Review of "Russia's Food Security and Climate Change: Looking into the future"
by Sergey Kiselev, Roman Romashkin, Gerald C. Nelson,
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The paper examines potential impacts of climate change on agricultural production and food security in Russia. The paper starts with an overview of the current situation in population growth, income and food consumption in Russia. The first section also discusses current trends in climate change and its possible impact on agriculture. It then provides an overview of land use and agricultural development in Russia. The main conclusion of the study with respect to impact of climate change on Russian agriculture can be summarized as follows:

1. Overall, global warming will positively impact Russian agriculture by extending the growing season and expanding agricultural land suitable for crops northward.
2. The southern regions of Russia may suffer increased stress due to a drier climate, more frequent severe weather events (droughts), and the spread of plant diseases and pests into new areas, which will have a negative impact on crop yields and livestock productivity.

The empirical part of the paper is preceded with a discussion of possible development pathways (scenarios) that are based on combinations of economic and demographic drivers and plausible changes in climate conditions. The empirical analysis of plausible climate change impact scenarios is conducted using the IMPACT modeling framework. The empirical results suggest that the grain production in Russia will increase substantially mainly due to significant increase in grain yields. The findings also suggest that potato production will decrease due to reduction in sown area and sugar beet production will increase moderately.

Comments:

1. The most important contribution of the paper is that it applies the IMPACT modeling framework to the analysis of the climate change impacts on Russian agriculture and food production. In doing so, they further improve the model by specifying the food production units (FPUs) for Russia and adding new data. However, the authors do not elaborate on how these FPUs were specified. Without full description of the FPUs and additional information on model assumptions, it is very difficult to assess the main results of the model simulations.

2. Another important contribution of the paper is the analysis of the possible impacts of climate change on wheat, maize, potato, sugar beet, and other grains production. The simulation results show that grain production will substantially increase in Russia under all scenarios mainly due to improvements in crop yields. For example, the model simulations predict that wheat production will reach 100 million tons by 2050, which is about twofold of the current production level in the country, which will be achieved to a greater extent due to growing wheat yields. These results are in line with a prevalent assumption existent in Russia that a warmer global climate would translate into significantly more hospitable agricultural environment in the country. Indeed, warmer climate may result in a reduction in the frequency of winter temperatures and longer crop growing seasons. Climate change also may make it possible to plant existing grain varieties farther north. The important question, however, is whether these changes will result in increased yields? According to some past studies, at least based on the crop varieties that are currently grown, increased gain yields are less likely to happen. Warmer temperatures may produce better grain yields in some parts of the country such as the Northwest, Central Federal District and Volga-Vyatsk regions, while other parts such as the Chernozem, Lower Volga, and the Southern Siberia may experience reductions in grain yields due to reductions in precipitation (National Intelligence Council, 2009, Russia: Impact of Climate Change to 2030 – A Commissioned Research Report and National Intelligence Council, 2009, Russia: Impact of Climate Change to 2030 – A Geopolitical Implications).
3. There is some contradiction between above mentioned empirical results regarding the grain production and the discussion on the possible impact of climate change on Russian agriculture in the paper (see page 33 and page 50). The model simulations may assume that Russia will invest in its agricultural infrastructure to mitigate possible negative impacts of climate change. However, it is not evident in the paper.

General comments:

1. The title of the paper does not fully reflect the content of the paper. I would suggest to replace food security with agriculture in the title.

2. The structure of the paper is rather confusing.
3. The paper uses subsistence level as a definition of poverty without properly (clearly) defining it. Subsistence is a widely used concept with varying meanings and definitions. The interpretation of subsistence as a mode of consumption corresponds to the concept of poverty line. The authors need to properly define the usage of the concept and its application in Russia.
4. The authors use a large number of acronyms in the paper without properly spelling them out the first time they use it. Many acronyms used in the paper are not quickly recognizable that confuses the reader.
5. Some figures in the paper are not properly constructed. For example, Figure 7 (page 9), Figure 16 (page 16) and Figure 20 (page 19).