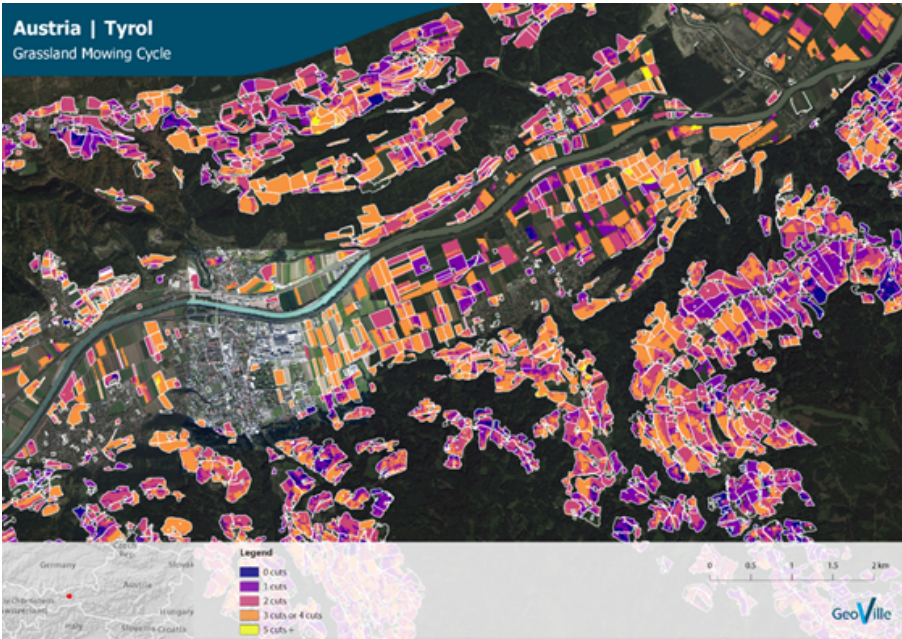# Grassland Mowing Cycle

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Example for mowing cycle in Tyrol, Austria (Source: GeoVille)

Category

☑ Product Development	☑ Product Sales	☑ Underwriting	☑ Loss Adjustment	☐ Claims Handling

PRODUCT DESCRIPTION

The moving of managed grassland to produce hay for livestock feed represents a major part of the total agricultural production in some regions. Therefore, it is valuable to monitor which areas of grassland are mowed to get information about hay production, and also how many times they are mowed in a growing season. The frequency and timing of mowing can also be used as evidence for possible damages on grasslands and monitoring the overall grassland productivity.

Reliable long-term data on grassland productivity and mowing cycles is used in agricultural insurance for development of index-based products for grasslands and pasture lands, monitoring grassland insurance portfolio by underwriters and assessing the scale and character of damage in loss adjustment.

Detailed information on grassland mowing cycle is an important service for all major stages of the product cycle (product development, risk pricing, underwriting, loss assessment, claim settlement). With grasslands mowing data agro-insurers are able to monitor the full cycle of the livestock fodder production.

PRODUCT SPECIFICATIONS

Main processing steps

The methodology of the automatic cut detection and counting algorithm is based on an analysis of optical and radar satellite imagery analysing temporal profiles over grassland parcels. It is based on a combination of various vegetation indices such as the Normalized Difference Vegetation Index (NDVI) and multiple stages of cluster analysis. Analysis is based on a pixel-by-pixel computation considering administrative or other boundaries.

Input data sources

Optical: Sentinel-2

Radar: Sentinel-1

Supporting data: n.a.

Spatial resolution and coverage

Spatial resolution: 10m

Coverage: Regional/national level (macro); Watershed/agro-ecological level (meso)

Availability: globally available

Accuracy / constraints

Thematic accuracy: > 85 %

Spatial accuracy: Absolute geolocation is constantly monitored for S2A and S2B. The long-term performance is close to 11 m at 95% for both satellites.

Limitations

Long-time gaps between observations due to cloud cover can make it impossible to detect cut events directly. Remaining noise (e.g. due to undetected clouds) could also result in false identifications of cutting events.

Frequency / timeliness

Frequency: upon request – across growing season, within-season, annual, multi-annual

Timeliness: near real-time

Delivery / output format

Data type: GIS-ready data formats; Raster; API (depending on customer needs)

File format: GeoTIFF, ESRI Grids, others on request (depending on customer needs)

Accessibility

Commercially available on demand from EO service providers.

CHALLENGES ADDRESSED - USE CASE(S)

Product Development:

- Market analysis

Product Sales:

- Farm structure / management practice (linking to cadastre)
- Regular market penetration review

Underwriting:

- Seasonal portfolio monitoring
- Online platforms or easy-to-use interfaces integrating various data sources (e.g. vegetation stress, field boundary changes, comparison etc.)
- Risk / crop zoning
- Procure better reinsurance terms/capacity from enhanced insurance practice
- Identification of farmer's production practice (technology, infrastructure, property, machinery, etc.)
- Identification of productive units
- Crop calendar and practices
- Regular assessment of risk pricing and product rating

Loss Adjustment:

- Risk mapping against crop's vegetation stages
- Increase credibility of loss adjustment (e.g. show pictures to support loss adjustment communication to farmer)

Claims Handling:

- Identification of actual damage size (tons (volume / ha (area) / price
- Quality control assessment of claims before pay-out
- Fraud detection
- Obtaining timely, reliable and consistent data to speed-up the indemnity pay-outs