

Table S1. Calculation of the doses of mineral fertilizers for the targeted harvest of winter wheat grain for rainfed areas of southern Kazakhstan

Variables	For the targeted 2 tons of grain per ha, kg/ha	
	N	P ₂ O ₅
Removal of nutrients with the harvest, 100 kg, kg	3.7	1.8
Required for the targeted harvest, kg/ha	74.0	36.0
Removal by crop from soil (without fertilizers) 0.7 t/ha, kg/ha	25.9	12.6
Required to be applied with mineral fertilizers, kg/ha	48.1	23.4
Coefficient of nutrient use from fertilizers, %	70.0	30.0
To be applied taking into account the use efficiency, kg/ha	59.6	20.4
Soil nutrient supply	low	low
To be applied taking into account the supply, kg/ha	60.0	20.0