remote sensing

Supplementary Materials: Mapping Smallholder Yield Heterogeneity at Multiple Scales in Eastern Africa

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Table S1. Summary of the Regression Model Trained for the Bungoma-Kakamega (B-K) Subregion.

Simulation trial				Equation	R^2
Phenology	VI	Yield estimation	Sowing window		
Default	GCVI	Yields	Wide	14.8554 + 0.4371×GCVI138 - 1.8078× GCVI153 + 1.4802× GCVI156 - 0.5432×Tavg	0.17
Default	GCVI	Yields	Narrow	7.9138 + 1.0641× GCVI138 - 2.9265× GCVI153 + 2.4508× GCVI156 - 0.2498×Tavg	0.40
Default	GCVI	Biomass×HI	Wide	11.64934 + 0.35819× GCVI138 -1.36924× GCVI153 + 1.18473× GCVI156 - 0.38335×Tavg	0.37
Default	GCVI	Biomass×HI	Narrow	11.5167 + 1.6353× GCVI138 - 2.4630× GCVI153 + 1.9681× GCVI156 - 0.4061×Tavg	0.38
Default	MTCI	Yields	Wide	15.8687 + 0.4371× GCVI138 - 1.8330× MTCI153 + 1.5008×MTCI156 - 0.5432×Tavg	0.17
Default	MTCI	Yields	Narrow	9.3847 + 1.0641× GCVI138 - 2.9673× MTCI153 + 2.4850× MTCI156 - 0.2498×Tavg	0.40
Default	MTCI	Biomass×HI	Wide	12.21995 + 0.35819× GCVI138 - 1.38833× MTCI153 + 1.20124× MTCI156 - 0.38335×Tavg	0.37
Default	MTCI	Biomass×HI	Narrow	13.0472 + 1.6353× GCVI138 - 2.4973× MTCI153 + 1.9955× MTCI156 - 0.4061×Tavg	0.38
Calibrated	GCVI	Yields	Wide	0.59674 + 0.55030× GCVI138 - 2.71861× GCVI153 + 2.71910× GCVI156 + 0.04045×Tavg	0.66
Calibrated	GCVI	Yields	Narrow	-5.2216 - 0.05361× GCVI138 - 0.26337× GCVI153 + 0.83266× GCVI156 + 0.28027×Tavg	0.98
Calibrated	GCVI	Biomass×HI	Wide	4.57129 + 0.44064× GCVI138 - 1.91961× GCVI153 + 1.94524× GCVI156 - 0.11839×Tavg	0.63
Calibrated	GCVI	Biomass×HI	Narrow	-0.81769 - 0.01955× GCVI138 + 0.24329× GCVI153 + 0.25935× GCVI156 + 0.10092×Tavg	0.91
Calibrated	MTCI	Yields	Wide	0.59522 + 0.55030× GCVI138 - 2.75651× MTCI153 + 2.75701× MTCI156 + 0.04045×Tavg	0.66
Calibrated	MTCI	Yields	Narrow	-6.98215 - 0.05361× GCVI138 - 0.26704× MTCI153 + 0.84427× MTCI156 + 0.28027×Tavg	0.98
Calibrated	MTCI	Biomass×HI	Wide	4.49201+ 0.44064× GCVI138 - 1.94637× MTCI153 + 1.97236× MTCI156 - 0.11839×Tavg	0.63
Calibrated	MTCI	Biomass×HI	Narrow	-2.37211 - 0.01955× GCVI138 + 0.24668× MTCI153 + 0.26297× MTCI156 + 0.10092×Tavg	0.91

Table S2. Summary of the Regression Model Trained for the One Acre Fund (1AF) Region.

Simulation trial				Equation	R^2
Phenology	VI	Yield estimation	Sowing window		
Default	GCVI	Yields	Wide	3.90999 - 0.21373×GCVI148 + 0.34775×GCVI158 - 0.04304×Tavg	0.11
Default	GCVI	Yields	Narrow	5.18547 - 0.47434× GCVI148 + 0.59711× GCVI158 - 0.12513×Tavg	0.23
Default	GCVI	Biomass×HI	Wide	6.501371 - 0.17072× GCVI148 + 0.283187× GCVI158 - 0.138939×Tavg	0.14
Default	GCVI	Biomass×HI	Narrow	7.88014 - 0.38817× GCVI148 + 0.52579× GCVI158 - 0.22747×Tavg	0.27
Default	MTCI	Yields	Wide	3.49553 - 0.21671× MTCI148 + 0.3526× MTCI158 - 0.04304×Tavg	0.11
Default	MTCI	Yields	Narrow	4.80579 - 0.48095× MTCI148 + 0.60543× MTCI158 - 0.12513×Tavg	0.23
Default	MTCI	Biomass×HI	Wide	6.153562 - 0.1731× MTCI148 + 0.287135× MTCI158 - 0.138939×Tavg	0.14
Default	MTCI	Biomass×HI	Narrow	7.45456 - 0.39358× MTCI148 + 0.53312× MTCI158 -0.22747×Tavg	0.27
Calibrated	GCVI	Yields	Wide	1.861028 + 0.074265× GCVI148 + 0.356754× GCVI158 + 0.003527×Tavg	0.46
Calibrated	GCVI	Yields	Narrow	2.066364 - 0.002254× GCVI148 + 0.484443× GCVI158 - 0.028138×Tavg	0.62
Calibrated	GCVI	Biomass×HI	Wide	4.057345 + 0.097473× GCVI148 + 0.264205× GCVI158 - 0.078523×Tavg	0.47
Calibrated	GCVI	Biomass×HI	Narrow	4.276406 + 0.078029× GCVI148 + 0.359302× GCVI158 - 0.112858×Tavg	0.64
Calibrated	MTCI	Yields	Wide	0.528091 + 0.075301× MTCI148 + 0.361728× MTCI158 + 0.003527×Tavg	0.46
Calibrated	MTCI	Yields	Narrow	0.575184 - 0.002285× MTCI148 + 0.491197× MTCI158 - 0.028138×Tavg	0.62
Calibrated	MTCI	Biomass×HI	Wide	2.938849 - 0.098832× MTCI148 + 0.267889× MTCI158 - 0.078523×Tavg	0.47
Calibrated	MTCI	Biomass×HI	Narrow	2.92395 + 0.079117× MTCI148 + 0.364311× MTCI158 - 0.112858×Tavg	0.64

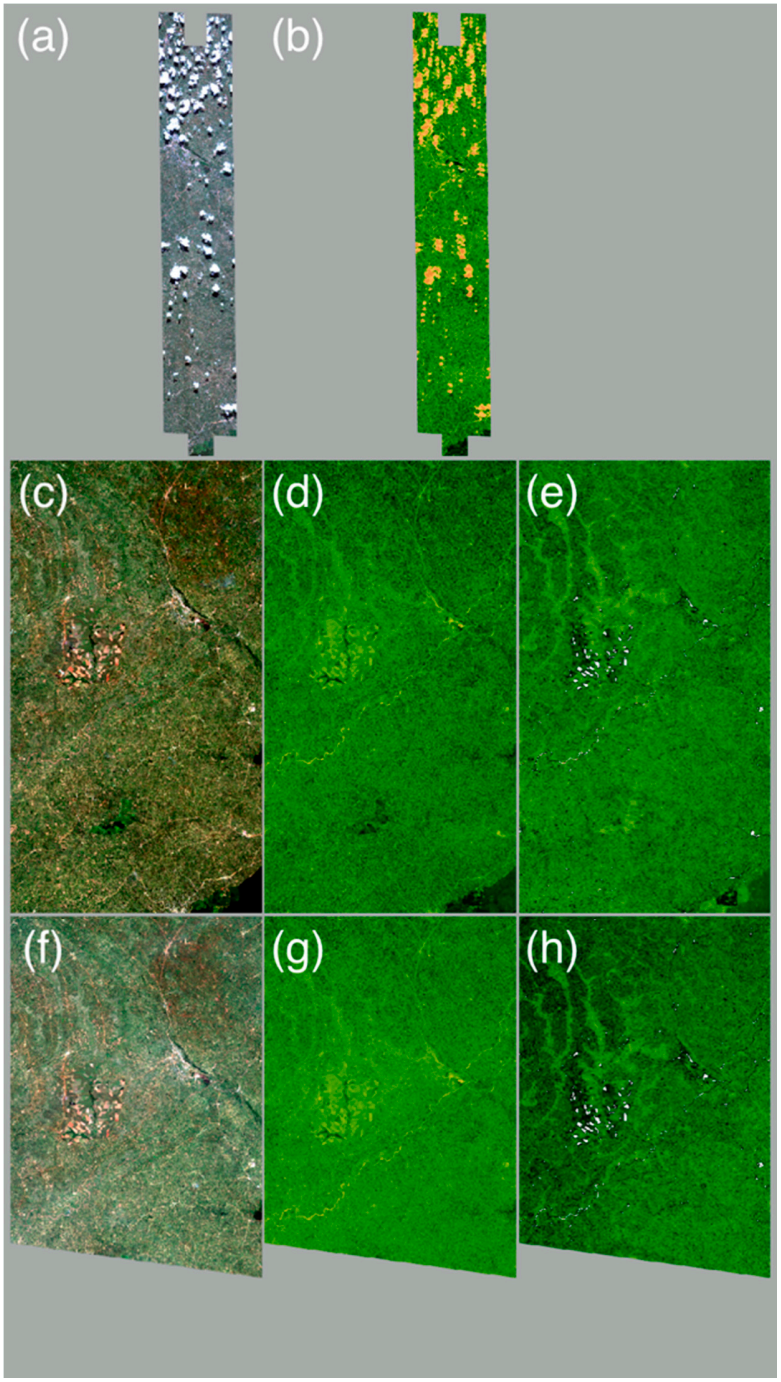

Figure S1. Snapshots of Skysat imagery in raw (a) and GCVI (b) on May 17th, RapidEye imagery in raw (c, f), GCVI (d, g) and MTCI (e, h) on June 1st and June 4th, respectively.

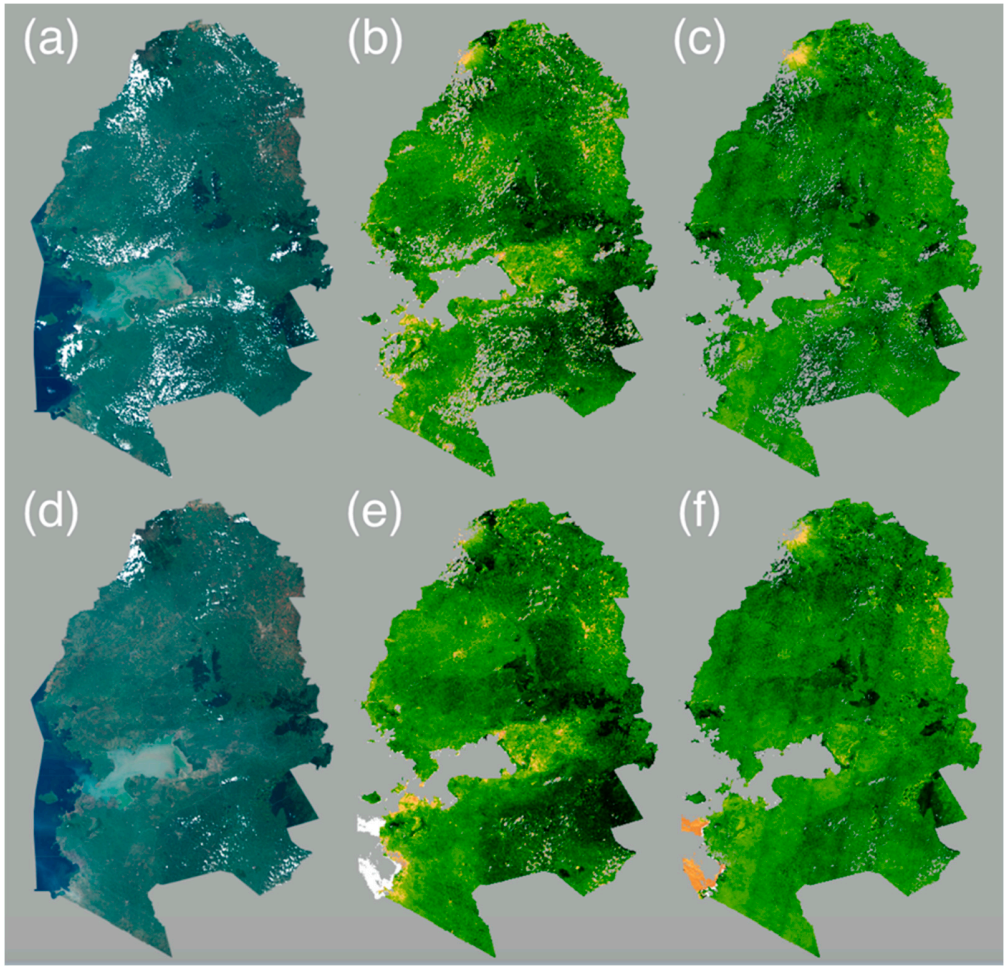

Figure S2. Snapshots of Sentinel-2 imagery in raw (a, d), GCVI (b, e) and MTCI (c, f) on May 27st and June 7th, respectively.

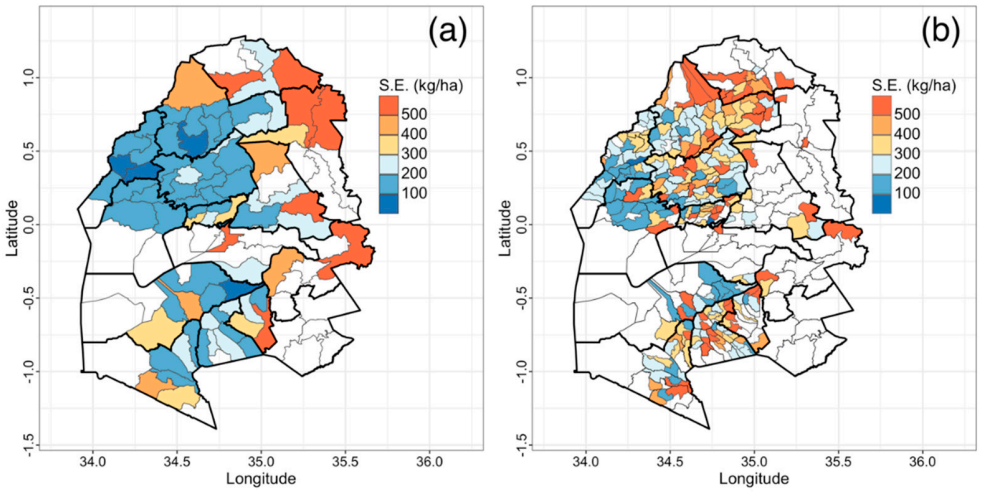

Figure S3. Standard error of One Acre Fund (1AF) crop cut yields aggregated to the District (a) and the Division (b) level.

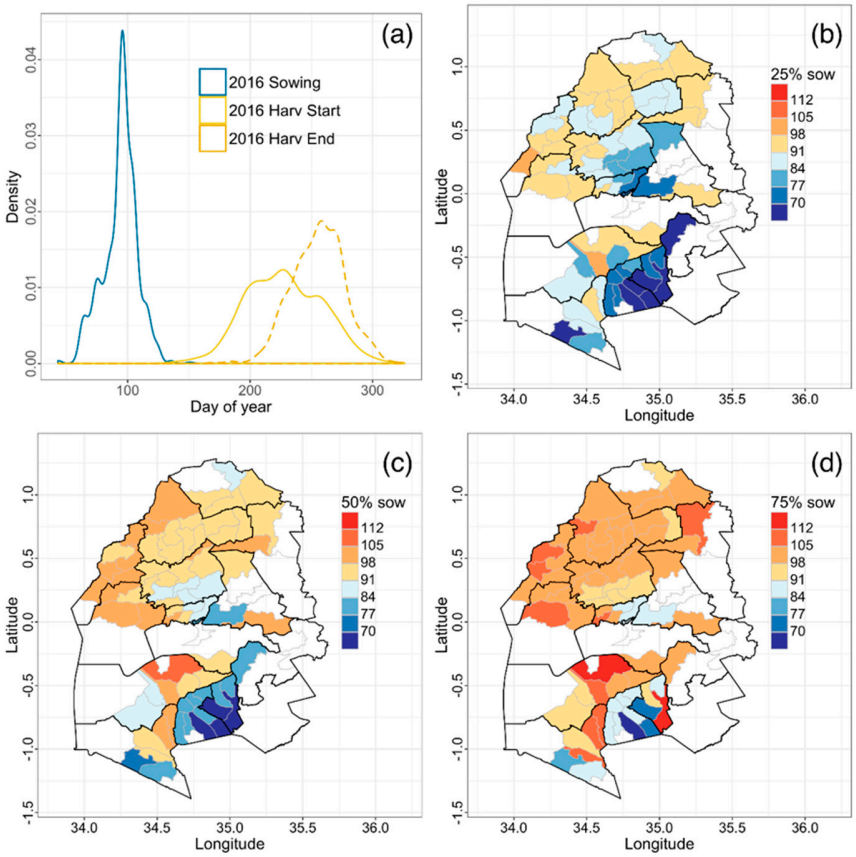

Figure S4 Distribution of farmer-reported sowing date, harvest start and end in 2016 for the B-K subregion (a), and the spatial pattern of sowing date at the District level.