Satellite Enabled Risk Mitigation in Agri-Financing

INSIGHT DRIVEN AGRICULTURE RISK MANAGEMENT, CREDIT RATING, AGRI LENDING, AND FINANCIAL INCLUSION
SatSure is a large area analytics company working towards improving financial inclusion of farmers in the developing world by combining the power of satellite Remote Sensing, IOT, Machine Learning, Cloud computing, and Big Data analytics.
DELIVERING NEAR REAL TIME INSIGHTS

**SENSOR DATA**
Satellites, IOT, Weather, Drone, Econometric Data

**PROPRIETARY IP**
Machine Learning Algorithms

**BIG DATA COMPUTING**
On Premises and On Cloud
AREAS OF FOCUS

- Food Security
- Climate Change
- Energy Security
- Water Security
- Sustainable Development
- Agro-Forestry
- Commodities
- Critical Infrastructure

SOLVING THE INSIGHTS CHALLENGE
The Objective

Faster loan and credit disbursement and settlement facility to farmers who requests crop or farming loans
FARM FINANCE SOLUTION

Current Information Gap

IF LOAN AMOUNT WAS USED for CROP INTENDED

If FARMING Activity is taking place

FARM ADVISORY for INTERVENTIONS

WEATHER for impact and exposure to related loss

Satellite Image Classification for Crop Identification

Large Area Monitoring across Growth Cycle

Time-series analysis based Crop Performance

NIGERIA PADDY ANALYSIS DEMO
AGRICULTURE LENDING

SATELLITE DATA

CROP PRICE DATA

WEATHER DATA

AGRONOMIC DATA

DIGITAL PAYMENTS DATA

DECISION INTELLIGENCE FRAMEWORK

LOAN DEFAULT RISK MANAGEMENT

FARM CREDIT WORTHINESS

AGRI LOAN RECOVERIES

CROP ADVISORY SERVICES
BASE TECHNOLOGY STACK
GEOSPATIAL ANALYTICS PLATFORM

Data Synchronisation Middleware: Gathine, SAP Leonardo

Data Store: SAP S/4 HANA

Analytics: VEGA, Deep Learning

Reporting: SatSure, Esri
Pre Loan Grant Default Management

Asset Linkage and Verification to establish default risk

CHECK CADASTRE against satellite imagery to see if land is not in zoned areas (riverbeds, wetland, revenue land) and verify against digital land records datasets for ROR compliance.

VERIFY HISTORICAL USE OF LAND to authenticate request and farming history Link to historical datasets of mandi-level support pricing to measure historical crop viability of the farm and farming practice.

CREATE & LINK FARM HEALTH INDEX based on parameters such as fertilizer usage, weather variance, ground water level etc.

LINKED ASSET passed back to Core Banking to create Customer 360 and loan disbursement decision.

Farmer Default Decision and Loan Recovery or waiver decision making.
Post Loan Grant Default Management

Constant Monitoring to establish default risk

**LOAN GRANTED** information is passed back to SatSure Platform for periodical monitoring.

**LARGE AREA ANALYTICS OF ENCUMBERED PARCELS** done via Satellite Data and other data sources on a periodical basis - weekly, bi-monthly, monthly basis to check on:

- **IF LOAN AMOUNT WAS USED** to buy seeds, and farm was sowed.
- **IF FARMING ACTIVITY** is taking place to claims of farming
- **WEATHER** for impact of crop in encumbered land and exposure due to extreme weather situations
- Whether **CROP GROWTH** is viable, failure and harvest readiness triggers for **LOAN FACILITY CLOSURE / RECOVERY**
AGRI LOAN PORTFOLIO MONITORING

LOAN OFFICER DASHBOARD - APPROVAL QUEUE MAP VIEW

APPLICATION NO
OBA-CL-001
CROP TYPE
PADDY
SEASON
Kharif 2018

PRE APPROVED

APPLICATION NO
OBA-CL-001
CROP TYPE
REDGRAM
SEASON
Kharif 2018

DISCRETIONARY

APPLICATION NO
OBA-CL-001
CROP TYPE
GROUNDNUT
SEASON
Kharif 2018

NOT APPROVED
CROP INTELLIGENCE PRODUCTS

SOWING INTELLIGENCE

CROP CONDITION MONITORING

ACREAGE MONITORING

HARVESTING INTELLIGENCE

Legend
- Very Good
- Good
- Average
- Below Average

Pulses

Maize

Crops | Area (in hectares) from Remote Sensing Data till 15th April | Area (in hectares) from Remote Sensing Data till 14th March | Actual Area (in hectares) Up to 14/03/2018 |
---|---|---|---|
Maize | 22,997.48 | 22,997.48 | 22,692 |
Paddy | 8,701.85 | 4982.33 | 3796 |
Ragi | 4,197.50 | 4,197.50 | 4,488 |
Pulses | 93542.06 | 93542.06 | 91,310 |

Maize Harvest Area
FARM FINANCE SOLUTION

Improve Credit Linkages

CHECK CADASTRE
Land not in zoned areas (riverbeds, wetland, etc.)
Verify digital land records for ROR

HISTORICAL CROP YIELD
Farming history

FARM HEALTH INDEX
Weather variance, fertilizer usage, ground water, etc

MARKET PRICES
Local mandi prices
Market Access
Global indices

FARM CREDIT WORTHINESS
Payment histories

Potential Impact:
10s of millions

Target Farmholdings:
> 1 acre

Delivery Mode:
APIs
Crop Risk – Smart Sampling

SMART SAMPLING OF CROP CUTTING EXPERIMENTS

- Higher accuracy of yield estimates
- Reduce number of CCEs by 80%
- Save approx Rs. 6 Cr per district

Step 1: Crop Classification
Step 2: Stratify based on Yield variation based on phenology*
Step 3: Re-stratify based on Proximity analysis with road network

Accuracy - 95% (on yield distribution and acreage)

* Identifying yield variations in paddy crop, by capturing its phenology through time-series satellite data, using vegetation indices, for creating a stratified sampling plan for CCEs

SRIKAKULAM, Kharif 2017
Harvest Progress – Kharif, 2017

1FN November
22K Ha

2FN November
109K Ha

1FN December
201K Ha

Accuracy - 97% (on Acreage)

*Accuracy measured with data published by AP Govt for only 5 mandals
## Rabi 2018 - Initial Update

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<th>Area</th>
<th>Satellite Detected Area (Ha.)</th>
<th>Reported Area (Ha.)</th>
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<td>Pulses</td>
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Crops in Next Update < 10,000 Ha.
- Maize
- Groundnut
- Paddy
- Sesame
- Sugarcane
USER CASE STUDIES

INSURANCE CLAIMS SETTLEMENT

LARGE AREA MONITORING
Business Ecosystem
Partnerships
Can we help you?
Can you help us?

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