NORSK REGNESENTRAL
NORWEGIAN COMPUTING CENTER

NordForsk FoodBalSec

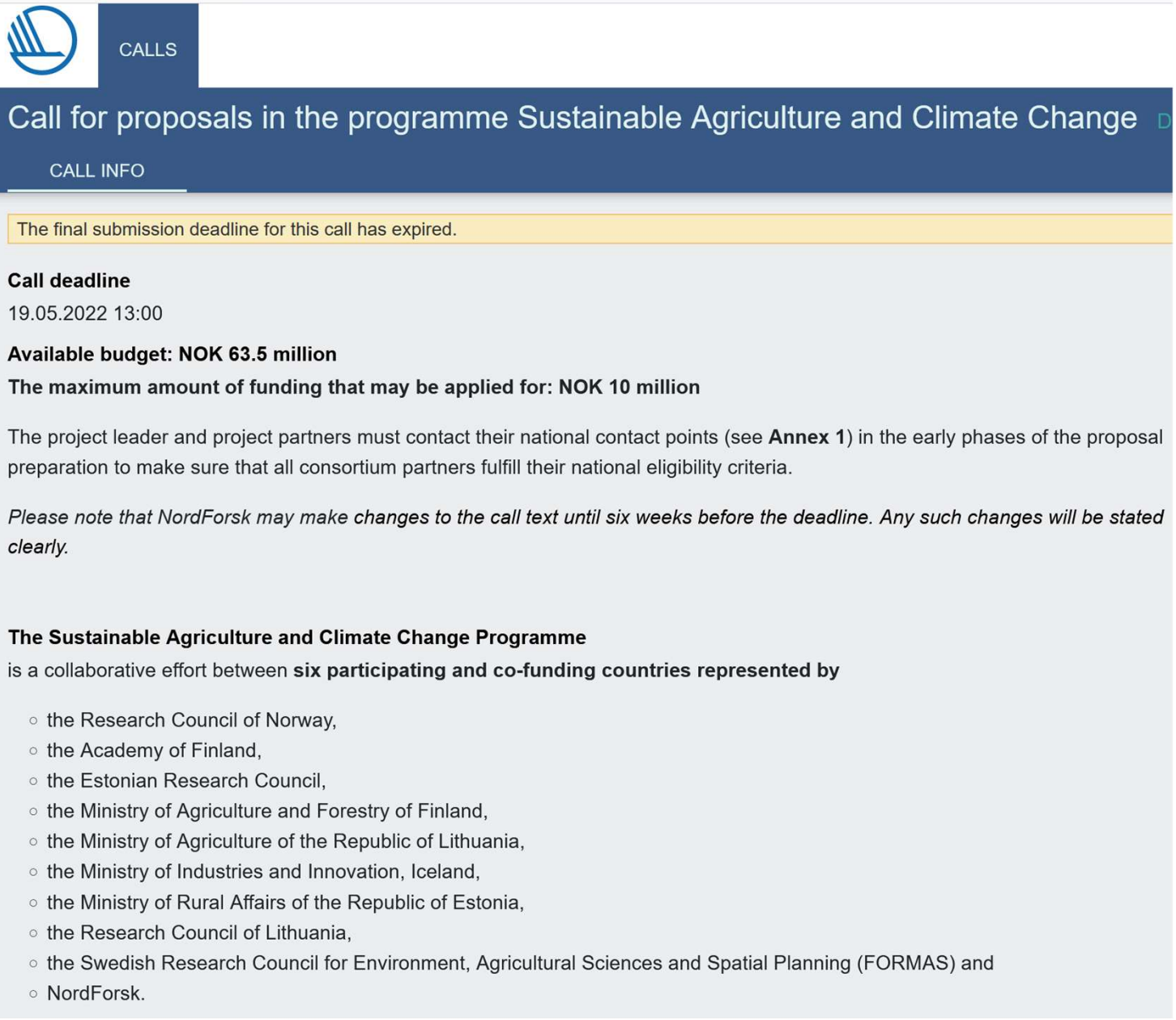
Project Overview

NR and Graminor

- NR is a private non-profit statistics research institute
- I lead the climate and environmental division – applications in agriculture, energy, infrastructure and financial risk
- Working with Graminor for roughly five years looking at creating future-resilient crop varieties
- Access to Graminor's own trial data, but a desire/need to expand this as broadly as possible in order to capture climate and genetic interactions

Background NordForsk

- Nordic-wide research funding body
- Thematic proposals throughout the year
- Requirement for several Nordic/Baltic country participation
- Funding levels ultimately dictated by the national level funding organizations
- NR has participated in previous initiatives funded by NordForsk



- In 2022 we noticed a call that fit our needs
- Note that Denmark not included in call – no funding for Danish research organizations
- With the help of Graminor, we contacted both academic and industrial partners
- Application submitted May 2022 and accepted Dec 2022

The main objective of NorBalFoodSec is to generate actionable knowledge on future Nordic and Baltic climate relevant for adapting plant cultivars to the future climate of the region, with a focus on cereal (barley), forage (red clover) and tuber (potatoes) crops.

NorBalFoodSec aims to answer the following research questions (RQs):

1. Which growing season climate indicators affect the performance of barley, red clover, and potatoes in the Nordic and Baltic regions, what is the relationship between trait, genotype, and climate, and how will future climate change affect performance?
2. Can we identify regions that presently experience the future climate of the Nordic and Baltic regions relevant for growing barley, red clover, and potatoes?
3. Can we provide skillful seasonal climate forecasts relevant for growing cereal, forage, and tuber crops in the Nordic and Baltic regions?

FoodBalSec Consortium

Landbúnaðarháskóli Íslands

Norges miljø- og biovitenskapelige universitet

Nordic Seed

BOREAL

SLU

Sejet planteforædling

FINNISH METEOROLOGICAL INSTITUTE

NORSK REGNESENTRAL NORWEGIAN COMPUTING CENTER

Graminor

Work Package 1: Future Nordic and Baltic Crops

WP1 will build statistical models to predict location- and crop-specific yield potential of barley, red clover and potatoes based on weather and variety

- Task 1.1: Models relating yield to variety and weather

  We will use publicly available phenotype and genotype data from variety trials and breeding programs—supplemented with privately owned data when appropriate—as well as historical weather data to infer trait and genotype interactions with the environment as described in Section 2 above.

- Task 1.2: Project future yield potential

  We will combine the modelling framework developed in Task 1.1 with the regional climate projections of relevant growing season indicators constructed in Task 2.1

WP2: Weather and Climate Information

WP2 will build the central repository of growing season forecasts and projections.

- Task 2.1: Climate Projections of Growing Season Indicators

  Using the growing season indicators investigated in WP1, we will develop methodology to postprocess the bias corrected EURO CORDEX RCM data to obtain projections of these indicators

- Task 2.2: Identify Climatic Regions for Breeding Trials

  The database in Task 2.1 will give an indication of projected growing conditions in regions of interest to stakeholders. An important question for plant breeders will be to find locations which experience these conditions presently.

- Task 2.3: Seasonal Forecasts of Growing Season Indicators

  We will investigate the predictability limits of seasonal forecasts of growing season indicators.

WP3: Tools, platforms and repositories

- Task 3.1: Repository of variety trial and historical weather data

  Public variety testing data from the different countries will be collected and processed to comparable formats. Similarly for publicly available pre-breeding trial data.

- Task 3.2: Repository of projected climate indicators

  We will apply this methodology to the RCM projections for the entire region to obtain a database of growing season indicators. In this task we will create the repository that houses these projections.

- Task 3.3: Software suite of analysis tools

  This task will compile the software used in WP1 to enable crop scientists to perform similar research on crops not considered in this project.

- Task 3.4: Prototype API for seasonal outlooks

  We envision a REST API system where users can send a custom-made URL request to a specialized server and receive forecast information on growing indicators back.

Conclusions

- Sharing trial data is a "win for all." Enables all our models to be robust to climate variability
- NordForsk project was a way to build a network across borders to begin thinking about a joint repository for trial data
- Structure and calls here require quite a bit of fine-tuning
- Happy to discuss other opportunities for data sharing and collaboration