

Supplementary Information

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2 Supplementary Note 1

3 **Estimation of bacteria transfer by raindrops from soil to air**

4 First, we used the bacteria *aerosolization efficiency* range of 0.01 % to 0.001 %, as shown in Fig.
5 7d. It is known that the global bacteria surface density ranges from 10^4 cells/cm² to 10^8
6 cells/cm².¹ The total land area without ice is approximately 131×10^6 km², with 50 % of the soil
7 containing clay.² Global average rainy days contributing 67 % of the total precipitation
8 distributes up to 90 days.³ To estimate, we used the middle range of rainy days, 45 days, similar
9 to that of the Northwest United States.³ Based on the average rainy days, we conservatively
10 assumed that annually 45 raindrops hit on the same spot.

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12 **Supplementary References**

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14 *and Interface Science* **328**, 421-428, (2008).
15 2. Walther, J. V. *Earth's Natural Resources*. (Jones & Bartlett Learning, 2013).
16 3. Sun, Y., Solomon, S., Dai, A. & Portmann, R. W. How often does it rain? *Journal of Climate* **19**, 916-934,
17 (2006).

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