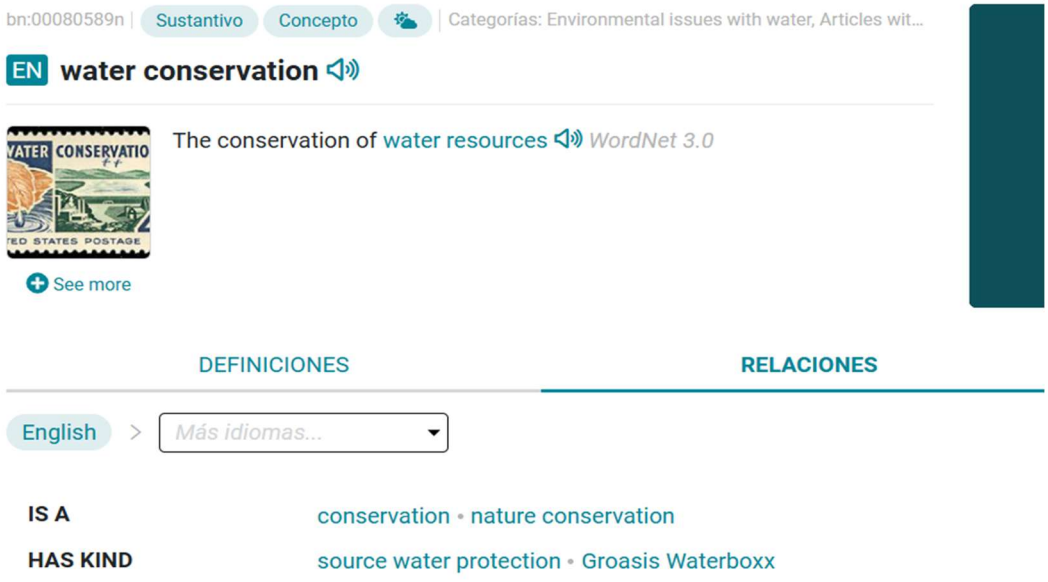
- Although “Irrigated Areas” does not appear in BabelNet, we know that they are areas that receive additional water to support crop growth.

Conclusion: We deduce that groundwater can be said to support irrigated areas by providing a supplementary water source.

29. ∀x (Drought(x) → ∃y (increasesNeedFor(y) ∧ WaterConservation(y)))



- Drought is defined as a shortage of rainfall, classified under **dryness** or **condition**.

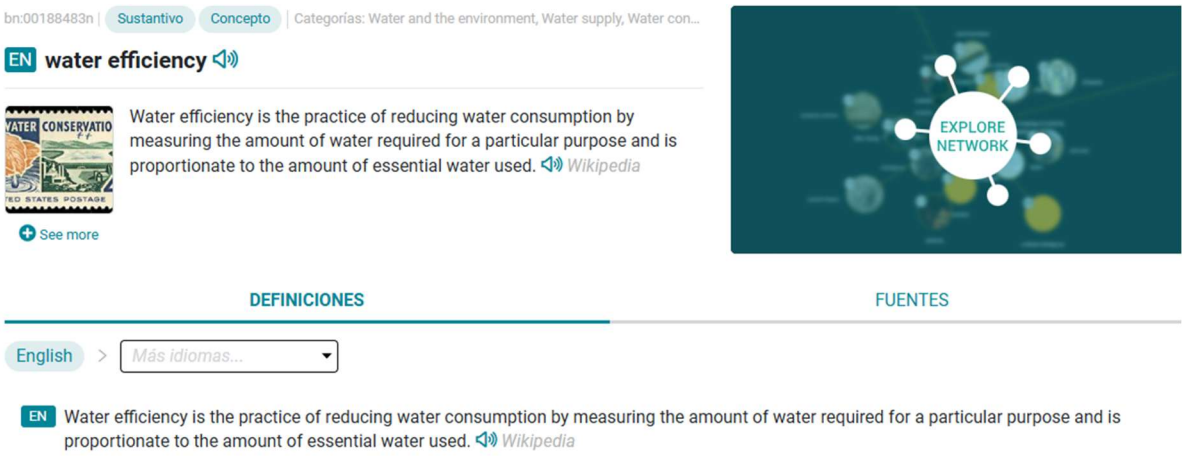


- "Water Conservation" is defined as the conservation of water resources, which aligns with efforts to manage and conserve water effectively, particularly in response to water shortages.

Conclusion: Drought, as a natural condition characterized by extended water scarcity, that is, by reduction of water availability, naturally leads to an increased need for conserving remaining water resources.

30. ∀x (PrecisionAgriculture(x) → ∃y (improves(y) ∧ WaterEfficiency(y)))

- "Precision Agriculture" is described as a farming management strategy that observes, measures, and responds to spatial and temporal variability to improve agricultural production sustainability. This method aims to optimize input usage (such as water) by adjusting practices based on data and real-time conditions.

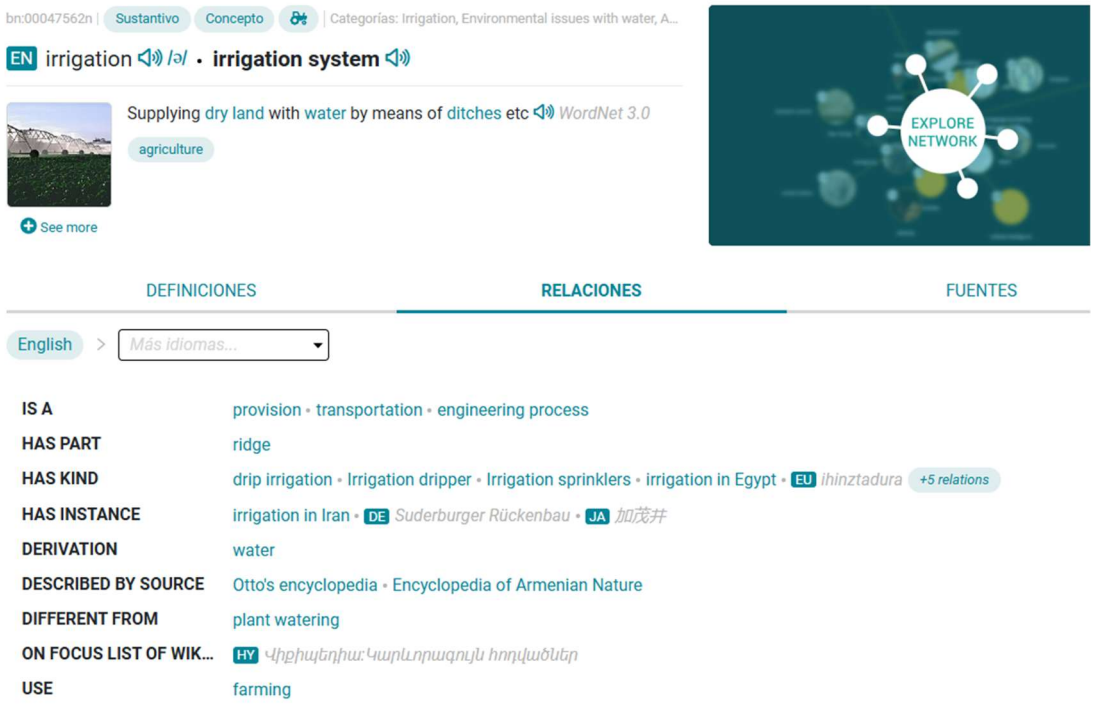


- "Water Efficiency" is defined as the practice of reducing water consumption by measuring the amount required for a particular purpose in proportion to the essential water used.

Conclusion: Precision agriculture, by using data-driven methods to apply water precisely, aims to reduce water waste and optimize water use, directly supporting water efficiency.

31. ∀x (CropIrrigationRequirements(x) → ∃y (isMetBy(y) ∧ IrrigationSystem(y)))

- Although "Crop Irrigation Requirements" does not appear in BabelNet, it can be defined as the specific water needs required to support crop growth during different stages or under varying conditions.

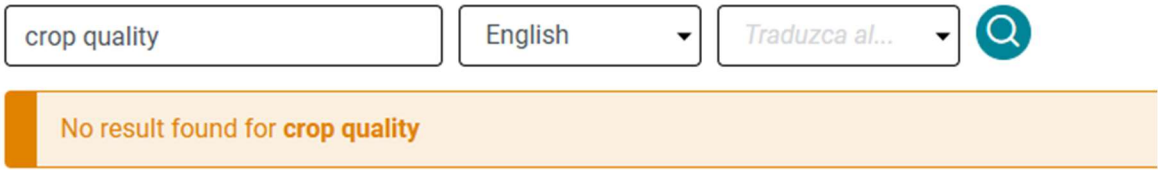


- "Irrigation System" is defined as supplying dry land with water by means of ditches, drippers, sprinklers, and other methods.

Conclusion: Irrigation systems are designed to deliver water efficiently to agricultural areas where water is required for crop growth, and this aligns with meeting crop irrigation needs.

32. ∀x (SoilHealth(x) ↔ GoodCropQuality(x))

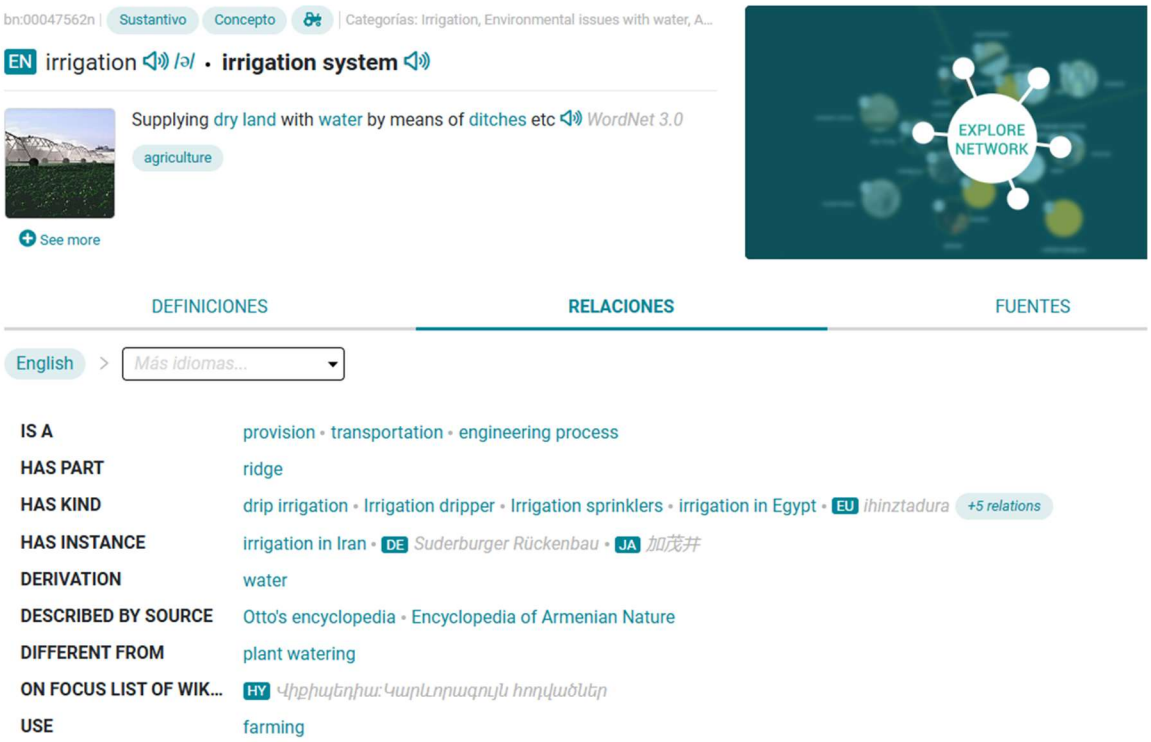
- "Soil Health" is defined as a state of a soil meeting its range of ecosystem functions as appropriate to its environment.



- Although "Crop Quality" is not defined in BabelNet, it can be described as the condition of a crop in terms of factors like nutrient content, appearance, and yield.

Conclusion: High-quality crops typically result from healthy soils, as they depend on essential soil functions to meet their growth needs. Soil health provides the necessary environment and resources for crops, promoting quality. Good crop quality is often a direct reflection of a soil's health, as poor soil conditions usually lead to lower quality crops.

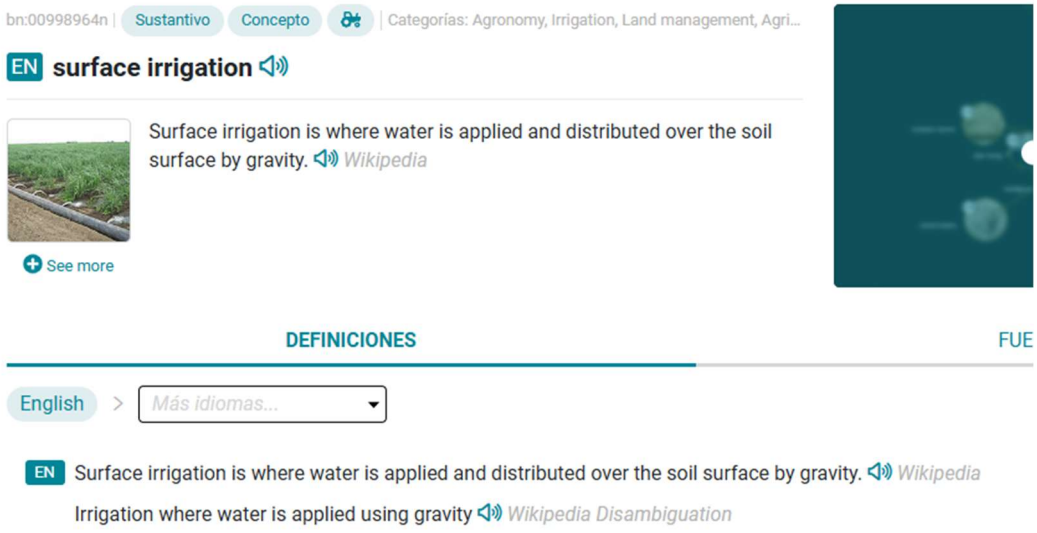
33. ∀x (IrrigationSystem(x) → UsesWater(x))



- "Irrigation System" is defined as supplying dry land with water by means of ditches, drippers, sprinklers, and other methods.

Conclusion: By definition, irrigation systems use water to supply dry land with it.

34. ∀x (SurfaceIrrigation(x) → ∃y (UsesMoreWaterThan(y) ∧ DripIrrigation(y)))



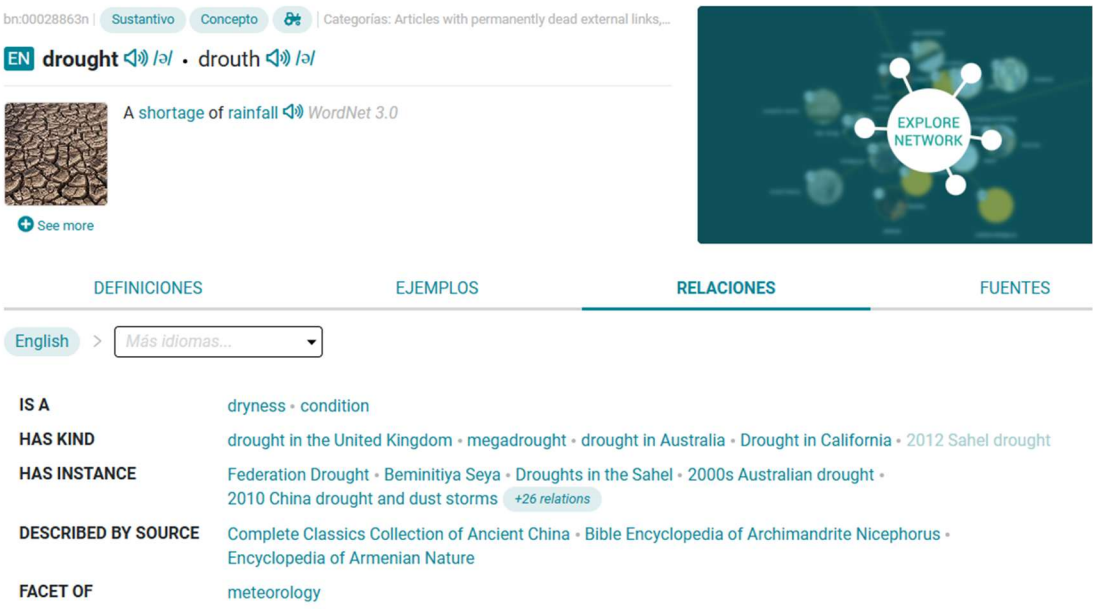
- Surface Irrigation applies water across the soil surface using gravity, leading to potential runoff and evaporation, which often results in higher water usage.

- Drip Irrigation delivers water directly to plant roots in a controlled, slow manner, significantly reducing water waste and improving efficiency.

Conclusion: The definition of surface irrigation indicates a reliance on gravity, which lacks the precision of drip irrigation systems, often resulting in greater water use.

35. ∀x (ClimateChange(x) → CausesDrought(x))

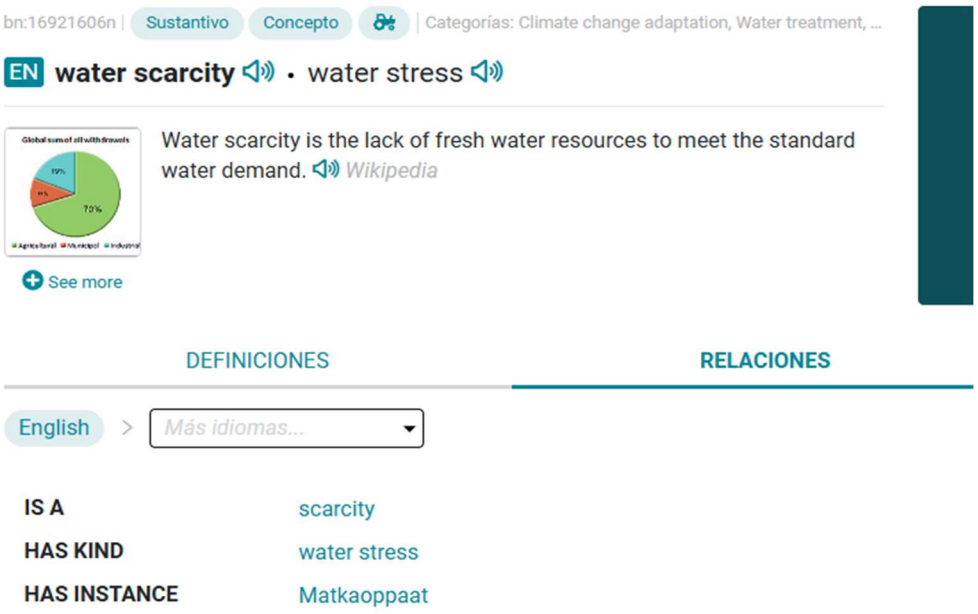
- "Climate Change" refers to significant and lasting changes in the climate, including shifts in temperature, precipitation patterns, and increased climate-related phenomena such as global warming. The definitions and relations indicate a broad environmental impact and suggest associated weather extremes.



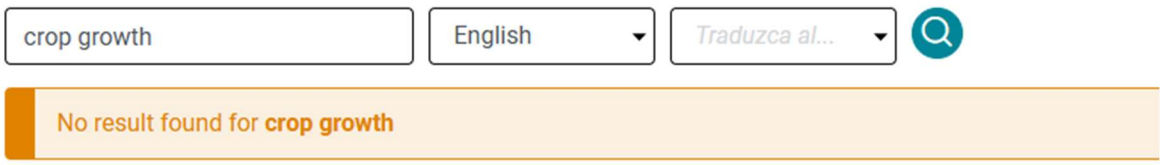
- "Drought" is described as a condition of dryness due to reduced rainfall. Drought can result from a range of meteorological factors, including climate change, which often alters rainfall patterns.

Conclusion: Climate change is likely to increase the frequency and severity of droughts by disrupting established weather patterns and causing irregular precipitation, since climate change's impact on temperature and precipitation directly influences water availability.

36. ∀x (WaterScarcity(x) → ¬IncreasesCropGrowth(x))



- "Water Scarcity" is defined as the lack of fresh water resources to meet the standard water demand.

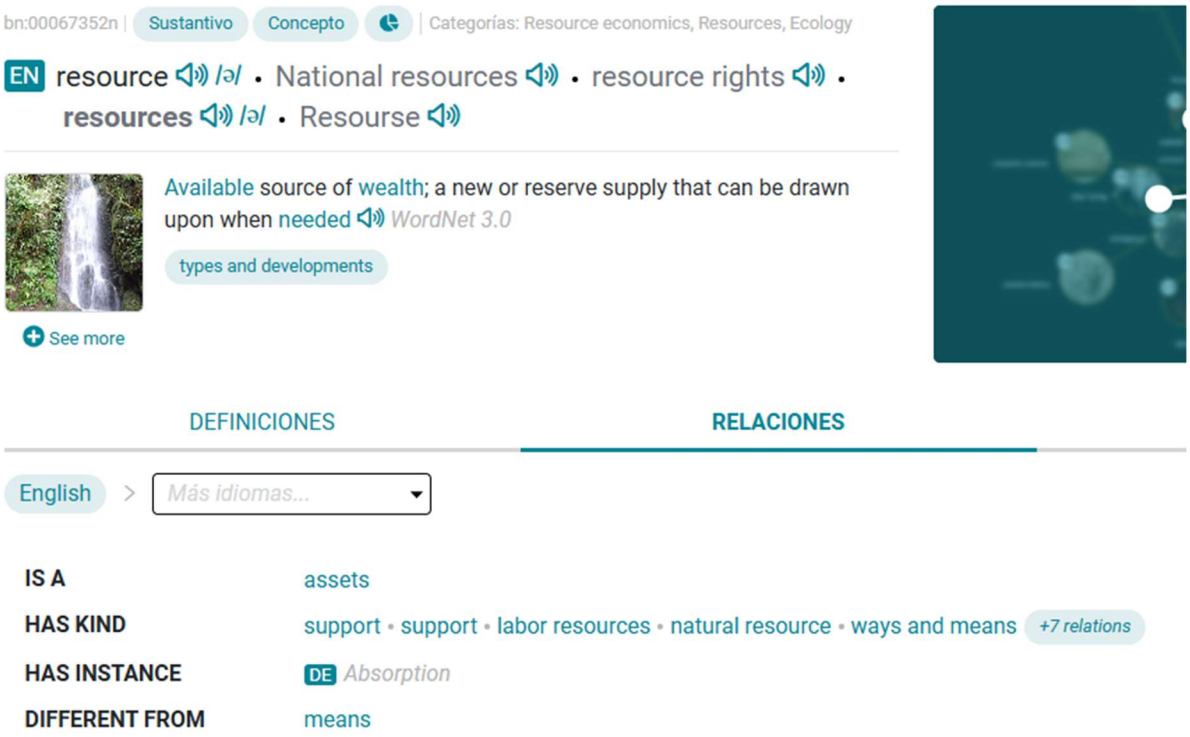


- While the specific term "Crop Growth" does not appear in BabelNet, it refers to the development of plants and needs several factors, including soil quality, nutrients, and particularly water availability.

Conclusion: Since "Crop Growth" does not appear in BabelNet, we are unable to verify the concept in that database directly. However, water scarcity is known to limit crop growth by reducing the water available for essential processes in plants, leading to reduced crop yields.

37. ∀x(¬SustainableAgriculture(x) → ¬ConservesResources(x))

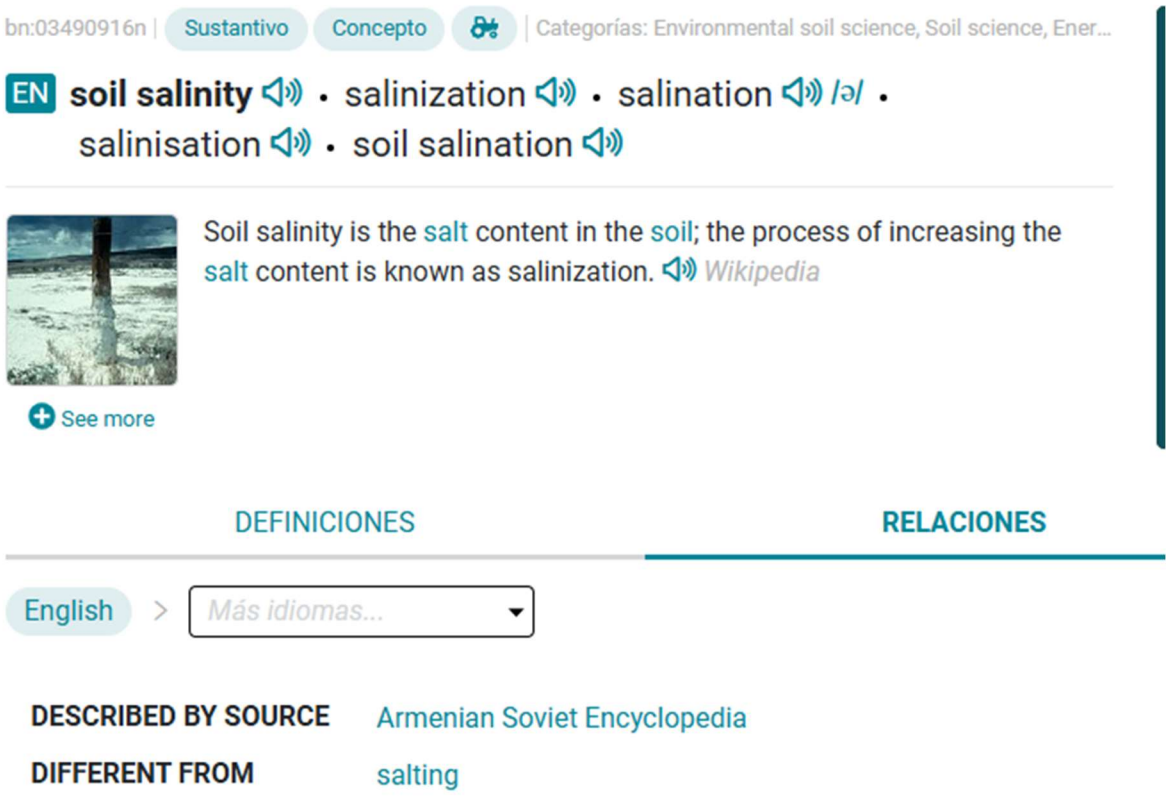
In BabelNet, "Sustainable Agriculture" is described as a farming approach designed to fulfill current demands for food and textiles without compromising the needs of future generations.



- "Resources" here are interpreted as **natural** and **support assets** essential for agriculture, which sustainable practices aim to conserve.

Conclusion: This axiom logically expresses that non-sustainable agriculture generally wastes resources. Unsustainable practices typically deplete resources at unsustainable rates, reduce biodiversity, or harm soil and water quality, all of which contradict conservation goals.

38. ∀x (SoilSalinity(x) → ¬ImprovesCropHealth(x))

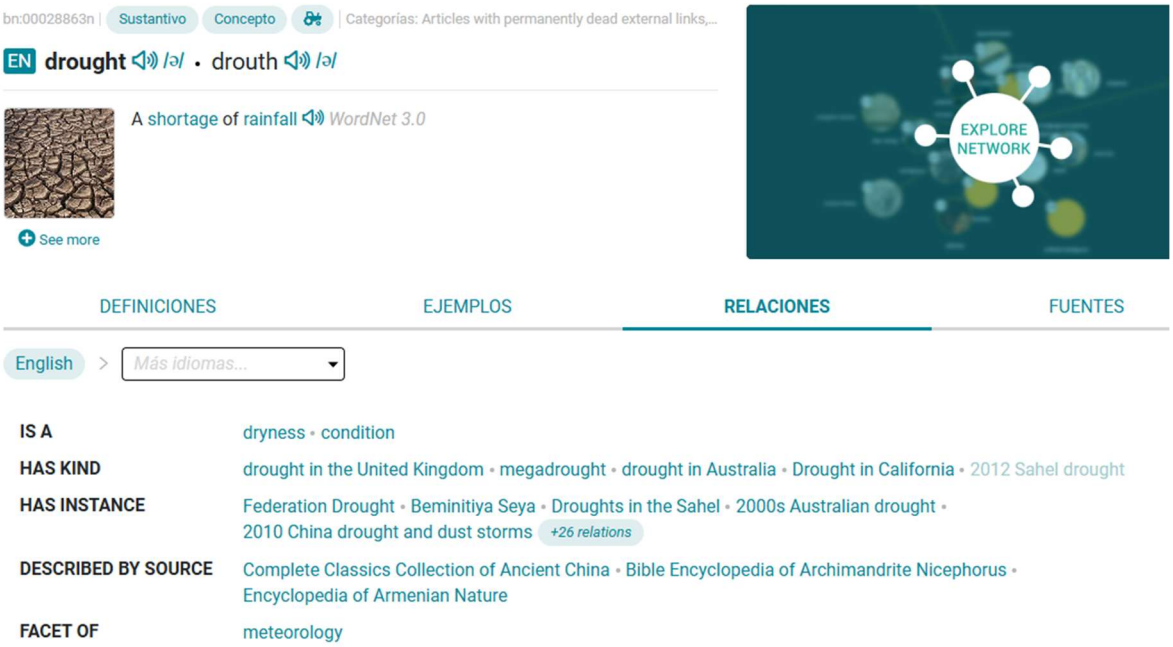


- "Soil Salinity" refers to the presence of salts in soil. High levels of soil salinity can lead to **salinization**, which can be detrimental to crop growth and overall health.

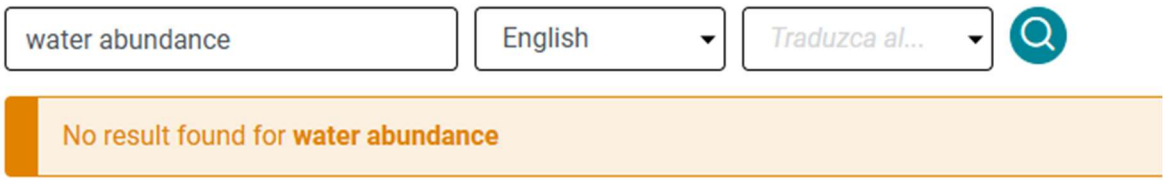
- Even though "Crop Health" is not available in BabelNet, it generally represents the ability of the crop to grow well and produce optimal yields.

Conclusion: This axiom reflects that high soil salinity typically harms crops rather than promotes their health. Saline soils can limit plants' ability to absorb water, leading to stress and reduced yield quality, all of which are indicators of poor crop health.

39. ∀x (Drought(x) → ¬CausesWaterAbundance(x))



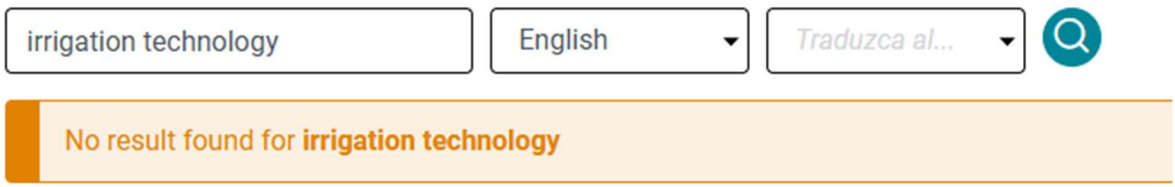
- "Drought" is described as a condition of dryness due to reduced rainfall. This can severely affect ecosystems, agriculture, and water supply.



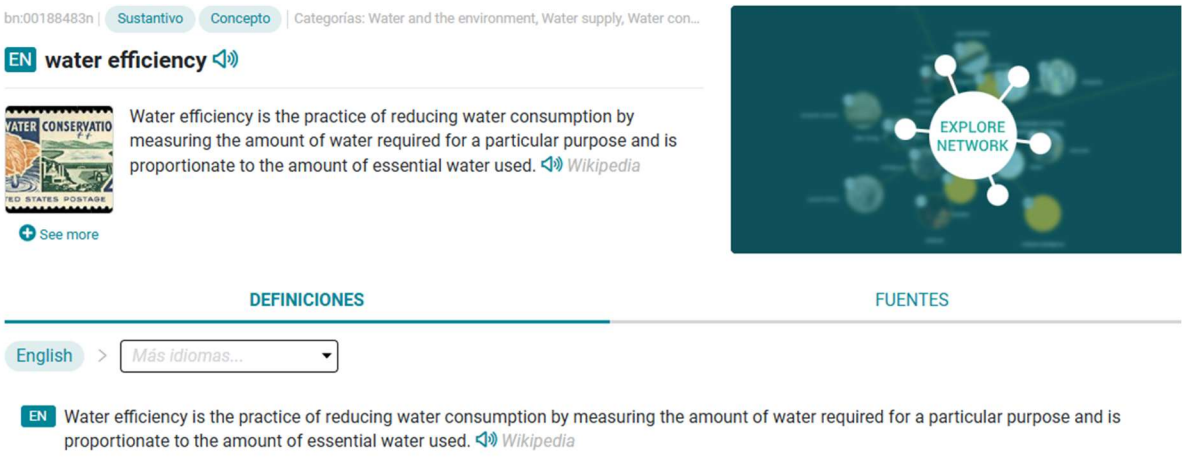
- Although "Water Abundance" does not appear in BabelNet, it typically refers to a condition where there is a plentiful supply of water available, sufficient to meet the needs of ecosystems, agriculture, and human consumption.

Conclusion: Since drought causes dryness due to reduced rainfall, diminishing water resources, it does not cause water abundance.

40. $\exists x$ (IrrigationTechnology(x) $\wedge$ ImprovesWaterEfficiency(x))



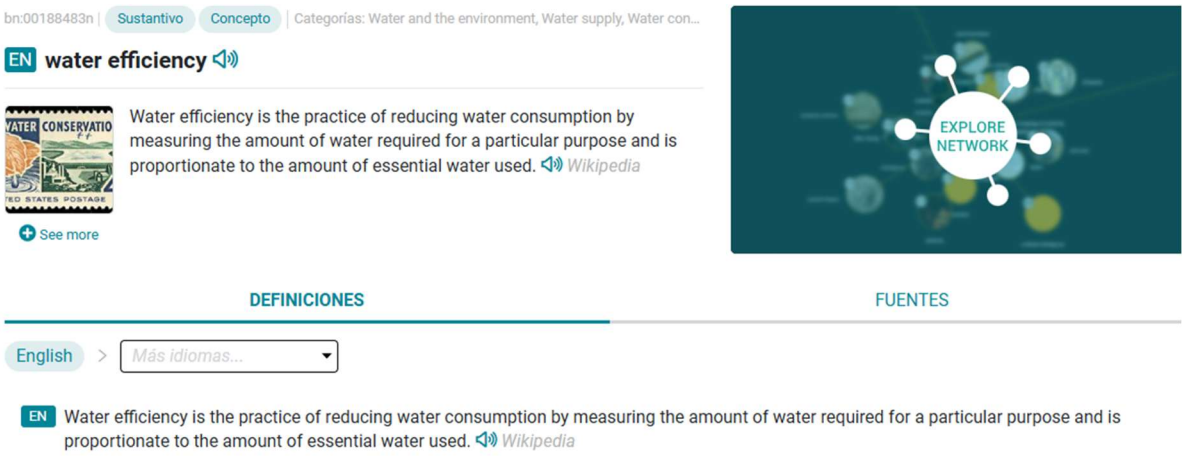
- Although "Irrigation Technology" is not directly available in BabelNet, it generally refers to tools, systems, and methods developed to apply water more effectively and reduce water loss in agricultural areas.



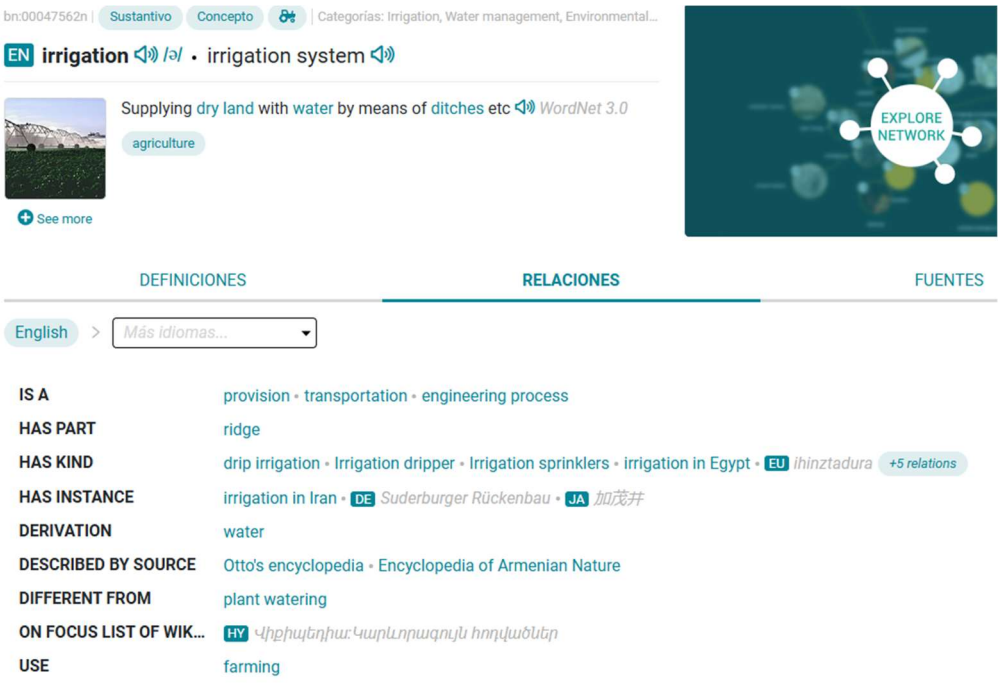
- "Water Efficiency" is defined as the practice of reducing water consumption by measuring the amount of water required for a particular purpose, ensuring that the amount of water used is appropriate for the needs of the crops without wastage.

Conclusion: Since irrigation technology are tools, systems, and methods developed to apply water more effectively and reduce water loss in agricultural areas, there exists irrigation technology that improves water efficiency, thus the axiom is consistent.

41. ∀x (WaterEfficiency(x) → ImprovesIrrigation(x))



- "Water Efficiency" is defined as the practice of reducing water consumption by measuring the amount of water required for a particular purpose, ensuring that the amount of water used is appropriate for the needs of the crops without wastage.

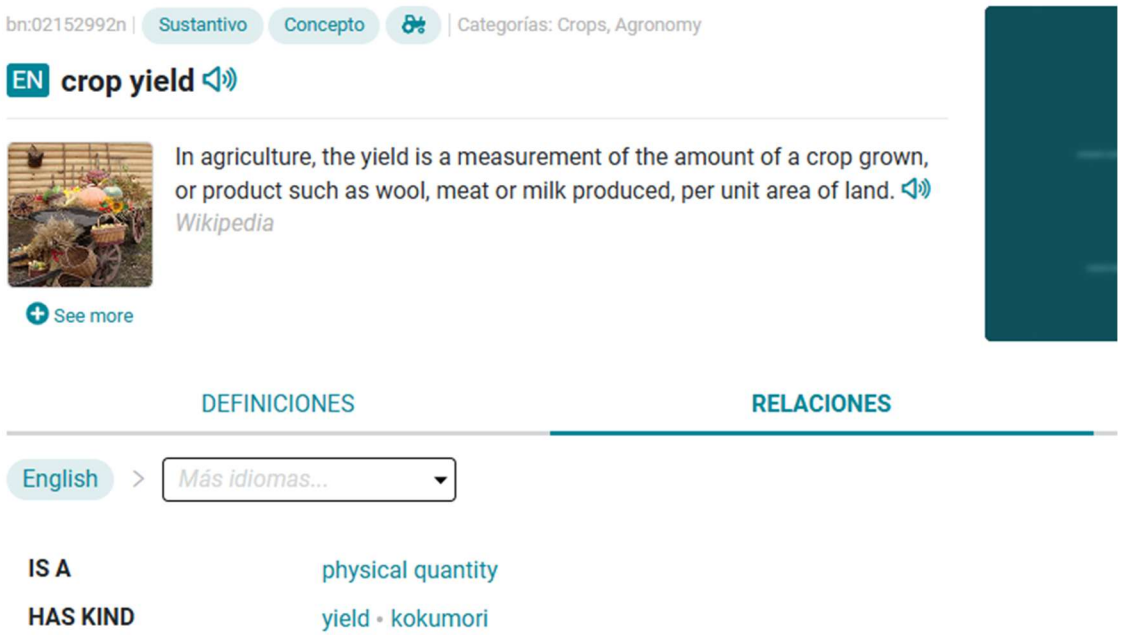


- "Irrigation" is defined as supplying dry land with water by means of ditches, drippers, sprinklers, and other methods.

Conclusion: If water consumption is reduced and water resources are used efficiently, then the amount of water consumed is minimized while still meeting the needs of plants and agricultural practices. This leads to an improvement in the effectiveness of irrigation systems.

42. ∃x (WaterUse(x) ∧ IncreasesCropYield(x))

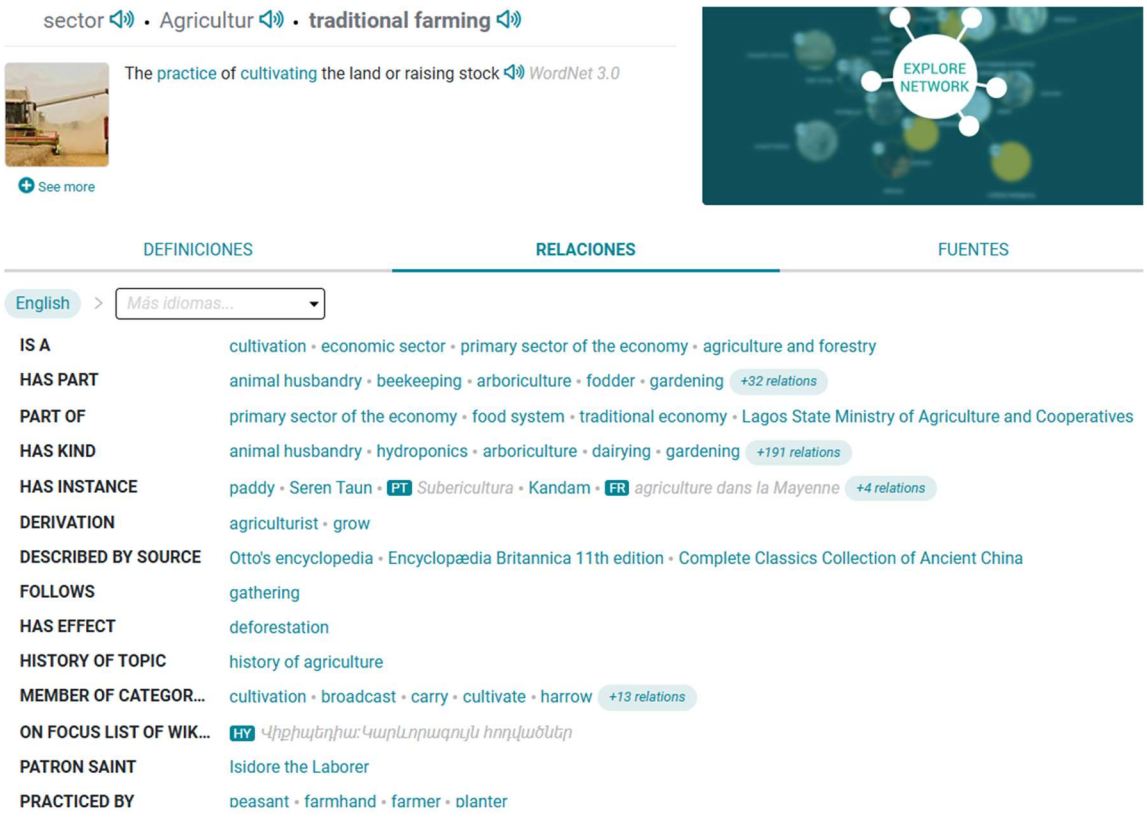
- "Water Use" refers to the application or consumption of water resources in activities such as agriculture.



- "Crop Yield" is described as a measurement of the quantity of a crop produced per unit area of land.

Conclusion: Water use, when managed effectively, is indeed capable of increasing the quantity of crop produced, so there exists at least one way in which the use of water contributes to an increase in crop yield.

43. ∀x (TraditionalFarming(x) → ∃y (ProducesLessYieldThan(y) ∧ PrecisionAgriculture(y)))

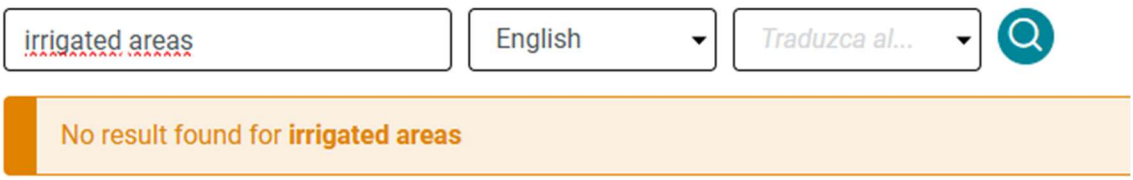


- "Traditional Farming" is defined as the practice of cultivating the land.
- Although BabelNet does not say it, it refers to conventional agricultural practices that typically rely on established methods, often with minimal technological aid, focusing on manual labor and natural inputs.

- "Precision Agriculture" is described as a farming management strategy that observes, measures, and responds to spatial and temporal variability to improve agricultural production sustainability.
- It is a modern farming approach that utilizes advanced technology, data analysis, and specific field observations to manage variations in crops and soil. It aims to maximize crop productivity by addressing precise crop and soil needs, optimizing input usage.

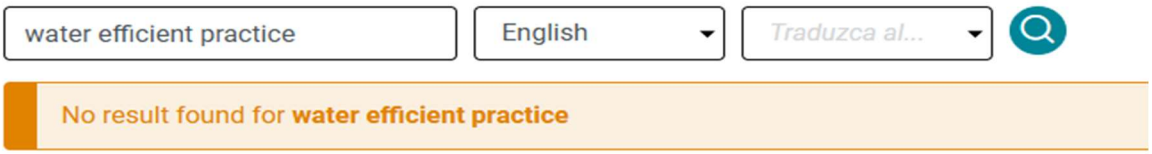
Conclusion: This axiom suggests that precision agriculture, due to its technological and data analysis approach, can generate higher crop yields compared to traditional farming methods. The efficiency gains in resource use and targeted application are key factors leading to this increased yield.

44. ∀x (IrrigatedAreas(x) → ∃y (HasHigherCropYieldThan(y) ∧ ¬ IrrigatedAreas(y)))



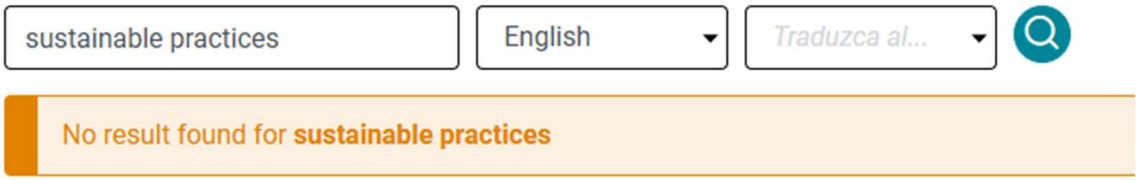
Since "**Irrigated Areas"** is not found in BabelNet, we are unable to verify the conceptual consistency of this axiom through BabelNet's data.

45. ∀x (WaterEfficientPractice(x) → ¬∃y (ConsumesMoreWaterThan(y) ∧ ¬ EfficientPractice(y)))

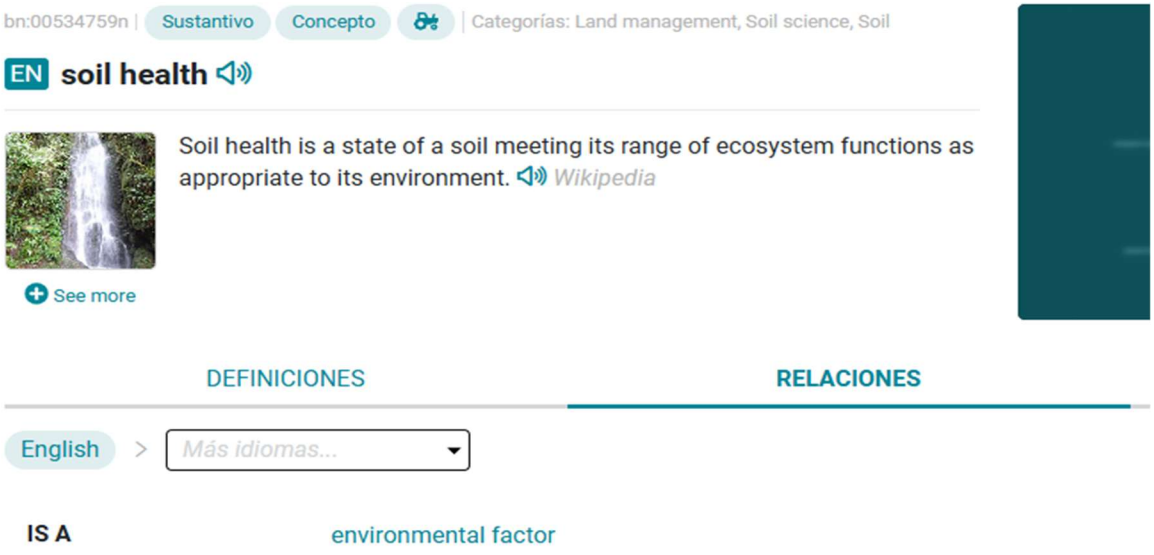


Since **"Water Efficient Practice"** is not found in BabelNet, we are unable to verify the conceptual consistency of this axiom through BabelNet's data.

46. ∀x (SustainablePractices(x) ↔ SoilHealth(x))



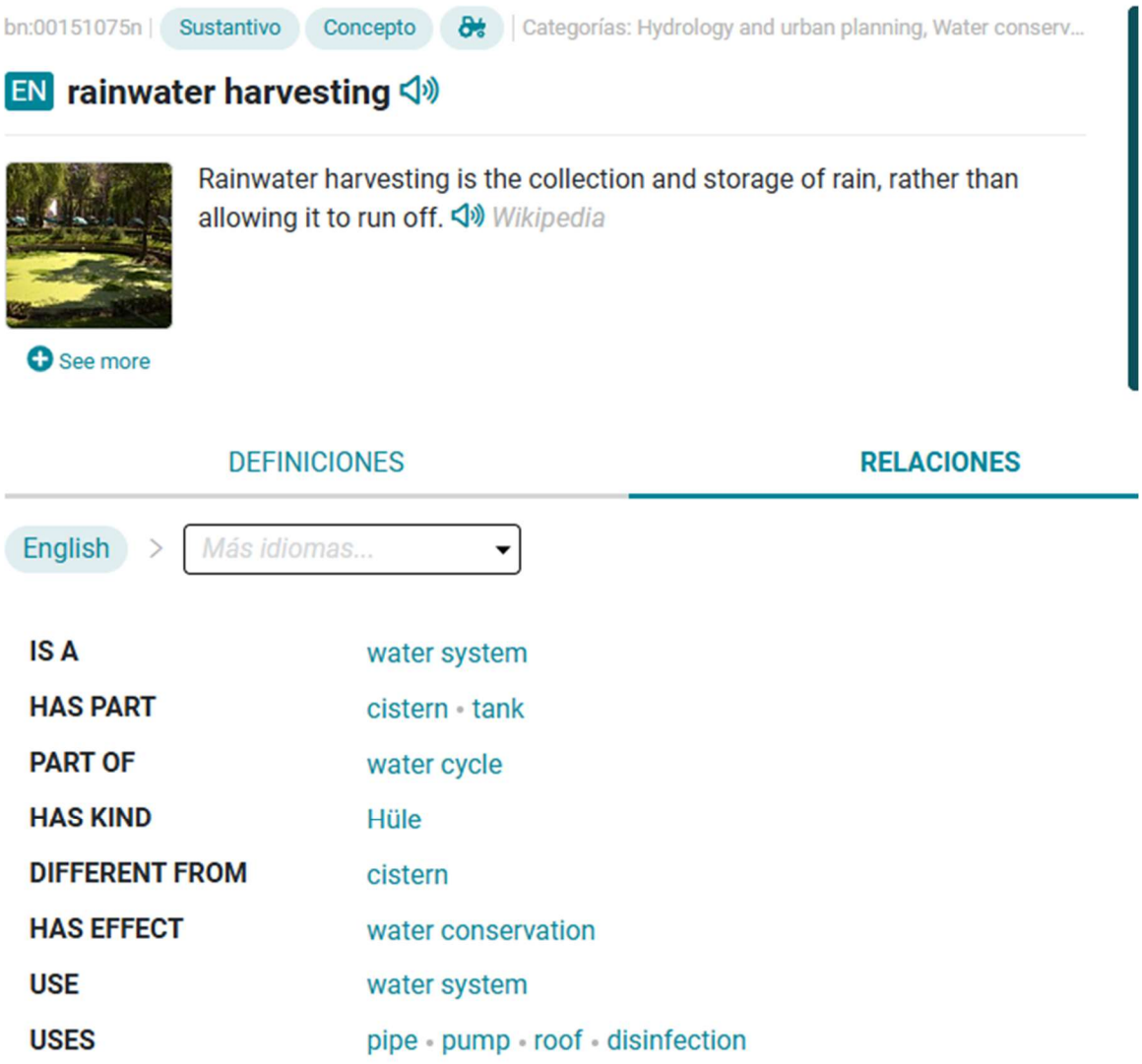
- Although "Sustainable Practices" does not appear in BabelNet, they refer to agricultural or environmental practices that aim to maintain ecosystem balance, preserve natural resources, and support long-term productivity.



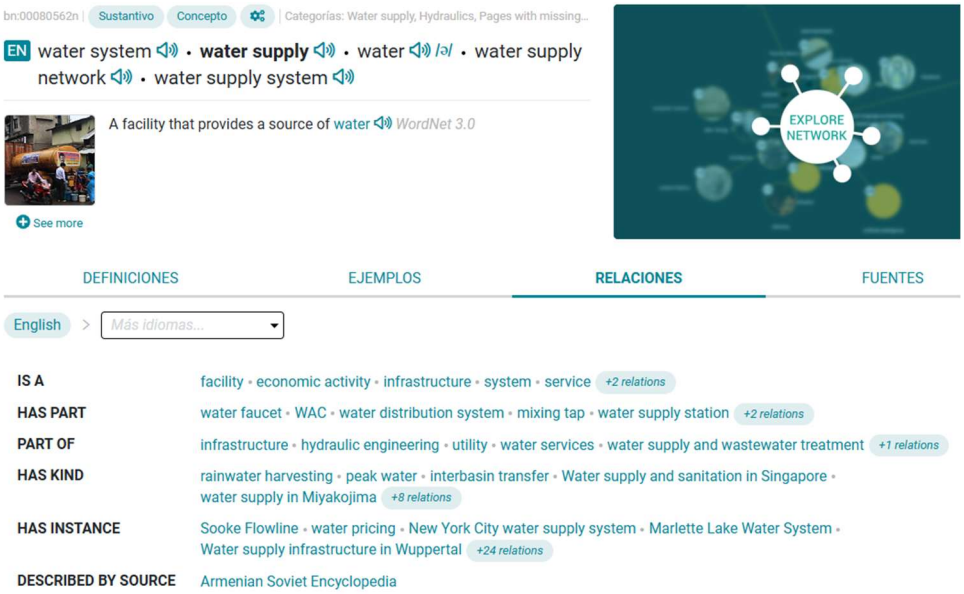
- "Soil Health" is defined as a state of a soil meeting its range of ecosystem functions as appropriate to its environment.

Conclusion: It follows that if a practice is sustainable, it will promote soil health, and if a soil health is maintained, it implies that sustainable practices are being employed.

47. ∀x (RainwaterHarvesting(x) → WaterSupply(x)



- Rainwater harvesting refers to the practice of collecting and storing rainwater instead of allowing it to run off, typically for later use in irrigation, potable water supply, or other uses.



- "Water supply" is defined as a facility that provides a source of water.

Conclusion: Rainwater harvesting involves the collection and storage of rainwater, so it provides a source of water, which means it is a type of water supply.

48. ∀x (AgriculturalEngineering(x) → ImprovesAgriculturalProductivity(x))

- "Agricultural Engineering" is described as the field of study and application of engineering science for agriculture purposes to improve the efficiency of farms as well as to ensure sustainability of natural and renewable resources.

- "Agricultural Productivity" refers to the measurement of outputs relative to the inputs used. It is a key indicator of farm efficiency and economic sustainability.

Conclusion: Since agricultural engineering aims to improve the efficiency of farms and to ensure sustainability of natural and renewable resources, it increases the measurement of outputs relative to the inputs, that is, it improves agricultural productivity.

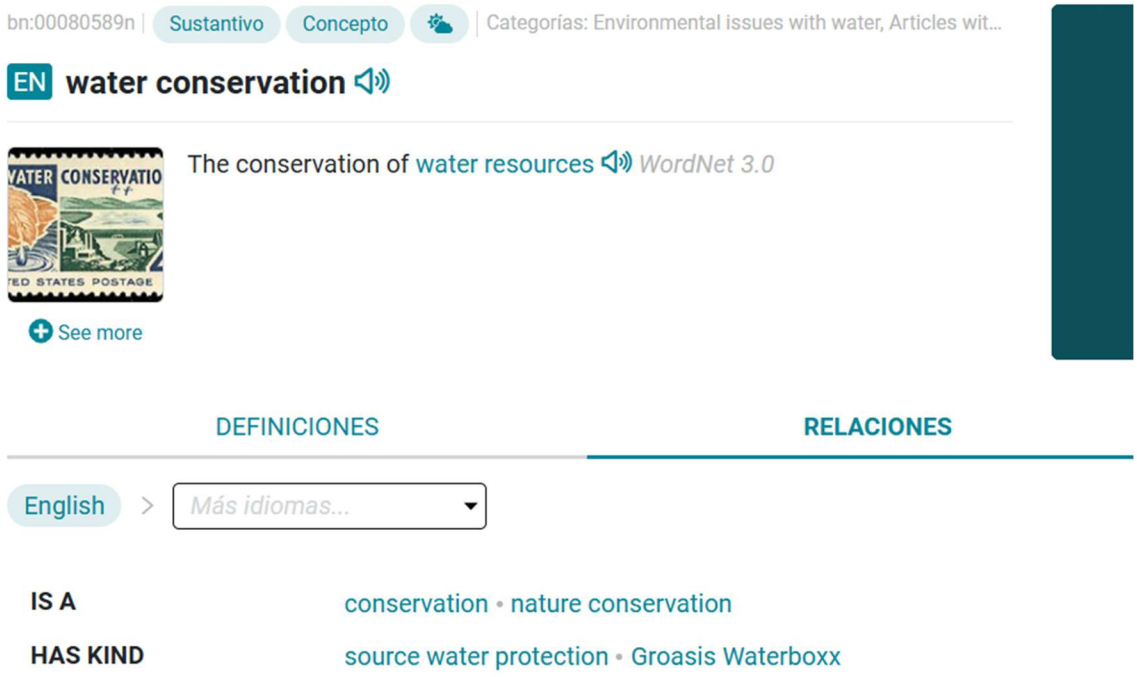
49. $\forall x\ (ClimateChange(x) \rightarrow \exists y\ (increasesNeedFor(y) \wedge IrrigationRequirements(y)))$

- "Climate Change" refers to significant and lasting changes in the climate, including shifts in temperature, precipitation patterns, and increased climate-related phenomena such as global warming. The definitions and relations indicate a broad environmental impact and suggest associated weather extremes.

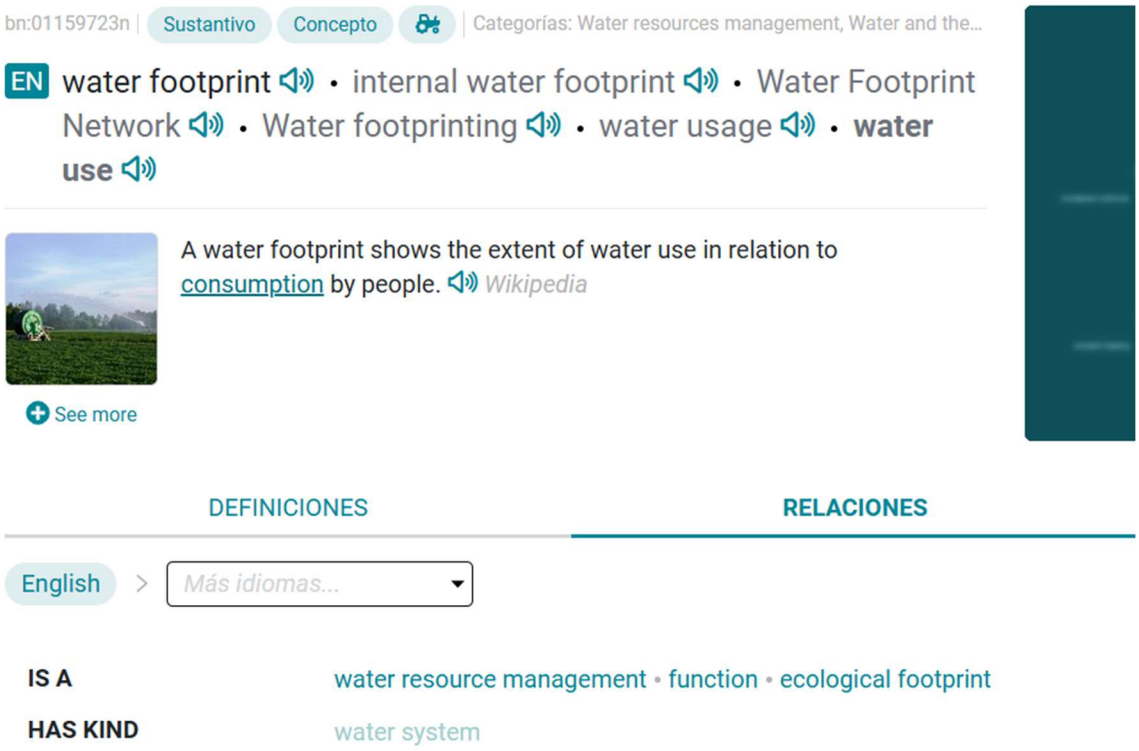
- "Irrigation Requirements" does not appear in BabelNet. However, it refers to the amount and frequency of water needed by crops or vegetation, typically increasing due to drier conditions or changes in rainfall patterns caused by climate change.

Conclusion: Climate change, by altering weather patterns and increasing drought, often raises the water needs of agricultural areas due to increased crop water demand, thus raising irrigation requirements.

50. ∀x (WaterConservation(x) ↔ ¬ExcessiveWaterUse(x))



- "Water Conservation" refers to the conservation of water resources.



- "Water Use" refers to the application or consumption of water resources in activities such as agriculture.

Conclusion: Water conservation aims to reduce water consumption, so it avoids excessive water use. Besides that, if there is not an excessive use of water, then it means that water is being preserved, leading to water conservation.