Supplemental information

Trade-offs among human, animal, and environmental

health hinder the uniform

progress of global One Health

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Supplementary Tables

Table S3. The number of countries categorized into three score-level configurations for human, animal, and environmental health from 2000 to 2020, Related to Figure 1.

Type	Human health(h)	Animal health(a)	Environmental health(e)	Number 2000	2005	2010	2015	2020
I	L_h	L_a	L_e	15	14	10	11	9
II	L_h	L_a	M_e	14	12	5	4	5
III	L_h	L_a	H_e	0	0	0	0	0
IV	L_h	M_a	L_e	8	6	11	6	8
V	L_h	M_a	M_e	13	14	12	13	9
VI	L_h	M_a	H_e	0	0	0	0	0
VII	L_h	H_a	L_e	0	0	0	0	0
VIII	L_h	H_a	M_e	0	0	0	0	0
IX	L_h	H_a	H_e	0	0	0	0	0
X	M_h	L_a	L_e	11	6	10	11	12
XI	M_h	L_a	M_e	24	18	16	16	16
XII	M_h	L_a	H_e	1	0	0	0	0
XIII	M_h	M_a	L_e	7	8	10	14	17
XIV	M_h	M_a	M_e	34	43	39	30	28
XV	M_h	M_a	H_e	0	0	0	0	0
XVI	M_h	H_a	L_e	2	0	1	0	1
XVII	M_h	H_a	M_e	7	8	6	5	4
XVIII	M_h	H_a	H_e	0	0	0	0	0
XIX	H_h	L_a	L_e	0	0	0	0	0
XX	H_h	L_a	M_e	0	1	3	5	3
XXI	H_h	L_a	H_e	0	0	0	0	0
XXII	H_h	M_a	L_e	2	2	3	2	2
XXIII	H_h	M_a	M_e	5	7	12	20	17
XXIV	H_h	M_a	H_e	0	0	0	0	0
XXV	H_h	H_a	L_e	0	0	0	0	0
XXVI	H_h	H_a	M_e	2	6	10	11	17
XXVII	H_h	H_a	H_e	0	0	0	0	0

Note: The classification criteria for the human health (h), animal health(a), and environmental health(e) scores are as follows: Those with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and those with scores between 60 and 80 as performing moderately (M). These configurations present both score levels and health dimensions.

Table S4. The average degree and average weighted degree of One Health targets in the synergy networks, Related to Figure 4.

Ranking	One Health target	Average Degree	Average Weighted Degree
1	H1	17	1122.39
2	H3	16	1090.45
3	H2	17	1036.66
4	A3	17	946.64
5	E5	17	943.38
6	H6	16	892.37
7	E1	16	877.66
8	H8	13	860.22
9	H4	13	790.01
10	E4	16	744.91
11	H7	16	737.07
12	E3	14	732.73
13	A2	14	720.19
14	E2	16	636.53
15	A4	12	396.06
16	H5	4	313.85

Note: The descriptions of the One Health indicators refer to Table S1.

Table S5. The average degree and average weighted degree of One Health targets in the trade-off networks, Related to Figure 4.

Ranking	One Health target	Average Degree	Average Weighted Degree
1	E2	16	810.86
2	H7	16	743.01
3	A4	12	737.30
4	E4	16	721.25
5	E5	17	673.11
6	E1	16	647.02
7	E3	14	586.19
8	A3	17	581.21
9	H6	16	577.55
10	H2	17	564.04
11	A2	14	526.18
12	H3	16	509.55
13	H1	17	493.07
14	H4	13	443.92
15	H8	13	379.50
16	H5	4	75.53

Note: The descriptions of the One Health indicators refer to Table S1.

Supplementary Figures
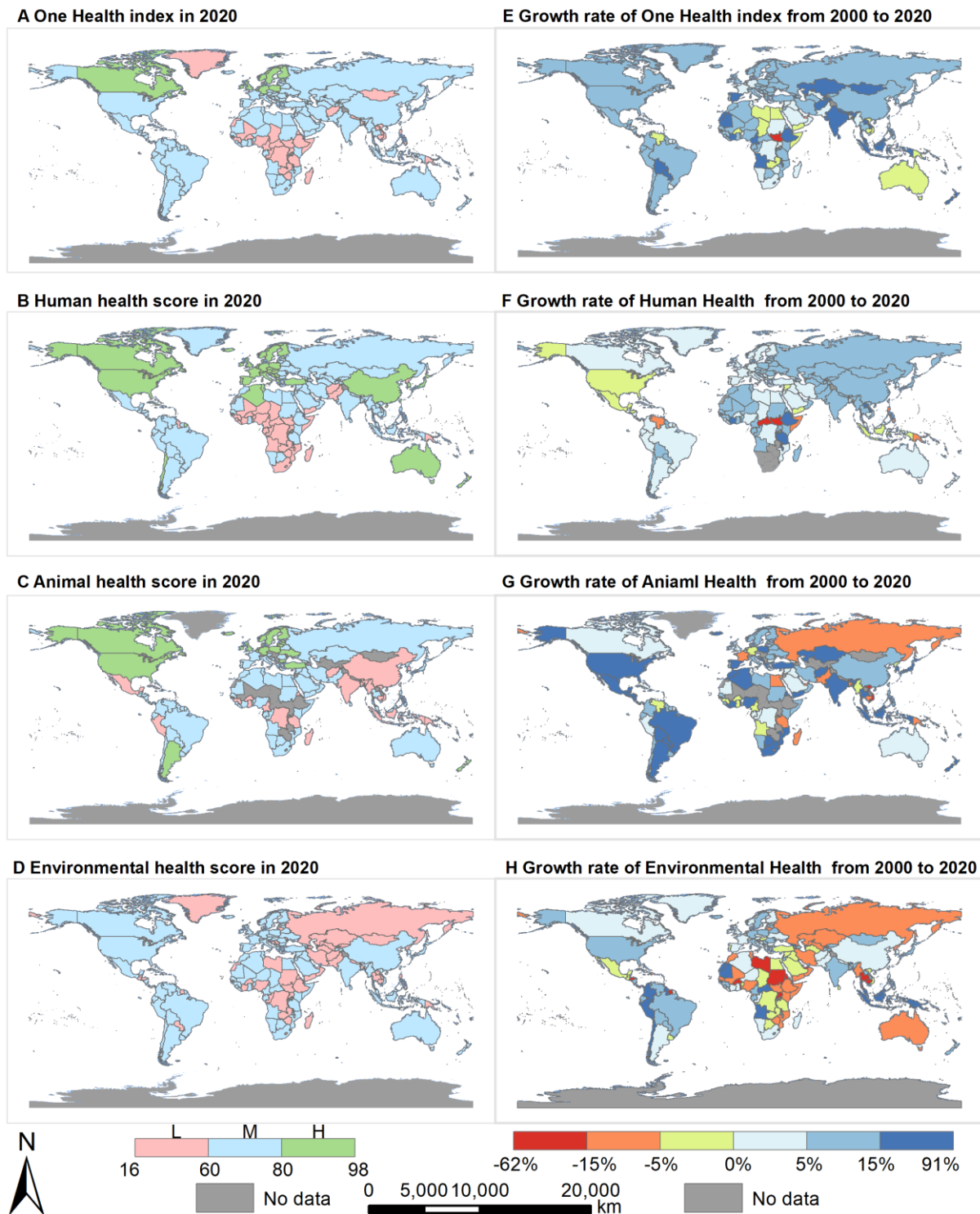
A One Health index in 2020

E Growth rate of One Health index from 2000 to 2020

B Human health score in 2020

F Growth rate of Human Health from 2000 to 2020

C Animal health score in 2020

G Growth rate of Aniaml Health from 2000 to 2020

D Environmental health score in 2020

H Growth rate of Environmental Health from 2000 to 2020

N

| L | M | H |

16   60   80   98

No data

0   5,000 10,000   20,000
km

-62%   -15%   -5%   0%   5%   15%   91%

No data

Figure S1. Global scores and their score growth maps of human health, animal health, environmental health, and One Health index, Related to Figure 1.

 (A-D) Global score map of human health, animal health, environmental health, and One Health index in 2020. (E-H) Score growth rate of the One Health index, human health, animal health, and environmental health from 2000 to 2020.

The three levels include countries with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and with scores ranging from 60 to 80 as performing moderately (M).
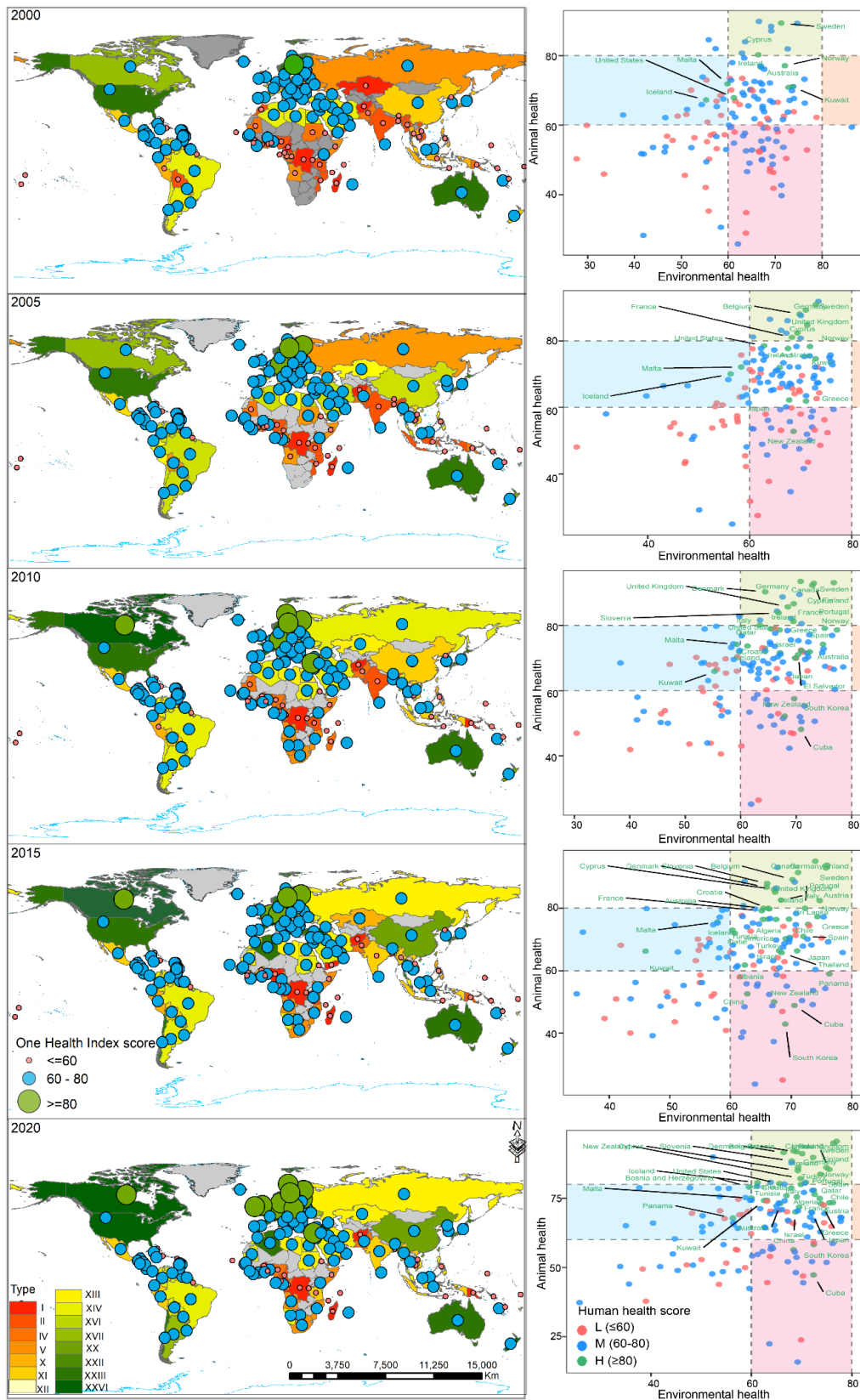
Figure S2. Global spatial configurations of score levels (Table S3) for human health, animal health, environmental health, and One Health index from 2000 to 2020, Related to Figure 1.

Scatter plots show the human, animal, and environmental health scores in global countries from 2000 to 2020.
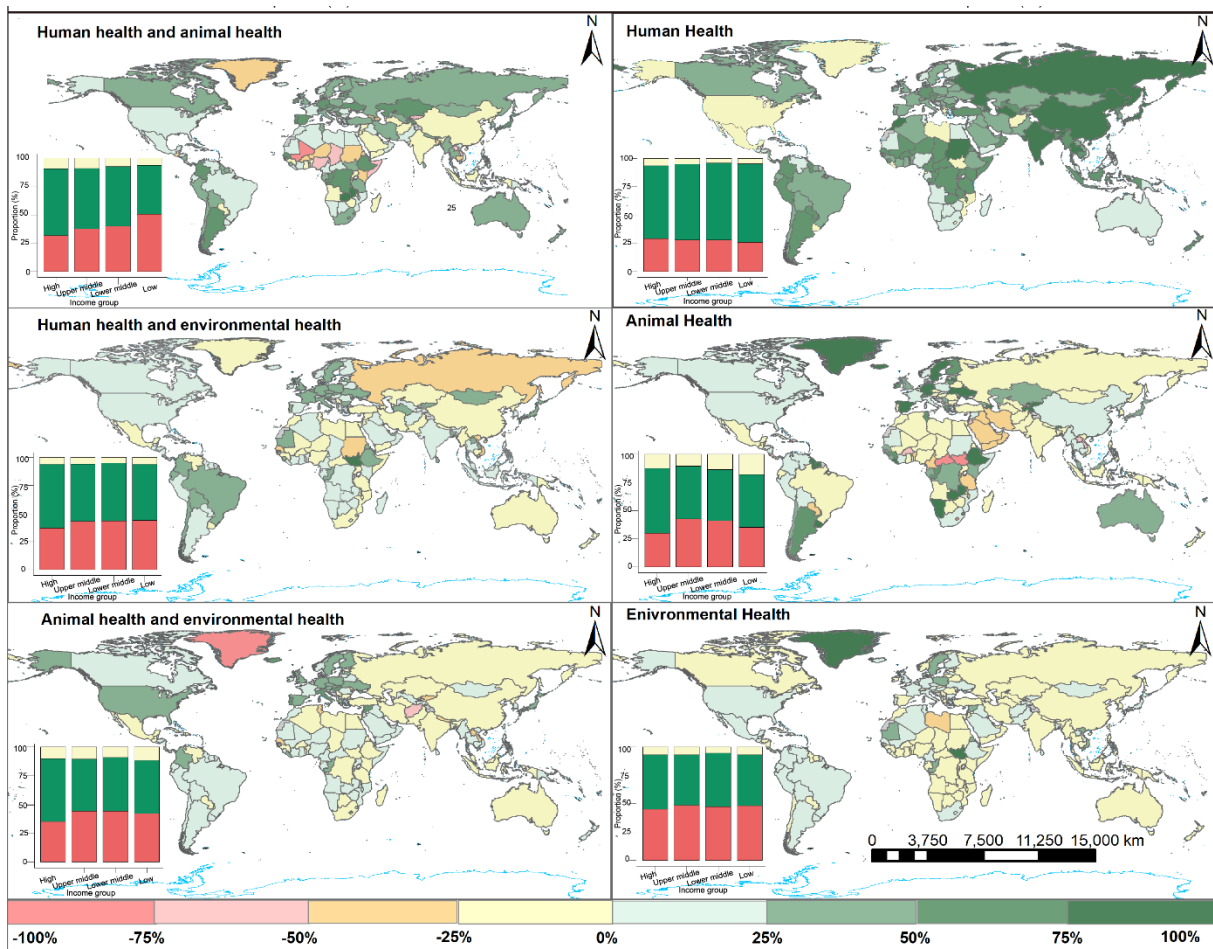
Figure S3. Differences in the proportion of synergies and trade-offs between and within human, animal, and environmental health at the national scale, Related to Figure 2.

The bar chart represents the proportion of countries with different income levels in various relationship configurations of three health dimensions, both within and between dimensions. The green colour indicates countries with a higher proportion of synergies than trade-offs, while the orange or red colour indicates the opposite. The darker the colour, the greater the difference.
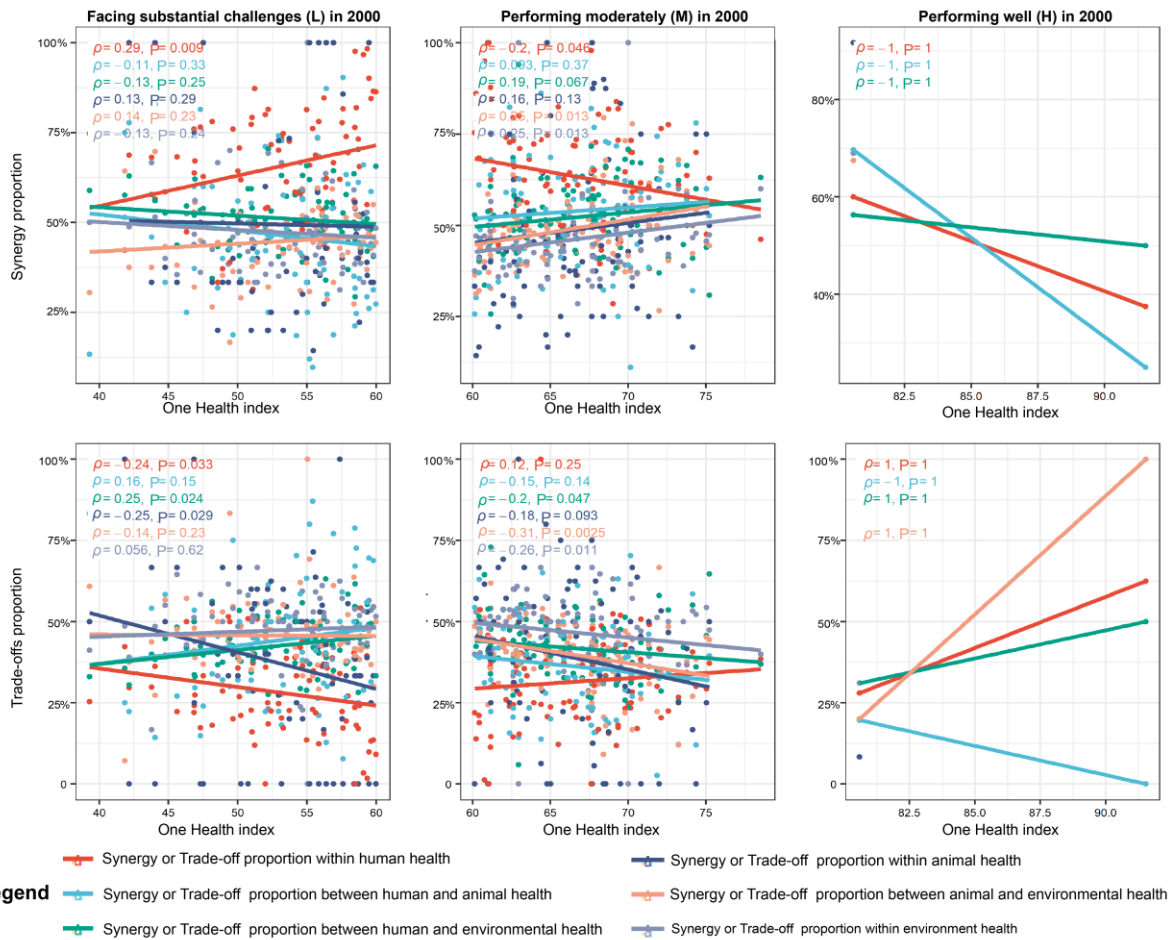
Figure S4. Correlation between the One Health index and the proportions of synergies (S) or trade-offs (T) within and between human, animal, and environmental health in countries worldwide in 2000, respectively, at three levels of the OH index, Related to Figure 3.

The three levels include countries with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and those with scores between 60 and 80 as performing moderately (M) on the One Health index.

Figure S5. Correlation between the One Health index and the proportions of synergies (S) or trade-offs (T) within and between human, animal, and environmental health in countries worldwide in 2005, respectively, at three levels of the OH index, Related to Figure 3.

The three levels include countries with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and those with scores between 60 and 80 as performing moderately (M) on the One Health index.

Figure S6. Correlation between the One Health index and the proportions of synergies (S) or trade-offs (T) within and between human, animal, and environmental health in countries worldwide in 2010, respectively, at three levels of the OH index, Related to Figure 3.

The three levels include countries with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and those with scores between 60 and 80 as performing moderately (M) on the OH index.

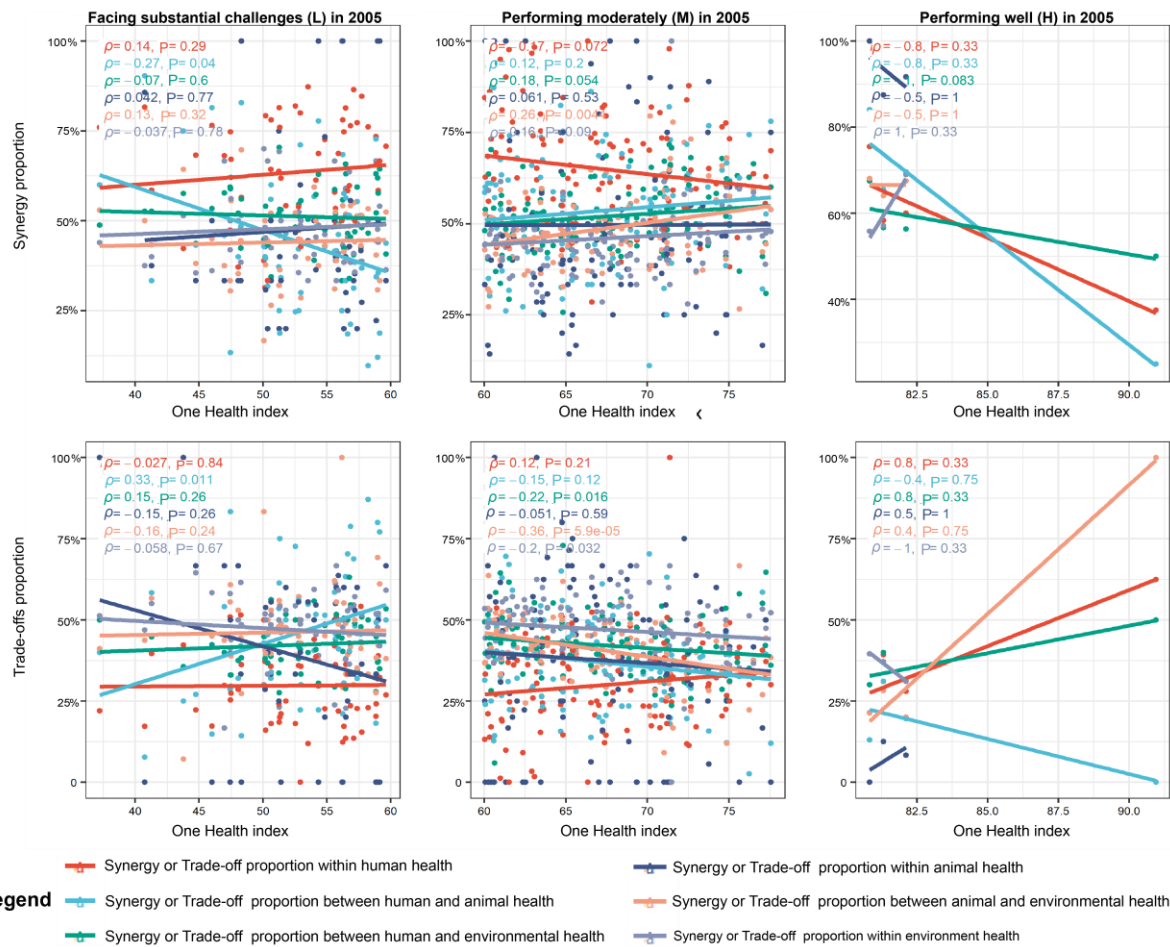**Figure S7.** Correlation between the One Health (OH) index and the proportions of synergies (S) or trade-offs (T) within and between human, animal, and environmental health in countries worldwide in 2015, respectively, at three levels of the OH index, Related to Figure 3.

The three levels include countries with scores >= 80 as performing well (H), those with scores <= 60 as facing substantial challenges (L), and those with scores between 60 and 80 as performing moderately (M) on the OH index.
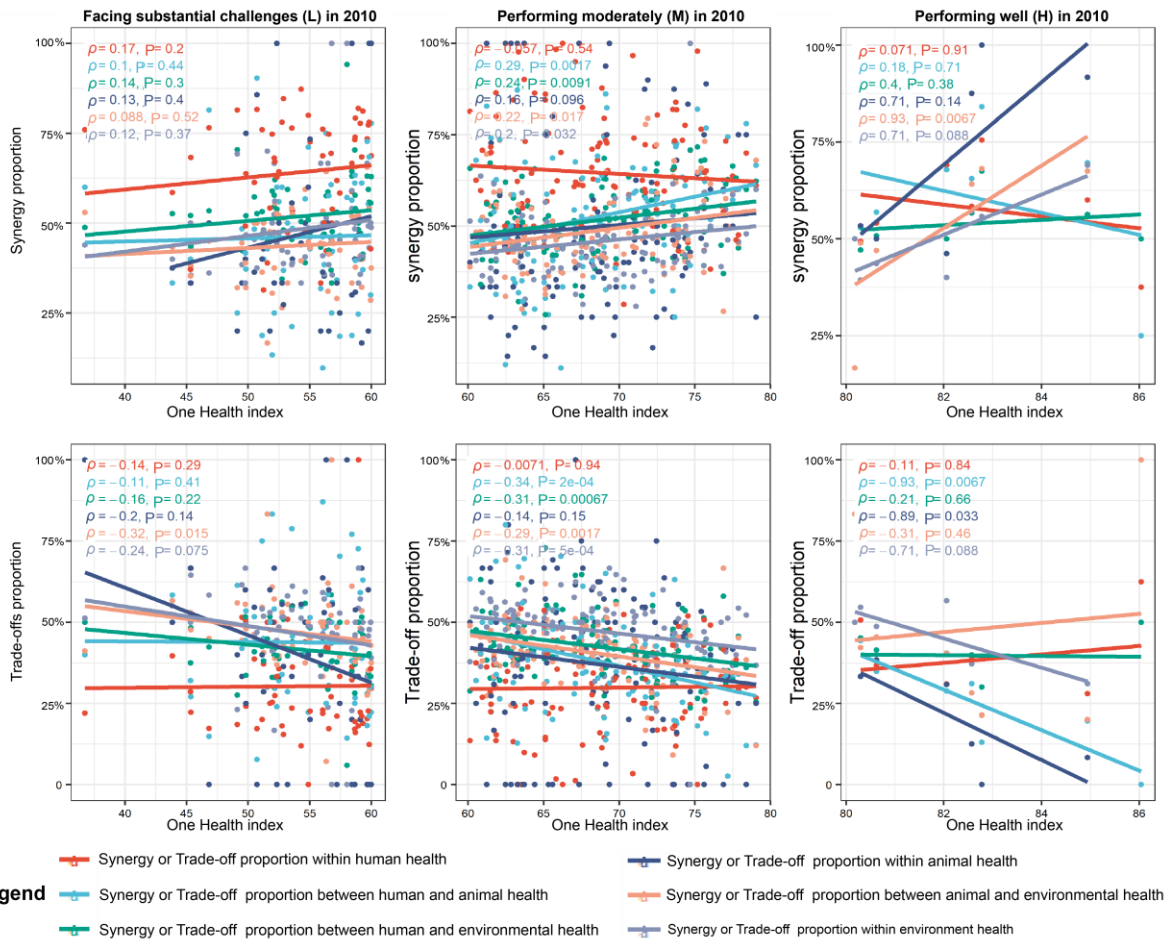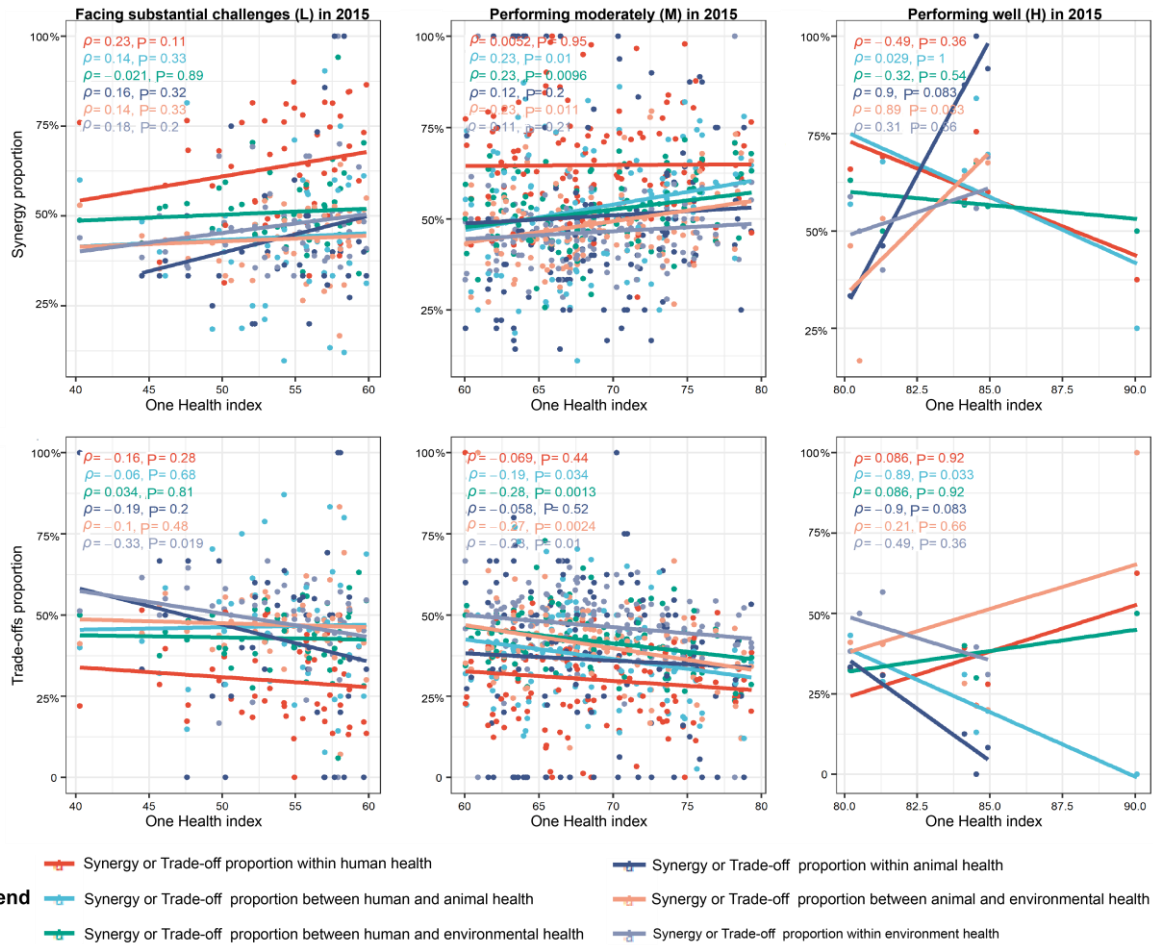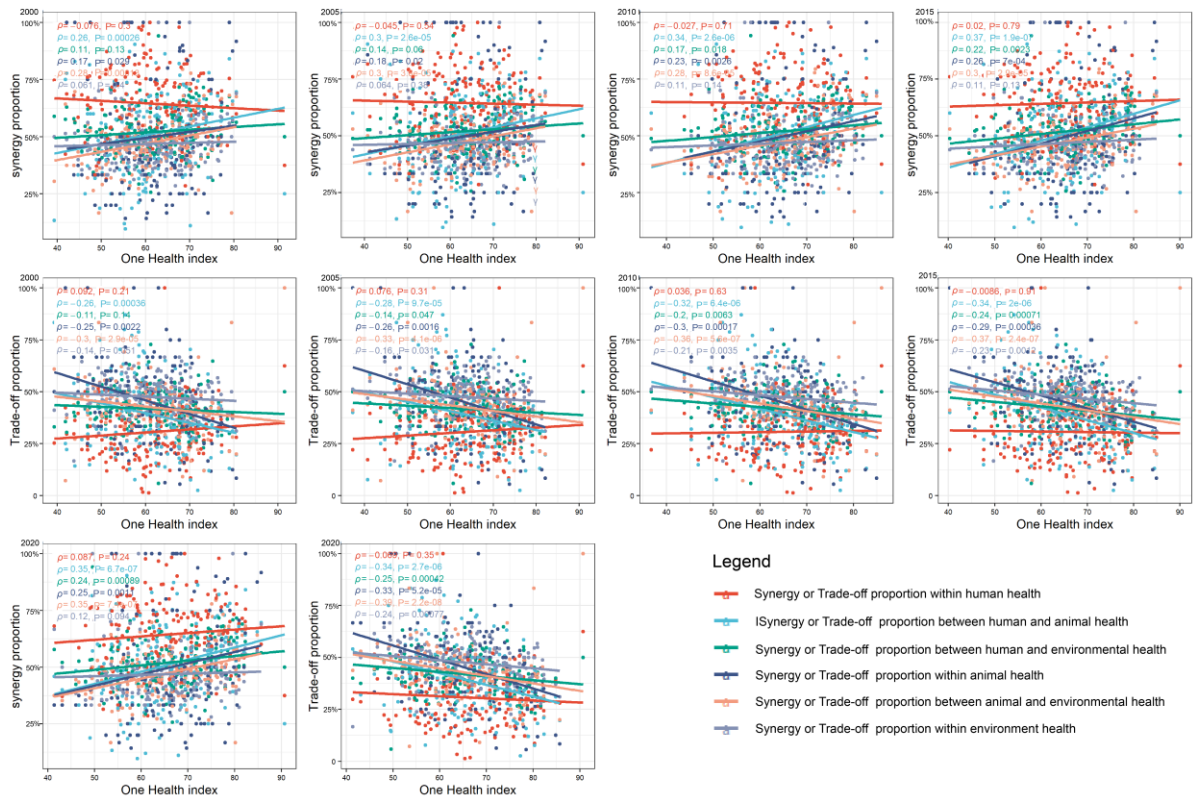
Figure S8. Correlation between the One Health index and the proportions of synergies (S) or trade-offs (T) within and between human, animal, and environmental health in countries around the world from 2000 to 2020, Related to Figure 3.
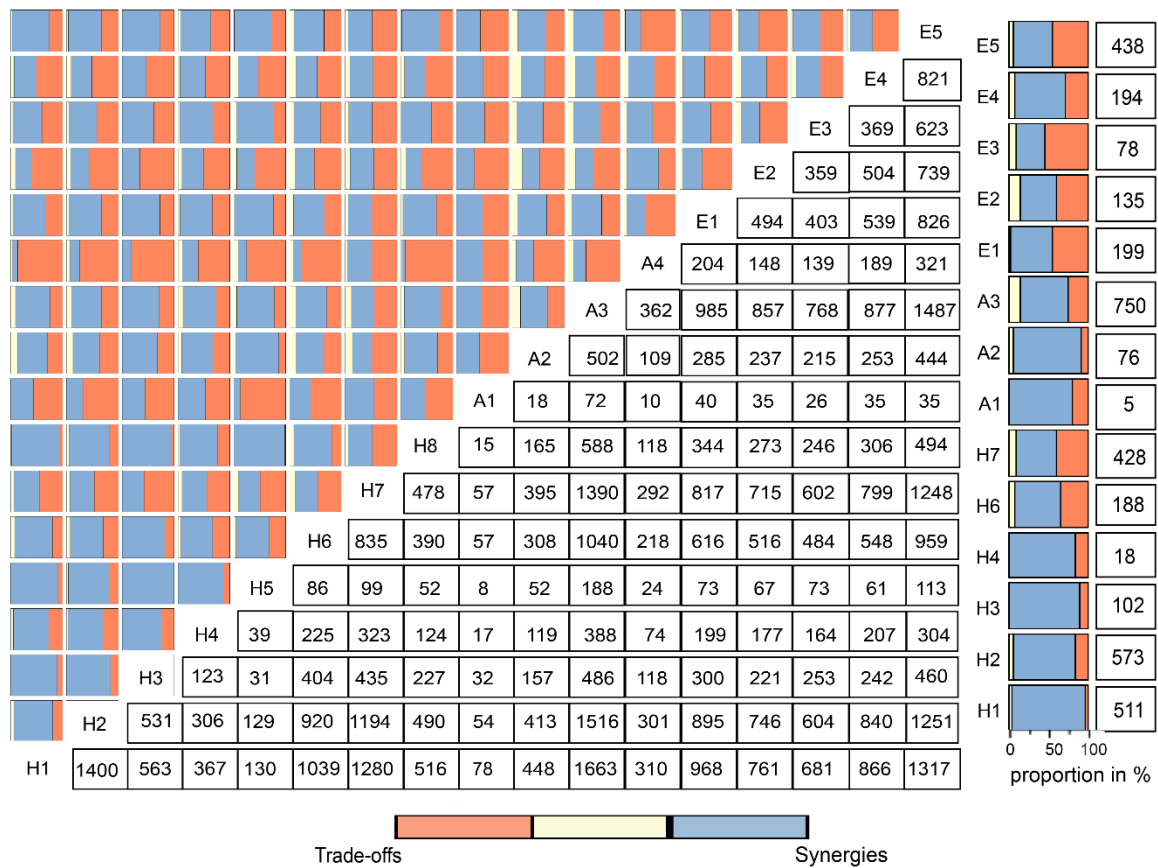
Figure S9 matrix data (synergies, non-classified, and trade-offs between One Health targets):

	H1	H2	H3	H4	H5	H6	H7	H8	A1	A2	A3	A4	E1	E2	E3	E4
E5																
E4	821															
E3	369	623														
E2	359	504	739													
E1	494	403	539	826												
A4	204	148	139	189	321											
A3	362	985	857	768	877	1487										
A2	502	109	285	237	215	253	444									
A1	18	72	10	40	35	26	35	35								
H8	15	165	588	118	344	273	246	306	494							
H7	478	57	395	1390	292	817	715	602	799	1248						
H6	835	390	57	308	1040	218	616	516	484	548	959					
H5	86	99	52	8	52	188	24	73	67	73	61	113				
H4	39	225	323	124	17	119	388	74	199	177	164	207	304			
H3	123	31	404	435	227	32	157	486	118	300	221	253	242	460		
H2	531	306	129	920	1194	490	54	413	1516	301	895	746	604	840	1251	
H1	1400	563	367	130	1039	1280	516	78	448	1663	310	968	761	681	866	1317

Right-hand proportion bars (number of data pairs):

Target	Value
E5	438
E4	194
E3	78
E2	135
E1	199
A3	750
A2	76
A1	5
H7	428
H6	188
H4	18
H3	102
H2	573
H1	511

proportion in %

Trade-offs ——— Synergies

Figure S9. Detected the proportion of synergies and trade-offs between different One Health targets and within the same OH target, from 2000 to 2020, Related to Figure 4.

The OH targets with only one indicator or those that did not pass significance tests are not displayed (P>0.05). The colour bars represent relationships between One Health indicators: synergies, non-classifieds, and trade-offs. The number in the boxes represents the number of data pairs used for the analysis.
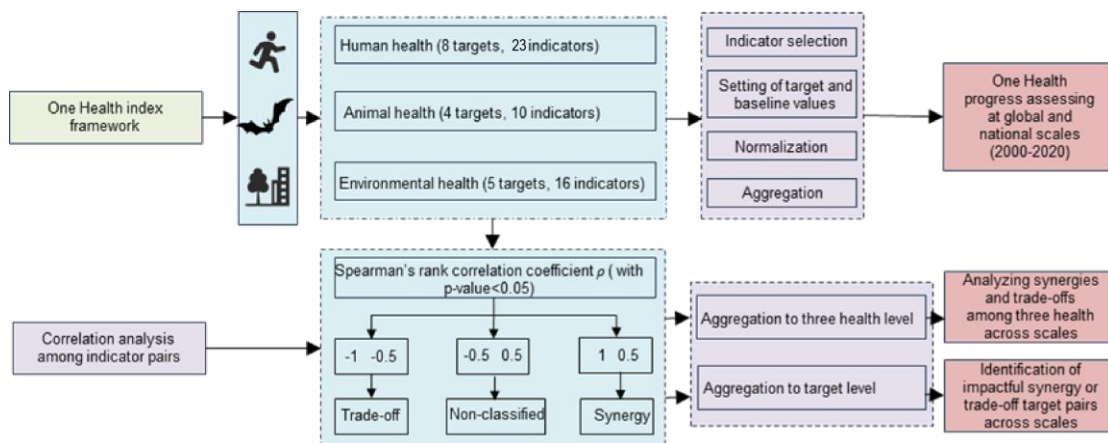
Figure S10 flowchart elements:

- One Health index framework
  - Human health (8 targets, 23 indicators)
  - Animal health (4 targets, 10 indicators)
  - Environmental health (5 targets, 16 indicators)
  - Indicator selection
  - Setting of target and baseline values
  - Normalization
  - Aggregation
  - One Health progress assessing at global and national scales (2000-2020)
- Correlation analysis among indicator pairs
  - Spearman's rank correlation coefficient ρ (with p-value<0.05)
    - -1 to -0.5: Trade-off
    - -0.5 to 0.5: Non-classified
    - 1 to 0.5: Synergy
  - Aggregation to three health level → Analyzing synergies and trade-offs among three health across scales
  - Aggregation to target level → Identification of impactful synergy or trade-off target pairs across scales

Figure S10. Flowchart for One Health assessment and evaluation of synergies and trade-offs among human, animal, and environmental health on global and national scales, Related to STAR Methods.