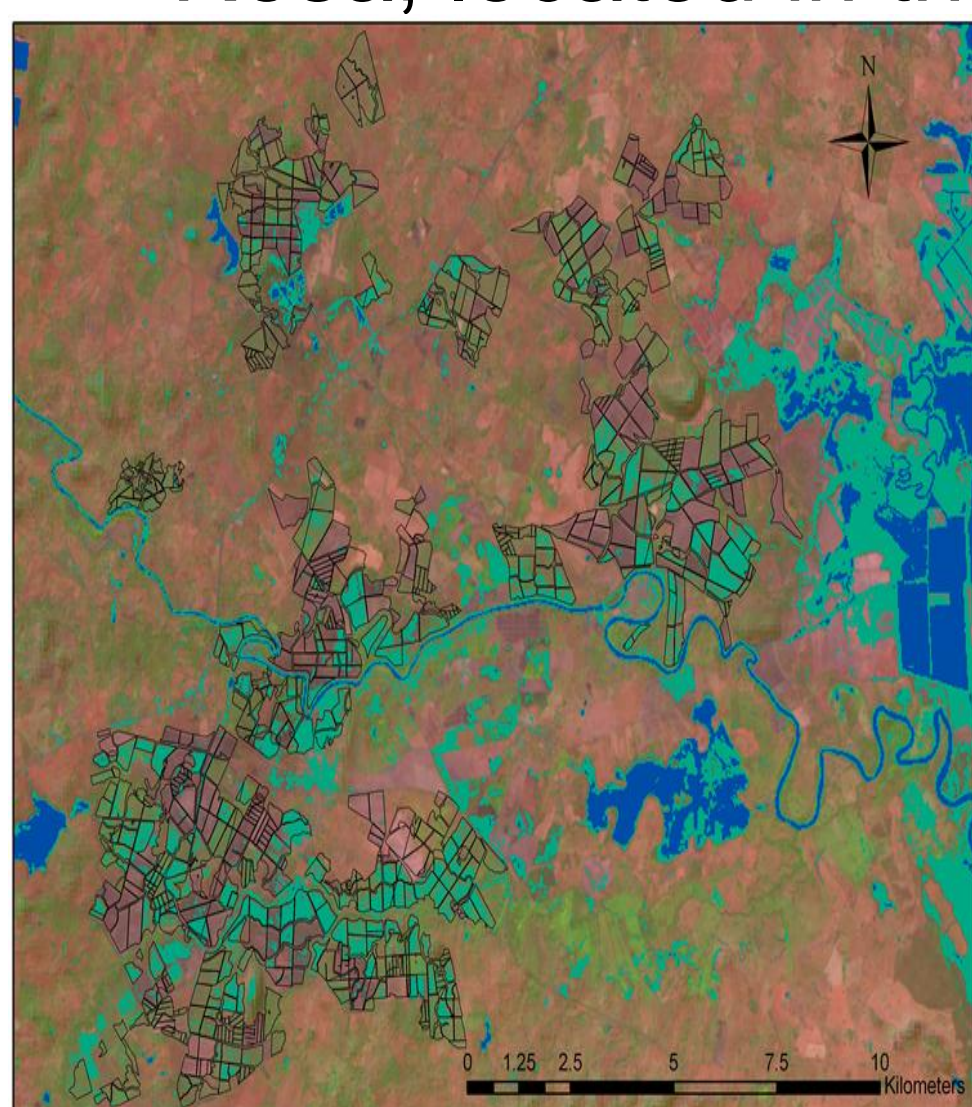


Precision Agriculture in Central America: Using satellite data to improve sugarcane yields

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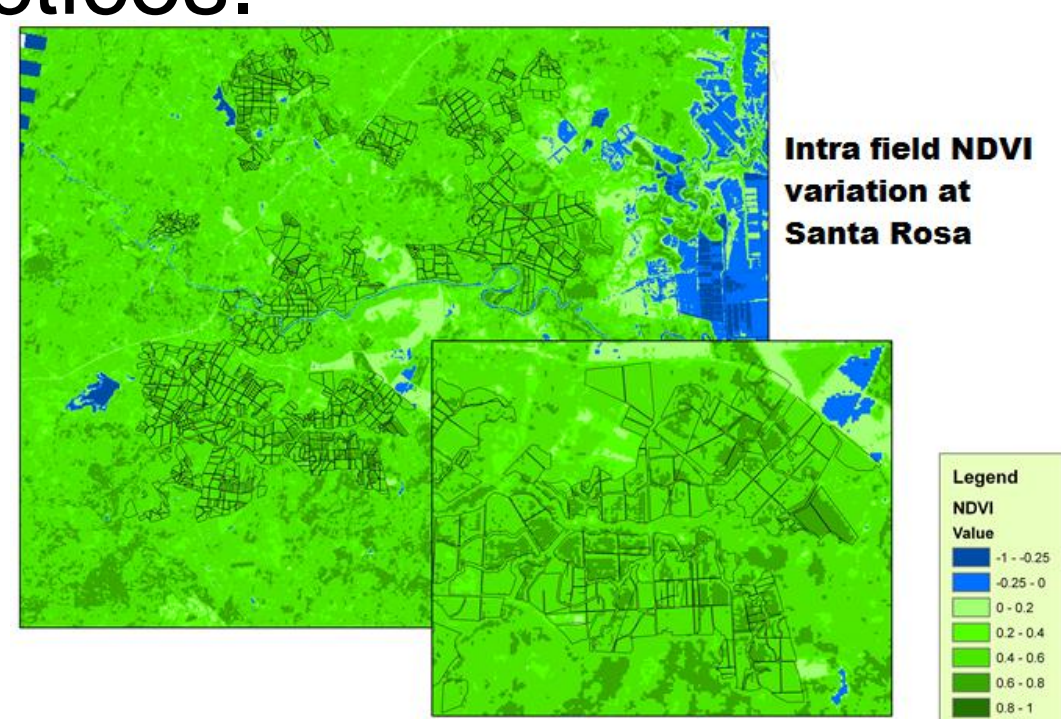
Overview

The research conducted provides a brief template for implementing precision agriculture in Central America, utilizing a site in central Panama for a pilot study. The decline in sugar production at Ingenio Santa Rosa, located in the Coclé Province of



Water and Swamp Areas Near Ingenio Santa Rosa
03/02/2010

Panama, led to the investigation of what could be done with modern technology to improve their agricultural practices.



Impact

We outlined a blueprint for the implementation of precision agriculture at Ingenio Santa Rosa as well as provided available data options for monitoring factors that affect plant growth such as soil data, sugarcane varieties, plot design, plant stress, and climatic factors.

Implementing such technology - a means for monitoring inter-seasonal variation using satellite imagery and geographical information systems - could be extremely useful for improving yield, as well as reducing costs and environmental hazards.

Highest Yielding Plots 2010					
Parcel	Precipitation	NDVI Feb. 19, 2010	Tons per Hectare	SOIL TYPE	plant variety
Los Canelos3	2730	0.679	18.5	Ultisoles	BJ-7262
Los Canelos102	2410	0.657	15.64	Inceptisol seco	ragnar
Los Canelos92	2688	0.7266	12.04	Inceptisol seco	B-76249
San Jose159	2834	0.1832	15.98	Ultisoles	BJ-7262
Panela79	2146	0.5284	16.08	Inceptisol seco	ragnar
Lowest Yielding Plots 2010					
Parcel	Precipitation	NDVI Feb. 19, 2010	Tons per Hectare	SOIL TYPE	plant variety
Mangote108	1161	0.100700000	2.33	Alfisoles	BJ-7262
Mangote46	996	0.015900000	3.52	Inceptisol seco	RAGNAR
San Jose187	1449	0.025300000	3.76	Ultisoles	B-76249
Los Canelos23	1383	0.039300000	3.82	Ultisoles	B-74125
Mangote60	1089	0.063600000	3.95	Inceptisol seco	B-76249
Mangote22	1057	0.072300000	4.01	Inceptisol seco	RAGNAR
San Jose182	1425	0.038400000	4.12	Ultisoles	B-74125
Santa Rosa14	1385	0.056300000	4.13	Ultisoles	RAGNAR

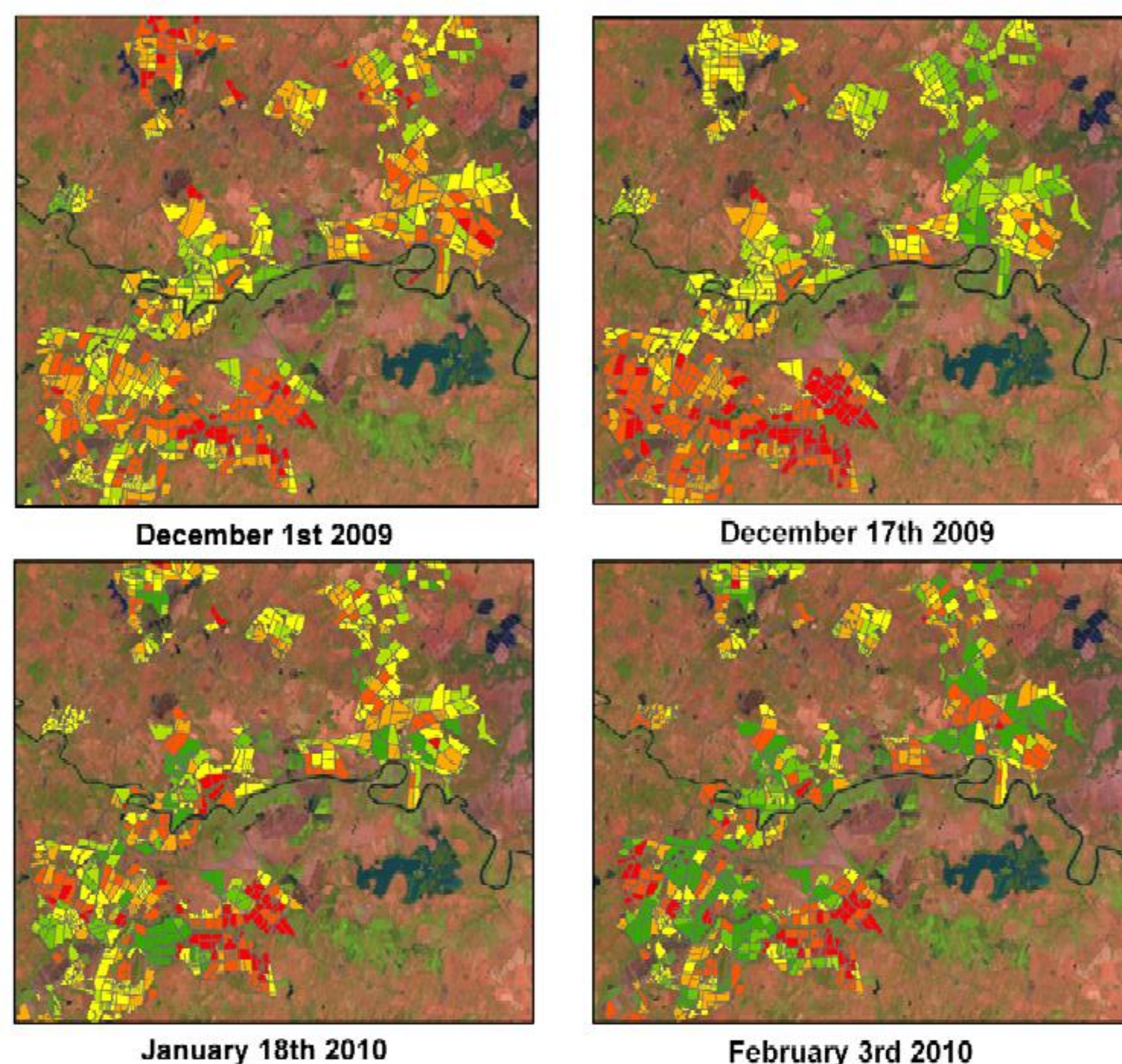
Acknowledgements

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Key Findings

Following data acquisition, ESRI ArcGIS ® was used to develop various satellite-derived products. This included maps comparing NDVI throughout the 2010 growing season as well as a spread sheet comparing final yields to variables such as soil type, precipitation, infestation, and water stress.

Changing NDVI for 2009-10
Growing Season at Ingenio Santa Rosa



Explanation

We hope that the research conducted and shared with Ingenio Santa Rosa can provide a useful, cost-effective methodology for analyzing field variation, ultimately to serve as a decision making tool that will assist farming techniques in anyway. We hope that this blueprint for crop management will be adopted by other farmers not only in Panama, but around the world. Through this research project we hope to “enhance and share humanity’s scientific understanding of the Universe” which is part of the mission of the AAS.