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# eMODIS NDVI analysis of the 2011 Spring Wheat Season in Kazakhstan

**August 17, 2011**

*Analysis conducted by USGS EROS*

# Purpose

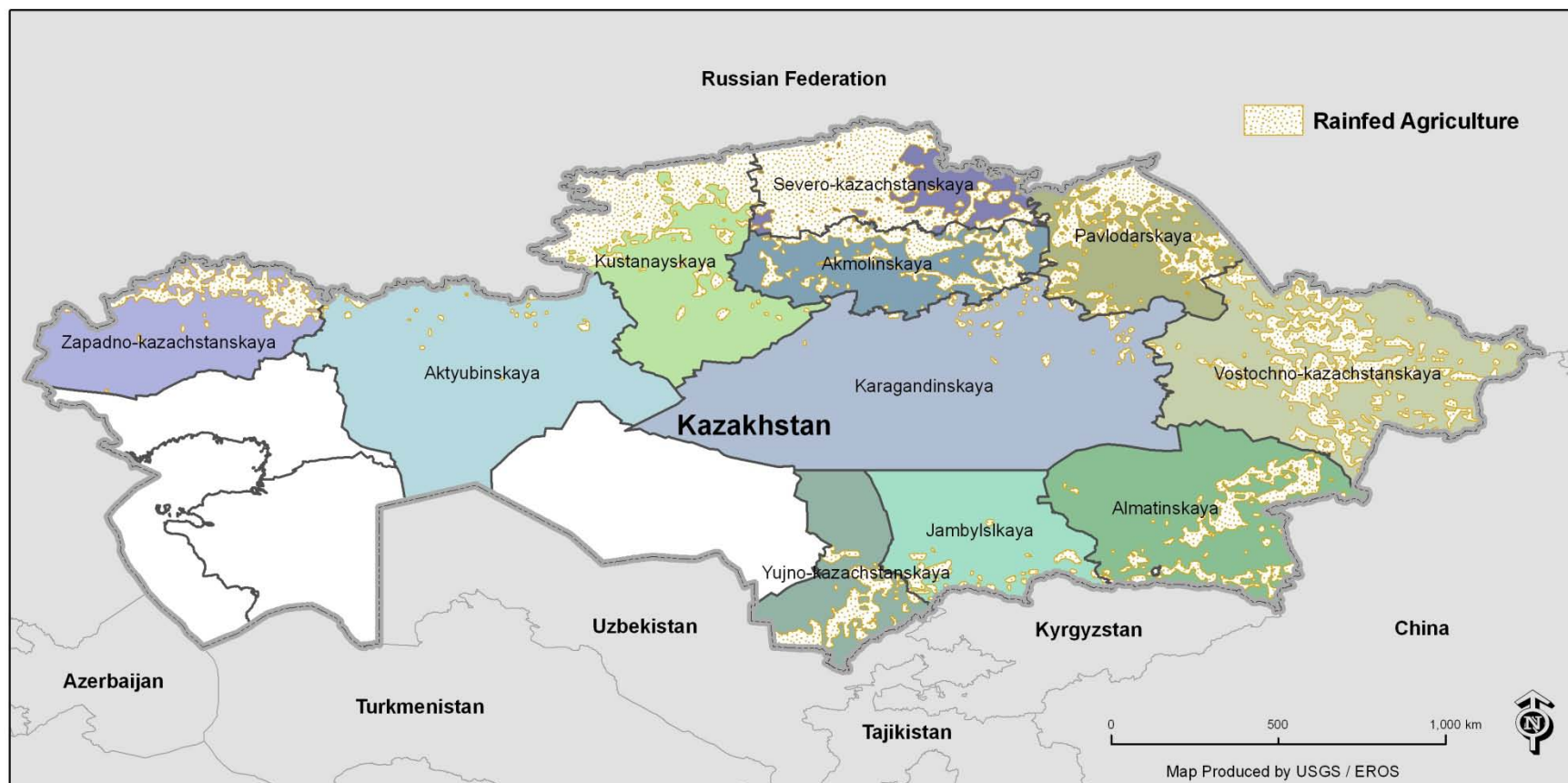
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*Utilize our collection of high resolution (250-m) expedited Moderate Resolution Imaging Spectroradiometer Normalized Difference Vegetation Index (eMODIS NDVI) data to assess the seasonal outcome for the 2011 spring wheat harvest in Kazakhstan, relative to recent years.*

## Current Knowledge

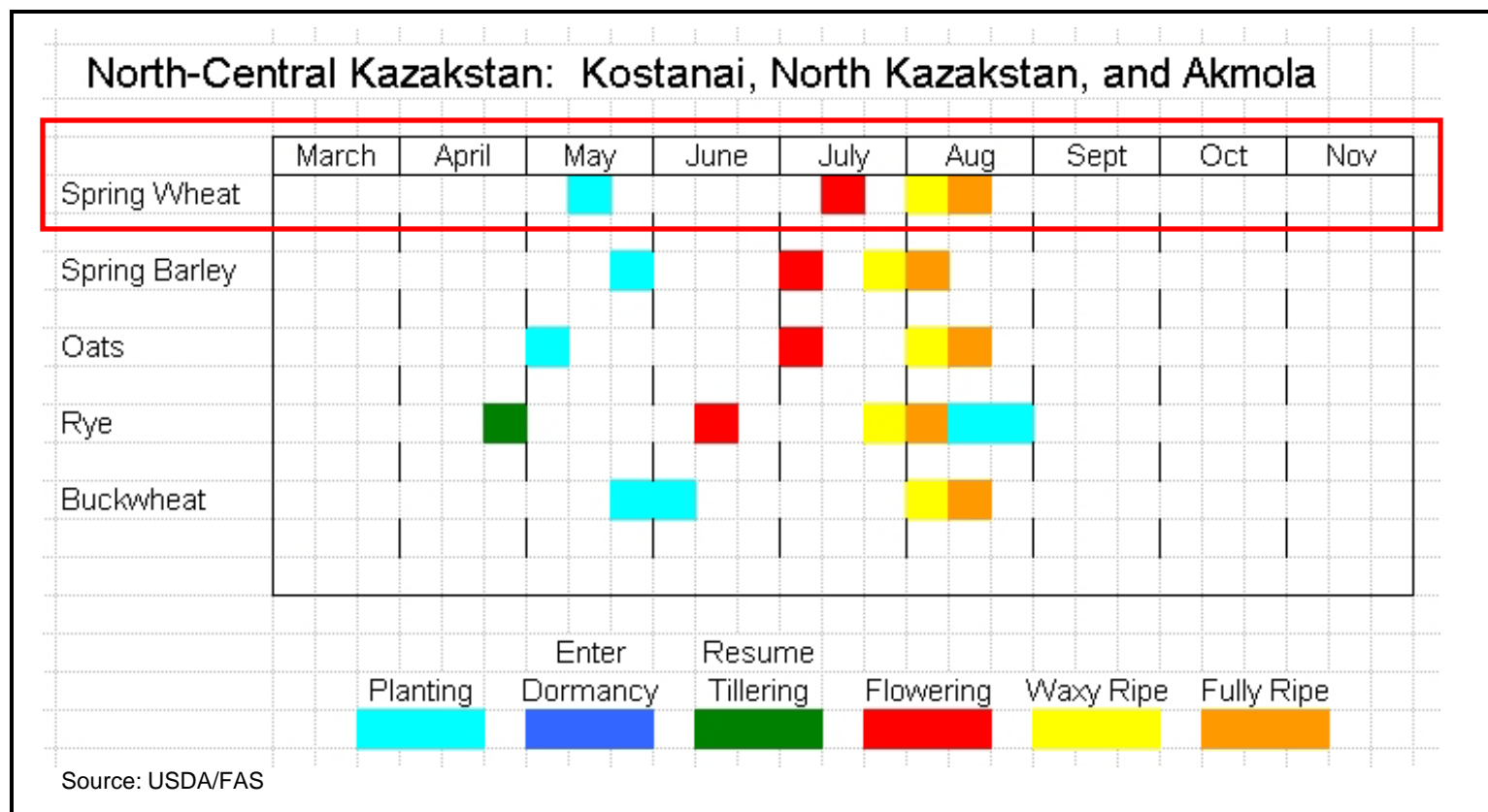
- Primary rainfed agricultural lands are located in the north central portion of the country, accounting for nearly 75% of the country's wheat production (USDA/FAS).
- Recent harvest years provide contrasting outcomes; 2009 was a high production year, while 2010 was a very poor year.
- The peak period of NDVI for the spring wheat season appears to occur in late July and early August.
- Comparing spatially averaged maximum NDVI for rainfed croplands for the current year versus the two analog years, provides a basis for inferring current season outcomes.

# Kazakhstan – Oblasts and Rainfed Agriculture



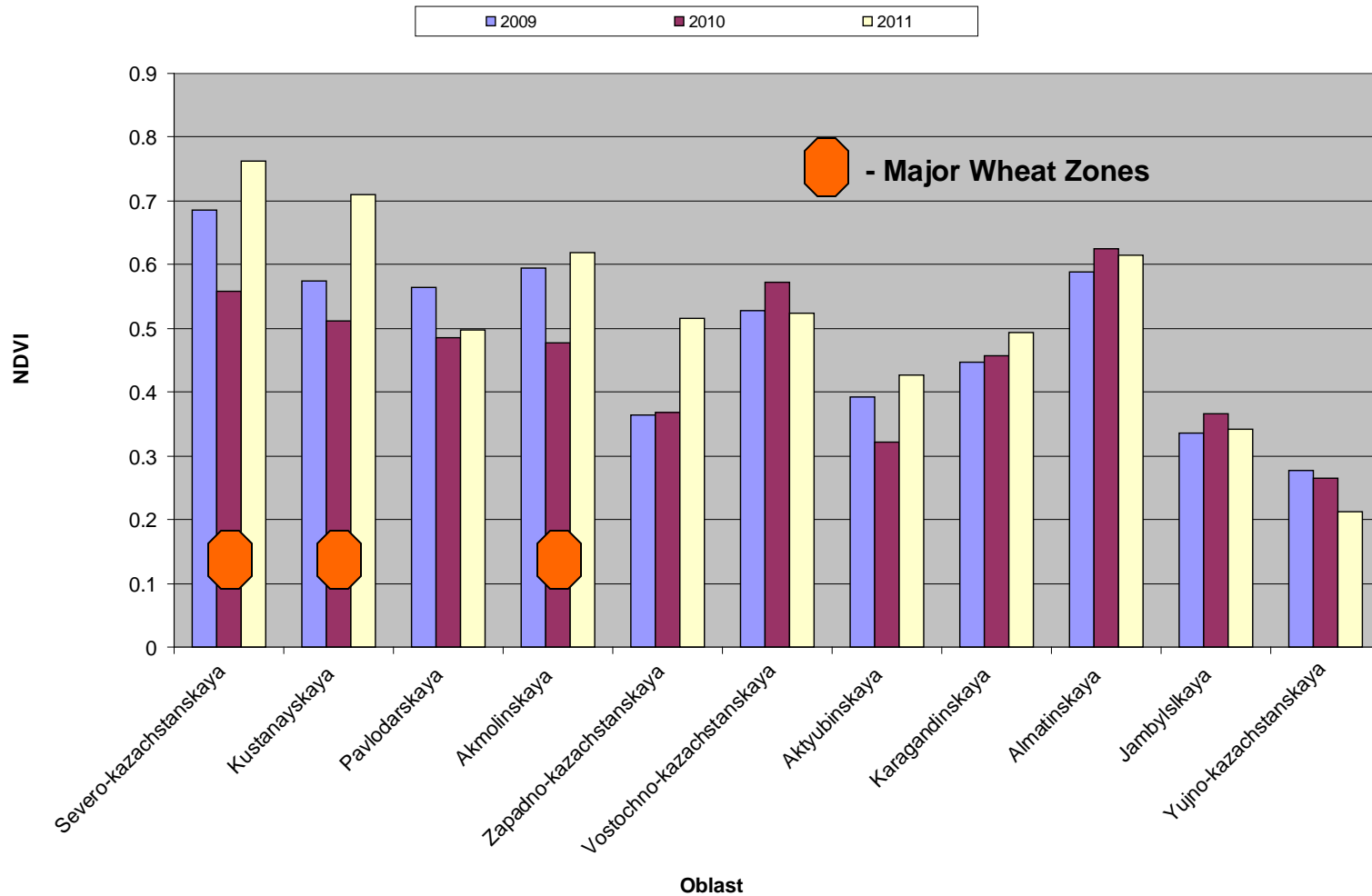
- Shaded oblasts contain rainfed agriculture as defined by the International Water Management Institute (IWMI)
- Major rainfed and wheat producing areas are found primarily in the north central portion of the country

# Kazakhstan Crop Calendar



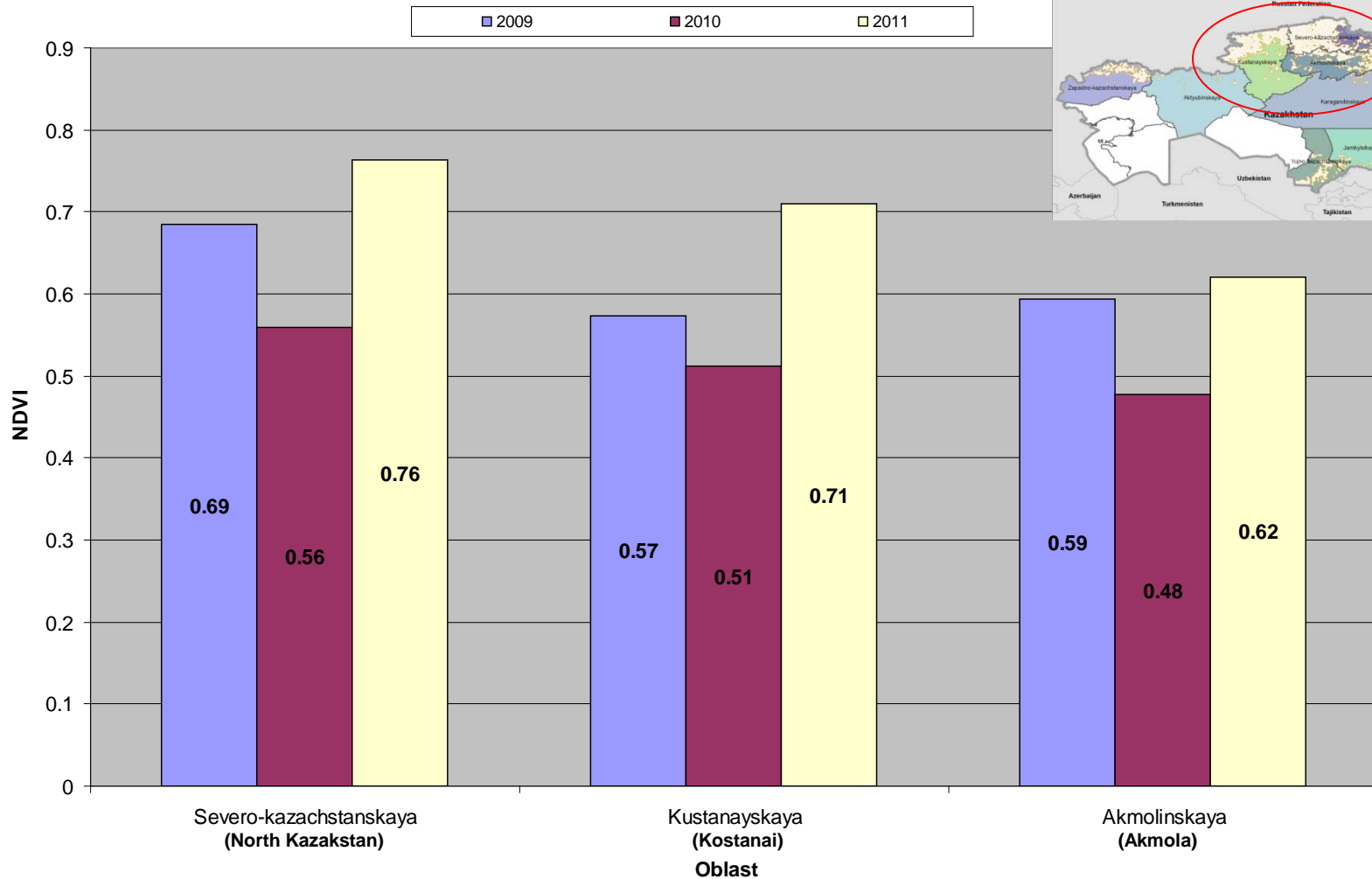
- Post-flowering and maturity of Spring Wheat occurs from late July to early August
- A period which corresponds to the time of peak NDVI making this a good surrogate for production

## Rainfed Agricultural Areas by Oblast - Spatially Averaged Maximum NDVI (July 1 - Aug 10)



- Maximum NDVI was spatially averaged over rainfed areas for eleven of the 14 oblasts in Kazakhstan
- Although variable, the poor production year in 2010 and the relatively high production year of 2009 are evident
- The current year appears better than 2009 in major wheat zones, and on par or slightly better in most other areas

## Rainfed Agricultural Areas for Major Wheat Producing Oblasts Spatially Averaged Maximum NDVI (July 1 - Aug 10)



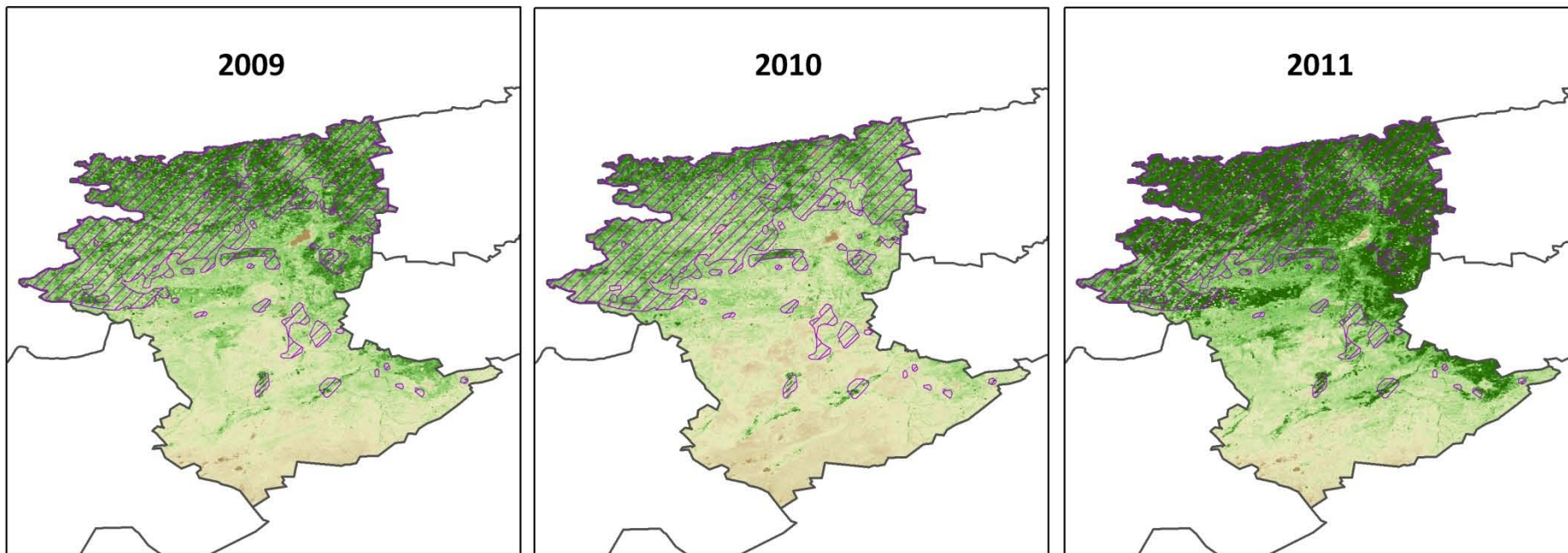
- In the three major wheat growing areas, 2011 maximum NDVI is greater than both 2009 and 2010
- The two northern oblasts, North Kazakhstan and Kostanai, show the greatest increase over both 2009 and 2010
- The most southerly, Akmola, contains less rainfed area and illustrates conditions similar to 2009

# Maximum NDVI (July 1 – August 10)



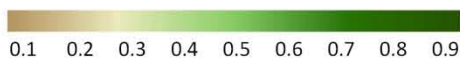
# Maximum NDVI (July 1 – August 10)

## Comparison of Interannual Variability in Maximum NDVI (July - August 10) - Kostanai Oblast



 - Rainfed Agriculture

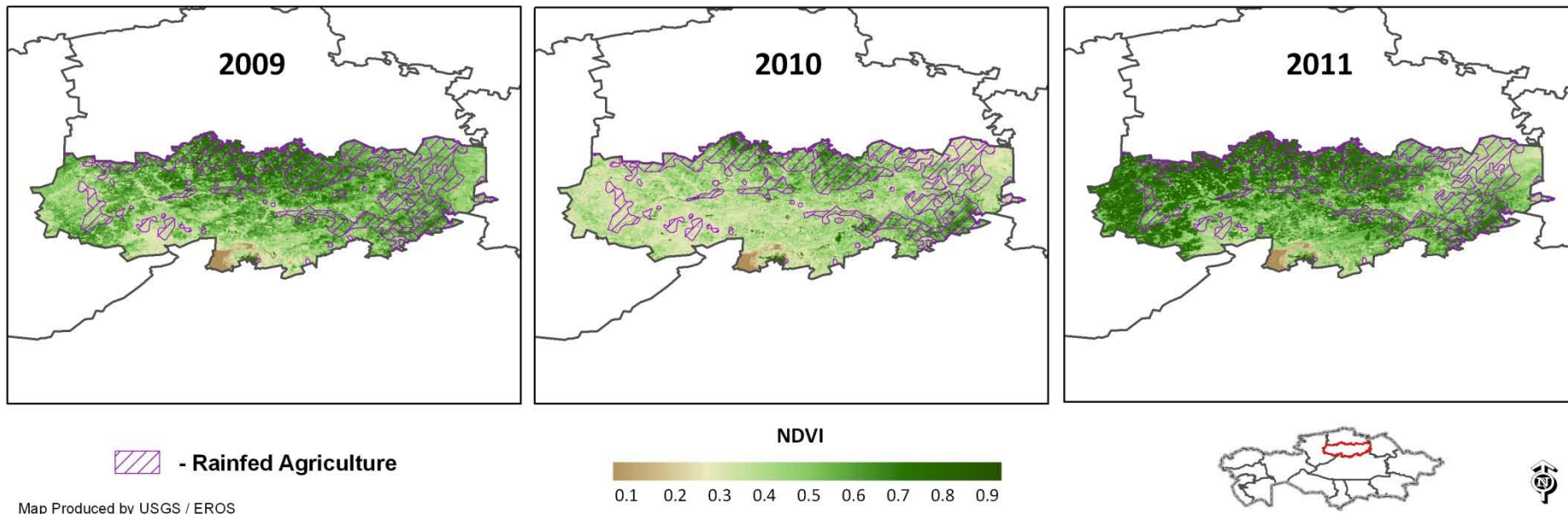
NDVI



Map Produced by USGS / EROS

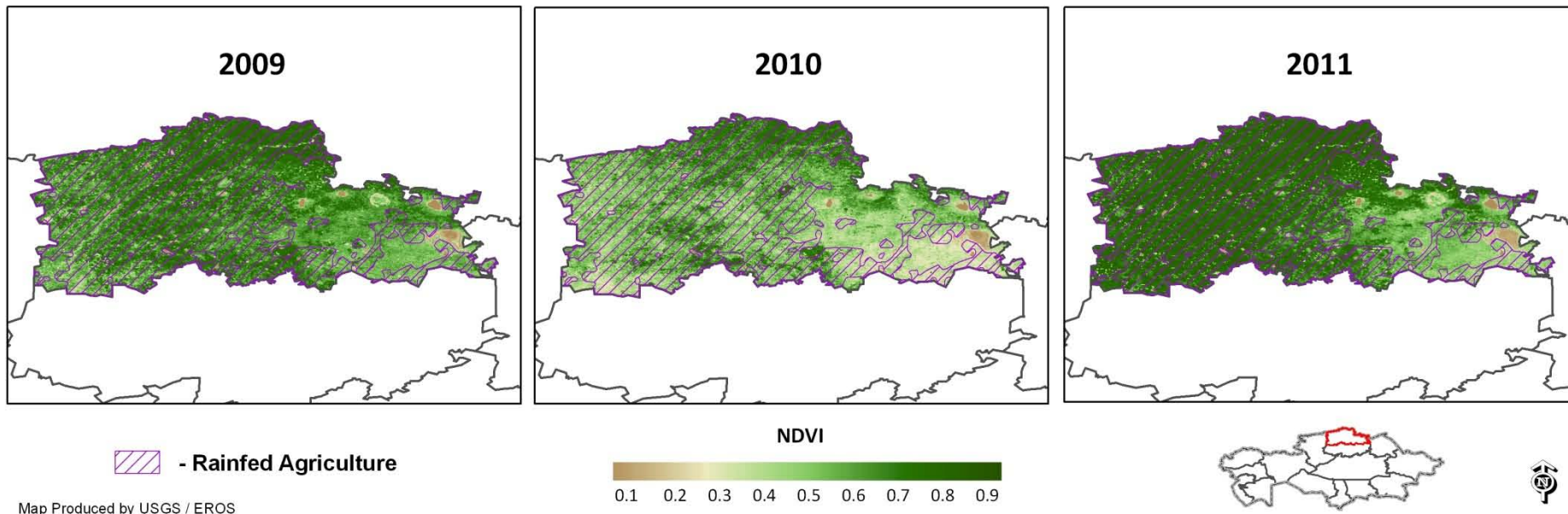
# Maximum NDVI (July 1 – August 10)

## Comparison of Interannual Variability in Maximum NDVI (July - August 10) - Akmola Oblast

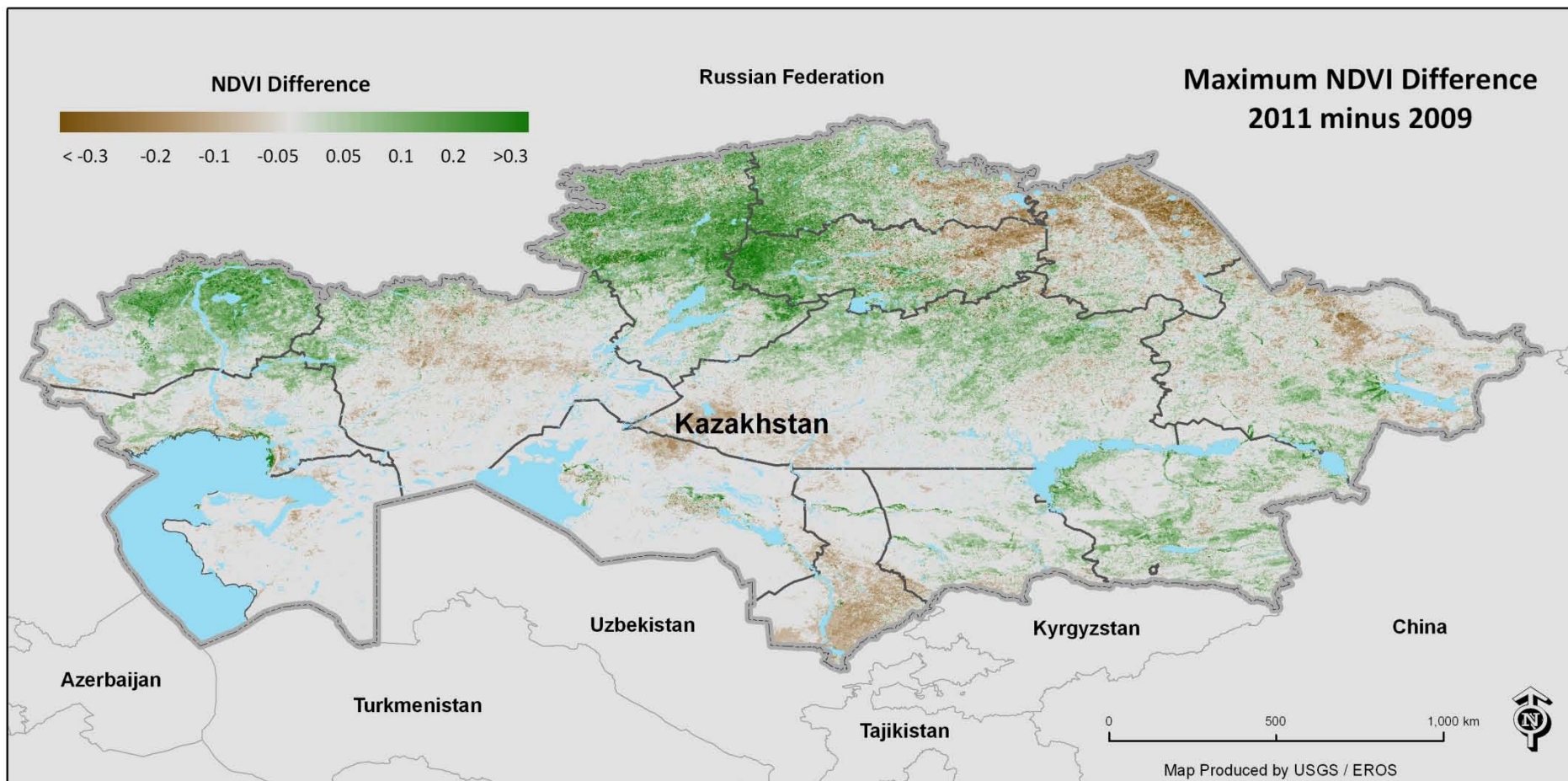


# Maximum NDVI (July 1 – August 10)

## Comparison of Interannual Variability in Maximum NDVI (July - August 10) - Northern Kazakhstan Oblast



# Maximum NDVI (July 1 – August 10) Difference – 2011 minus 2009



# Conclusions

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- **Analysis of peak season NDVI for rainfed agricultural areas of Kazakhstan indicates that the 2011 harvest season should hold good promise.**
- **The analog years that were used for comparison represented both a high production year (2009) and a poor season (2010).**
- **While estimating the magnitude of any production increase is beyond the scope of this analysis, it would be reasonable to infer that the 2011 production should be equal to or greater than that of the 2009 season.**
- **Likewise, the 2011 spring wheat production should be much improved over last year.**