**Discussion**

**4c.**

Nitrogen (N) is a critical nutrient for enhancing crop yields and, in turn, improving food production. N losses (or surpluses) – i.e. the difference between the N input into agricultural systems and the N agricultural outputs - are released into the environment, and an excess of N contributes to atmospheric pollution, climate change, environmental degradation and biodiversity losses.

High levels of nutrient losses can be observed in Europe (e.g. Germany, France, Netherlands, Slovenia), North America (e.g. Canada, United States of America), Asia (e.g. Pakistan, India). Some of these countries are important producers of wheat, however they have low nitrogen-use efficiency (NUE) (>25%, e.g. in India, Pakistan and China), or they are High-N-input countries (e.g. Netherlands, France Germany). It is fundamental both to regulate (and limit) the N inputs and to improve the NUE. Without improving the NUE, food production might be hindered and food prices might increase, leading to hunger.

**5)**

The results obtained within this exercise might be used to implement an integrated framework to analyze N fluxes and set them within specific boundaries, including an analysis of food security and eventual positive nutrition outcomes and poverty reduction. This framework should include the effects of climate change on the Nitrogen cycle and on the availability of water for agriculture. The model should be designed to provide a robust scientific assessment and foresight to inform policymakers globally and locally.

**6)**

I have no specific issues to report. I only considered an average Nyield per country to assess the N output per country.