

Interactive comment on “Estimated impact of global population growth on future wilderness extent” by E. Dumont

Anonymous Referee #1

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Journal: ESD Title: Estimated impact of global population growth on future wilderness extent Author(s): E. Dumont MS No.: esd-2012-19 MS Type: Research Article

General comments The paper tries to estimate the impact of future birth rates on wilderness extent. This seems at first glance a very simple and limited study. My main objection to this study is that there are no feedback mechanisms included. Especially as listed in section 2, line 9 to 15 many possible feedbacks in the agricultural demand and supply system are not taken into account. The

Secondly, no attention has been given towards the possibility of restoration. Currently, considerable agricultural areas in China (Loess Plateau, see John Liu’s work) and Ethiopia have been restored, thus diminishing the pressure on remaining (wilderness) areas.

Most remote areas of wilderness will not be influenced because of very low population pressure and/or unsuitability for agriculture, so these areas are not very interesting in this study. Therefore, I would like to see a map of all 4 categories as listed in section 2, line5-6.

The discussion section is rather weak. Yes, we all know that more people lead to more trouble in the future, but arguing that birth control and education are the only answers for policy makers is far too simple. It's much more complicated than that and therefore Integrated Assessments Models have been developed to take all possible factors and feedback mechanisms into account to answer these questions.

Specific comments Section 2.3.1, line23-25. What about the decrease in agricultural areas during the past decades in North America, Japan and Europe ? It's surely not only in Asia, as the text suggests.

Section 2.3.1, line 25-27, Expansion is also very much still possible in Africa, not only in Latin America!

I do not understand this argument that caloric intake per capita has not increased since 2000, and will not increase in the future due to the increasing demand for biofuels. The dietary preferences of humans is influenced by income (GDP), the richer the more meat people tend to eat. Biofuels has nothing to do with this, only the competition for land is influenced by this.

Section 2.3.1., line 7-10. The argument that climate change is not included in the calculation because the impacts of climate change can't be reliably estimated is a weak one. Surely, there are still many uncertainties, but many crop models can fairly accurately predict possible climate effects on crop yields. Many studies exist in this field.

Extrapolation of past (agricultural) efficiencies towards the future is dangerous. Very few people can tell what effect new technology can have on future yields, whether it is for food or biofuels. Currently, much of the debate on biofuels is whether this is a good

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and wise thing to do with the available land (apart from the discussion whether it would lead to extra emissions, use of fertilizer, pollution, etc), rather than we are going to do so, no matter what the demand for food is. I'll be very careful with this.

Section 2.3.2, first paragraph. 'People require' is different than 'people are going to get' a certain amount of land for housing, etc. It's a rather poor argument just using one study for Boston, and applying that for the whole world. I suggest the author have a look at Potere and Schneider (2007) who compiled an overview on global datasets on built-up area. When you compute the current ratio of built-up area per capita for the year 2000 it indeed yields around 700 m²/capita, but this changes really fast over time. In 1950 it was almost 80 m²/cap and in 2050 it could be 132 m²/cap (based on the RCP scenarios, (van Vuuren et al., 2011)). So keeping that value constant seems to be not correct.

References

Potere, D. & Schneider, A. (2007) A critical look at representations of urban areas in global maps. *GeoJournal*, 69, 55-80. van Vuuren, D.P., Stehfest, E., den Elzen, M.G.J., Kram, T., van Vliet, J., Deetman, S., Isaac, M., Goldewijk, K.K., Hof, A., Beltran, A.M., Oostenrijk, R. & van Ruijven, B. (2011) RCP2.6: Exploring the possibility to keep global mean temperature increase below 2°C. *Climatic Change*, 109, 95-116.

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