

## PRODUCTION LEVELS ABOVE AVERAGE IN MEDITERRANEAN REGION, EASTERN EUROPE, UK AND IRELAND. VULNERABLE REGIONS IN WESTERN EUROPE AS A CONSEQUENCE OF SCARCE RAINFALL DURING SPRING.

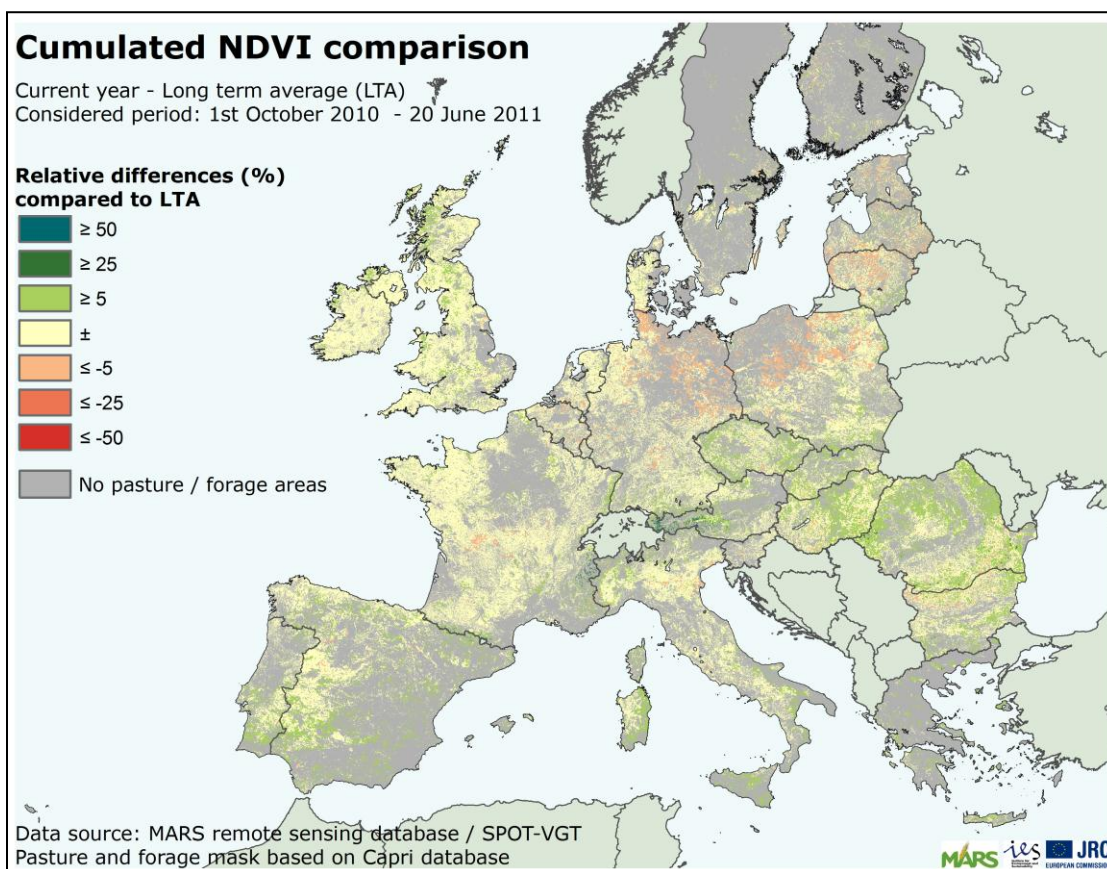
### HIGHLIGHT

Temperature accumulation from March to May above average in most of Europe. Water stress can affect biomass production in France, Benelux and Germany.

Precipitation accumulated since winter and the milder than usual spring season resulted in an anticipated growth cycle for pastures all over Europe, except for Baltic countries and Poland, resulting in biomass production below the standard values. In Western Europe the lack of rainfall during April and May could impact future production levels in France and Germany. Expectations for the Mediterranean region, United Kingdom and Ireland are slightly above past production levels.

### CONTENT

1. Remote sensing
2. Country analysis



## 1. Remote Sensing analysis

### Relative cumulated NDVI:

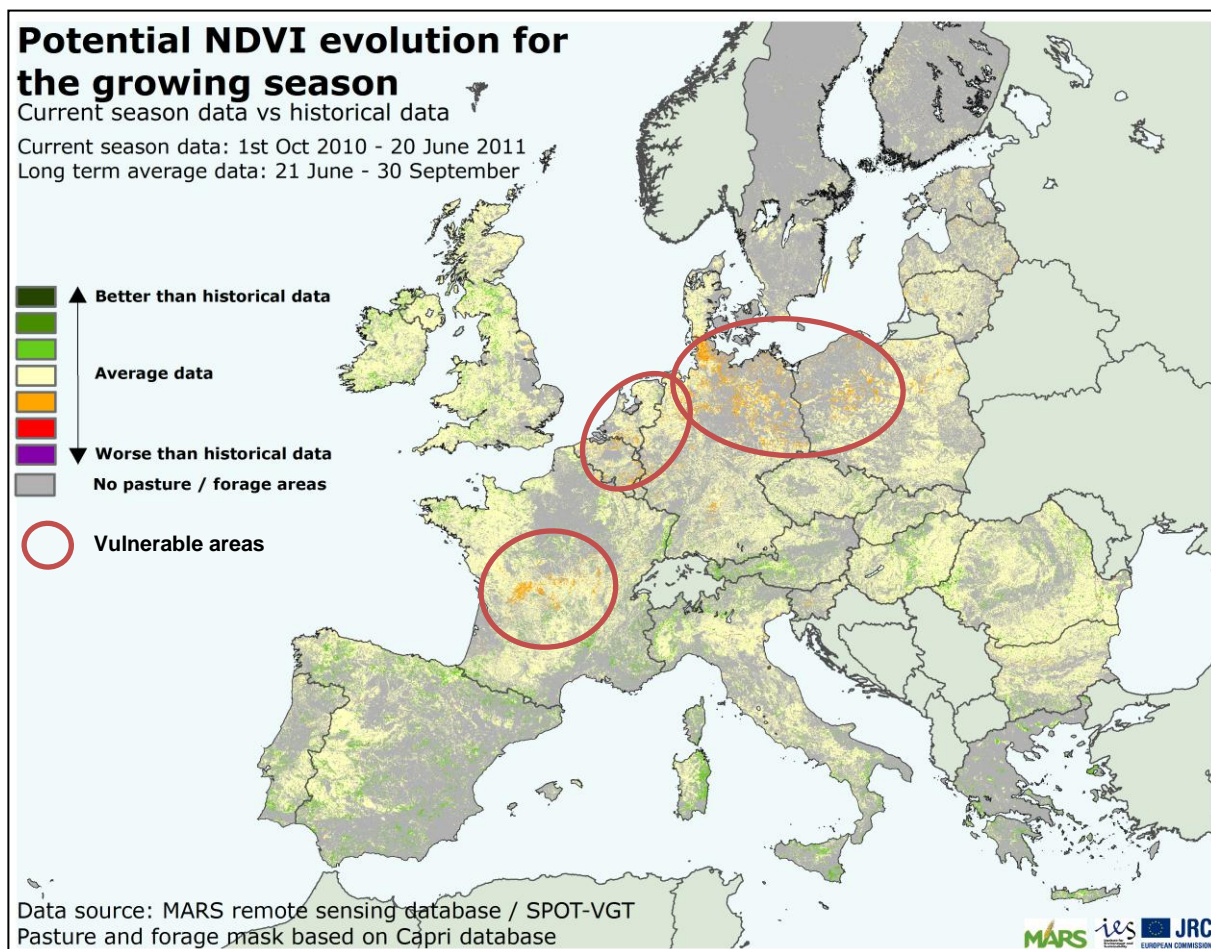
The comparison of cumulated Normalized Difference Vegetation Index (NDVI) of the current season against the long-term average (LTA) depicts average biomass accumulation in France, southern Germany and northern Italy. In the United Kingdom and Ireland remote sensing observations show green leaf area presence slightly higher (+5 %) along the season than the historical series. Similar figures are observed in Czech Republic and Slovakia, Austria, Romania and Bulgaria. The

Mediterranean region (Spain, Portugal, Italy and south of France) experienced favourable conditions in the current season with biomass production levels slightly above average. On the contrary, in Germany, The Netherlands and Belgium, NDVI values accumulated from the beginning of the season show an incipient negative trend from average values. The dry period observed in Western Europe during April and May has limited the biomass accumulation.

### Potential NDVI evolution for the growing season:

The potential evolution of NDVI for the current growing season depicts average production levels along the season. However, the analysis of NDVI scenarios highlights four vulnerable areas: Central France, Benelux, Germany and Western Poland, as a consequence of the lack of precipitation during spring. If dry conditions

continue during the next month, biomass production in those countries could be drastically reduced. For western UK, Ireland and Spain expectations are quite optimistic, since all scenarios describe at least average production levels with a large margin for improvement in case of favourable conditions in the next month.

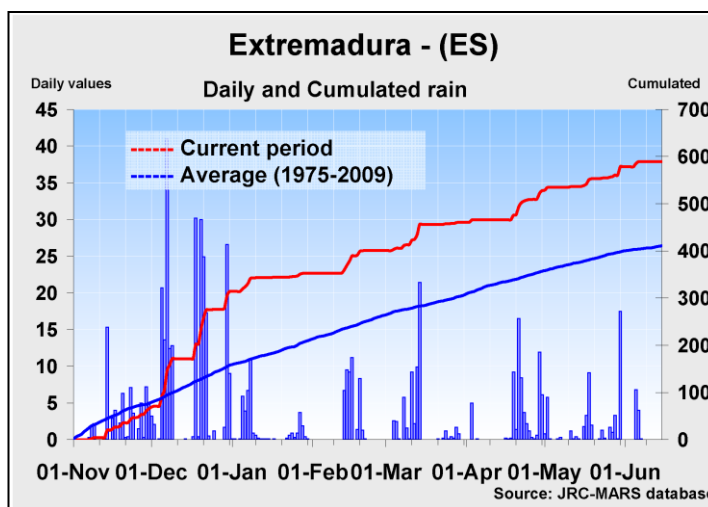
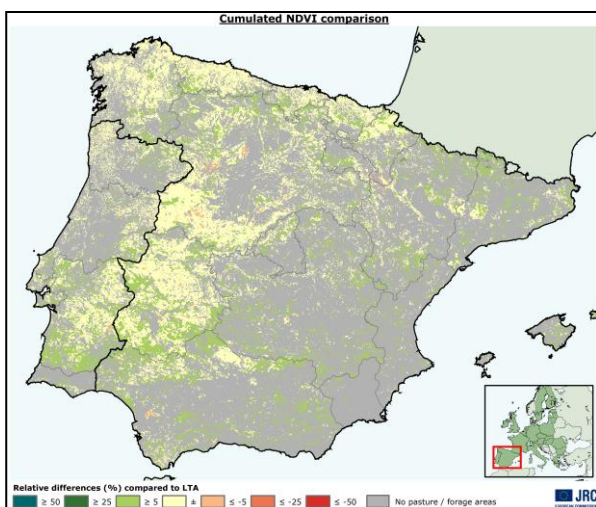


## 2. Country analysis

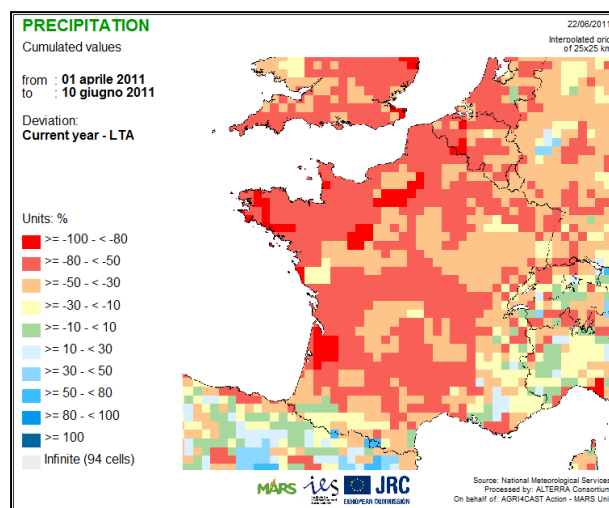
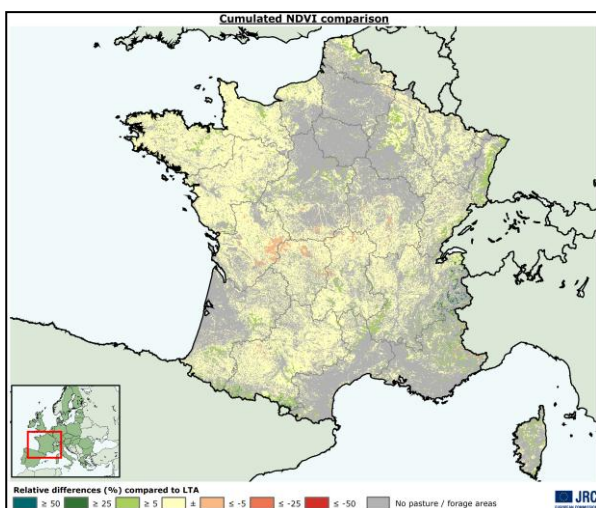
### Spain and Portugal: Mild temperatures and wet conditions during winter and spring. Favourable conditions for biomass production.

Rainfall accumulation along the season (especially in December, April and May) in conjunction with warm temperatures during spring depicts a favourable picture for biomass production in the Dehesa area (*Extremadura* and *Alentejo* regions). *Galicia* and *Asturias* in northern Spain experienced also favourable climatic conditions, the temperature sum during April and May was 25 % higher than on average.

The analysis of NDVI shows an average biomass accumulation in *Extremadura* and *Alentejo* regions. Moreover, the analysis of possible scenarios during the season suggests at least average production levels for the rest of the season, with a significant increase, if the favourable climatic conditions currently observed will continue. In the Cantabrian basin the season is running with production levels above average and good expectations for the forthcoming months.



### France: Water stress could affect biomass production in the forthcoming months.



The current season is determined by low rainfall records observed in most of the regions, with the exception of the southern coast, from February to the end of May. This places the current spring among the driest spring seasons since 1975. In parallel, accumulation of active temperatures during the same period was substantially

higher (15-20 %) than LTA, anticipating the growth cycle of pastures for about two weeks as compared to an average season. Despite the dry period, the water accumulated during winter sustains production levels at seasonal values.

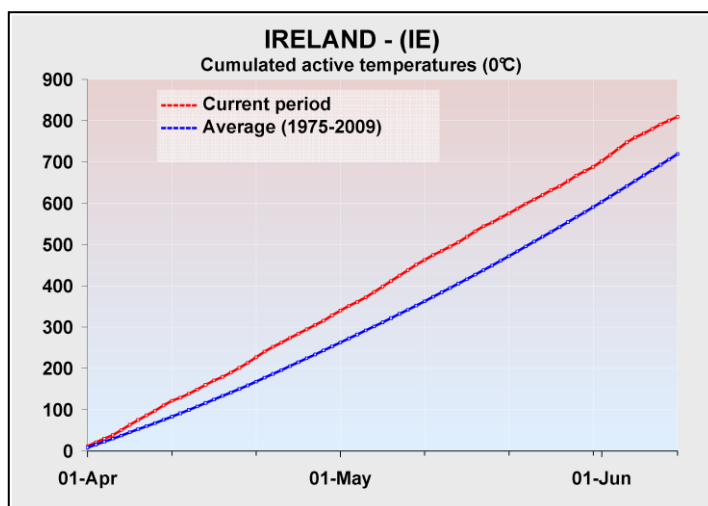
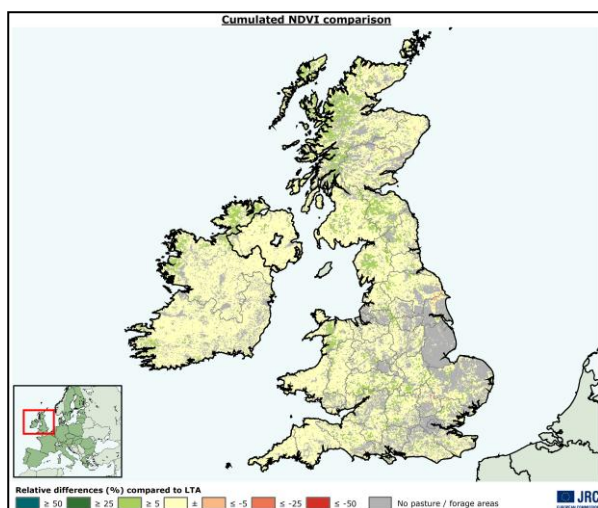
Cumulated NDVI values along the season are similar to previous years. Apparently, biomass has not been affected up to now in the *North* and *Centre Regions*; only *Limousin* and *Auvergne* show accumulated NDVI values slightly lower than average. However, if the lack of

rainfall continues, it will limit the recovery of pastures after the first cuts. The analysis of potential NDVI scenarios until the end of the season underlines this vulnerability of many regions in central and south-western France.

### Ireland and United Kingdom: Temperatures during spring above seasonal average. Production levels higher than average.

Temperatures above average in all the regions from April onwards, coupled with adequate rainfall, increase expectations for biomass production to an above-average year. Although a dry spell could have affected eastern and southern UK, average accumulated rainfall has been observed for this year in *Western England*, *Wales*, and *Ireland*. In *Scotland* precipitation accumulated during this year was 30 % higher than average, and temperatures in April to May have been 20 % higher than LTA. The analysis of NDVI accumulation during the current season confirms the conclusions

drawn from the meteorological observations: Biomass production as of today is higher than the average year. This is partially due to an anticipation of the growth cycle – about 2 weeks – as a consequence of high temperatures observed in April and May. NDVI scenarios underline the good meteorological conditions registered during the season: The expected biomass production is higher than the average year. If present conditions (i.e. warm temperatures and sufficient precipitation) are maintained, production levels can even be substantially improved.



### Germany, Benelux and Denmark: Biomass accumulation is affected by water stress in Belgium, northern and eastern Germany.

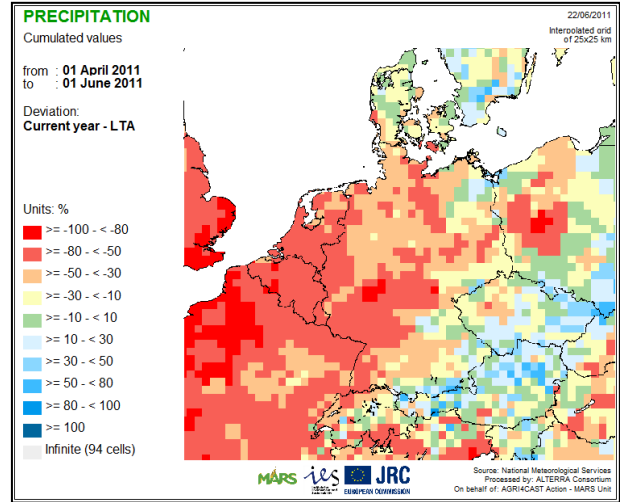
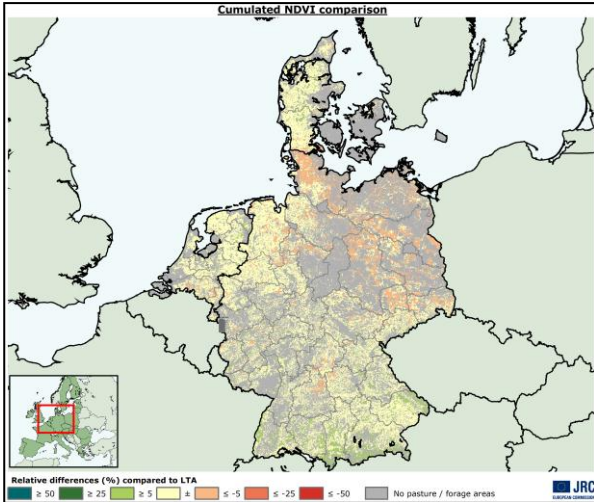
The dry period observed in Western Europe during the current spring season constraints biomass production in some of the regions. Accumulated rainfall in The Netherlands and in northern and eastern regions of Germany is 30 % lower than the seasonal average. As in most of Europe the accumulated temperatures between April and June are substantially higher than LTA (+ 25 % higher in some regions such as *Brandenburg* or *Niedersachsen*), leading to an anticipated crop development of about 2 weeks.

The analysis of NDVI accumulated along the season depicts an unfavourable picture for current biomass accumulation. Production levels in eastern and northern

Germany, especially in *Schleswig-Holstein*, are already substantially lower than average, as they are in southern Netherlands and northern Belgium. The potential NDVI scenarios show that these regions will hardly reach biomass production close to standard values.

In other regions of Germany such as *Nordrhein-Westfalen* biomass production is now close to average. The dry period has finished with the rain arriving in the second week of June.

In Denmark and southern Germany the accumulation of biomass is slightly higher than the average year due to adequate rainfall.

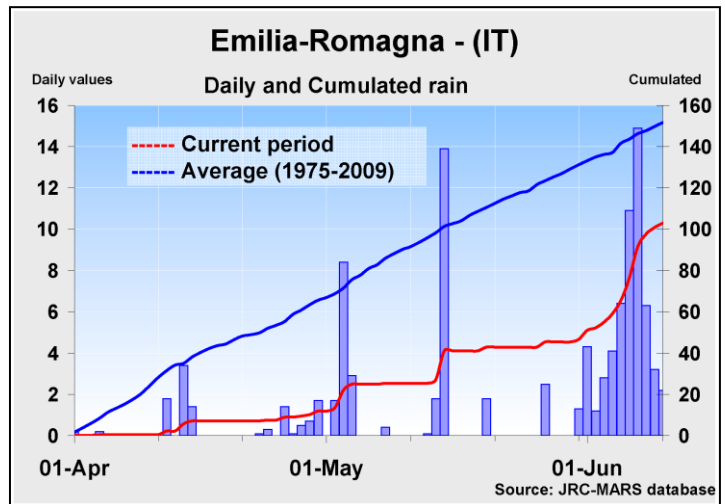
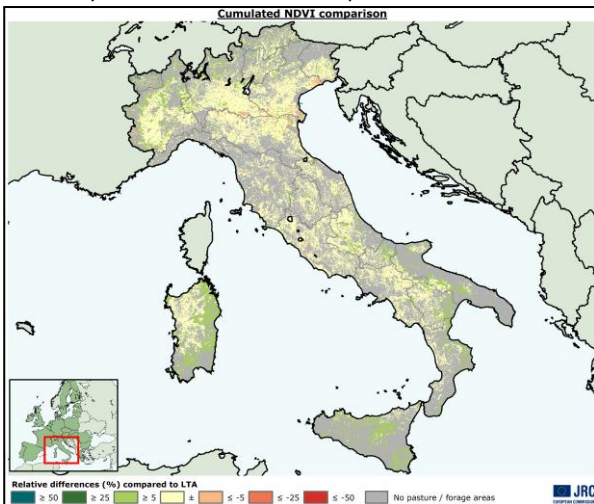


**Italy: Rain in the south above normal, but average biomass production.**

The meteorological conditions observed during winter and spring in the southern regions of Italy (*Abruzzo, Basilicata, Sicilia* and *Sardegna*) with rainfall accumulation 40 % higher than average and a temperature sum during spring higher than seasonal average depict a favourable scenario for biomass production. In the northern regions, an exceptionally warm spring anticipated the crop cycle for about one week. Cumulated temperatures were 20 % higher than average between April and June in *Piemonte* and *Lombardia*. The dry period observed between March and May has been followed by two weeks of intense

precipitation, allowing pastures to recover after the first cuts and improving also the conditions for the development of green maize.

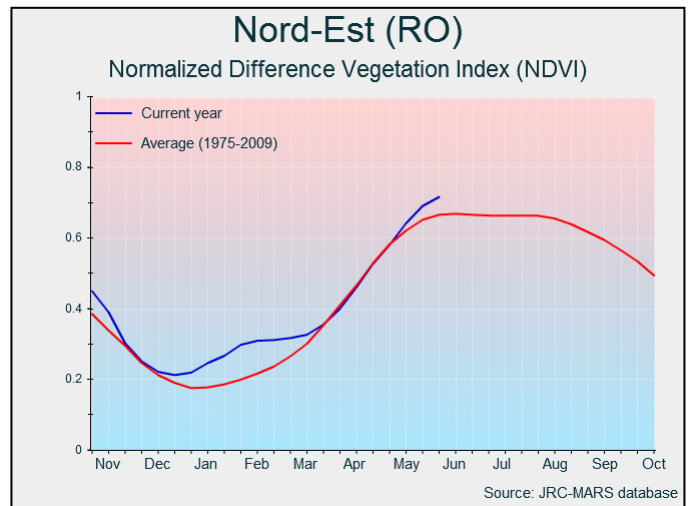
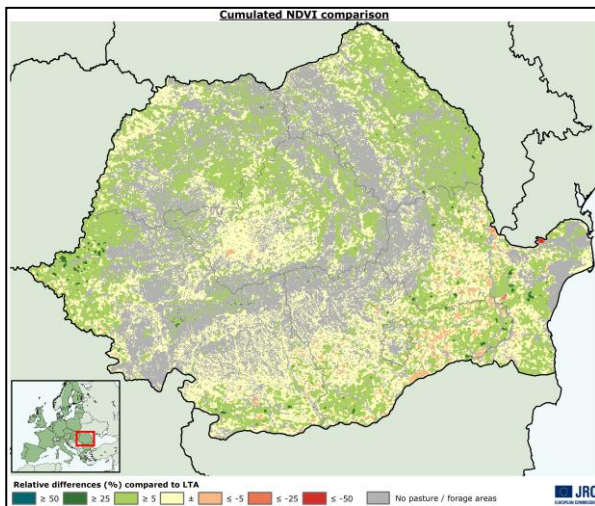
The NDVI analysis shows production levels above average in the south and some pre-alpine areas of *Piemonte* and *Lombardia*, while biomass production is at average in the centre of Italy. In the Po valley some areas show production levels below the standard values due to water stress experienced in May. Potential NDVI scenarios indicate possible low production levels in the Po valley and the center-south of *Lombardia*.



## Romania: Good expectations for biomass production.

Accumulated temperatures during winter and spring are above seasonal average, especially in northern and central regions. Rainfall was above average in the *Sud-Est* and *Sud-Muntenia* regions, but close to average in the North. Although crops are in an earlier phase of development as compared to western European countries, biomass production as seen by remote

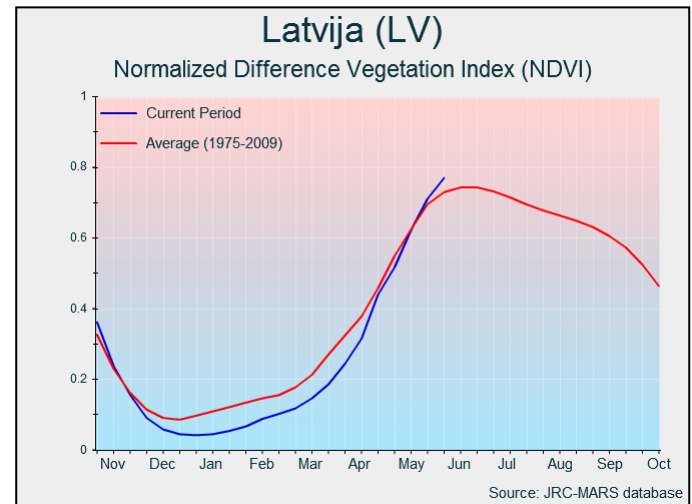
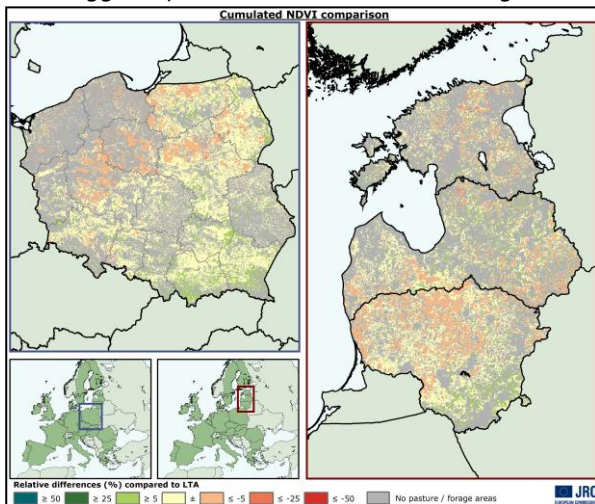
sensing data suggests higher values than average, underlining the favourable meteorological conditions observed. The potential NDVI scenarios for the forthcoming months are quite variable, but point to production levels slightly above the seasonal average in case of average meteorological conditions.



## Poland, Estonia, Latvia and Lithuania: Warm temperatures in May and June increase production expectations.

After a winter period with temperatures close to LTA an increase in temperature as compared to the seasonal average has been observed in Estonia, Latvia, Lithuania and north-eastern Poland (*Podlaskie* and *Mazowieckie*). This increase and an adequate water supply during May and June produced a biomass accumulation higher than seasonal average values. While the analysis of NDVI data suggests production levels below average in most

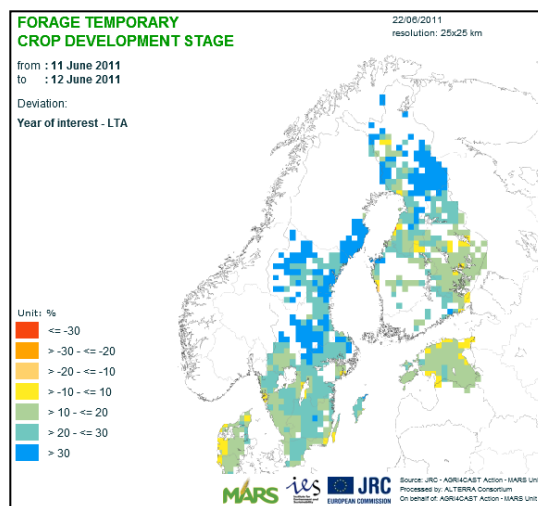
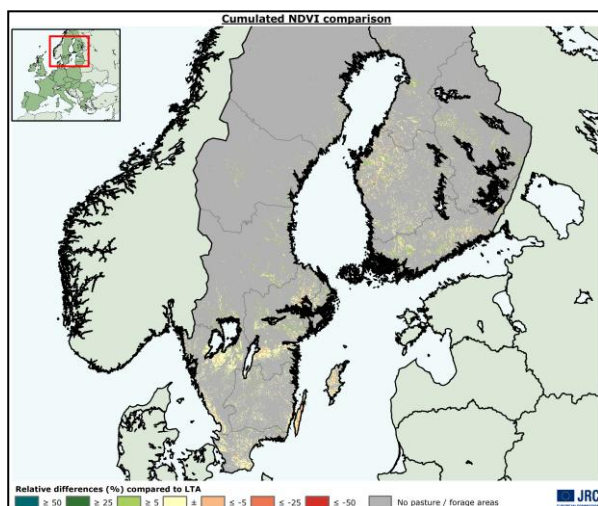
regions with the exception of *Malopolskie* in Poland, this apparent reduction is due to a delay in crop growth as compared to the average year. In reality, NDVI values of the last two decades are higher than the long-term average. Therefore expectations of biomass production are currently at average, subject to the meteorological conditions of the next months.



### Finland and Sweden: Mild temperatures during April and May anticipate crop growth.

Temperature accumulation during April and May was 25 % higher than the seasonal average in most of Southern regions of Finland and Sweden. This increase of temperatures, together with an adequate water supply during May and the first weeks of June, resulted in an anticipation of crop development. At this moment of the season (prior to anthesis) the biomass production in

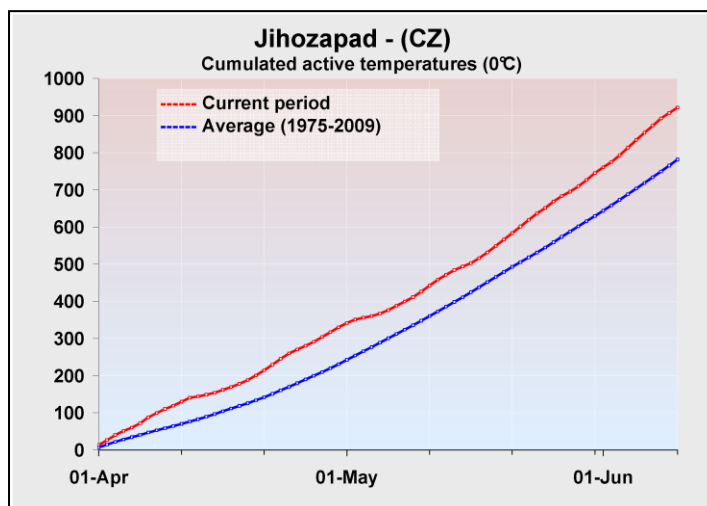
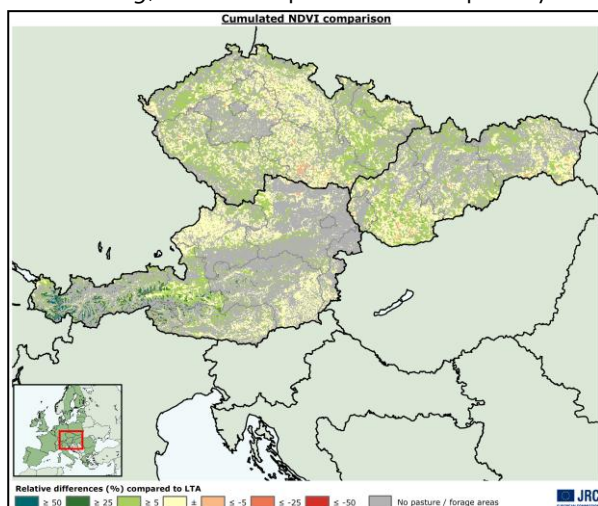
all regions is slightly higher than average due to the early crop development of one to two weeks, according to remote sensing observations. It is too early in the season to produce an estimate of the future NDVI scenarios. The end of June and first weeks of July will be crucial to evaluate the actual production.



### Austria, Czech Republic and Slovakia: High temperatures increase biomass production expectations.

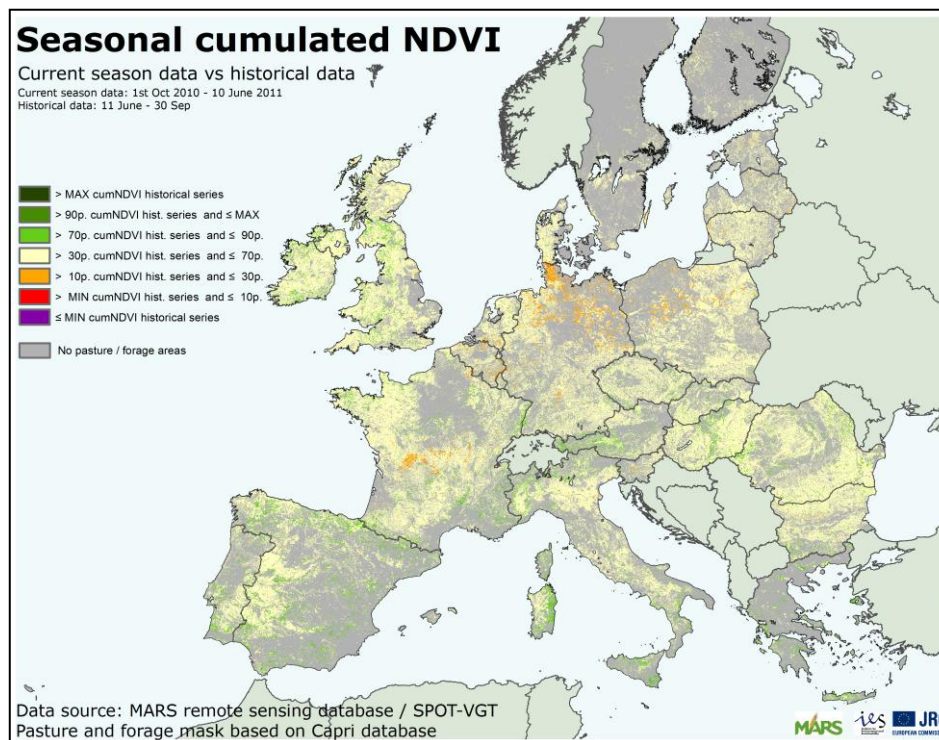
The current season is marked by temperatures above the seasonal average of April and May. Rainfall accumulation in all the three countries is close to LTA, resulting in favourable conditions for crop development. Consequently, crop development is about one week in advance as compared to the average year. The analysis of satellite imagery reveals an increase in production levels compared to LTA: NDVI profiles show a considerable increase in biomass accumulation in the western regions of Austria (*Tirol* and *Salzburg*) as a consequence of the especially warm

April and May with temperatures almost 30 % higher than the standard values. In these regions the potential NDVI accumulation at the end of the season is expected to be substantially higher than on average. In eastern Austria, Czech Republic and Slovakia NDVI values are also higher than average, but it appears to be related mainly to an advanced crop development. The meteorological conditions in the months of June and July will determine the potential biomass production along the season.



### Methodological Note:

The campaign analysis at country level is done only in the countries where their areas at NUTS2 level are represented in the 80 % of the total surface used for grasslands and forage plants in the EU. Data from the Table Eurostat code *ef\_lu\_ovcrotaa*, (2007) were used. To monitor pasture and forage production SPOT-VGT remote sensing derived products are used. References for the analysis are the cumulated values of NDVI (Normalized Differences Vegetation Index) from October to September of the current season, and their comparison with the long-term average (LTA). The availability of historical NDVI statistics in form of minimum, maximum, average and percentiles of the 10-daily NDVI values allows scenario generation of possible developments.



The current cumulated NDVI values for the end of the season were computed using the observed NDVI values from 1st October 2010 to 10 June 2011, and adding historical average NDVI values from 11 June to 30 September. The NDVI cumulated values obtained were compared with the three historical series (minimum, maximum and average).

Values of cumulated NDVI at the end of the growing season are classified in 7 categories:

1. Values of cumulated NDVI at the end of the growing season were higher than maximum values registered in the historical NDVI series. These values are considered as the highest biomass production levels ever potentially to be reached.
2. Values of cumulated NDVI at the end of the growing season are between maximum values and the 90 percentile of the historical NDVI series. These values are considered as high biomass production.
3. Values of cumulated NDVI at the end of the growing season are between 90 percentile values and the 70 percentile of the historical NDVI series. These values are considered as quite high biomass production.
4. Values of cumulated NDVI at the end of the growing season are between 70 percentile values and the 30 percentile of the historical NDVI series. These values are considered as average biomass production.
5. Values of cumulated NDVI at the end of the growing season are between 30 percentile values and the 10 percentile of the historical NDVI series. These values are considered as quite low biomass production.
6. Values of cumulated NDVI at the end of the growing season are between 10 percentile values and the minimum values registered in the historical NDVI series. These values are considered as low biomass production.
7. Values of cumulated NDVI at the end of the growing season were lowest than minimum values registered in the historical NDVI series. These values are considered as the lowest biomass production levels.

The mask used to highlight the pasture regions was obtained from the CAPRI database.

Cumulated NDVI evolution scenarios methodology was adapted from the methodology used by Instituto de Clima y Agua-Castelar- Instituto Nacional de Tecnología Agropecuaria (Argentina).



The current **MARS\* Bulletin** is an EC publication from  
AGRI4CAST action (JRC/IES MARS Unit)

#### Analysis and reports

R. Lopez and L. Seguini

#### Edition

M. El Aydam, B. Baruth, S. Niemeyer

#### Data production

MARS unit AGRI4CAST/JRC and ALTERRA (NL), Meteoconsult (NL), VITO (BE)

Further information can be found in the website. All MARS Bulletin are available under:

<http://mars.jrc.it/mars/About-us/AGRI4CAST/MARS-Bulletins-for-Europe>.

MARS agrometeorological data and data processing is available at <http://www.marsop.info>.

#### Contacts

JRC-IES-MARS / AGRI4CAST Action

I-21027 Ispra (VA)

Fax +39-0332-783033

[agri4cast@jrc.ec.europa.eu](mailto:agri4cast@jrc.ec.europa.eu)

#### Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

#### Disclaimer

The geographic borders are purely a graphical representation and are only intended to be indicative. The boundaries do not necessarily reflect the official EC position.

\*MARS stands for **Monitoring Agriculture Resources Unit**

JRC 65558 – EUR 24736,

Scientific and Technical Research series – ISSN 1831 - 9793

© European Union 2011

### 2011 MARS Bulletin (update)

Publication date in 2011	Publication	Reference
8 Feb	Agrometeorological analysis and weather forecast	Vol. 19 No. 1
8 Mar	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 2</b>
22 Mar	Agrometeorological analysis and weather forecast	Vol. 19 No. 3
12 Apr	Crop yield forecast	Vol. 19 No.4
12 Apr	Agrometeorological analysis and weather forecast	Vol. 19 No. 5
17 May	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 6</b>
14 Jun	Agrometeorological analysis and weather forecast	Vol. 19 No. 7
28 Jun	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 8</b>
✓ 28 Jun	Pasture monitoring in Europe	Vol. 19 No. 9
12 Jul	Agrometeorological analysis and weather forecast	Vol. 19 No. 10
26 Jul	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 11</b>
26 Jul	Rice monitoring in Europe	Vol. 19 No. 12
9 Aug	Agrometeorological analysis and weather forecast	Vol. 19 No. 13
23 Aug	Crop yield forecast	Vol. 19 No.14
6 Sep	Agrometeorological analysis and weather forecast	Vol. 19 No. 15
20 Sep	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 16</b>
4 Oct	Agrometeorological analysis and weather forecast	Vol. 19 No. 17
4 Oct	Rice monitoring in Europe	Vol. 19 No. 18
18 Oct	Pasture monitoring in Europe	Vol. 19 No. 19
25 Oct	Crop yield forecast	Vol. 19 No. 20
8 Nov	Agrometeorological analysis and weather forecast	Vol. 19 No. 21
29 Nov	<b>Agromet. analysis, remote sensing and yield forecast</b>	<b>Vol. 19 No. 22</b>
13 Dec	Agrometeorological analysis and weather forecast	Vol. 19 No. 23

Special issues are planned for crop monitoring in countries outside EU27