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SUPPLEMENTARY INFORMATION
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Supplementary material S1

S1.1 Estimates of global soil erosion rates by water in the literature

Estimates of global soil erosion rates by water erosion published in the last 15 years have been compiled in Table S1. These estimates vary by an order of magnitude, due in part to the methods used to obtain them. It is therefore necessary to critically examine these estimates before deciding which to use.

The first global estimate of water soil erosion rates on agricultural land is often attributed to Pimentel et al.[1] However, close reading of their paper shows that they obtained their estimate (75 Pg yr-1) from Myers[2], who in fact stated that about two-thirds of this soil erosion occurs on agricultural land. This would estimate water erosion on agricultural land at 50 Pg yr^{-1} – but the way this estimate was calculated is unclear. Pimentel et al. also estimate the average soil erosion rates on cropland in Europe and North America at 17 t ha^{-1} yr^{-1} and in Africa, Asia and Latin America at 30–40 t ha^{-1} yr^{-1}, and they propose an average erosion rate of 6 t ha^{-1} yr^{-1} for pasture land in North America. Assuming that pasture or rangeland erosion rates are similar in Europe, North America and Oceania and are higher (10 t ha^{-1} yr^{-1}) in Africa, Asia and South America due to poorer management and a more erosive climate[3,4] , global soil erosion by water on agricultural land can be estimated by simply multiplying these rates with the land areas under consideration[5]. This results in a total global agricultural soil erosion rate by water of 73.5 Pg yr^{-1}.

Stallard[6] used a different approach, whereby he multiplies measured sediment discharges in agriculturally developed river systems with a (sediment) yield enhancement factor to obtain water erosion rates on agricultural land. The yield enhancement factor is the factor that the sediment discharge needs to be multiplied with in order to obtain a basin-wide erosion rate and, as such, is the inverse of the sediment delivery ratio. Furthermore, he uses a maximum enhanced yield that cannot be exceeded, as the procedure described above sometimes resulted in unacceptably high erosion rates. By varying both factors (especially the maximum erosion rate) he obtained a range of global water erosion estimates on agricultural land from 23.7 to 64.9 Pg yr^{-1}.

Lal[7] uses an approach similar to Stallard, but does not apply any spatial discretization. He uses the estimate of Walling and Webb[8] of total global sediment yield (ca. 20.1 Pg yr^{-1}) and assumes that this represents 10% of all the soil that is being eroded, arriving at a most likely global soil erosion estimate of 201.1 Pg yr^{-1}. Lal uses this value to estimate carbon fluxes and carbon emission to the atmosphere due to water erosion.

Yang et al.[9] were probably the first to use a spatially distributed soil erosion model in order to estimate soil erosion by water. They obtained a mean global soil erosion rate for all continents (except Antartica) of 10.2 t ha^{-1} yr^{-1} and reported that 60.3 % of the total current erosion is due to human impact on land use, i.e. the conversion of naturally vegetated land to arable land and pastures. Using a total continental surface area (excluding Antartica) of 1.301×10^8 km² [5] soil erosion by water is then ca. 132.7 Pg yr^{-1} of which 80.0 Pg yr^{-1} occurs on agricultural land.

Wilkinson and Mc Elroy[10] cite Myer's estimate for global soil erosion (75 Pg yr^{-1}). Yet a closer examination of their own calculations allows the derivation of an independent estimate of water erosion on agricultural land from their data. They used data collected on soil erosion plots to estimate the average soil erosion rate on arable land as 0.885 mm yr^{-1} and estimated the average erosion rate of non-arable agricultural land as 0.24 mm yr^{-1}. Assuming an average soil bulk density of 1350 kg m^{-3} for soils on arable land and 1500 kg m^{-3} for soils on pastureland and a total agricultural area of 49.3 x 10^8 ha and an arable land area of 14.1 x 10^8 ha [5], this results in a global soil erosion rate of 28.1 Pg yr^{-1}. This value should be considered their best estimate, based on the data they presented. Later in their paper they assume an average erosion rate on all agricultural land of 0.6 mm yr^{-1}, which would result in a global soil erosion rate of ca. 39.9 Pg yr^{-1}. As with Pimentel et al., they use average erosion rates from erosion plot studies which are directly extrapolated to the global scale without any further correction.

Van Oost et al.[11] used a spatially distributed soil erosion model: they calibrated their model so that modelled erosion rates for the USA and Europe were similar to those obtained through independent estimates. Their best estimate of global erosion on agricultural land was 28.3 Pg yr^{-1} by water erosion and 5.1 Pg yr^{-1} by tillage erosion.

Ito[12] also used a spatially distributed soil erosion model to estimate overall global soil erosion and arrived at a best estimate of total soil erosion of 172.2 Pg yr^{-1}. Ito estimated the global C due to erosion as 1.6 Pg yr^{-1}.

Estimates by Ito account for soil erosion on both agricultural and non-agricultural land.

Considering the various estimates available several critical observations can be made. The estimates by Lal[7] and Ito[12] refer to total soil erosion rather than soil erosion on agricultural land and are therefore higher than the estimates referring specifically to agricultural soil erosion. Comparing Lal and Ito's estimates with those obtained for agricultural land might suggest that most (>100 Pg) soil erosion occurs on non-agricultural land. This contradicts evidence that erosion on agricultural land is 1–2 orders of magnitude higher than on land under natural vegetation[13]. We believe that both Lal and Ito's estimates are likely to overestimate total global erosion rates. Lal's method assumes that the sediment delivery ratio is 10% both for agricultural areas and natural mountain areas subject to intense erosion. However, erosion in mountain areas is driven by river incision leading to hillslope instability. This means that, in contrast to agricultural areas, sediment mobilization zones are well connected to the river system and that the sediment delivery ratio of mountain areas will often be much larger than 10%. Ito applies the RUSLE model[14] at a global scale and reports the spatially weighted average values he calculated for the various model factors. Spatially averaged soil erodibility in Ito's study was 0.053 Mg ha h ha^{-1} MJ^{-1} mm^{-1}, which is close to the maximum value measured in experimental studies for the most erodible agricultural soils ([14]p. 94), however, the erodibility of most agricultural soils is considerably lower. On steeply sloping non-agricultural land, erodibility will be further reduced, mainly through the presence of a rock fragment cover[15]. Using a more realistic erodibility value of 0.025 Mg ha h ha^{-1} MJ^{-1} mm^{-1} would result in a total water erosion rate on both agricultural and non-agricultural land of ca. 81 Pg yr^{-1}.

The estimate we derived from data reported by Pimentel et al.[1] on soil erosion rates on arable land and grazing land is also an overestimation: the main reason for this is that the erosion rates they report were from studies designed to measure soil erosion and it is known that such rates are significantly higher than the average regional or continental soil erosion rate. Erosion studies are set up in areas where erosion is known to be a problem. Within these areas, scientists tend to select sites on slopes that are steeper than average, thereby exacerbating the discrepancy between erosion plot erosion rates and average continental erosion rates. For instance, Pimentel et al.[1] proposed an average erosion rate for cropland in the USA of 17 t ha^{-1} yr^{-1} and 6 t ha^{-1} yr^{-1} for grazing land based on erosion plot measurements, while NRCS[16] reported an average value of 6.94 t ha^{-1} yr^{-1} on cultivated cropland and 2.01 t ha^{-1} yr^{-1} for 1997 by adjusting erosion plot estimates for spatial variations in crops, topography, soil type and climate erosivity.

Yang et al.[9] describe their parameterization of the RUSLE in detail. They use an average erodibility of 0.0318 Mg ha h ha^{-1} MJ^{-1} mm^{-1}, which is more realistic than the value used by Ito[12]. However, slope length is calculated as the grid area divided by the number of rivers present in a 0.5° grid cell. This is likely to lead to a serious overestimation of the slope length used in erosion calculations, as field lengths will generally be much smaller than this maximum slope length: often, slopes drain into dry valleys or depressions rather than rivers and are interrupted by field boundaries and other field divisions, such as lines of trees. The overestimation is evident when their estimates are compared with other, independent estimates. Yang et al. estimate that 75% of the total soil erosion occurring in North America is on agricultural land. Assuming that this percentage is also valid for the USA, a total erosion amount by water on agricultural land of ca. 498.5 Tg yr^{-1} is obtained. Estimates by NRCS[16] of average erosion rates for arable and pasture land for 1997 result in a total soil loss of ca. 166.7 Tg yr^{-1} on agricultural land, suggesting that the estimates by Yang et al. are indeed too high.

The remaining estimates for water erosion on agricultural land vary between ca. 23 and ca. 64 Pg yr^{-1} and we may therefore realistically assume that global water erosion rates on agricultural land are between these minimum and maximum values. For several reasons we believe the true value will be closer to the minimum than to the maximum estimate. First, Van Oost et al.[11] compared their estimate of 28 Pg yr^{-1} with other estimates of regional soil erosion rates and found good agreement for Europe and the USA. Evidently, it is possible that their estimates for the other continents are biased towards underestimation; however, their calculations are based on a model structure that allows accounting for the major factors controlling erosion and therefore a strong spatial variation of bias is unlikely. Stallard's estimates vary between 23.7 and 64.9 Pg yr^{-1}: yet in order to obtain the latter estimate he has to assume basin-wide soil erosion rates of up to 40 t ha^{-1} yr^{-1}. While such rates are most certainly locally possible, such a value is extremely high at the scale of a large river basin. His lower estimates (23.7–44.3 Pg yr^{-1}) are therefore likely to be more realistic. The most likely value that can be derived from

Wilkinson and McElroy's analysis (28. 1 Pg yr^{-1}) is also close to the value obtained by Van Oost et al. Furthermore, estimates of 25-40 Pg yr^{-1} are consistent with another independent estimation. Syvitsky et al.[17] calculated that human impacts on land use led to an increase by ca. 4 Pg yr^{-1} of the total sediment flux from the land to the ocean, if abstraction is made of the effects of dams. It is well known that this increase only represents a small part of the sediment that is eroded: sediment delivery ratios in basins with significant agricultural erosion are often between 10 and 20%. Thus, an increase of sediment delivery to the ocean by 4 Pg yr^{-1} would correspond to a total agricultural soil erosion rate of 20–40 Pg yr^{-1}.

Based on the above analysis, we therefore assume conservatively that global erosion rates by water may vary between 25 and 40 Pg yr^{-1} and we propose 28 Pg yr^{-1} as the most likely estimate, since this value is close to the estimates we consider to be the most accurate. It is clear, though, that further work is necessary to constrain these estimates further.

S1.2 Materials and methods for global estimates of agricultural soil, nitrogen, phosphorus and carbon erosion.

Soil Erosion

We use the global estimates and spatial distribution of agricultural soil erosion (in Mg ha^{-1} yr^{-1}, both on cropland (E_c) and on pasture (E_{pa}) areas) on a 10 km grid presented by Van Oost et al[11]. These estimates are based on mechanistic models that quantitatively describe the relationships between erosion and the key controlling factors (i.e. land use, topography, climate and soils). We use this estimate because (i) the water erosion estimate from this source (c. 28 Pg yr^{-1}) is close to our most likely estimate (see S1.1) and (ii) it provides a global, but high resolution, spatial distribution of erosion rates which facilitates the modeling of global C, N and P erosion (see further). Erosion estimates include water and tillage erosion processes for croplands and water erosion for pastures. The global contemporary agricultural sediment flux due to water and tillage erosion is about 22 (± 6) Pg yr^{-1} on croplands and about 11 (± 3) Pg yr^{-1} on pasture-lands. The global estimate for tillage erosion that we use is thus 5 Pg yr^{-1}, which is the only estimate available[9]. The latter is also a conservative estimate given that field boundary effects are not accounted for. No reliable estimates exist for wind erosion from arable land, but a recent review[18] of literature place total dust uplift fluxes at ca. 1 - 3 Pg yr^{-1}. This number also includes dust from wind erosion on non-arable land. However, the total sediment flux due to wind erosion will be higher than the dust flux, as wind also moves sandy material (through saltation). We therefore estimated total sediment movement by wind on agricultural land as 1 - 3 Pg yr^{-1}, with 2 Pg yr^{-1} as the best estimate. The uncertainty relating to this estimate is probably higher though than for the other erosion fluxes. The magnitude of the total agricultural flux, used in this paper, is then ca. 35 Pg yr^{-1}, with a range of 25 - 45 Pg yr^{-1}. For the estimation of the fraction of the eroded sediment that is transported to the ocean, we use a delivery ratio of 20%[10]

N Erosion

In order to estimate global N fluxes associated with agricultural erosion, we combine the rates and spatial patterns of agricultural erosion described above[11] with global soil databases. Soil parameters were derived from the ISRIC-WISE database[19] (5 minute resolution). Estimates of soil nitrogen (N) were based on an area weighting of the N content (%) for the top 0-20 cm layer, considering the full map composition. Soils with very low (<0.5% C) or very high (>10% C) SOC contents were considered to be non-agricultural soils and were excluded from the analysis. The HYDE 3 global land cover database[20] (5 minute resolution) for 1990 was used to estimate the percentage of cropland and pasture (L_c and L_{pa}, respectively, in % of total grid cell area). Using the soil nitrogen content (%) and the cropland or pasture area (%), the agricultural erosion rate (representing water and tillage processes) for each grid cell (10 by 10 km) was then converted into nitrogen (E_N, in Mg N ha^{-1} yr^{-1}) erosion rates using $E_N = N.(L_c.E_c+L_{pa}.E_{pa})$. As no spatial information on wind erosion is available, we used the average N content of eroded soil by water and tillage processes to obtain a global estimate of N erosion by wind processes. In combination with the uncertainty associated with global soil erosion rates, this method results in an estimate of the amount of N moved by agricultural erosion of 23 - 42 Tg N yr^{-1}.

P Erosion

In contrast to C and N, P contents are only scarcely documented in global soil databases. Mean ratios of C:P in soils are more variable than C:N ratios. Using the value of Cleveland and Liptzin[21] as a first approximation, organic P fluxes due to agricultural erosion will vary between 2.1 and 3.9 Tg yr^{-1}. P is present in both organic and inorganic forms in soil, and total amounts of P present in cultivated soils may be significantly higher than organic P, depending on fertilization status and parent material[22]. Total P content in low-input agro-ecosystems can be very low, while it rarely exceeds 0.1% in high-input agro-ecosystems (e.g.[8]). Assuming an average, mid-range value of 0.05% P[23], lateral total P fluxes due to erosion will be between 12.5 and 22.5 Tg yr^{-1}.

C Erosion

In order to be consistent with our N erosion estimates, estimates of global C fluxes associated with water and tillage erosion on agricultural lands are taken from Van Oost et al[11]. As no spatial information on wind erosion is available, we used an average C content of 1.4 % for agricultural soils[11] to obtain a global estimate of C erosion by wind processes. The lateral C flux due to soil erosion is then 0.5 (± 0.15) Pg yr^{-1}, whereby water, tillage and wind erosion contribute 81%, 13% and 6%, respectively.

S1.3 Verification of our nutrient erosion estimates.

Due to the large errors associated with global soil erosion estimates on one hand, and limitations of global soil databases on the other hand, our C, N and P erosion rates remain highly uncertain. In this section, we confront our C, N and P erosion rates, derived from spatially explicit models, with independent estimates.

N Erosion

Currently information available to estimate N fluxes is limited. Here, we derive a reasonable estimate based on the sediment and C fluxes derived above, but do not attempt to define the uncertainty on those estimates. At the hillslope scale, measured rates of N movement vary widely, from < 1 kg ha^{-1} yr^{-1} in desert environments[24] to tens of kilograms per year in mechanized agricultural systems[25]. However, assuming that a C:N ratio between 10:1 to 15:1, which is commonly found in many agricultural soils (although mean soil C:N ratios organic soils can be as high as 26:1)[26,27], holds for eroded sediments, estimated organic N fluxes range between 23 and 65 Tg yr^{-1}. These estimates of N flux associated with erosion on agricultural land do not include reactive nitrogen (Nr). This is likely to be at least an order of magnitude lower, since the mass of Nr found in overland flow at the hillslope scale is small (0.5–10%) when compared with the total mass of N transported[28,29]. This estimate and that of 18-25 Tg N yr^{-1} [30], derived from mean regional erosion rates, from an unspecified source, and a range of soil N contents (0.08-0.1%) compares favorably with our estimate of 23 – 42 Tg yr^{-1} obtained with spatial explicit databases (see S1.2).

P erosion

We only found one estimate of global soil P flux due to erosion in the literature[31]. This was derived from an assumed global mean erosion rate of 20 Mg ha^{-1} yr^{-1} and produced an estimated total P flux of 25-30 Tg yr^{-1} which is similar to our estimates of organic and inorganic P fluxes of 2.1–3.9 Tg yr^{-1} and 12.5–22.5 Tg yr^{-1}.

C Erosion

Several authors also provide estimates of carbon fluxes due to erosion. This requires the carbon content of the eroding soils to be known. The estimates of carbon content that are used vary largely (Table S1) and are usually based on a range of carbon contents known for agricultural soils. Van Oost et al.[11] used a spatially explicit database to derive carbon fluxes from sediment fluxes and obtained a mean average carbon content of eroding soils of 1.46% for cropland and 1.36% for pasture land. Here, we assumed a mean weighted carbon content of 1.4% to derive carbon fluxes from erosion rates/sediment fluxes. Evidently, there is uncertainty associated with this value: the true value may be lower, for example because eroding soils contain less carbon than reference profiles, or higher because erosion may be selective thereby mobilizing more carbon. We therefore consider a range of 1.2–1.6% as a reasonable estimate for the weighted average carbon content of eroding soils. These values are significantly lower than those estimated by Behre et al.[32] and Lal[33], but, given the available information on the carbon content of agricultural soils, the values they used in their calculations appear to be an overestimation since most agricultural soils contain < 2% organic carbon.

Using this alternative method, the likely estimate of total carbon fluxes due to tillage, water and wind erosion is therefore 0.49 Pg yr^{-1}, with a possible range of 0.30-0.72 Pg yr^{-1}. This is again in the same order of magnitude as our estimates based on spatial explicit modeling (see S1.2)

Summary

Although it is clear that the methods used here to estimate C, N and P erosion rates require further refinement, this analysis indicates that our spatially explicit estimates, evaluated at a global scale, are consistent with methods based on typical C and N contents of agricultural soils.

Table S1. Estimates of global soil erosion rates and carbon fluxes due to water erosion on agricultural land. The assumptions and calculations behind these estimates are discussed in the text.

Source	Total global soil erosion rate	Erosion rates on agricultural land Pg yr^{-1}	Percent C content of eroding soil	C flux due to erosion Pg yr^{-1}
Myers, 1993	75	50	-	-
Pimentel, 1995		73.5	-	-
Stallard, 1998		23.7-64.9	1.9	0.45-1.23
Lal, 2003	201.1		2-3	4-6
Yang et al., 2003	132.7	81	-	-
Ito, 2007	172.2		0.93	1.6
Berhe et al., 2007	75*		1.5-5	1.1-3.7
Wilkinson and Mc Elroy, 2007		28.1-39.9	-	-
Van Oost et al., 2007		28.3	1.4	0.40

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Supplementary Materials S2

The methods used here are based on the extension of a widely used model of soil carbon dynamics, in which changes in C stocks are controlled by C decomposition, C losses through heterotrophic respiration, and SOC formation by C inputs through plant and root litter[1]:

$dC_z/dt = i_z - k_z C_z$ (eq. 1)

where C_z (g C m^{-2}) is the C stock at depth z (m), i_z (g C m^{-2} yr^{-1}) is the root and litter input at depth z and k_z (yr^{-1}) is a first-order loss constant (decomposition rate) at depth z. As such, the simulated interactions between erosion and C dynamics do not result from new or modified process descriptions, but are instead a direct consequence of extending basic C dynamic concepts that appear in similar form in other models.

We used a spreadsheet model, based on the models presented in van Oost et al [1,2], that depicts soil layers of variable thickness, SOC content, and SOC decomposition and formation rates. It represents a single profile down to a depth of 1 m and simulates C dynamics in each layer of the soil profile independently with layer-dependent C inputs and decomposition rates. The decomposition rates are taken to decrease exponentially with depth with an exponent of 2.6[3]. The C input into the soil profile is modeled by an exponential root density profile using the parameters presented by Van Oost et al.,[2]. In order to reflect the plough layer, carbon input and decomposition are assumed to be homogeneous for the upper 0.2 m of the soil profile and this surface layer is represented as one single layer in the model. The model uses a time step of one year. At the start of the simulation the C profile is positioned at steady state by setting the C input, so that dC_z/dt equals zero at each depth interval.

We extend this model to include erosion effects as follows. An erosion rate can be defined which will remove a fraction of the carbon of the surface layer in proportion to the erosion height:

$$C_{ero} = C_s * E/D_s \qquad \text{(eq. 2)}$$

where C_{ero} is the eroded C (g C m^{-2} yr^{-1}), C_s is the C stock in the surface layer (g C m^{-2}), E is the erosion rate (m yr^{-1}) and D_s (m) is the thickness of the surface layer, taken as 0.2 m. The thickness of each layer below the surface layer is set as the annual height loss due to erosion (e.g. an erosion rate of 10 mm yr^{-1} results in 80 layers representing the soil profile between 0.2 and 1m depth). The model keeps track of the C depth profile evolution in response to carbon erosion and soil profile lowering, which are treated as annual events. As the layer thickness for each layer is maintained throughout the simulation and assuming that the depth and bulk density of the surface layer remain constant, the rate of subsoil incorporation into the surface layer is equal to the erosion rate. Similarly, the C from the next subsoil layers is moved upwards one layer. A constant C content in the bottom layer of the profile and constant bulk density for each depth layer were assumed throughout the simulation. After updating the carbon profile in response to erosion, eq. 1 is applied to simulate carbon input and decomposition after each model iteration as described above.

The erosion-induced fluxes between soil and atmosphere can be evaluated by comparing the carbon input and losses with and without erosion throughout the soil profile[1]. As the simulation starts from a steady-state with no erosion, the erosion induced change in the carbon exchange between the atmosphere and the soil profile is then given by equation 1. Positive values reflect an effective sink term at eroding sites, i.e., a net uptake into the soil relative to undisturbed conditions; while negative values reflect an effective source term, i.e., an increase in the rate of release of SOC into the atmosphere.

We have applied the model to different land use/management systems to explore the interactions between soil erosion rate and C turnover, which are both controlled by land use and management. The C decomposition rate for the surface layer was set to 0.01 yr^{-1} for croplands, 0.008 for croplands under conservation, 0.005 yr^{-1} for pastures and 0.003 yr^{-1} for undisturbed grasslands[4]. This results in a mean C residence time ($1/k_z$) for croplands of 100 yr and 1455 yr for the surface and 1m depth layer respectively. Typical erosion rates associated with each land use[5] were used. In order to easily identify of the effect of erosion on C cycling and to facilitate a direct comparison of different land use/management scenarios, we use the same shape parameters for depth attenuation of both C turnover and C input. For the cropland, different scenarios are implemented: the input term on eroding sites is modelled assuming (i) no feedbacks between erosion and primary production and (ii) assuming a feedback of 4% yield loss for each 10 cm of erosion, representing high-input agriculture and (iii) assuming a feedback of 15% yield loss for each 10 cm of erosion, representing low-input agriculture[6]. This negative feedback on was implemented by reducing the carbon input term for each depth layer as follows:

$$I_t = I_r*(1-E_{c,t}*R_f/0.1) \qquad \text{(eq. 3)}$$

Where I_t is the carbon input at time t (g C m^{-2} yr^{-1}), I_r is the reference carbon input when no erosion occurs (g C m^{-2} yr^{-1}), $E_{c,t}$ is the cumulative erosion (m) at time t and R_f is a reduction factor (-) which was set to 0.04 and 0.15 for high-input and low-input agriculture, respectively. The losses in carbon input due to erosion were considered to constitute a net atmospheric source in the calculations. The model results presented here reflect the average sink/source-behavior for a 300 year period.

List of model variables

Term	Definition	Unit
C_z	C stock at depth z (m)	(g C m^{-2})
i_z	root and litter input at depth z	(g C m^{-2} yr^{-1})
k_z	decomposition rate at depth z	(yr^{-1})
C_{ero}	C erosion rate	(g C m^{-2} yr^{-1})
C_s	C stock in the surface layer	(g C m^{-2})
E	soil erosion rate	(m yr^{-1})
D_s	thickness of the surface layer	(m)
I_t	the carbon input at time t	(g C m^{-2} yr^{-1})
I_r	reference carbon input when no erosion occurs	(g C m^{-2} yr^{-1})
$E_{c,t}$	cumulative erosion at time t	(m)
R_f	C input reduction factor	(-)

Table S2. Model parameters used in the simulations.

Land Use / Management	Erosion rate E (m yr^{-1})	Surface layer (0-0.2m) decomposition rate k (yr^{-1})
Cropland	0.001 - 0.01	0.01
Conservation agriculture	0.0005 - 0.001	0.008
Pasture	0.0001 - 0.0005	0.005
Undisturbed grassland	0 - 0.0001	0.003

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