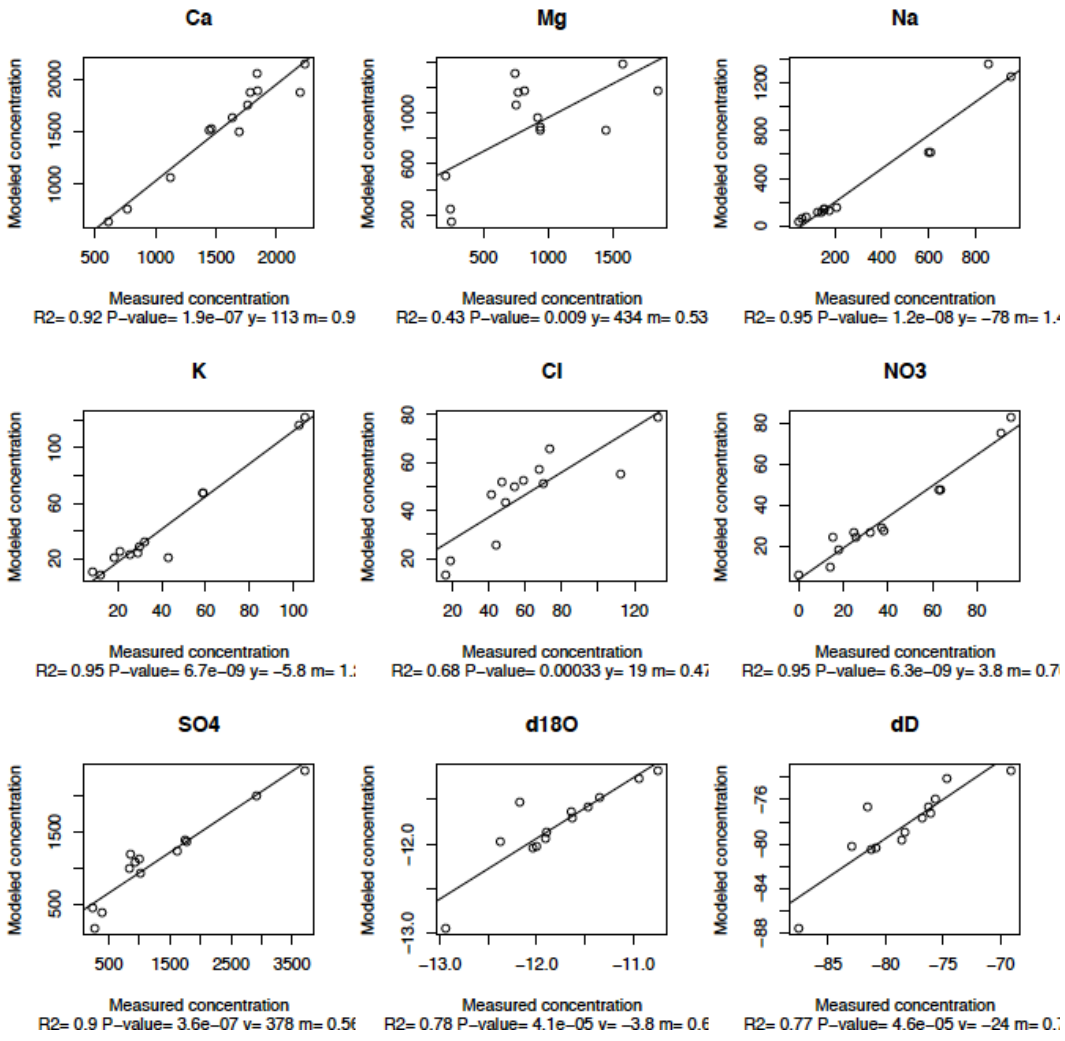


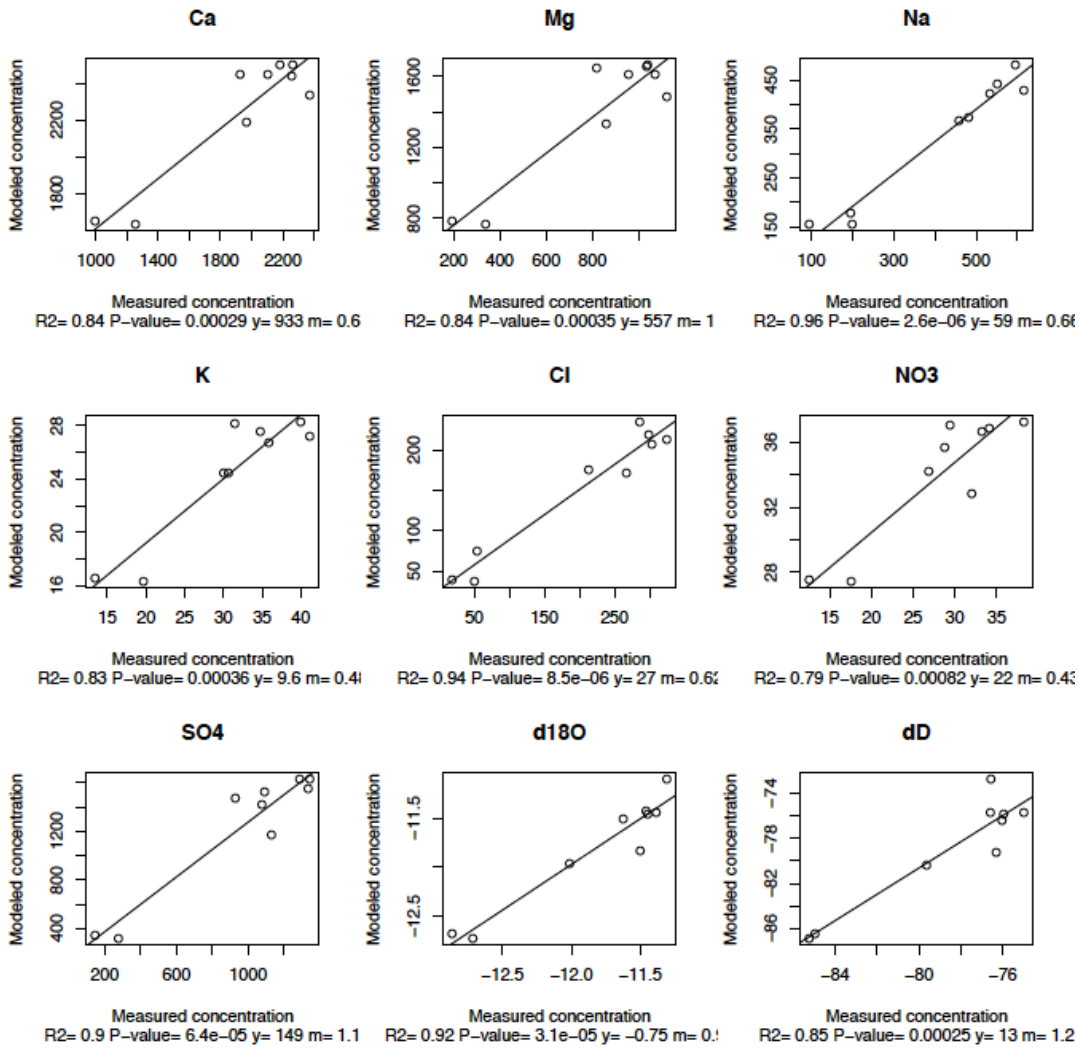
Supplementary Information:

Table S1. Survey questions during the door-to-door interviews and example responses for Kotormo, a water-regulated community near Toktogul reservoir that was relocated in 1969 due to construction of Toktogul Dam.

Survey prompt	Response
Households/ population	300/~1,600
Land allotment hectare/family	0.28
Main crops in 2000	vegetables, wheat, barley, millet
Main crops in 2016	maize, potatoes, onion, carrots
Water price and availability	1.5 Kyrgyz som for seasonal water ration; water not guaranteed
Household income 2000	Jobs in Russia, Kazakhstan and Bishkek
	Garden and small plots are not enough to feed the family
Household income 2016	Jobs in Russia, Kazakhstan and Bishkek
	Garden and small plots
	Animal stock
Migration, reasons	Unemployment, not enough land for a family
	~50% (376 out of 776 of adult population) is in Russia, Kazakhstan, Bishkek
Main needs	Irrigation water; best served with gravitation canals, not electrical water pumps
	More land if possible, land plots are smaller than in neighboring Terek Suu
	Clean water
	Jobs/employment
	Reservoir (from underground spring)
	First aid station/small clinic
Changes (2000-2016)	No positive changes
	Increase in poverty
	Increase in drinking water demand
	Not enough clean drinking water supply due to resettlement and deteriorated drinking water system. Need to install new pipes and access for increased population
	Decrease in crop productivity and yield due to limited irrigation water.



(a)



(b)

Figure S1: Observed hydro-chemical concentrations versus hydrochemistry model reconstruction for mixing model validation for Upper Naryn (a) and Lower Naryn (b) models.