Monitoring the dynamics of abandoned agriculture, fallow fields and grasslands

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Approach
Approach

Data preparation

Step-1
Annual data
- Active agriculture
- Non-woody herbaceous
- Woody
- Non-vegetated

Step-2
Multi-year
- Permanent agriculture
- Recultivated agriculture
- Non-woody abandoned agriculture
- Fallow Fields
- Permanent grasslands
- Woody abandoned agriculture
- Permanent woody

Masking of clouds, snow, and ice, and data harmonization
Training data generation

Step-1 Calibration samples
- Ground truth collection

Step-2 Class separation
- Calculate metrics of the features
- Threshold selection

Step-3 Sample generation
- Pixel-clustering
- Cluster-centroid generation
- Quality control
Step 1 Calibration samples
Step 2 Class separation
Step 3 Sample generation
Approach

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Results
## Results

<table>
<thead>
<tr>
<th>Where</th>
<th>Biome</th>
<th>Major cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smolensk, Russia</td>
<td>Temperate forests</td>
<td>Socio-economics</td>
</tr>
<tr>
<td>Orenburg, Russia</td>
<td>Semi-arid</td>
<td>Socio-economics</td>
</tr>
<tr>
<td>Volgograd, Russia</td>
<td>Grasslands</td>
<td>Socio-economics</td>
</tr>
<tr>
<td>USA, Nebraska</td>
<td>Grasslands</td>
<td>Economics</td>
</tr>
<tr>
<td>USA, Wisconsin</td>
<td>Temperate forests</td>
<td>Economics</td>
</tr>
<tr>
<td>Brazil, Amazon</td>
<td>Tropics Rainforest</td>
<td>Economics</td>
</tr>
<tr>
<td>Brazil, Cerrado</td>
<td>Tropics Dry Forest</td>
<td>Economics</td>
</tr>
<tr>
<td>Sardinia, Italy</td>
<td>Mediterranean</td>
<td>Socio-economics</td>
</tr>
<tr>
<td>Iraq</td>
<td>Semi-arid</td>
<td>Armed Conflict</td>
</tr>
<tr>
<td>S-China</td>
<td>Subtropical</td>
<td>Economics</td>
</tr>
<tr>
<td>N-China</td>
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<td>Political</td>
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<tr>
<td>Nepal</td>
<td>Mountainous</td>
<td>Social</td>
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<tr>
<td>Uganda</td>
<td>Tropical</td>
<td>Armed Conflict</td>
</tr>
<tr>
<td>Bosnia</td>
<td>Temperate</td>
<td>Armed Conflict</td>
</tr>
</tbody>
</table>
Results
Volgograd, Russia
Imagery composite (RGB: 743) in 1987

SILVIS Lab
Spatial Analysis for Conservation and Sustainability
Conclusions

• What is novel
  – Annual maps of abandonment: abandonment is frequent
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  – Annual maps of abandonment: abandonment is frequent
  – Mapping algorithm that works globally: abandonment widespread across the globe
  – Mapping algorithm that works in both forest and dryland biomes: abandonment widespread in drylands
Conclusions

• What is next
  – Annual maps of abandonment for E-Europe
  – Separating hayfield, pastures, and natural grasslands
  – Quantifying the value of having both Landsat and Sentinel-2
Conclusions

• In summary
  – Agricultural abandonment is an important LCLUC process
    But has been stepchild of land use science
  – We can map abandonment annually and in different biomes
    It is great to live the era of two Landsats and two Sentinel-2s
Thank you!