## Supplementary File 2: References for contribution of each N output

- [1] Bhandari M, Ma Y, Men M, Wu M, Xue C, et al.2020. Response of winter wheat yield and soil N<sub>2</sub>O emission to nitrogen fertilizer reduction and nitrapyrin application in North China Plain. *Communications in Soil Science and Plant Analysis* 51:554-565 https://doi.org/10.1080/00103624.2020.1718687
- [2] Qing C,Wen X F. 1997.Fate of fertilizer nitrogen in soil-plant system under irrigating condition 1. Effect of nitrogen level. *Acta Agriculturae Nucleatae Sinica*. 2:97-102.
- [3] Chen X,et al.2008. Effects of postponing N application on the yield, apparent N recovery and N absorption of winter wheat. *Journal of Plant Nutrition and Fertilizer*. 3:450-455.
- [4] Chen X, et al.2006. Synchronizing N supply from soil and fertilizer and nitrogen demand of winter wheat by an improved Nmin method. *Nutrient Cycling in Agroecosystems*. 74:91-98 <a href="https://doi.org/10.1007/s10705-005-1701-9">https://doi.org/10.1007/s10705-005-1701-9</a>
- [5] Dang T H, et al. 2009. Relationship between soil nitrate, nitrogen balance and utilization in rainfed land. *Plant Nutrition and Fertilizer Science*. 3:573-577.
- [6] Yajun Gao, Yun Li, Jianchang Zhang, Wenguo Liu, Zhanping Dang, et al. 2009. Effects of mulch, N fertilizer, and plant density on wheat yield, wheat nitrogen uptake, and residual soil nitrate in a dryland area of China. *Nutrient Cycling in Agroecosystems*. 85:109-121 <a href="https://doi.org/10.1007/s10705-009-9252-0">https://doi.org/10.1007/s10705-009-9252-0</a>
- [7] Tiancai Guo, et al. 2008. Utilization and Balance of Nitrogen and Proper Application Amount of Nitrogen Fertilizer in Winter Wheat in High-Yielding Regions. *The Crop Journal*. 5:886-892.
- [8] Shaowen Huang, et al.2002. Effect of the regionalized balanced fertilization technique on nitrogen fertilizer utilization efficiency and soil nutrient balance. *Soil Fertilizer*. 6:3-7.
- [9] Yanzhi Ji,Xiaotang Ju,Xinyu Liu, Lijuan Zhang, Li Xin, et al. 2010. Ampact of different nitrogen application on nitrogen movement and gaseous loss of winter wheat fields. *Soil and Water Conservation*. 3:113-118.
- [10] Jie X L, Han Y l, Tan J F, Guo T C, Wang H C, et al. 1998. Studies on use efficiency of N fertilizer in wheat field with different soil fertility and soil texture. *Acta Agronomy Sinica*. 6:884-888.
- [11] Ju,X T,Liu X J,Zhang F S, et al. 2002. Study on effect of nitrogen fertilizer and nitrogen balance in winter wheat and summer maize rotation system. *Scientia Agricultura Sinica*. 11:1361-1368.
- [12] Bingqi Li, et al.2010. Effects of wheat yield and nitrogen use efficiency of nitrogen application in Chao Soil region. *Henan Chemical*. 27:38-40 <a href="https://doi.org/10.14173/j.cnki.hnhg.2010.19.014">https://doi.org/10.14173/j.cnki.hnhg.2010.19.014</a>
- [13] Li, Q.Q. Effects of LIMUS, a urease inhibitor, on ammonia reduction, crop yield and nitrogen utilization in China Agricultural University. (2014).
- [14] Jianming Li, Shi Juan Li, Zhangli Zeng, et al. 2003. Studies on the soil nitrate content and nitrogen balance in winter wheat plants under limited irrigation condition. *Acta Agriculturae Boreali-Sinica*. 2;51-55.
- [15]Li Shuo, Wang Xuan,Zhang XiQun,Liu ZeLong,Zhao Hao. et al.2019. Effects of swine slurry application on ammonia emission, nitrogen utilization and apparent balance of a winter wheat-summer maize rotation system. *Chinese Journal of Eco-Agriculture*. 27:1502-1514 <a href="https://doi.org/10.13930/j.cnki.cjea.190150">https://doi.org/10.13930/j.cnki.cjea.190150</a>

- [16] Liao X Y.2001. Effects of optimal nitrogen management system in winter wheat-summer maize rotation in North China Plain. *Hunan Agricultural University*.
- [17] Limin Gu, Tiening Liu, Jingfeng Wang, Peng Liu, Shuting Dong, Bingqiang Zhao, et al. 2016. Lysimeter study of nitrogen losses and nitrogen use efficiency of Northern Chinese wheat. *Field Crops Research*. 188:82-95 <a href="https://doi.org/10.1016/j.fcr.2015.10.014">https://doi.org/10.1016/j.fcr.2015.10.014</a>
- [18] Xinyu Liu, Xiaotang Ju, Lijuan Zhang, et al. 2010. Effects of different N rates on fate of N fertilizer and balance of soil N of winter wheat. *Journal of Plant Nutrition and Fertilizer Science*. 2:296-303.
- [19] Liu Xuejun, Ju Xiaotang, Zhang Fusuo.2004. Effects of reduced nitrogen application on nitrogen utilization and balance in winter wheat-summer maize cropping system. *The Journal of Applied Ecology*. 15:58-462.
- [20] Lv F L.2019. Agronomic and environmental effects of combined application of organic and inorganic fertilizers in winter wheat/summer maize rotation system. *Journal of Northwest A&F University*..
- [21] MA Xinghua, WANG Dong, YU Zhenwen, WANG Xizhi, XU Zhenzhu, et al. 2010. Effect of irrigation regimes on water consumption characteristics and nitrogen distribution in wheat at different nitrogen applications. *Acta Ecologica Sinica*. 30:1955-1965 <a href="https://doi.org/10.20103/j.stxb.2010.08.001">https://doi.org/10.20103/j.stxb.2010.08.001</a>
- [22] Sha, Zhipeng, Ma Xin, Loick Nadine, Lv Tiantian, Cardenas Laura M, Ma Yan, Liu Xuejun et al. 2020. Nitrogen stabilizers mitigate reactive N and greenhouse gas emissions from an arable soil in North China Plain: Field and laboratory investigation. *Journal of Cleaner Production*. 258:121025 <a href="https://doi.org/10.1016/j.jclepro.2020.121025">https://doi.org/10.1016/j.jclepro.2020.121025</a>
- [23] Shen XL, et al. 2003. Effects of nitrogen rate on nitrogen uptake and utilization of winter wheat and residual nitrate in soil under straw mulch. *Journal of Northwest A&F University*. 31:1-14.
- [24] Shi Yu, Yu Zhen Wen. 2006. Effects of nitrogen fertilizer rate and ration of base and topdressing on yield of wheat, content of soil nitrate and nitrogen balance. *Acta Ecologica Sinica*. 11:3661-3669.
- [25] Tong YanAn, Zhao Ying, Zhao HuBing, Fan Hong Zhu. 2007. Effect of N rates on N uptake, transformation and the yield of winter wheat. *Journal of Plant Nutrition and Fertilizer Science*. 1:64-69.
- [26] Wang D, et al. 2005. Physiological and ecological basis of effects of nitrogen application rate on soil nitrogen change and wheat yield and quality. *Shandong Agricultural University*.
- [27] Wang L.2019. Effects of nitrogen fertilizer and winter wheat varieties on NH<sub>3</sub> exchange between canopy and atmosphere. *Northwest A&F University*.
- [28] Wang Qi,Li Fengru,Zhao Lin, Zhang Enhe, Shi Shangli,et al.2010. Effects of irrigation and nitrogen application rates on nitrate nitrogen distribution and fertilizer nitrogen loss, wheat yield and nitrogen uptake on a recently reclaimed sandy farmland. *Plant and soil*. 337:325-339 https://doi.org/10.1007/s11104-010-0530-z
- [29] WANG Xiao Ying, HE MingRong, LIU Yong Huan, ZHANG Hong Hua, LI Fei, et al. 2008. Interactive effects of irrigation and nitrogen fertilizer on nitrogen fertilizer recovery and nitrate-N movement across soil profile in a winter wheat field. *Acta Ecologica Sinica*. 2: 685-694.
- [30] Wang XiNa, Wang Zhao Hui, Li Sheng Xiu. 2006. Soil nitrogen balance in a winter wheat/summer maize rotation system on the Loess Plateau. *Journal of Plant Nutrition and Fertilizer science*. 6:759-764.
- [31] Wang XB, et al. 2009. Soil ammonia volatilization in winter wheat/summer maize rotation system under optimized fertilization in North China. *Journal of Plant Nutrition and Fertilizer Science*. 2:344-351.
- [32] Wang XuGang, Hao MingDe, Li JianMin, Zhang ChunXia. 2007. Effects of fertilizer N, P on wheat yield

- and nutrients uptake characters in dryland of Loess Plateau. *Journal of Northwest A&F University*. 2:138-142.
- [33] Wei JL, et al.2010. Effects of different nitrogen management strategies on wheat yield and nitrogen use efficiency. *Shandong Agricultural Sciences*. 9:53-59.
- [34] Junxi Wu. 2003. Study on soil nitrogen supply capacity in winter wheat/summer maize rotation system. *China Agricultural University*.
- [35] laikun xia,hongtao bin,xuebin xu,et al. 2009. Effects of different nitrogen application periods on dry matter accumulation and nitrogen utilization of summer maize. *Journal of Maize Science*. 5:138-140,144
- [36] Xuejun Liu, Xiaotang Ju, Fusuo Zhang, Jiarong Pan, Peter Christie, et al. 2003. Nitrogen dynamics and budgets in a winter wheat—maize cropping system in the North China Plain. *Field Crops Research*. 83:111-124 <a href="https://doi.org/10.1016/s0378-4290(03)00068-6">https://doi.org/10.1016/s0378-4290(03)00068-6</a>
- [37] Yang Yang, Chunju Zhou, Na Li, Kun Han, Yuan Meng, et al. 2015. Effects of conservation tillage practices on ammonia emissions from Loess Plateau rain-fed winter wheat fields. *Atmospheric Environment*. 104:59-68 https://doi.org/10.1016/j.atmosenv.2015.01.00
- [38] Aiping Zhang, Shiqi Yang, Shujing Yang, et al. 2009. Effect of N rates on yield of spring wheat, fertilizer N recovery and N balance. *Chinese Agricultural Science Bulletin*. 17:137-142.
- [39] Xu Zhang, Yilun Wang, Yan Han, et al. 2010. Effects of nitrogen ratio of base fertilizer and topdressing on uptake, utilization of nitrogen and yield in winter wheat. *Acta Agriculturae Boreali-Sinica*. 25:193-197.
- [40] Yuexia Zhang, Junlin Yang, Wei Liu, et al. 2009. Effects of nitrogen rate on nitrogen uptake and utilization of winter wheat and residual nitrate in soil under straw mulch. *Agricultural Research in the Arid Areas*. 27:189-193.
- [41] Junyan Zhao, Zhenwen Yu. 2006. Effects of nitrogen rate on nitrogen fertilizer use of winter wheat and content of soil nitrate-N under different fertility condition. *Acta Ecologica Sinica*. 26: 815-822.
- [42] Rongfang Zhao, Xinping Chen, Fusuo Zhang, et al. 2005. Study on nitrogen optimized management at different growing stages of winter wheat based on nutrient balance and soil test. *Chinese Agricultural Science Bulletin*. 11:211-225.
- [43] Shicheng zhao, zhiming sha, ping he. 2011. Response of winter wheat to different nitrogen managements in North Central China. *Journal of Plant Nutrition and Fertilizers*. 17: 517-524.
- [44] Zhao P, Chen F. 2008. Effects of straw mulching plus nitrogen fertilizer on nitrogen efficiency and grain yield in winter wheat. *Acta Agronomy Sinica*. 34:1014-1018.
- [45] Fengxia Zheng, shuting dong, peng liu, et al. 2017. Effects of combined application of manure and chemical fertilizers on ammonia volatilization loss and yield of winter wheat. *Journal of Plant Nutrition and Fertilizers*. 23:567-577.
- [46] Zhong Q, ju x t, zhang f s. 2006. Analysis of environmental endurance of winter wheat/summer maize rotation system to nitrogen in North China Plain. *Journal of Plant Nutrition and Fertilizers*. 12:285-293.
- [47] Ding X Q.2005. Ammonia volatilization from nitrogen fertilization in winter wheat-summer maize rotation system in the north China Plain. *China Agricultural University*.
- [48] Mohan Bhandari, Yang Ma, Mingxin Men, Min Wu, Cheng Xue et al.2020. Response of winter wheat yield and soil N<sub>2</sub>O emission to nitrogen fertilizer reduction and nitrapyrin application in North China Plain. *Communications in Soil Science and Plant Analysis*. 51:554-565

- [49] Cai G X, Chen D L, Ding H, Pacholski A, Fan X H, et al. 2002. Nitrogen losses from fertilizers applied to maize, wheat and rice in the North China Plain. *Nutrient Cycling in Agroecosystems*. 63:187-195 <a href="https://doi.org/10.1023/A:1021198724250">https://doi.org/10.1023/A:1021198724250</a>
- [50] Li C Q, et al. 2014. Effects of Limus a urease inhibitor on ammonia reduction crop yield and nitrogen utilization in China. *China Agricultural University*.
- [51] Guitong Li,baoguo li,deli chen.2001. Method for measurement of ammonia volatilization from large area field by Bowen ratio system. *Journal of China Agricultural University*. 5: 56-62.
- [52] Li S, wang x, zhang x q, liu z l, zhao h, et al. 2019. Effects of swine slurry application on ammonia emission, nitrogen utilization and apparent balance of a winter wheat-summer maize rotation system. *Chinese Journal of Eco-Agriculture*. 10:1502-1514 https://doi.org/10.13930/j.cnki.cjea.190150
- [53] Gu, L.M., et al. Lysimeter study of nitrogen losses and nitrogen use efficiency of Northern Chinese wheat. *Field Crops Research*. 188, 82-95 (2016).
- [54] Limin Gu, Tiening Liu, Jingfeng Wang, Peng Liu, Shuting Dong, et al. 2012. Effects of N fertilization rates on the NH<sub>3</sub> volatilization and N<sub>2</sub>O emissions from the wheat-maize rotation system in North China Plain. *Journal of Ecology and Environment*. 2:225-230 https://doi.org/10.1016/j.fcr.2015.10.014
- [55] Zhipeng Sha, Xin Ma, Nadine Loick, Tiantian Lv, Laura M. Cardenas et al.2020. Nitrogen stabilizers mitigate reactive N and greenhouse gas emissions from an arable soil in North China Plain: Field and laboratory investigation. *Journal of Cleaner Production*. 258:121025 <a href="https://doi.org/10.1016/j.jclepro.2020.121025">https://doi.org/10.1016/j.jclepro.2020.121025</a>
- [56] Tingyu Li, Xin Zhang, Huaxin Gao, Bei Li, Huan Wang, et al. 2019. Exploring optimal nitrogen management practices within site-specific ecological and socioeconomic conditions. *Journal of Cleaner Production*. 241:118295 <a href="https://doi.org/10.1016/j.jclepro.2019.118295">https://doi.org/10.1016/j.jclepro.2019.118295</a>
- [57] Wenliang Wei, Huaqing Yang, Mingsheng Fan, Haiqing Chen, Dayong Guo, et al. 2020. Biochar effects on crop yields and nitrogen loss depending on fertilization. *Science of the Total Environment*. 702: 134423 <a href="https://doi.org/10.1016/j.scitotenv.2019.134423">https://doi.org/10.1016/j.scitotenv.2019.134423</a>
- [58] Xia W J.2011. Characteristics of nitrogen cycling in rice-wheat rotation under optimal nitrogen application. *Chinese Academy of Agricultural Sciences* https://doi.org/10.7666/d.Y1932924
- [59] Zhang Y M, Chen D L, Zhang J B, Edis R, Hu CS, et al. 2004. Ammonia volatilization and denitrification losses from an irrigated maize-wheat rotation field in the North China Plain. *Pedosphere*. 4:533-540.
- [60] Zheng Feng-Xia, Dong Shu-Ting, Liu Peng, Zhang Ji-Wang, Zhao Bin. 2017. Effects of combined application of manure and chemical fertilizers on ammonia volatilization loss and yield of winter wheat. *Plant Nutrition and Fertilizer Science*. 3:567-577 https://doi.org/10.11674/zwyf.16426
- [61] Bhandari Mohan, Ma Yang, Men Mingxin, Wu Min, Xue Cheng, et al. 2020. Response of winter wheat yield and soil N<sub>2</sub>O emission to nitrogen fertilizer reduction and nitrapyrin application in North China Plain. *Communications in Soil Science and Plant Analysis*. 4: 554-565 <a href="https://doi.org/10.1080/00103624.2020.1718687">https://doi.org/10.1080/00103624.2020.1718687</a>
- [62] Wu Di, Zhao Zichao, Han Xiao, Meng Fanqiao, Wu Wenliang et al. 2018. Potential dual effect of nitrification inhibitor 3,4-dimethylpyrazole phosphate on nitrifier denitrification in the mitigation of peak N<sub>2</sub>O emission events in North China Plain cropping systems. *Soil Biology and Biochemistry*. 121:147-153 https://doi.org/10.1016/j.soilbio.2018.03.010
- [63] Cui Feng, Yan Guangxuan, Zhou Zaixing, Zheng Xunhua, Deng Jia et al. 2012. Annual emissions of

- nitrous oxide and nitric oxide from a wheat-maize cropping system on a silt loam calcareous soil in the North China Plain. *Soil Biology and Biochemistry*. 48:10-19 <a href="https://doi.org/10.1016/j.soilbio.2012.01.007">https://doi.org/10.1016/j.soilbio.2012.01.007</a>
- [64] Han Xue, Fan Jingwei, Bai Jinhua, Ren Huanyu, Li Yingchun, et al. 2016. Effects of reduced nitrogen fertilization and biochar application on CO<sub>2</sub> and N<sub>2</sub>O emissions from a summer maize-winter wheat rotation field in north China. *Agricultural Science & Technology*. 12: 2800-2808 <a href="https://doi.org/10.16175/j.cnki.1009-4229.2016.12.029">https://doi.org/10.16175/j.cnki.1009-4229.2016.12.029</a>
- [65]Li B Y,Qiu Y H,Hui X L,et al. Effect of nitrogen fertilizer on N<sub>2</sub>O emissions from winter wheat field in the Loess Plateau. *Journal of Northwest A&F University*. 5, 50-58 (2018).https://doi.org/10.13207/j.cnki.jnwafu.2018.05.008.
- [66] Li Y Q, wen Y C, lin Z A, et al. 2019. Effect of different manures combined with chemical fertilizer on yields of crops and gaseous N loss in farmland. *Journal of Plant Nutrition and Fertilizer Science*. 11:1835-1846.
- [67] Liang D L.2003. Study on nitrogen loss of nitrous oxide in loess soil and its influencing factors. *Northwest A&F University*.
- [68] Liang G Q, Zhou W, Xiao W J, Wang X B, Sun J W, et al. 2010. Effect of optimized nitrogen application on N<sub>2</sub>O emission from paddy field under wheat-rice rotation system. *Journal of Plant Nutrition and Fertilizer Science*. 2: 304-311.
- [69]Lv F L.2019. Agronomic and environmental effects of combined application of organic and inorganic fertilizers in winter wheat/summer maize rotation system. *Northwest A&F University*.
- [70] Wang X B, et al.2009. Effect of optimized nitrogen application on denitrification losses and N<sub>2</sub>O emissions from soil in winter wheat/summer corn rotation system in North China. *Journal of Plant Nutrition and Fertilizer Science*. 1: 49-54.
- [71] Wen W, et al.2019. Study on annual nitrogen efficient utilization of spring wheat-silage maize. *Shihezi University*.
- [72] Hu Xiao-Kang, Su Fang, Ju Xiao-Tang, Gao Bing, Oenema Oene et al. 2013. Greenhouse gas emissions from a wheat-maize double cropping system with different nitrogen fertilization regimes. *Environmental Pollution*. 176: 198-207 <a href="https://doi.org/10.1016/j.envpol.2013.01.040">https://doi.org/10.1016/j.envpol.2013.01.040</a>
- [73] Xu H,Xin G X,Cai Z C, et al.2000. Effects of soil texture on N<sub>2</sub>O emission from wheat and cotton fields. *Agro-Environment Protection*. 1: 1-3.
- [74] Dong Y.2001. Nitrous oxide emissions from cultivated soils in the North China Plain. *Tellus*. 53:1-9.
- [75] Yang Y,Tong Y A,Gao P C, Htun Y M, Feng T et al.2020. Evaluation of N<sub>2</sub>O emission from rainfed wheat field in northwest agricultural land in China. *Environmental Science and Pollution Research International*. 27:43466-43479 https://doi.org/10.1007/s11356-020-09133-0
- [76] Yao Z S, Yan G G,Zheng X H, Wang R,Liu C Y,et al.2017 Straw return reduces yield-scaled N<sub>2</sub>O plus NO emissions from annual winter wheat-based cropping systems in the North China Plain. *Science of the Total Environment*. 590:174-185 https://doi.org/10.1016/j.scitotenv.2017.02.194
- [77] Yizhen Zhou, Yuanyuan Zhang, Di Tian, Yujing Mu.2017. The influence of straw returning on N<sub>2</sub>O emissions from a maize-wheat field in the North China Plain. *Science of the Total Environment*. 584-585:935-941. https://doi.org/10.1016/j.scitotenv.2017.01.141
- [78] Zeng J H, Wang Z P, Zhang Y M, Song W Z, Wang S B, et al. 1995. Estimation of soil N<sub>2</sub>O flux and total amount during wheat-maize rotation. *Environmental Science*. 1:32-35.

- [79] Zhang Y M.2005. Study on nitrogen cycling and balance in winter wheat-summer maize rotation farmland in front plain of Taihang Mountain, North China. *China Agricultural University* https://doi.org/10.7666/d.y773955
- [80] Zhao J B,Chi S J,Ning T Y,Li Z J,Gu S B, et al.2008. Study on N<sub>2</sub>O emission and its influencing factors in wheat field under conservation tillage. *Journal of China Agricultural University*. 3:196-200 <a href="https://doi.org/10.13870/j.cnki.stbcxb.2008.03.032">https://doi.org/10.13870/j.cnki.stbcxb.2008.03.032</a>
- [81] Shufeng Chen, Chengchun Sun, Wenliang Wu, Changhong Sun. 2017. Water leakage and nitrate leaching characteristics in the winter wheat-summer maize rotation system in the North China Plain under different irrigation and fertilization management practices. *Water*. 2:141 <a href="https://doi.org/10.3390/w9020141">https://doi.org/10.3390/w9020141</a>
- [82] Li X X, Hu C S, Zhang Y M, Dong W X, et al. 2006. Study on nitrate leaching under wheat and maize cropping system in North China. *Water*. 6:7-10.
- [83] Gu Limin, Liu Tiening, Wang Jingfeng, Liu Peng, Dong Shuting, et al. 2016. Lysimeter study of nitrogen losses and nitrogen use efficiency of Northern Chinese wheat. *Field Crops Research*. 188:82-95 <a href="https://doi.org/10.1016/j.fcr.2016.09.001">https://doi.org/10.1016/j.fcr.2016.09.001</a>
- [84] LUO Wen-He, SHI Zu-Jiao, WANG Xu-Min, LI Jun, WANG Rui, et al. 2017. Effects of water saving and nitrogen reduction on soil nitrate distribution and water and nitrogen use efficiency of winter wheat. *Acta Agronomica Sinica*. 6:924-936 https://doi.org/10.3724/SP.J.1006.2020.91060
- [85] Xiao X H.2004. Quantitative evaluation of water and nitrogen balance in irrigated farmland under winter wheat-summer maize rotation. *China Agricultural University*. https://doi.org/10.7666/d.y659040
- [86] Zheng W K, Wan Y S, Li Y C, Liu Z G, Chen J Q, et al. 2020. Developing water and nitrogen budgets of a wheat-maize rotation system using auto-weighing lysimeters: Effects of blended application of controlled-release and un-coated urea. *Environmental Pollution*. 263:114383 <a href="https://doi.org/10.1016/j.envpol.2020.114383">https://doi.org/10.1016/j.envpol.2020.114383</a>
- [87] Zhu AN, Zhang J B, Zhao B Z, Cheng Z H,Li L P,et al. 2005. Water balance and nitrate leaching losses under intensive crop production with Ochric Aquic Cambosols in North China Plain. *Environment International International*. 6:904-912 https://doi.org/10.1016/j.envint.2005.05.038
- [88] Wang J X, Sha Z P, Zhang J R, Qin W, Xu W, et al. 2023. Improving nitrogen fertilizer use efficiency and minimizing losses and global warming potential by optimizing applications and using nitrogen synergists in a maize-wheat rotation. *Agriculture, Ecosystems & Environment*. 353, 108538 (2023). https://doi.org/10.1016/j.agee.2023.108538
- [89] Sha Z P, Wang J X, Ma X, Lv T T, Liu X J, et al. 2023. Ammonia loss potential and mitigation options in a wheat-maize rotation system in the North China Plain: A data synthesis and field evaluation.

  \*Agriculture, Ecosystems and Environment. 352: 108512 https://doi.org/10.1016/j.agee.2023.108512
- [90] Xu P, Li G, Zheng Y, Fung JCH, Chen AP, et al. 2024. Fertilizer management for global ammonia emission reduction. *Nature*. 626:792-798 https://doi.org/10.1038/s41586-024-07020-z