Referee #1

General comments:

1) "Irrigation potential is computed as the ratio between groundwater recharge (reduced for water requirements in other sectors or for the environment) and irrigation water requirement (Equation 1). Consequently, irrigation potential is largest in very humid regions where groundwater recharge is high and irrigation water requirement is low. However, irrigation is a measure of land use intensification and used to increase crop yield by reducing crop drought stress (in arid regions) or by reducing weed pressure by flooding (in rice paddies). Therefore the benefit of irrigation is largest in arid regions where the lowest potential is calculated according to equation 1. When comparing the current extent of groundwater irrigation in Africa with the potential computed in this study (Figure 7) it also becomes clear that most of the current groundwater based irrigation is in areas of low potential while very little irrigation is in regions of high potential according to equation 1. I can understand the viewpoint of hydrologists with the focus on resource availability but I also think that it is misleading to postulate a potential for irrigation in regions where irrigation is actually not needed or where the benefit for the farmers is low. Therefore I suggest to rephrase title and objectives of the study. What is investigated is basically the crop area in Africa that can be irrigated with local renewable groundwater resources. However, I highly recommend avoiding the use of the term irrigation potential for it."
   - → It is correct that the benefit of GWI is larger in arid areas, as reflected in the map of actual GWI areas. However, a few points need to be kept in mind. We are looking at supplying irrigation for optimal growth for mostly double crops, corresponding to predominantly full irrigation (in the dry season) and supplemental irrigation (in the wet season). In most regions of Africa, the rainfall is highly variable, within and between years, and this is where groundwater plays a critical role. We are calculating this deficit anywhere in the continent to show a non-zero irrigation need in most places due to this variability. By taking green water availability, we come up with an average crop water demand and average irrigation water demand. In addition, GWI is mostly developed currently in Northern and Southern Africa, not only because of arid conditions, but also because of generally higher economic development. It does not necessarily imply that there is no irrigation demand or potential benefits in the SSA (minus South Africa) region. In fact, this is what is brought forward time and time again in the literature, that irrigation could really boost food production and economic development in these regions and this was one of our incentives to do the assessment. We have hence kept the term 'irrigation potential'. A sentence has been added to indicate that irrigation is both supplemental and full (p.6075, l.21): 'This benefit accrues from mostly supplementary GWI in the wet season as well as mostly full GWI in the dry season'.

2) "It seems that the irrigation water requirement calculated in this study and shown on Figure 4 is much too high. For example, irrigation water requirement in the Congo or Gabon is about 1000 mm per year (Figure 4). In these tropical regions annual precipitation is up to 2000 mm per year or even more so that irrigation water requirement should be very low. Actually it looks more like that Figure 4 is showing the total crop water requirement from rainfall and irrigation (as shown in the supplementary information) but not the net irrigation water demand. It also seems that the area that can be irrigated with the available groundwater resources (Figure 6) is too low in these humid regions. Therefore it needs to be checked carefully whether the calculation procedure is correct."

→ Figure 4 shows the net irrigation water demand for the whole year which includes two crop growing seasons. The net irrigation water demand is calculated first on a monthly basis, secondly summing on an annual basis, using green water as the water available for the crops indirectly and naturally from rainfall through soil moisture. The green water corresponds to the transpiration of natural vegetation and non-irrigated crops, extracted from the PCR-GLOBWB global hydrological model (Wada et al., 2011). This conservative approach, disregarding soil evaporation, allows not overestimating the availability of water for the crops in order to integrate the factors reducing water access to the crops from rainfall (surface runoff, percolation and interception). The figures have been checked, and green water represents from 50% to 75% of the total evapotranspiration in the mentioned tropical regions as it is also illustrated in Lawrence et al. (2006). Furthermore, crop water demands are relatively high due to the intentional catering for high water-demanding crops (see Reviewer # 2, Specific comment no. 9).

3) "The calculation of groundwater availability for irrigation neglects artificial recharge generated by irrigation with surface water resources. This is one of the reasons why the area currently irrigated with groundwater (in Northern Africa and South Africa) is not detected (Figure 7). Another reason is the scale used for the calculation of groundwater availability (resolution of 0.5 degree). In general, groundwater availability should be calculated for each single aquifer and it should also account for an exchange between groundwater and surface water resources. There are high yielding shallow aquifers along most of the large rivers in Africa and water extractions from groundwater would be compensated by groundwater flow from the rivers or wetlands connected to the river. In Western Africa, but also in other regions, most of the groundwater use for irrigation is of this type and therefore also not reflected on the map shown in Figure 7. The water resource described in this example is mainly created in more humid upstream areas, transported as surface water (river) to arid downstream areas, converted to groundwater by infiltration to shallow aquifers and extracted by wells in the alluvial plains. These examples show that neglecting these interactions between surface water resources and groundwater resources is critical. Accounting for these interactions would certainly change the spatial patterns of area irrigable with groundwater a lot. Therefore I see two options for modification of the study: i) Accounting for interactions between surface water resources and groundwater resources is certainly the best option but this would require major modifications in study setup, methodology and input data. ii) A second option is a change of the study objectives towards analyzing the extent of cropland that could be irrigated with groundwater created from local natural recharge. Local is then defined by the resolution of the data set (0.5 degree ≈ 50 km). Then it needs to be mentioned that the study is not accounting for the potential caused by lateral flows of groundwater and surface water between grid cells and consequences for the study results need to be discussed more in detail."

→ We maintain the approach of only accounting for GW availability through direct, diffuse local recharge. This is based on the sustainability considerations. Keeping GW use (here GWI and other demands) within the recharge is the theoretically correct approach to determining upper limits to GW exploitation and we do it in a spatially distributed sense, looking a locally available GW (within the resolution of the approach). We acknowledge that significant GWI development occurs along or downstream of rivers, often in alluvial sediments/aquifers, but strictly speaking it cannot be considered derived from groundwater (recharge). Such assessments need to have a more integrated approach, highlighting interactions between GW and SW, which was not the intention in this study. That lateral flows (groundwater or irrigation water) between cells are disregarded is mentioned (p.6069, l.12).

Furthermore, we changed the sentence (p.6070, l.16): ‘GW Recharge [L^3 T^{-1}] is the net groundwater recharge. It corresponds to the total quantity of water from rainfall which reaches the aquifer’ to: ‘GW Recharge [L^3 T^{-1}] is the net groundwater recharge. It corresponds to the total quantity of water from rainfall which reaches the aquifer as diffuse recharge. Return flows from surface water irrigation and other forms of artificial recharge as well as focused or induced recharge from water surface bodies are disregarded.’ - to indicate that we are not considering enhanced/focused recharge from surface water bodies or SWI schemes. Finally, in the Conclusions (p.6079, l.23), the sentence: ‘…, it is clear, that present GWI has been primarily developed in northern and southern Africa where the development potential is relatively limited, and where it is governed by abstraction from non-renewable or already stressed resources, while the rest of the continent (except for the Sahara region) still has appreciable potential, especially for smallholder and less intensive GWI.’ has been expanded to ‘…, it is clear, that present GWI has been primarily developed in northern and southern Africa where the development potential is relatively limited, and where it is governed by abstraction from non-renewable or already stressed resources, from recharge from larger rivers like the Nile, or return flows from surface water schemes, while the rest of the continent (except for the Sahara region) still has appreciable potential, especially and most relevantly for smallholder and less intensive GWI in the semi-arid Sahel and East Africa regions.’ – to illustrate that these types of GWI exist.

Specific comments:

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1.	P. 6066, l. 21 P. 6067, l. 19	Please use a consistent format for numbers (either million hectares or 10^6 hectares).	$\times 10^6$ has been used throughout, also in figure captions for Fig. 4 and 5.
2.	P. 6069, l. 16	Strange units are used for water resources and water use (L3 T-1). Should be m3 yr-1, right?	[L^3 T^{-1}] is standard for lenght^3/time, i.e. a volumetric flow.
3.	Equations 1-3	It is very important to mention for which time steps these balances or ratios are calculated. In particular for equation 3 the results will strongly depend on the choice of the time step because green water and crop water demand show strong seasonality.	This is given on p. 6071, l.1. All calculations of Eq. 2-3 are done on an annual basis and Eq.1 is calculated using average annual values from Eq. 2-3 (see Supplementary material).
4.	P. 6071, l. 17-18	"For the green water availability, the sum of the simulated actual transpiration of the two soil layers under non-irrigation conditions was used." => Water flows from the soil to the atmosphere are typically denoted as evaporation while flows from the plant to the atmosphere as transpiration. Please clarify.	Text changed from: ‘For the green water availability, the sum of the simulated actual transpiration of the two soil layers under non-irrigation conditions was used. This conservative approach, disregarding soil evaporation, allows not overestimating the availability of water for the crops (Van Beek et al., 2011).’ to: ‘For the green water availability, the sum of the simulated actual transpiration of

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			the two soil layers under non-irrigation conditions (i.e. natural vegetation and rainfed crops) was used. This conservative approach, effectively reducing precipitation for surface runoff, percolation, soil evaporation and interception, gives a measure of easily available soil moisture for the plants, and ensures that the availability of water for the crops is not overestimated (Wada et al., 2011)..' These model data are based on the GLCC version 2 at 30 arc seconds (Earth Resources Observation and Science Center, U.S. Geological Survey, Global land cover characteristics data base version 2.0, http://edc2.usgs.gov/glcc/glcc.php)
5.	P. 6072, l. 5-8	"Six major irrigated crop groups, accounting for an average of 84% of the total harvested cropland in 2000 (165.7106 ha) over the continent, were considered (Table 1). These include: cereals, oils, roots, pulses, vegetables and sugar crops (sugarcane mostly in Africa)." => The crop distribution considered in this study mainly reflects patterns and extent of rainfed crops. However, irrigated crops differ completely from the rainfed crops grown so far in most regions of Sub-Saharan Africa (Portmann et al., 2010). In addition, irrigated crops are often grown in the dry season while rainfed crops are often sown at the beginning of the rainy season resulting in very different (irrigation) water requirements. This should be mentioned and discussed.	A couple of sentences have been added (p.6072 l. 9): 'It is assumed that the cropping pattern is not influenced by introduction of groundwater. While it is known that smallholder GWI may preferentially be applied to higher value crops (like vegetables) in Sub-Saharan AfricaSA (Villholth, 2013) and that the dominant crops in irrigated and rainfed agriculture differ from region to region in Africa (Portmann et al., 2010), no data on the larger scale and distributed impact of crop pattern change as a result of GWI exist. '
6.	Throughout	Please change "oils" to "oil crops".	Done.
7.	P. 6072, l. 25 P. 6073, l. 2	"The monthly crop water demand for each crop is determined by disaggregating total (for one cropping season) crop water	The calculation of crop water demand is now elaborated in the Supplementary material.

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		demand for that crop and knowledge of its crop calendar (Supplement). The seasonal crop water demand, growing periods and associated single crop coefficients (Kc) for the various crops are extracted from the literature (FAO, 1992, 1986)." It is highly appreciated that the calculated crop water demand is listed in a supplementary table. However, the methods used to calculate crop water demand and irrigation water demand need to be described more in detail (maybe as part of the supplement). From the description it is not clear whether the monthly crop water demand is proportional to the monthly kc or whether it also accounts for differences in weather (temperature). It is also not clear whether "Green Water" (Equation 3) is similar to precipitation or whether precipitation is reduced for surface runoff, percolation and interception.	The monthly crop water demand is proportional to K_c, and independent of climate (see Referee #2, General comment no 1) Reg. 'Green Water', the sentence (p.6071, l.18): 'This conservative approach, disregarding soil evaporation, allows not overestimating the availability of water for the crops (Van Beek et al., 2011). 'has been replaced by: 'This conservative approach, effectively reducing precipitation for surface runoff, percolation, soil evaporation and interception, gives a measure of easily available soil moisture for the plants, and ensures that the availability of water for the crops is not overestimated (Wada et al., 2011)'
8.	P. 6085 (Table 2)	The irrigation efficiencies refer to irrigation with off-farm surface water and are therefore too low for groundwater irrigation, which is mainly based on water extraction from on-farm wells. When groundwater is extracted from shallow aquifers the whole term does not really make sense because percolation is artificial recharge and therefore the water storage is not affected => efficiency should then be close to 100%.	It is correct, that GWI is more efficient than SWI due to less conveyance losses and due to recoverable return flows. However, the SWI values have been applied here, for two reasons: 1. Some water is still lost in a GWI scheme, due to non-beneficial soil evaporation and transpiration from non-crop vegetation. There may also still be loses from some off-farm conveyance. 2. We wanted to ensure a conservative approach. We removed the sentence (P.6070, l.14) 'The return flow to groundwater is considered lost for irrigation (i.e. not included in the recharge, see below) to not overestimate the groundwater availability.' as it should be implicit that return flows to groundwater

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			cannot be added to the recharge as it is not part of the renewable part.
9.	P. 6086 (Table 3)	Domestic and industrial water uses are reported per cap. For the spatial assignment the source of population density needs to be reported.	The reference is given on p.6073, l.27.
10.	P. 6089, Table A1	The results presented in this table would be more interesting when separating the calculated irrigable areas to different levels of aridity (e.g. ratio between irrigation water demand and total crop water requirement). For example, the huge "potential" calculated for Congo DPR is not really a potential because irrigation is not needed there (with the exception of rice cultivation). More interesting is to see whether there is irrigable area in more arid regions where irrigation is really beneficial.	As the approach looks at the aggregated needs for supplemental irrigation (for wet season, mostly rainfed cropping) as well as requirements for full irrigation (dry season cropping), this distinction has not been made.
11.	Figure 2	Again, please change "oils" to "oil crops"	Done.
12.	Figure 4	Does the figure really show net irrigation water demand? It looks more like the total crop water demand (irrigation + green water) what is shown here.	See Referee #1, General comment no. 2.

Referee #2

General comments:

1) "However, the presentation of the study is poor and not transparent, and it makes the study and its results difficult to understand. The method needs to be described more precisely (e.g. regarding the time steps, source of data), in particular regarding the many assumptions made (e.g. crop water demand seems to be independent of climate, mostly year-round cropping seems to be assumed, return flows not considered, green water estimated in PCR-GLOBWB as transpiration of which vegetation?). The paper therefore requires a careful rewriting such that the readers can efficiently understand the assumptions as well as their implications for the computational results."
    - → Reg. time step, see Referee # 1, Specific comment no. 1. See also more elaborate Supplementary material, e.g. for more info on source of data.
    - → Crop water demand independent of climate. The seasonal crop water demand for optimal growth is based on theoretical values from the literature (Supplementary material) and is independent of climate. Crop water demand is calculated on a monthly base using seasonal crop water and is climate independent. However, there

are two factors to take into account. Firstly, the conservative approach for calculating crop water demand for the crop group allows not underestimated the crop water demand. Secondly, the net irrigation water demand is dependent on climate as green water is dependent on climate (Supplementary material).

→ Year-round cropping. The sentence (p.6072, l.23): 'Up to two specific crops from the same crop group can be cultivated per year on the same cropland and allows an annual cropping rotation.' has been changed to: 'Up to two specific crops from the same crop group can be cultivated per year on the same cropland and allows year-round cropping and an annual cropping rotation.'

→ Return flows. See Referee #1, General comment no. 3.

→ Green water description has been improved to also say that the vegetation considered is non-irrigated (i.e. natural vegetation or rainfed crops) (6071, l.17). See also Referee # 1, Specific comment no. 4.

2) "In addition, it seems arbitrary to compute GWIP only in grid cells that had cropland around the year 2000. Then, for example, GWIP is computed for grid cells of 2500 km2 that are mainly covered by forest but do contain a few hectares or km2, but not for the adjacent grid cell where no cropland was known to exist in 2000"

→ We fixed the cropland area to year 2000 based on most recent continental distributed data available (Ramankutty, 2008). The original data at 5 min resolution (about 10 km per 10 km) were rescaled to a 5 degree resolution without losing information on crop area. The GWIP is given in relation to (fraction of) the cropland as the determination of the Crop Group Water Demand is necessary for the GWIP calculation. As consequence, no GWIP can be calculated in cells without cropland. However, these cells correspond firstly to arid areas where groundwater availability for irrigation is extremely limited (Southern Africa, Saharan area and Eastern Africa) and secondly to tropical forests, which have no cropping interest (Central Africa).

3) "Given that year-round cropping is assumed and crop water demand values in this study do not take into account different climatic conditions throughout Africa, is it really worth considering current cropping patterns for computing irrigation potentials? I suggest the authors compute, in addition to the presented work, GWIP for two simple cases:

a. Annual crop water demand = 1800 mm (like sugar cane, and not much higher than for most double-cropping in Table S2)
b. Annual crop water demand = 700 mm, to represent single cropping during the wet season.

I think this sensitivity study would clarify the dependence of the computed GWIP on cropping patterns and also help to see to what extent the computed GWIP is not only dependent on assumption of environmental flow requirements but also cropping pattern (that may change in the future). In addition, such an approach would all allow computing GWIP also for half-degree grid cells without current cropland."

→ We did not perform this sensitivity analysis. It would surely demonstrate the importance of cropping patterns on GWIP. However, the pattern chosen is probably the best available estimate for a realistic cropping pattern and distribution. Our intention was to incorporate as much distributed information as possible, relative to other similar studies (Pavelic et al, 2012, 2013) who used the blanket method of assuming a fixed crop irrigation water demand at three levels but did not consider any spatial variation. From these studies, the influence of cropping pattern on GWIP can be inferred. A sentence (p.6079, l.12) has been added to indicate this: 'However, the influence of cropping choice was clearly demonstrated in Pavelic et al. (2013). They showed that going from a 1000 mm year-1 irrigation demand to a 100 mm year-1 crop, everything else being equal, entailed an order of magnitude higher GWIP.'

4) "Central to the required clearer presentation is the specification of the temporal resolution of all elements of the computation. For example, where time series of monthly (or daily) transpiration used to estimate green water in Eq. 3, or mean monthly values (or daily) transpiration used to estimate green water in Eq. 3, or mean monthly values 1960-2000), or was green water aggregated to annual values (in this case, it would have to be discussed why this is appropriate)? The computational results of Eq. 3 are expected to differ strongly with the temporal resolution."
   → This has been elaborated in the Supplementary material.

5) "In addition, it appears to be decisive for the computed GWIP that double-cropping with almost year-round crop growth is assumed. This leads to the high net irrigation water requirements shown in Fig. 4b, while growth of one crop during the wet period would be much lower, and a much higher GWIP would be computed. Please clearly state and explain the assumptions regarding cropping patterns (and related crop water demand)."
   → See Referee #2 General comment no. 1 and Supplementary material.

Specific comments:

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1.	Abstract P. 6066, l. 10.	It is not correct that 41 years of data were used 41 years of climate data were used to compute groundwater recharge and green water, while crop water demand is computed without taking into account neither temporal nor spatial variation of climate, and human water demand, irrigation efficiency and cropping patterns from one time period only were taken.	In the abstract, the sentence: 'The method builds on an annual groundwater balance approach using 41 years of data, allocating only that fraction of groundwater recharge that is in excess after satisfying other human needs and environmental requirements, while disregarding any socio-economic and physical constraints in access to the resource.' has been modified to: 'The method builds on an annual groundwater balance approach using 41 years of **hydrological** data, allocating only that fraction of groundwater recharge that is in excess after satisfying other **present** human needs and environmental requirements, while disregarding any socio-economic and physical constraints in access to the resource.' The fact that crop water demand is assumed constant and not dependent on climate is now mentioned explicitly in the methodology (p.6073, l.2) by changing the sentence 'The seasonal crop water demand, growing periods and associated single crop coefficients (Kc) for the various crops are extracted from the literature (FAO, 1992, 1986)' to 'The seasonal crop water demand, growth periods and Kc

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			values for the various crops are extracted from the literature (FAO, 1992, 1986) and are assumed to be constant and not dependent on climate'. A sentence on limitation in methodology due to neglecting changes (spatially and temporally) in cropping pattern and irrigation efficiencies have been added to Section 6.2 Limitation of approach (p.6079, l.12): 'Likewise, historic and potential future changes in cropping patterns and irrigation efficiencies have not been considered though they could significantly change the groundwater availability and hence potential for irrigation. In essence, the method is a snapshot continental distributed view of present or most recent GWIP, based on averaged hydrological conditions and best available most recent coherent datasets.'
2.		Is "cultivated land" and "harvested cropland" and "cropland" (in abstract) the same? Please use the same term if the same thing is meant.	Ramamkutty et al (2008) compiled the cropland data to be consistent with the FAO definition of "Arable lands and permanent crops" Siebert et al. (2010) defined cultivated area according to the FAO AQUASTAT glossary (http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en) which gives cultivated land as the sum of the arable land area and the area under permanent crops. **Thus,** cultivated land and cropland are the same. Harvested cropland is the part of the cropland which is effectively cropped. A footnote has been added to that effect (p.6067, l.18).
3.	Introduction	In Introduction, present correctly / more precisely previous work as compared to the presented work (e.g. FOY 2005, Pavelic et al 2013). In particular, explain better the spatial resolution / scale. For example, the work of You et al. (2011) is not represented correctly. It is a continental-scale study, like the study presented in this manuscript, and, also like the presented study, considers water resources	The sentence (p.6068, l.10): 'You et al. (2010) estimated the potential contribution from small-scale irrigation (incl. ponds, small reservoirs, rainwater harvesting, and groundwater) in Africa to be 0.3 to 16×106 ha based on a distributed multi-criteria analysis' has been changed to: 'You et al. (2010) estimated the potential contribution from small-scale irrigation (incl. ponds, small reservoirs, rainwater harvesting, and groundwater) in Africa to be 0.3 to 16×106 ha based on a **continental** distributed, **mainly economic** multi-criteria analysis **at a 5 min. resolution**'. Foy (2005) could not be located.

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		at the 0.5 grid scale. In Discussion, compare results of previous studies with results of this study (in terms of GWIP, but also relating it to total IP).	Reg. the comparison of our results with previous results, this is done in Results (p.6075 l.27): 'The GWIP for the 13 countries estimated by Pavelic et al. (2013) (13.5×106 ha) is here calculated to 12.8×10^6 ha, showing correspondence between the methods, though the present method does indicate the distributed extent of GWIP across the countries and for the whole continent.' Reg. comparing our results with previous results for total IP, a sentence has been added in the Result (p.6076 l.7): 'Comparing the GWIP with the overall irrigation potential of 42.5 $*10^6$ ha estimated by FAO (2005), it is clear that groundwater can play a significant role in food production and food security in large parts of Africa. While in such comparison, figures for irrigation potential may not be simply additive due to overlap of the resource and lack of cropland or other constraints, it is clear that opportunities exist in the concurrent development of both sources and some benefits are achievable in planning schemes that are conjunctive (Evans et al., n.d.).'
4.	Conclusions and Abstract	In Conclusions and Abstract, do not only mention aggregated Africa-wide values of GWIP but rather distinguish regions with no/small/large (total and additional GWIP) (as visible in Fig. 7b).	In Abstract, added (p.6066 l.23): 'In particular, significant potential exists in the semi-arid Sahel and eastern African regions which could support poverty alleviation if developed sustainably.' In Conclusions, the sentence (p.6079 l.23): 'However, comparing GWIP to existing maps of GWI, it is clear, that present GWI has been primarily developed in northern and southern Africa where the development potential is relatively limited, and where it is governed by abstraction from non-renewable or already stressed resources, while the rest of the continent (except for the Sahara region) still has appreciable potential, especially for smallholder and less intensive GWI' has been changed to: 'However, comparing GWIP to existing maps of GWI, it is clear, that present GWI has been primarily developed in northern and southern Africa where the development potential is relatively limited, and where it is governed by abstraction from non-renewable or already stressed resources, from recharge

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			from larger rivers like the Nile, or return flows from surface water schemes, while the rest of the continent (except for the Sahara region) still has appreciable potential, especially and most relevantly for smallholder and less intensive GWI in the semi-arid Sahel and East Africa regions.' (see Referee #1, General comment no 3)
5.	Figure 4	Clarify in caption what is meant with irrigated area. All the cropland shown in Fig. 1 or only the irrigated part?	The caption has been changed to: 'Figure 4. Estimated average net irrigation water demand (1960-2000) for the cropland in Fig. 1 (a) expressed in 10^6 m^3 $year^{-1}$ $cell^{-1}$ (0.5ę*0.5ę), and (b) in mm $year^{-1}$.'
6.	Table A1	Include country values of GWI based on Siebert et al. (2010), as shown in Fig. 7a, to show were additional irrigation would be possible. In addition include GWIP as a fraction of actual cropland.	Country values of GWI from Sibert et al. (2010) have been added in Table 4. Rather than adding GWIP as fraction of actual cropland, the total cropland per country has been added as a separate column.
7.	Supplementary material	Additional text is required that explains the method for computing monthly crop water demands, discusses Tables S1 and S2 and provides sources of data. E.g. are the seasonal water demands in Table S2 computed by the authors, or from some FAO Table (then provide precise reference?	This is done In the Supplementary material. The seasonal water demand in Table S2 (now S1) is from FAO literature. This has been added to the Supplementary material,
8.	Table S2	The heading "Water need per growing period (mm)" needs to be deleted.	It is Table S1 now. 'Water need per growing period (mm)' has been changed to: 'Crop Coefficient per Growth Period'
9.	Table S2	Wheat, millet and maize have seasonal crop water demands between 650 and 695 mm. However, in zone 4 of Table S1, for example, the seasonal crop water demand of wheat/millet/maize is 870 mm. Would it not be more reasonable to use 695 mm, instead of using maximum crop water demand values at the monthly scale.	The grouping of individual crops (i.e. wheat, millet, maize) into group crops (i.e. cereal) can increase the total crop group seasonal water demand as the larger monthly crop water demand figures for the crops within a crop group have been applied (Supplementary material). This conservative approach allows farming flexibility in the crop choice within the crop group and ensures a conservative estimate of GWIP.

References

Lawrence D., Thornton P., Oleson K., Bonan G.: The Partitioning of Evapotranspiration into Transpiration, Soil Evaporation, and Canopy Evaporation in a GCM: Impacts on Land–Atmosphere Interaction, JOURNAL OF HYDROMETEOROLOGY, 8, DOI: 10.1175/JHM596.1, 2006

Ramankutty, N., Evan, A., Monfreda, C., and Foley, J.: Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000, Global Biogeochem. Cy., 22, GB1003, doi:10.1029/2007GB002952, 2008.