

Helping machines and people agree on what things mean in production agriculture: AgGateway's Glossary and Semantic Infrastructure

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AgGateway is a nonprofit consortium of 240+ companies dedicated to advancing implementation of standards for interoperability in agriculture. Its work originally targeted supply chain processes, but was expanded in 2010 to include production agriculture field operations such as planting, crop protection, crop nutrition, irrigation, and harvest. An important deliverable of AgGateway's field operations projects (SPADE, PAIL) has been to identify the data variables that support the growers' field operations processes, document their meaning, and establish the various contexts in which they are used. It subsequently became necessary to create machine-readable variable type registries, controlled vocabularies, and other semantic resources to facilitate interoperability, thus enabling all participants in a data exchange process (or their software, rather) to unambiguously understand the *meaning* of the data being exchanged. These resources will be made available to users primarily through one or more application programming interfaces (APIs) for use by farm management information systems (FMIS) and other software.

There are, so far, three fundamental types of variable registries in this semantic infrastructure: a) The Representation System, which describes "universal" variables and their units of measure (e.g., yield as mass per unit area), derived from an internal representation system John Deere donated to the ADAPT project; b) The ContextItem System, which describes geopolitical-content-dependent variables (e.g., EPA numbers, FSA tract Ids) and complements the Representation system; c) Observation Codes, which are a specialized form of representation system built using the ContextItem system's sophisticated architecture.

This infrastructure will require ongoing additions and maintenance, but the resources' and APIs' originating projects (e.g., SPADE, PAIL) have a finite duration. AgGateway's Standards and Guidelines Committee consequently saw fit to create a Controlled Vocabularies Working Group (CVWG) to provide a permanent home for the semantic resources' management processes. The overarching intent is to create resources that will be used extensively by the industry. An important precondition for that usage is transparency in governance; as a result, the CVWG derived its governance model from the ISO 19135 standard for register management.

AgGateway has also invested in a human-readable Glossary, hosted at www.agglossary.org and designed to bring together agricultural terminology from different sources (e.g., ASABE) as an educational resource and discussion-support tool. This resource includes a taxonomy for representing the origin and context of each term, and was initially hosted using the MediaWiki platform. The Glossary Team is now working toward upgrading the architecture of the glossary, seeking machine-readability and compatibility with the ISO 25964 data model, in pursuit of maximizing the value of the resource to contributors and users of the data, especially for concepts and terms that may be contained within it and not in international efforts such as GACS (the Global Agricultural Concept Scheme); e.g., legal terms and terms derived from ASABE (and other) standards.

Keywords: information systems; software; semantics; infrastructure; API

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