Ajayu Agri–Fintech Information System Strategy

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Technical Data Documentation

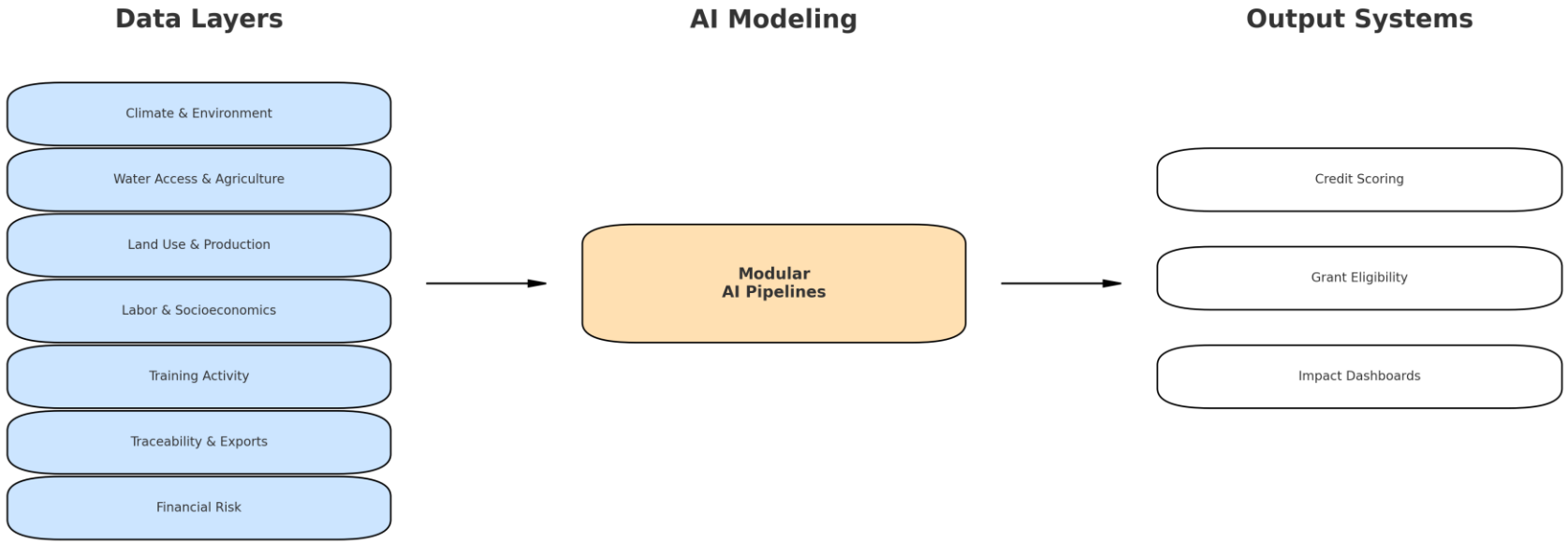
Ajayu's Integrated Data Sources:

- ENA (Encuesta Nacional Agraria) Survey: farmer access to financial services, cost of production, training participation, producer profiles.
- CENAGRO (2012 Agrarian Census): baseline producer counts for spatial expansion.
- INEI (Demographics): population projections, rural workforce data.
- INEI Financial Offer Mapping: spatial distribution of banking and insurance services.
- Aduanet/SUNAT Export Data: horticultural export metrics aligned to HS codes.
- SENAMHI Climate Indicators: district-level rainfall, drought, temperature, and humidity.
- Reservoir and Irrigation Databases: water access by district and crop.

Data Harmonization Strategy:

- ENA ratios expanded using CENAGRO census and INEI demographic baselines.
- All sources spatially joined at UBIGEO district/province/region levels.
- Ready for real-time AI model integration, credit scoring, and predictive analytics.

Ajayu Data Architecture



ENA Agrarian Surveys | CENAGRO Census | INEI Demographic Data | INEI Financial Offer Mapping | Aduanet Customs Data

SENAMHI Climate Data | Reservoir & Irrigation Data | IoT Sensor Integration | UBIGEO Regional Codes

Predictive Spatial Intelligence for Rural Finance

Designed and authored by José Carlo Burga for the Ajayu Data Architecture, supporting scalable rural finance innovation.

Data Intelligence Stack

Delivery Layer

AI Models, Power BI, PPTX Generator, Farmer-Facing Mobile Tools

Master Feature Store

District x Product matrix for modeling and dashboarding

Feature Engineering

Over 60 Engineered Features

Integration Layer

Unified by geolocation (Region, Province, District levels)

Data

Spatial, Agriculture, Peruvian Global Value Chains, Peruvian Demographics, Climate, Irrigation, Land, Farmer Training, Costs of Agricultural Production, Farmer Access to Financial Services

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Cross-Layer Feature Interactions

- Product-Code Linkage: Top 15 exports from G3 aligned to Aduanet via HS codes
- Geolocation Layer: UBIGEO enables district-level spatial joins across all sources
- Climate Sync: Rainfall, temperature, and humidity joined to export zones via UBIGEO
- Water Resources: Irrigation and reservoir data layered on crop geography
- Training Flags: ENA-based training score tied to land use and credit gaps
- Logistics Overlay: Distance to Callao, export routing, and market exposure scoring
- AI Inputs: All features engineered to feed into credit, productivity, and risk models

Model – 1. Farmer Profile & Behavior

- Credit history score
- Loan repayment rate
- Transaction frequency
- Income seasonality index
- Digital device access
- Mobile app usage
- Grant/subsidy history
- Cooperative membership
- Leadership index
- Gender of producer

Model – 2. Crop & Production Intelligence

- Primary crop type
- Farm size (ha)
- Crop rotation frequency
- Irrigation access
- Fertilizer use intensity
- Pesticide use intensity
- Yield history
- Harvest calendar alignment
- Organic certification
- Post-harvest storage access

Model – 3. Climate & Environmental Risk

- Rainfall index
- Temperature variability
- Altitude
- Drought risk
- Flood frequency
- Frost exposure
- Soil quality
- Erosion risk
- Evapotranspiration index
- Microclimate deviation

Model – 4. Traceability & Market Access

- HS code match
- Blockchain enrollment
- Traceability % output
- Port access time
- Cold chain availability
- Exporter association
- Market volatility index
- Exporter location
- Product grading compliance
- Digital logistics integration

Model – 5. Behavioral & Digital Usage

- Onboarding speed
- SMS/WhatsApp open rate
- Language preference
- App session duration
- Form completion rate
- Referral behavior
- Support tickets
- Response time to offers
- Training attendance
- Early repayment behavior

Model – 6. Risk & Eligibility Scoring

- Composite risk score
- Eligibility index
- Climate risk index
- Market alignment index
- ESG alignment
- Traceability score
- Digital literacy
- Cross-subsidy flag
- Loan approval likelihood
- Grant scoring index

Best-Fit Predictive Models

Model Domain	Best-Fit Predictive Models	Why?
Farmer Profile & Behavior	Logistic Regression, Decision Trees	Binary outcomes (repayment, trust) + interpretability
Crop & Production Intelligence	Random Forest, Gradient Boosted Trees	Complex nonlinear relationships in input/output patterns
Climate & Environmental Risk	Support Vector Machines, Neural Nets, Ensemble Methods	High-dimensional data, complex interactions
Traceability & Market Access	K-Nearest Neighbors, Naïve Bayes, Multi-class Classification Models	Segmenting exporters vs. local vs. partial traceability
Behavioral & Digital Usage	Time-Series Analysis, Clustering (K-Means), Behavioral Trees	Pattern recognition + engagement scoring
Risk & Eligibility Composite Scores	Ensemble Models (XGBoost, Stacking), Meta-Models	Aggregation of outputs from other models into composite scoring