

## Supplementary Materials:

**Table S1.** The number, range size and proportion of current protected areas (PAs) for wild fruit forests and wild apples in the study area.

Country	Region	Total PAs		PAs for wild fruit forests		PAs for wild apples	
		Number	Range size (km <sup>2</sup> )	Number	Range size (km <sup>2</sup> ) and proportion (%)	Number	Range size (km <sup>2</sup> ) and proportion (%)
China	Xinjiang	8	8,933	1	1,150 (12.88%)	1	1,150 (12.88%)
Kazakhstan	East Kazakhstan	7	14,689	0	0	0	0
	Almaty	16	59,492	6	33,131 (55.69%)	6	33,131 (55.69%)
	Zhambyl	2	202	0	0	0	0
	South Kazakhstan	9	85,738	3	6,508 (7.59%)	3	6,508 (7.59%)
Kyrgyzstan	/	30	18,967	10	15,135 (79.8%)	3	1,400 (7.39%)
Tajikistan	/	18	29,111	16	29,005 (99.63%)	16	29,005 (99.63%)
Uzbekistan	/	20	15,759	9	7,033 (44.63%)	5	6,413 (40.69%)
Total		110	232,891	45	91,963 (39.49%)	34	77,608 (33.32%)

**Table S2.** The range size and proportion of suitable habitats for wild apples in the current and future scenarios.

Country	Region	Range size (km <sup>2</sup> ) and proportion (%)				
		Current	2050s (SSP126)	2050s (SSP585)	2090s (SSP126)	2090s (SSP585)
China	Xinjiang	14,070(29.96%)	16,758(33.77%)	12,558(27.29%)	16,821(34.39%)	8,358(18.1%)
Kazakhstan	East Kazakhstan	3,087(6.57%)	15,582(31.4%)	20,790(45.18%)	15,099(30.87%)	28,539(61.8%)
	Almaty	8,715(18.56%)	7,707(15.53%)	6,888(14.97%)	7,497(15.33%)	6,237(13.51%)
	Zhambyl	2,835(6.04%)	1,638(3.3%)	1,239(2.69%)	1,638(3.35%)	987(2.14%)
	South Kazakhstan	3,339(7.11%)	1,512(3.05%)	672(1.46%)	1,554(3.18%)	798(1.73%)
Kyrgyzstan	/	13,587(28.94%)	6,048(12.19%)	3,843(8.35%)	6,027(12.32%)	1,239(2.68%)
Tajikistan	/	1,155(2.46%)	357(0.72%)	0	273(0.56%)	21(0.05%)
Uzbekistan	/	168(0.36%)	21(0.04%)	21(0.05%)	0	0
Total		46,956	49,623	46,011	48,909	46,179

**Table S3.** Proportional changes of suitable habitats for wild apples in the future scenarios.

Country	Region	Proportion of changes (%)			
		2050s (SSP126)	2050s (SSP585)	2090s (SSP126)	2090s (SSP585)
China	Xinjiang	19.10	19.55	-10.75	-40.60
Kazakhstan	East Kazakhstan	404.76	389.12	573.47	824.49
	Almaty	-11.57	-13.98	-20.96	-28.43
	Zhambyl	-42.22	-42.22	-56.30	-65.19
	South Kazakhstan	-54.72	-53.46	-79.87	-76.10
Kyrgyzstan	/	-55.49	-55.64	-71.72	-90.88
Tajikistan	/	-69.09	-76.36	-100.00	-98.18
Uzbekistan	/	-87.50	-100.00	-87.50	-100.00
	Total loss	-26.65	-39.71	-27.28	-55.86
	Total gain	32.33	37.70	31.44	54.20