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Corrigendum: A review of trends and drivers of greenhouse gas
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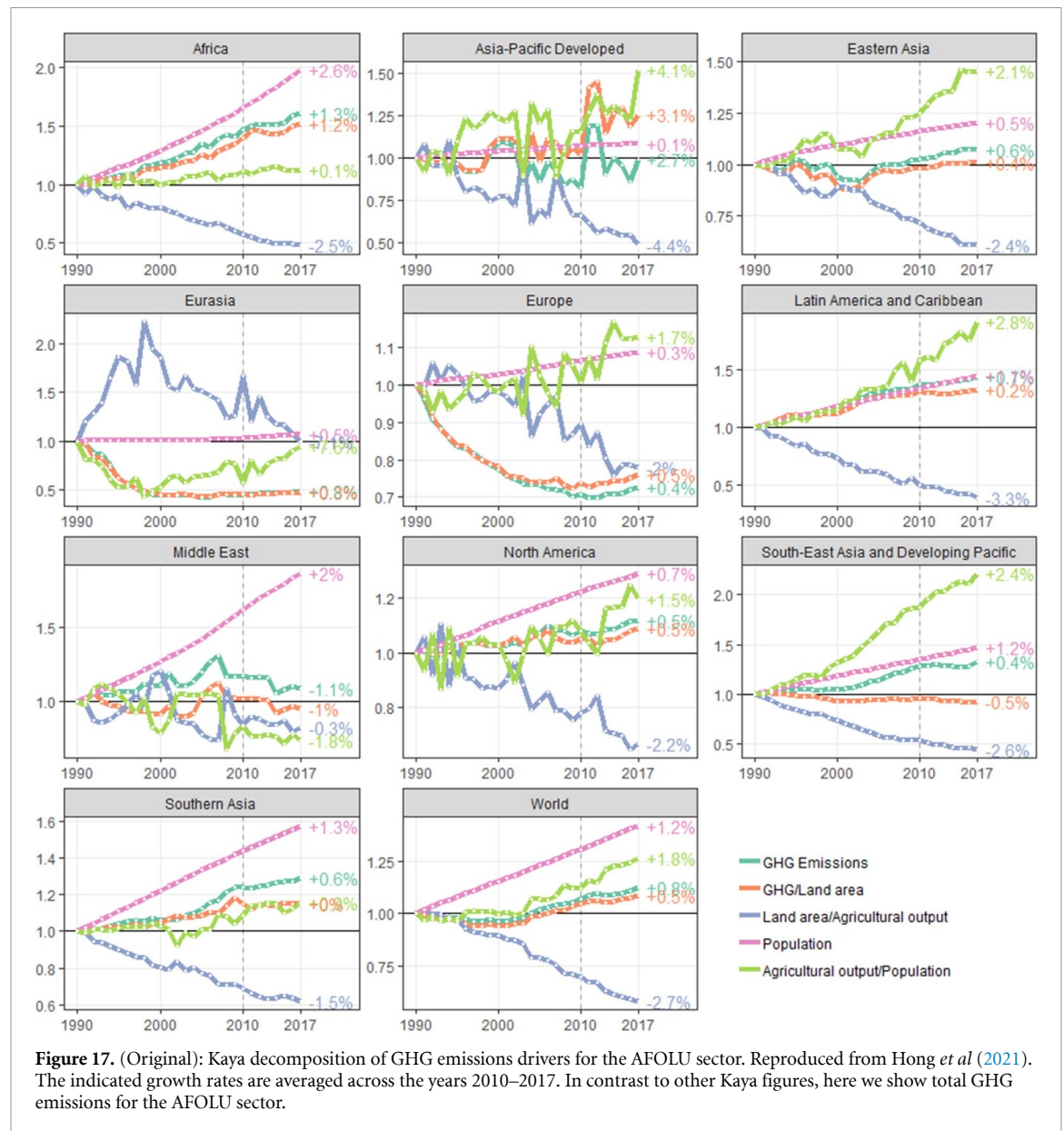
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This corrigendum resolves an error in figure 17 and clarifies the scope of the cement sector in figure 2.

Figure 17 in the original published manuscript depicts a Kaya identity for the agriculture, forestry and other land uses (AFOLU) sector. We unintentionally excluded land-use CO₂ emissions from total greenhouse gas (GHG) emissions in this identity, and depicted only agricultural GHG emissions. The

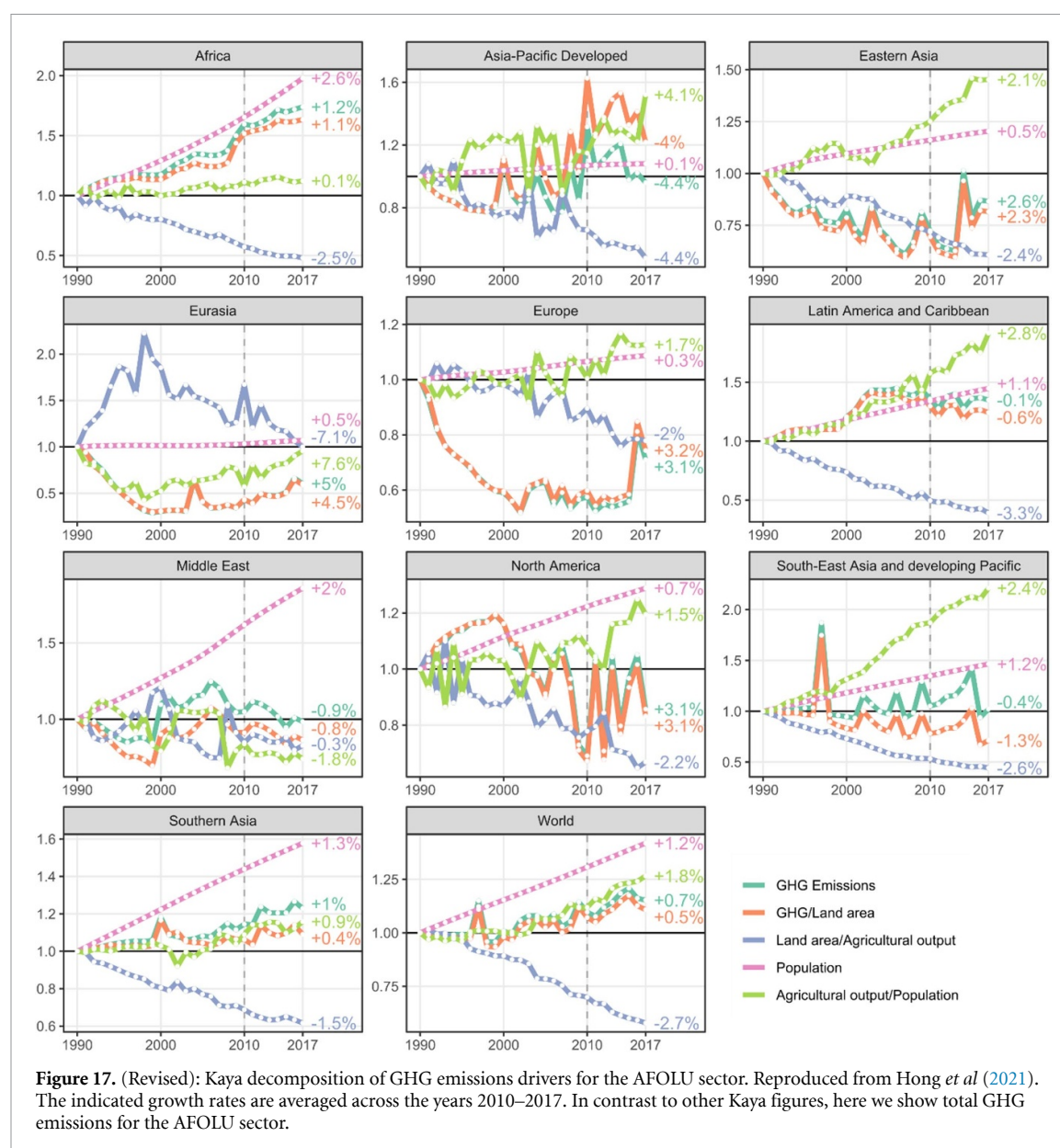
original published version of figure 17 is shown here, followed by the revised version with land-use CO₂ emissions included. Two components of the identity are affected: GHG emissions and GHG/land area. The land-use CO₂ emissions data used in this paper (the average of three bookkeeping models; Hansis *et al* 2015, Houghton and Nassikas 2017, Gasser *et al* 2020) has a steadily increasing global



average trend, but relatively large regional year to year fluctuations. As such, the global average Kaya identity for the AFOLU sector depicted in the ‘World’ panel is largely unaffected by the change, with a small reduction of 0.1 percentage points in the average annual growth rate of GHG emissions from 2010 to 2017. In contrast, regional growth rates, and in some cases the signs, for the GHG emissions and GHG/land area Kaya factors are affected. Since the text does not dir-

ectly refer to the Kaya factors in this figure, no other changes besides substituting the figure are necessary for this correction.

Finally, in figure 2 of the original manuscript, we clarify that cement emissions are process only, a point that was mistakenly omitted: ‘Note that cement refers to process emissions only, as a lack of data prevents the full reallocation of indirect emissions to this sector.’



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References

- Gasser T, Crepin L, Quilcaille Y, Houghton R A, Ciais P and Obersteiner M 2020 Historical CO₂ emissions from land use and land cover change and their uncertainty *Biogeosciences* **17** 4075–101
- Hansis E, Davis S J and Pongratz J 2015 Relevance of methodological choices for accounting of land use change carbon fluxes *Glob. Biogeochem. Cycles* **29** 1230–46
- Hong C, Burney J A, Pongratz J, Nabel J E M S, Mueller N D, Jackson R B and Davis S J 2021 Global and regional drivers of land-use emissions 1961–2017 *Nature* **589** 554–61
- Houghton R A and Nassikas A A 2017 Global and regional fluxes of carbon from land use and land cover change 1850–2015 *Glob. Biogeochem. Cycles* **31** 456–72