

Ajayu Agri-Fintech

Core Risk Feature Tables

Jose Carlo Burga

This document outlines the structured tables for the four core dimensions of Ajayu's risk platform: Land Availability, Water Availability, Climatic Conditions, and Disaster Exposure. Each table includes the feature name, a short description, the link to the pipeline, and any associated formulas.

Land Availability Risk Features

Feature	Description	Relation in Pipeline	Formula (if applicable)
Land_Suitability_Score	Measures suitability based on slope, crop type, and irrigation zone status	Derived from CENAGRO + UBIGEO, filtered by crop	Composite index of slope norm + irrigation dummy
Expansion_Potential	Binary indicator: can expansion occur within mapped productive zones?	Cross-referenced against national land classification	N/A
Crop_Land_Match	Validates if top crops match available zoned land	SUNAT G3 + UBIGEO + CENAGRO overlay	Jaccard similarity score
High_Elevation_Zone	Flag for crops suited to altitudes >2,000m	CENAGRO + GPS elevation matched to crop registry	N/A

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Water Availability Risk Features

Feature	Description	Relation in Pipeline	Formula (if applicable)
Irrigation_Access_Index	Composite score based on canal proximity, irrigation infrastructure	ENA + remote sensing data + CENAGRO irrigation zones	Weighted sum (infrastructure + distance decay)
Seasonal_Water_Variability	Standard deviation of water availability across 12-month window	Derived from SENAMHI + NOAA historical time series	std(monthly rainfall)
Aquifer_Reliance	Estimate of how reliant zone is on groundwater vs surface water	SENAMHI region codes + local infrastructure datasets	Ratio of groundwater:surface dependency
Rainfed_Dependence	Score indicating risk for rain-only zones	ENA + rainfall threshold cutoffs	Binary threshold >600mm annual rainfall

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Climatic Conditions Risk Features

Feature	Description	Relation in Pipeline	Formula (if applicable)
Temperature_Anomaly_Score	Normalized deviation from 10-year monthly average temperature	NOAA API + SENAMHI temperature grids	
Precipitation_Anomaly_Score	Same as above but for rainfall	NOAA API + regional datasets	
Humidity_Risk_Index	Risk score based on mean + std of humidity in production window	Matched to crop windows via UBIGEO and ENA	mean(humidity) + volatility factor
Frost_Risk	Number of frost days in last 5 years by district	SENAMHI and satellite data	Count(Frost Days)

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Disaster Risk Features

Feature	Description	Relation in Pipeline	Formula (if applicable)
El_Nino_Exposure_Index	Composite exposure level to El Niño events (drought, flood combo)	Overlay of SENAMHI event history + district crops	Weighted score by historical frequency
Landslide_Exposure	Terrain, rainfall, and slope-based indicator for landslide likelihood	CENAGRO terrain + rainfall from SENAMHI + satellite imagery	$Slope * Rain\ Index$
Flood_Risk_Score	Based on past flooding records and topographic basin exposure	Historical flood maps + GPS overlay	Mean recurrence interval
Pest_Disease_Flag	Recent phytosanitary alerts by crop/location	National phytosanitary registry + crop match	Binary flag

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Ajayu integrates disaster risk at the model and policy levels for:

- Predictive credit scoring
- Parametric insurance pricing
- Portfolio risk control
- Regional expansion logic

Parametric Insurance Trigger Model

- Based on:
- Historical disaster frequency (10–20 year baseline)
- Monthly anomalies from SENAMHI + NOAA
- Crop-specific risk windows
- Formula:

$$\text{Trigger} = 1 \quad \text{if} \quad X_t \notin [\mu - k\sigma, \mu + k\sigma]$$

Where X_t = rainfall/temperature index for UBIGEO-month-crop cluster

2. Disaster_Exposure_Index (New Feature)

- Inputs:
 - Geo-coded frequency of floods/droughts (e.g. SENAMHI)
 - Historical crop loss by UBIGEO-product
- Applies to:
 - Loan ceilings
 - Interest rate risk buffers
 - Geographic exclusion from pilot sta