

Smart Integrated Farm Network for Rural Agricultural Communities (SIRAC)

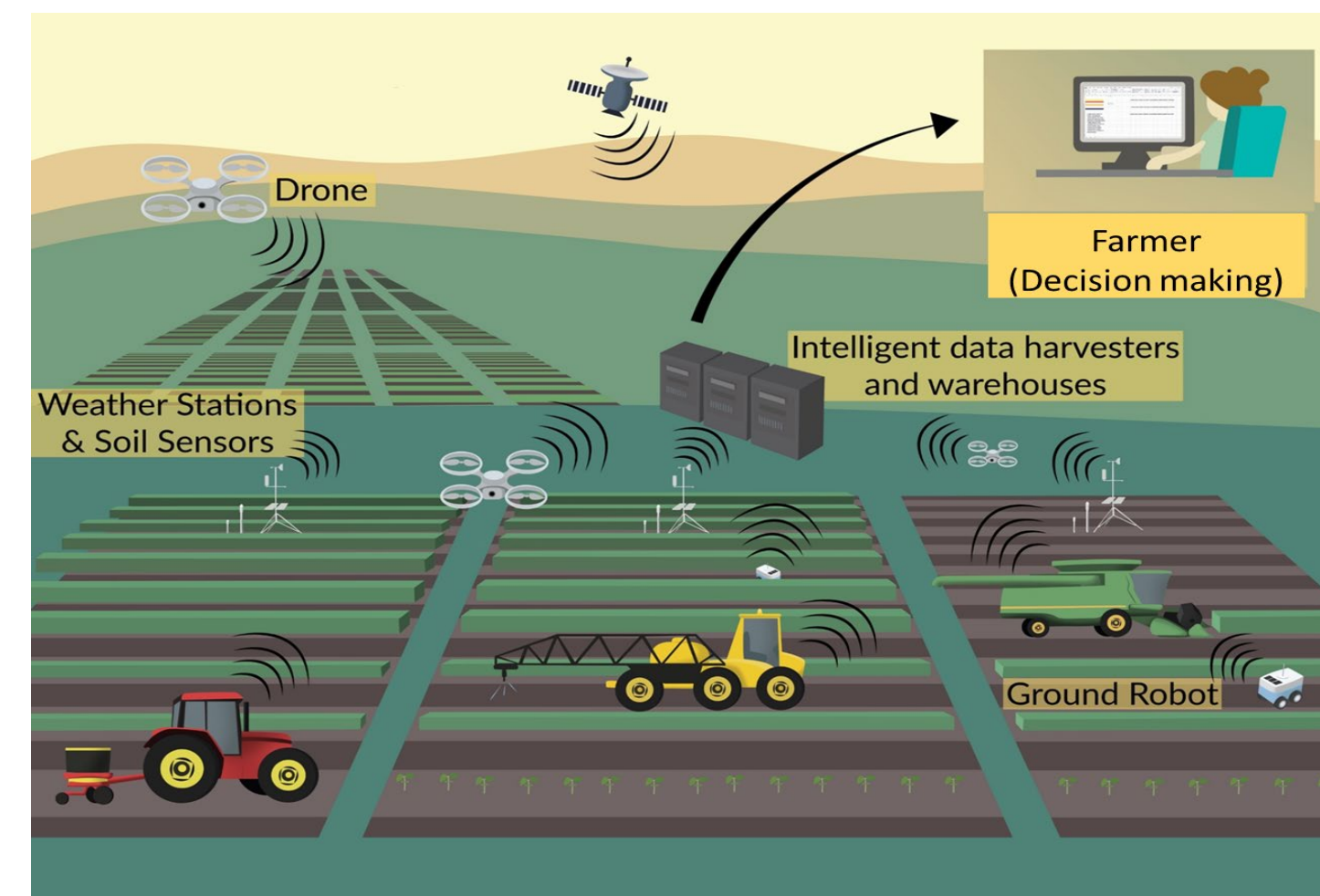
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Award Type (IRG), Solicitation Year (IRG-2, FY2020)

The novelty of SIRAC project is to advance rural connectivity and community decision-making, with social translational research to address adoptability, trust, risk preferences, and economic benefits for farmers. Mobile crowd sensing and ML based privacy preservation will improve trustworthiness and decision accuracy of information spread.

SIRAC was formed with active involvement of Iowa Soybean Association (farmer organization) to tackle their need for connectivity to mitigate risks and improve sustainability.



Intellectual Merit: Develop smart sensing and decision support tools. IoT based flexible, scalable and efficient communication infrastructure. Privacy-preserving data analytics for community-level decision-making, monitoring real-time threats. Behavioral experiments to identify social-economic incentives for farmers & stakeholders.

network's value in the pest management context.

- SIRAC involves eight Iowa farmers in community of practice (CoP), ~200 farmers in awareness community, and knowledge dissemination to ~10,000 IA farmers.
- Organized workshops involving farmers in CoP, and in awareness community to inform about SIRAC, learn impressions. Initiated survey, discrete choice experiment, behavioral games.
- Developed insect-pest data collection protocol, shared with farmers.
- Designed an economics learning model to assess the SIRAC
- Trained object detection and classification ML-based models for insect-pests.
- Developed an AI-enabled smartphone app for insect-pest detection.
- Developed deep learning framework for plant stress phenotyping that guarantees privacy to data owner and model developer.

Broader impact (immediate)

Farmers will have timely data sharing and knowledge exchange for coordinated responses to crop production threats, ensuring profitability.

Broader impacts (sustainability)

Learning and feedback among CoP, trusted data and technology acceptance, and economic benefit to SCFs. Positive impacts on farmers, farm workers, their families, ag industry.

Next steps

Identify more members in awareness community.
Conduct workshops, surveys.
Continue data collection on plant stresses
Privacy-preserved data analytics.