Conceptual Design of Fully Traceable Supply Chain for Bulk Agricultural Commodities

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Conceptual Design of Fully Traceable Supply Chain for Bulk Agricultural Commodities

Disciplines
Agriculture | Bioresource and Agricultural Engineering | Operations and Supply Chain Management

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Conceptual Design of Fully Traceable Supply Chain for Bulk Agricultural Commodities

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Outline

- Traceability
- Chain Traceability
- Traceability System Requirements
- Internal Traceability
- Conceptual Traceability Model
  - Entity-Relationship Model
  - Sequential Interaction Model
- Concluding Thoughts
Traceability

Under European Union Law,

“Traceability” means the ability to track any food, feed, food-producing animal or substance that will be used for consumption, through all the stages of production, processing and distribution.

Traceability is a risk-management tool which allows food business operators or authorities to withdraw or recall products which have been identified as unsafe.

Require that each company know who their immediate supplier is and to whom the product is being sent, on the principle of one up, one down

One weak link in the supply chain can result in unsafe food, which can present a serious danger to consumers and have costly repercussions for suppliers

Food safety is therefore the joint responsibility of all the actors involved
Bulk Grain Supply Chain

- Seed Production
- Farming
- Handling
- Processing
- Distribution
Chain Traceability

SEED PRODUCTION

FARMING

HANDLING

PROCESSING

DI STRIBUTION

TRACE

TRACK
Traceability System Requirements

- Seed Company
- Farmer
- Grain Handler
- Processor
- Distributor
- Retailer
- Consumer

Grain Traceability System

- Comply with Food Safety Regulations
- Authenticate Claims
- Protect Integrity of Brand Name
- Record Breeding Practices
- Record Farming Practices
- Record Handling/Storage Practices
- Record Processing Practices
- Document Chain of Custody
- Meet Consumer Preferences
Internal Traceability

Every actor in the supply chain is responsible for maintaining records that link the inputs with the outputs.

**Internal processes:**
- Movement
- Storage
- Aggregation
- Segregation
- Transformation
- Destruction
Internal Traceability: Entity-Relationship Models
Internal Traceability: Entity-Relationship Models
UML Sequence Diagram
Suspect Product

Farming
- Send Crop Data

Handling
- Send Grain Data
- Request Additional Information for Suspect Grain
- Return Necessary Information for Suspect Grain

Processing
- Send Product Data
- Request Additional Information for Suspect Products
- Return Necessary Information for Suspect Products

Distribution
- Send Product Data
- Request Additional Information for Suspect Products
- Return Necessary Information for Suspect Products

Retail
- Return Requested Information

Top Package: User
- Request Additional Information

IDEF0: Traceability System Development

- Regulatory Compliance
- Chain-of-custody Documentation
- Production Practices Documentation
- Claims Authentication
- Safety & Quality Assurance
- Customer Satisfaction
- Validation Certificates

Develop Traceability System

- Regulatory Need
- Business Need
- Customer Preference
- Industry Standards
- Personnel
- Procedures

Control
Input
Output
Mechanism
Process Name

Name
Traceability System Development

1. Determine Traceability Plan
   - Regulatory Compliance
   - Procedure Manual

2. Implement Traceability Plan
   - Implementation Report
   - Performance Report

3. Evaluate System Performance
   - System Validation
   - Evaluation Report
   - System Maintenance

4. System Validation
   - Chain-of-custody Documentation
   - Production Practices Documentation
   - Claims Authentication
   - Safety & Quality Assurance
   - Customer Satisfaction
   - Validation Certificates

5. System Maintenance
   - Performance Report
   - System Validation
   - System Maintenance

- Regulatory Need
- Business Need
- Customer Preference
- Industry Standards
- Personnel
- Procedures
Grain Elevator Model
(Handling Specialty Grain)

1. Determine Traceability Plan
   - Regulatory Compliance (ISO)
   - ISO Certification (Regulatory Need)
   - Segregate different crops (Business Need)
   - Speciality grains (Consumer Demand)

2. Implement Traceability Plan
   - Traceability System Manual
   - Implementation Report

3. Evaluate System Performance
   - Evaluation of System Performance
   - Performance Report (QMS reports)
   - Audit reports

4. System Validation
   - Production Practices Documentation
   - Quality Management System Documentation
   - ISO Certification
   - Customer Satisfaction
   - Validation Certificates

5. System Maintenance
   - Industry Standards
   - Personnel
   - Procedures
Concluding Thoughts

- Traceability systems should meet business and regulatory requirements while providing product information.
- All actors in the supply chain must maintain internal and external traceability systems.
- Businesses should share relevant information with other partners.
- A request for traceability data should be responded to as soon as possible (comply with regulations).
- Failure at one point in the chain will result in the system failure. A chain is only as good as its weakest link.
Thank you

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