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Supplement of

A historical reconstruction of cropland in China from 1900 to 2016

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Supplement

Fig. S1 Supplementary information showing national cropland data officially reported in different periods.

National cropland areas reported from different official agencies were differed and not consistent in temporal. For example, the National Land and Resources Bulletin (NLRB) released by the Ministry of Land and Resources of China has an abrupt change of national cropland in 2009 (Figure S1).

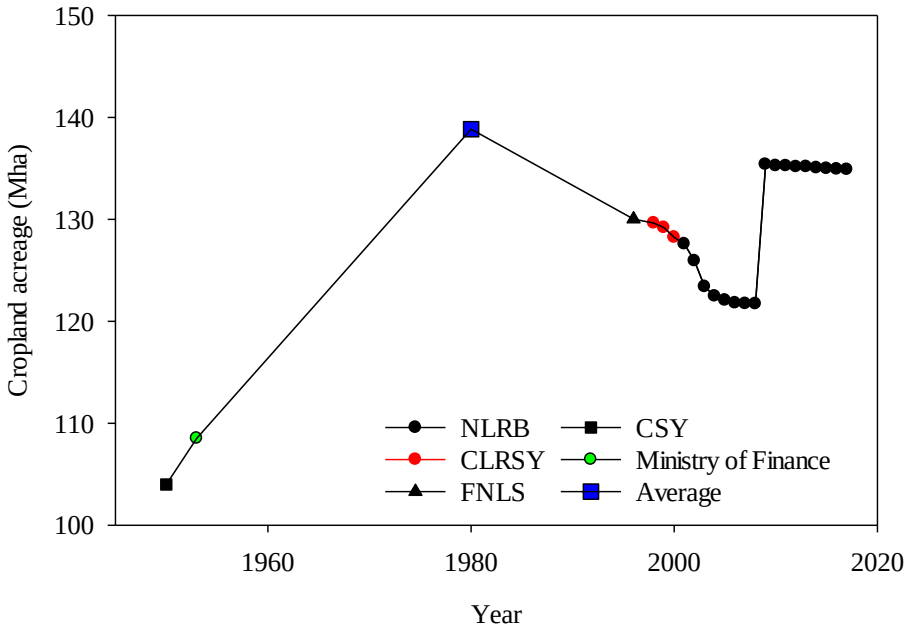

Figure S1 Comparison of the national cropland area reported from different official agencies in China (NLRB: National Land and Resources Bulletin; CSY: Chinese Statistical Yearbook; CLRSY: China Land and Resources Statistical Yearbook; FNLS: the First National Land Survey, Average: averaged from the numbers reported by the Soil Fertility Station of the

Ministry of Agriculture, the Committee of Integrated Survey of Natural Resources, the Committee of Agricultural Regionalization)

Fig. S2 Supplementary information showing original, gapfilled, and adjusted cropland data from the Chinese Agricultural Yearbook at provincial level.

The Chinese Agricultural Yearbook (CAY) from the National Bureau of Statistics of China provided annual cropland area from 1980 to 2018 at provincial level with substantial records missing (~19%). We first linearly interpolated cropland in missing years between available years. Then, we extrapolated the cropland area data to 1980 or 2019 using the trends extracted from the nearest 10-year data. We then manually adjusted cropland area in each province to remove the abrupt changes by assuming that latest data is more reliable than earlier data. We made this assumption because the cropland areas and its changes are increasingly reliable from improving technologies. The above-mentioned processes help adjust cropland to the most recent level while assimilating the inter-annual variations from each segmental period. Examples here showed original raw data, gapfilled data, and the adjusted data of cropland acreage in four provinces, including Anhui, Jiangsu, Shandong, and Heilongjiang (Figure S2).

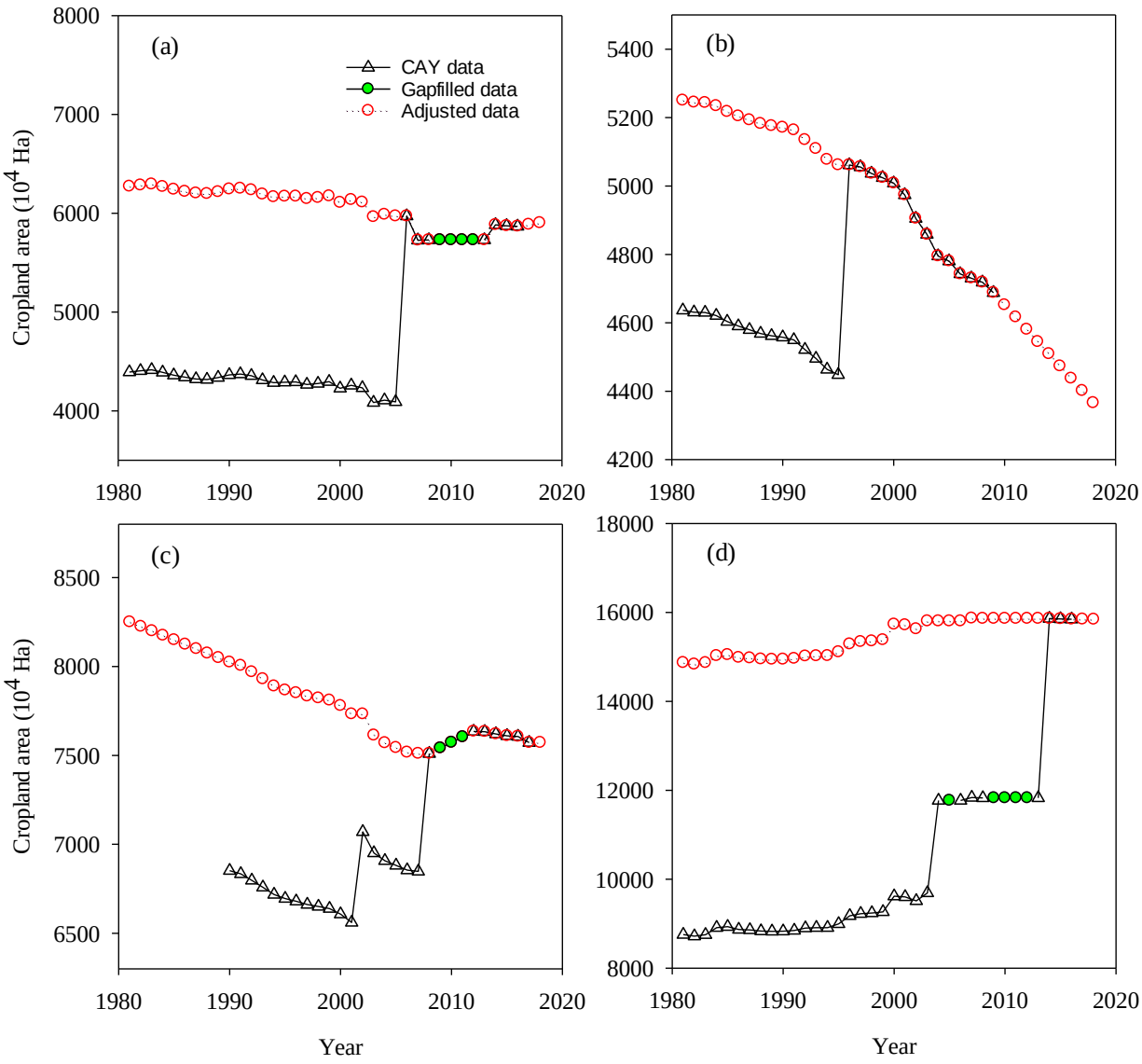

Figure S2. Adjusted cropland acreage from the Chinese Agricultural Yearbook (CAY: Chinese Agricultural Yearbook; Black triangle: cropland area from the Chinese Agricultural Yearbook; Red circle: adjusted cropland area; Figure a-d indicate cropland areas in Anhui, Jiangsu, Shandong, and Heilongjiang province, respectively)

Fig. S3 Supplementary information showing relationship between grain crop production and national cropland acreage documented from different reports.

The cropland areas officially reported in Chinese Agricultural Yearbook was distorted during the period of 1960 to 1980 due to political issues (see main text section 4.1). Here, we built relationship between the crop production and cropland acreage intermittently reported from other studies to reconstruct cropland area between 1949 and 1979.

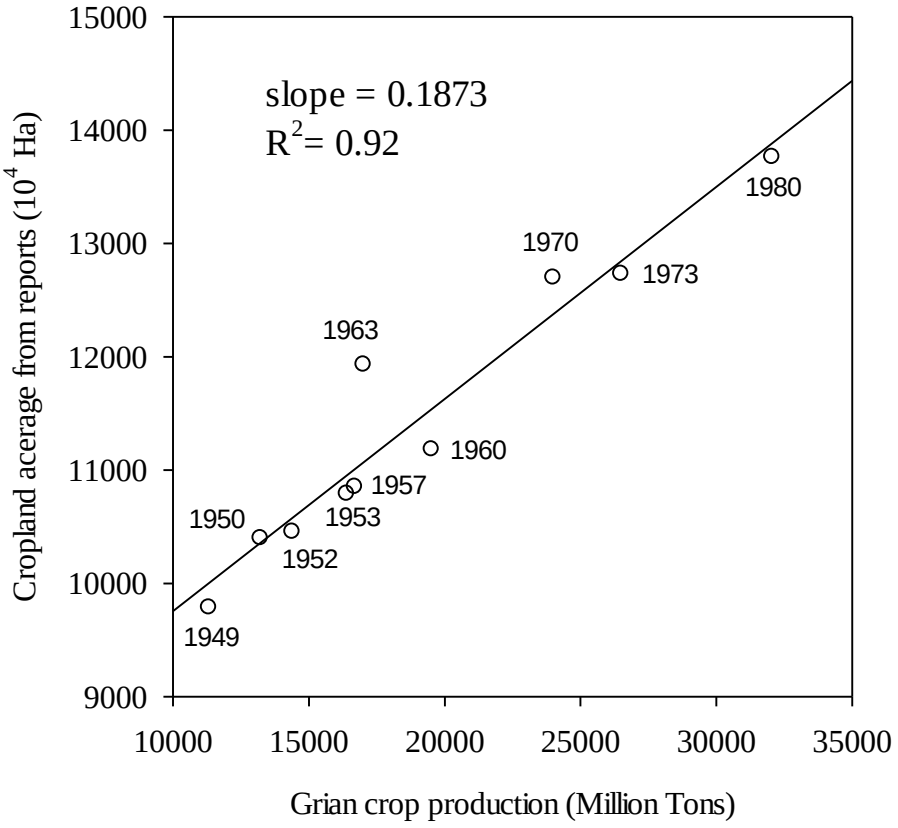

Figure S3. Relationship between grain crop production and cropland area for the 1949-1980 period

Table S1 Supplementary information showing the intermittently documented cropland area in China.

Table S1. Intermittently reported cropland area in China from different sources

Data sources	Year	Acreage (Mha)
Zheng (1991)	1949	97.88
Chinese Statistical Yearbook	1950	104.00
Feng et al. (2005)	1952	107.92
Ministry of Finance of China	1953	108.53
Feng et al. (2005), Ministry of agriculture and forestry of China	1957	111.83
Feng et al. (2005), Ministry of agriculture and forestry of China	1960	104.58
Barney (1981)	1963	119.33
WRI and UNEP (1987)	1970	127.00
Barney (1981)	1973	127.33
Average of multiple sources data*	1980	137.64

*The sources include: Committee of Agricultural Regionalization; Committee of Integrated Survey of Natural Resources; Soil Fertility Station of the Ministry of Agriculture; National Land Administration of China.

Fig. S4 Supplementary information comparing the maximum cropland coverage derived from this study and HYDE.

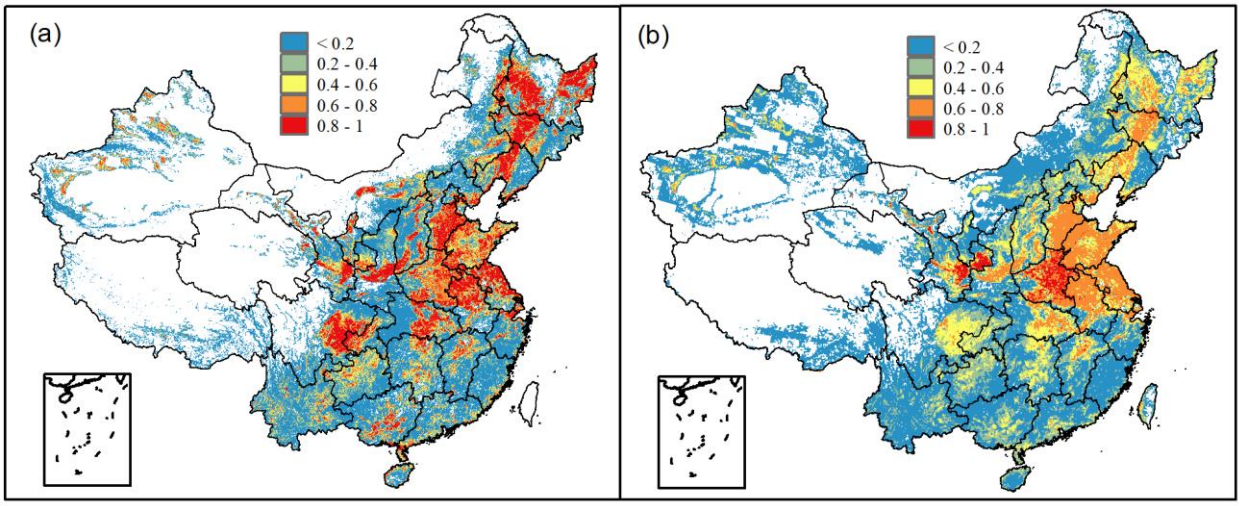

Figure S4. Maximum cropland coverage derived from (a) this study and (b) HYDE

Fig. S5 Supplementary information showing the validation of the cropland reconstructed using Global validation sample set.

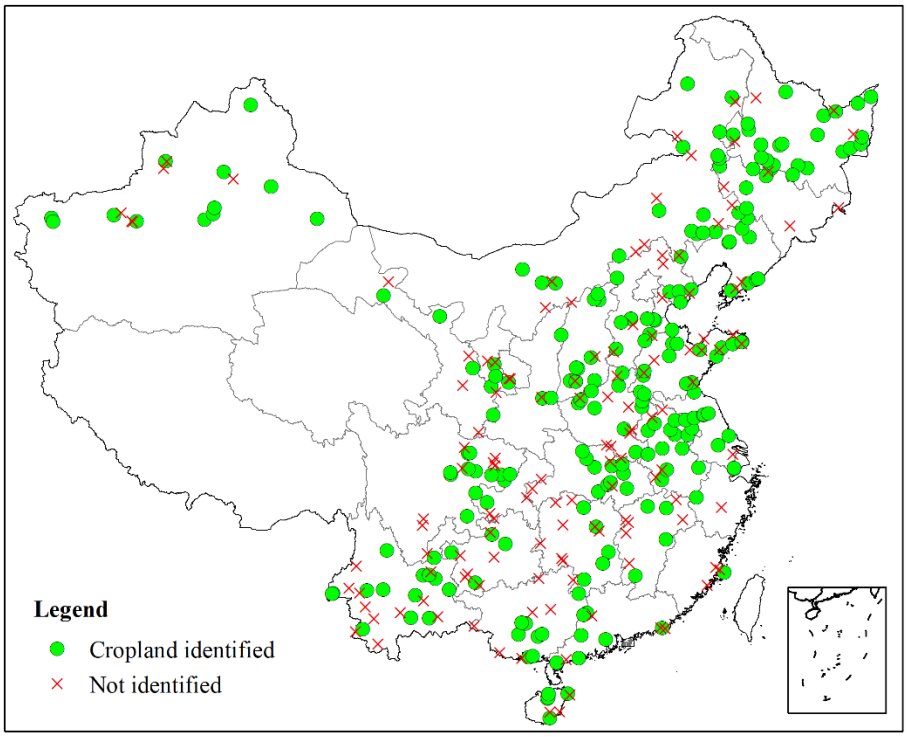

Figure S5 Validation of the cropland reconstructed using Global validation sample set v1 (http://data.ess.tsinghua.edu.cn/) (Green circle and red cross indicate cropland correctly identified and not identified from the 100-m, intermediate cropland maps during the period of 2000-2010; in total of the 356 cropland validation sites, in which 219 (62%) of the sites were correctly identified in our intermediate product)

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