Global Calculator Climate-KIC Project Committee meeting
4th February 2014

Attendees:

Sophie Hartfield (DECC)	Ken Wright (DECC)
Tom Bain (DECC)	Erica Thompson (LSE)
Jeremy Woods (Imperial College)	Lenny Smith (LSE)
Alexandre Strapasson (Imperial College)	Mikhail Semenov (Rothamsted Research)
Nicole Kalas (Imperial College)	Tim Kruger (Oxford Martin)
Juergen Kropp (Potsdam / CMF)	Thomas Gasser (IPSL)
Jason Lowe (Met Office)	

Target business users for the web tool

Sophie Hartfield and Tom Bain presented on the proposal to target multinational businesses as potential users of the tool. The group saw some merit in this, but fed back that we would need to have a very clear idea of exactly which businesses we wanted to reach and exactly what we would want out of them. We will return to this discussion during the course of the project.

Land/bio/food

Alexandre talked through his presentation slides describing the definition of each of the land/bio/food levers.

- Lever 1: calories consumed. Some commented that level 1 should arguably be higher, ideally closer to US levels, because currently there is not much spread between level 1 to 4. General agreement that this would be sensible, subject to whether it can be consistent with making the land balancing aspects of the model work. **Action: Alexandre** to investigate.
- Lever 2: dietary preferences. General agreement that, although level 4 is associated with very low consumption of meat, this was appropriate for showing the full variation in effort possible.
- Lever 3: crop yields. Mikhail questioned whether the crop yield numbers were sensible. It is difficult to sanity check them because they are average crop yield figures (i.e. average between developed/developing countries, where the scope for yield improvements varies a lot; and average between different crop types). **Action: Alexandre/Jem** to have a follow up discussion with **Mikhail/Martin Parry** about this.
- Lever 3, 4, 5 on yields: suggestion it would be better to express these as per annum increases.

- Lever 7: query about whether there was sufficient spread between level 1 and 4. Action: Alexandre to consider.

For all levers: agreement that numbers are expressed with two significant figures only.

Climate science

The group agreed we should make the following changes to how the climate science is presented in the web tool:

- **Thermometer for 2050 and 2100**. We agreed that the dashboard and climate science screens should show temperature change in both 2050 and 2100.
- **White outline of globe**. In the next version of the Calculator, the temperature maps will automatically circulate through a range of model outputs consistent with a GMTs within the range on the thermometer. But if the user generates a high emissions pathway consistent with 6C, we will not have enough temperature maps to present because there are only eight models that go up to 6C and fewer look at even higher temperatures. So to substitute for these "missing" graphics, we will use a white outline of the globe. If the user hovers over it, they will get a message that says "no models have looked at the impact of an xC temperature increase".
- **Lower resolution of map images**. We agreed to use a lower resolution grid scale for the temperature maps because this was more analytically defensible and easier to draw out common messages (such as land warms more than ocean).
- **Common messages from maps**. We agreed that the common messages from the temperature maps (i.e. warming and the poles and land warms more than ocean) should be articulated somewhere, perhaps as text underneath the maps.
- The "see also" heading should have 5 or 6 items under it (at most).
- **Tipping points and thresholds**. The group agreed we should have a separate note on this, but not for the next version of the tool (by mid March).

Climate impacts

The group discussed Nigel Arnell's papers on regional impacts. This work has recently completed its peer review. The group discussed whether we should include this work in the Global Calculator.

<u>Pros:</u>

- These metrics give users a **tangible sense** of what changes in the climate could mean for humans. E.g. Exposure to water stress, river flood risk, change in heating-energy requirements, etc. This may help to persuade our audience of the urgent need to avoid dangerous climate change.

<u>Cons:</u>

- **Different methodology**. These metrics are calculated from one model, which is different to the approach used elsewhere in the Global Calculator of showing the fullest uncertainty range, as derived from a variety of models. Adopting different approaches may make it difficult to explain to the user the methodology we have used.

- **Difficult to interpret results**. It could be argued that these metrics underestimate the potential uncertainty because they are based on just one climate model. However it could also be suggested that these metrics overestimate uncertainty because they do not allow for any adaptation. So this could potentially make it difficult to explain to a user how to interpret them.
- **Temperature range**. The temperature range as calculated by Erica and shown on the thermometer is very wide (typically 4 degrees, e.g. around 1 to 5C). It would be difficult to say anything meaningful about these metrics given such a wide range (e.g. it would consume the whole graph). However this concern could be overcome if we just looked at the impacts consistent with global mean temperature change.
- **Suitability for cropping metric**. Mikhael raised a specific query about this metric. He was aware of some research at Rothamsted that suggested that the variability between crop models actually exceeded the variability arising from climate models. This would suggest that Nigel's suitability for cropping metric may be an underestimate. See:

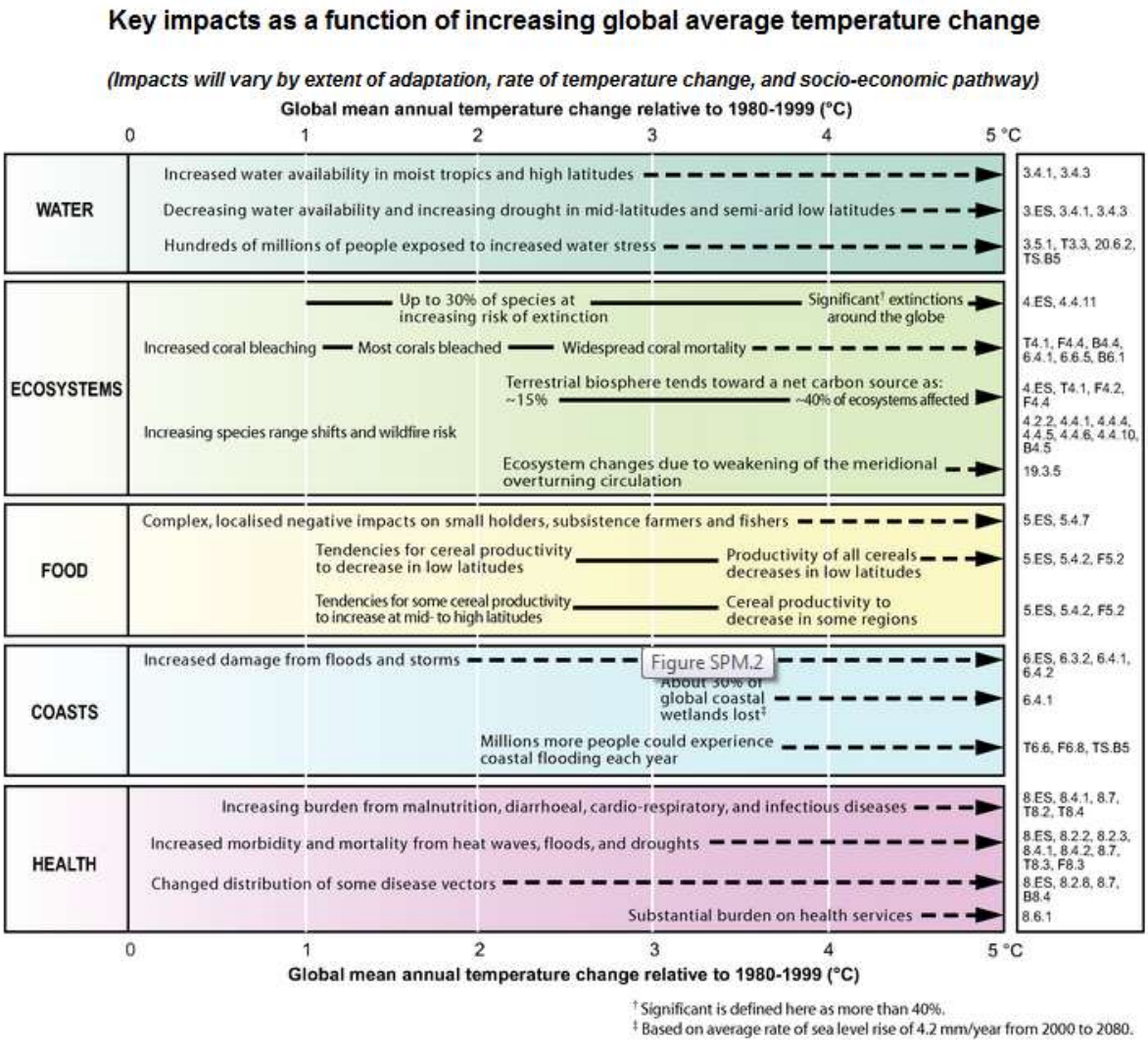
Uncertainty in wheat models NCC 2013 ePr

Therefore we concluded that we would not incorporate Nigel's regional impacts work into the mid-March version of the web tool. However, we were very aware that those with the greatest interest/expertise in regional impacts (David Mackay and Nigel Arnell) were not at this meeting. So we concluded that we would revisit this discussion at a future meeting. **Action: Sophie** to add regional impacts discussion to agenda for next KIC Project Committee meeting.

Human climate impacts – other ways of including this

The group considered alternative ways of including human climate impacts information in the Global Calculator and concluded that as a minimum we should do this by including:

- **AR5 diagram**. We should include a diagram such as the one below, from the AR5, and we can shade out the area of temperature change consistent with the user's pathway. E.g. See below.



- **Warning messages**. We should include warning messages where appropriate, e.g. if the user generates a 6C pathway and also selects high crop yields, we could have a message that says “warning! This may not be consistent”. Another example would be if the user selected a 6C pathway but selected a low heating/cooling intensity for buildings, this could also raise a warning flag.

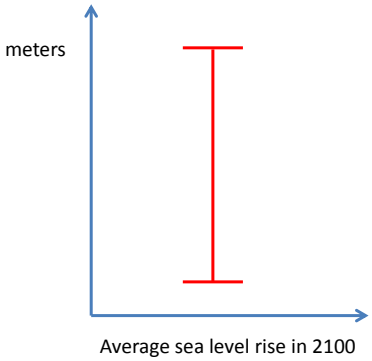
Priorities for the next version of the web tool:

The group agreed that Erica should prioritise the following for the mid-March version of the model:

- Basic physics page
- Temperature change, precipitation maps – downloading data, prep maps.
- Activate model uncertainty lever.
- The small presentational changes mentioned above.

Priorities for inclusion in the June version:

- If possible, “endogenise” non-CO2 emissions into temperature calculation. Action: Erica to meet with Jason separately to discuss this.
- Ocean acidification: inclusion of a simple graphic on this (e.g. similar to above IPCC temperature graphic, but for ocean pH). **Action: Ken** to investigate.
- Sea level rise graphic such as below. **Action: Jason/Erica** to discuss further.



Next steps

We are planning to lock down the land/bio/food overall methodology and 2011 baseline by mid March so that we stay on track to release the first public version of the tool by July. **Action: KIC partners to send any comments on the broad methodology or 2011 baseline data for the land/bio/food sector to Alexandre by 28th February** (to give him enough time to take on board any comments by mid March).

By mid March we also want to lock down the broad methodology for the climate science work. **Action: KIC partners to send Erica any comments on her methodology paper or climate visualisation paper by cop 7th March**.

The next Climate-KIC Project Committee meetings will be in London as follows:

- 1st May – to discuss emerging findings from the April version of the Global Calculator. Also to receive feedback on the land/bio/food April workshop with expert stakeholders.
- June – to discuss key messages from the final version of the Global Calculator model, prior to its public release in July.