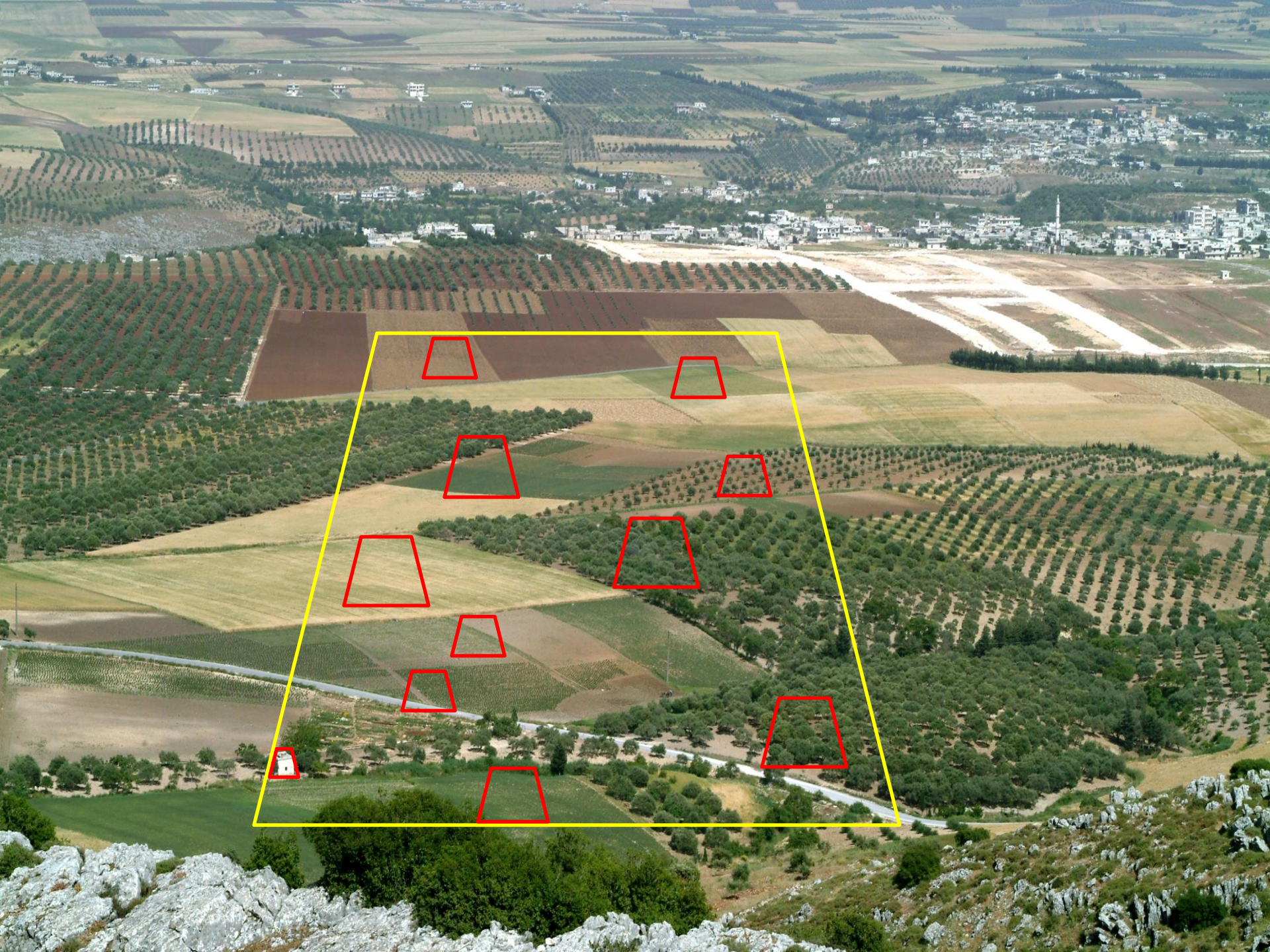


Geoinformatics for Sustainable Agricultural Development in Central Asia and the Caucasus



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NASA LCLUC Science Meeting
Nov 11-13, Tashkent



Role of Geospatial Science, Technology and Applications (GeSTA) in Dryland Systems

Ensuring Food Security

Startup 35.47m
Total 122.7m

Gender
Address social inequities, greater roles and priorities



Geospatial commons, KM sharing, stakeholder feedback



Youth & Capacity Dev.
Engaging and empowering young gen. by creating opportunities



156 Remote sensing missions in orbit
>12 Sensors potential in CRPs/IRPs, etc.
>6 are free

Mapping present, emerging & future land use /land cover dynamics, cropping patterns, intensities, water use, pest & diseases, climate change & impacts

Land degradation & reclamation in existing production systems

5 Regions

- 1) The West African Sahel and dry savannas
- 2) East and Southern Africa
- 3) North Africa and West Asia
- 4) Central Asia
- 5) South Asia

Characterization of vulnerable areas for increasing resilience and assist in identifying mitigation pathways with biophysical, socioeconomic and stakeholder feedback as well as specific needs & constraints

Characteristics of agricultural and livestock production in smallholder farming systems and rural livelihoods



Biodiversity
Spatial enrichment and its role in food security, risk mitigation, & sustainability

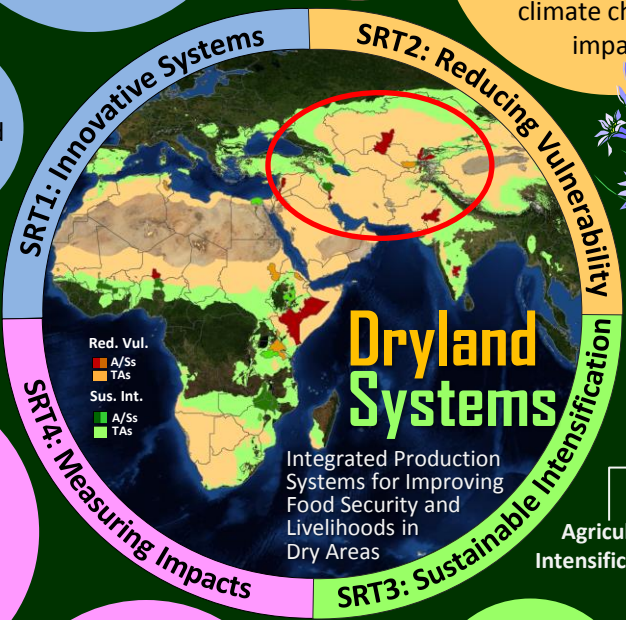
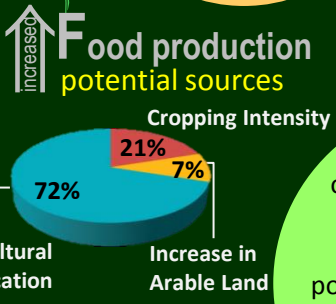


Mapping the extent of existing & traditional practices, indigenous knowledge, diversity, potential areas for modern & improved, productive, profitable, and diversified dryland agriculture, & linkages to markets

2.5b People Live in Drylands

1.5b Livestock Depend on Drylands

Assessment of present, emerging & future droughts, floods, pests & diseases, extreme events, infrastructure, migration



Cooperative Research and Partnerships

Drylands 41% Earth's land area

Measuring the impact at spatial scales, rate, magnitude, synergy among the systems, CRPs, cross-regional synthesis

Farmers, stakeholders, policymakers, mobilization, & marketing

Assessing the impact of outcomes in Action Sites, post-project implementation, & M&E

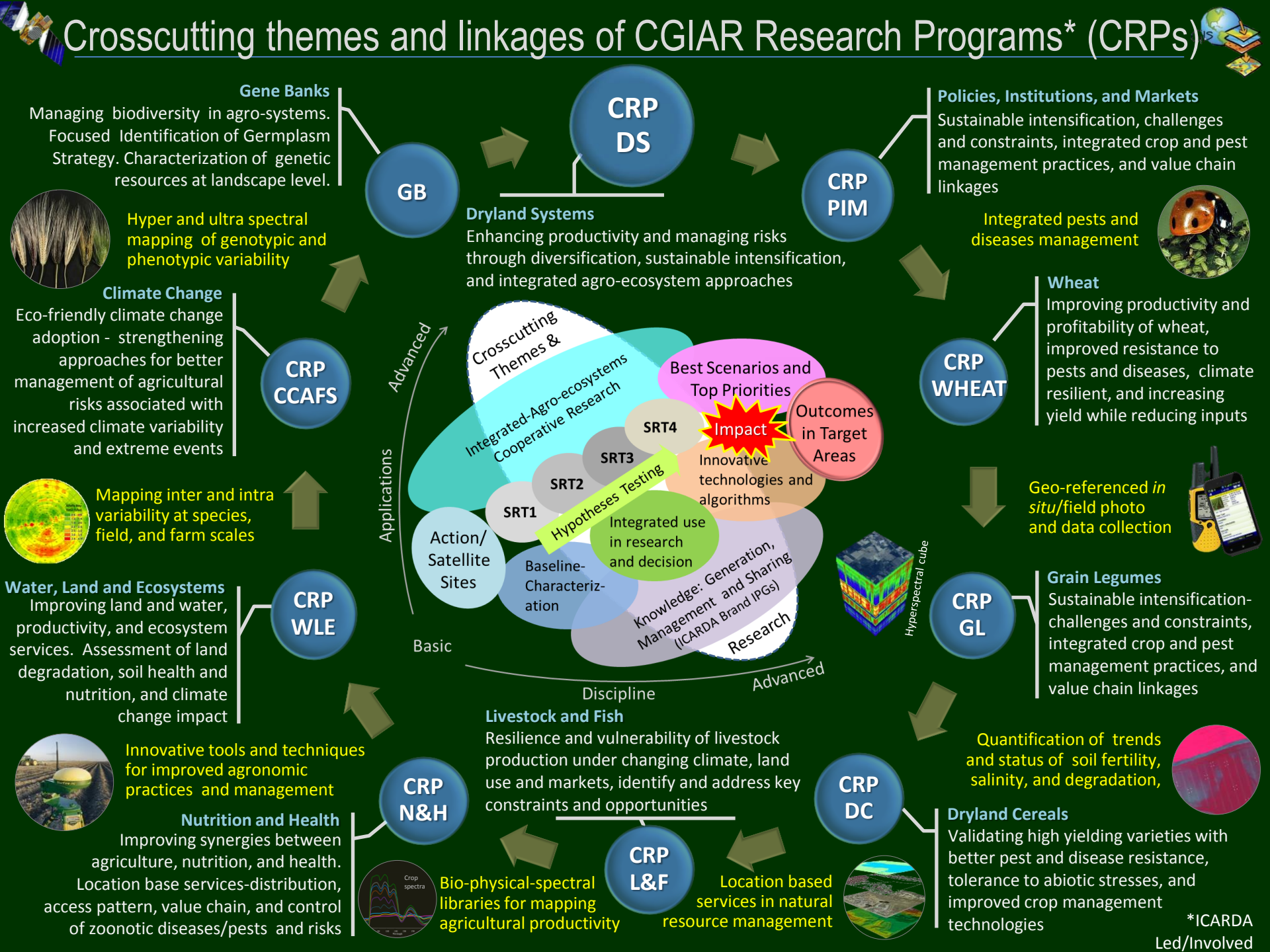


Status & trends of existing production systems

Health
Changing diet patterns, nutrition and health



Crosscutting themes and linkages of CGIAR Research Programs* (CRPs)



*ICARDA Led/Involved

Remote Sensing of Agro-ecosystems

Shift in Paradigm: Landscape to Farmscape

RS data characteristics	Platforms	Ground/ <i>in-situ</i>		Airborne		Spaceborne				
	Mode	Hyperspectral	Multispectral	Optical	LiDAR	Optical			LiDAR	SAR
Sensor	ASD FieldSpec	Mx Camera	APs/UAVs	Lidar	WorldView-2	Landsat	MODIS	ICESat*	PALSAR	
Spectral	350-2500nm	4 bands	3-4 bands	1264nm	8 bands	7 bands	7/36 bands*	1264 & 532nm	L band	
Spatial resolution	0.1-1.5m	0.1-0.2m	1-m	20 - 80cm	0.46m Pan; 1.84m MS	15m Pan; 30m MS	250m, 500m, 1000m MS	70m	10m, 20m, 100m	
Swath	1-4m	2-10m	--	1-2km	16.4km	185km	2330km		35-250km	
Revisit	--	--	3-year	--	1.1 days	16 days	1 day	91 days	46 days	
Biophysical	Plant biomass	x	x		x	x	x		x	
	Plant height				x			x	x	
	LAI, fPAR, LST	x	x			x	x			
	NDVI, EVI, LSWI	x	x	x		x	x			
Biochemical	Erosion, Salinity	x	x	x	x	x	x			
	Soil moisture	x	x	x		x	x		x	
	Chlorophyll	x	x	x		x	x			
	Nitrogen	x	x	x		x	x			
	Phosphorous	x	x			x				
	Plant water	x	x			x		x		
Production	GPP	x	x	x		x		x		
	NPP	x				x	x	x		
LULC	land cover/use	x	x	x		x	x	x	x	
	phenology	x	x				x	x	x	
	Irrigation	x	x	x		x	x	x	x	
Terrain	DEM		x	x	x			x	x	
	Derivatives		x	x	x			x	x	
Scale	Tier 1 AOIs	x	x	x	x	x	x	x	x	
	Tier 2 action sites	x	x	x			x	x	x	
	Tier 3 AEZs	x	x	x				x	x	
	Tier 4 Target			x				x	x	

