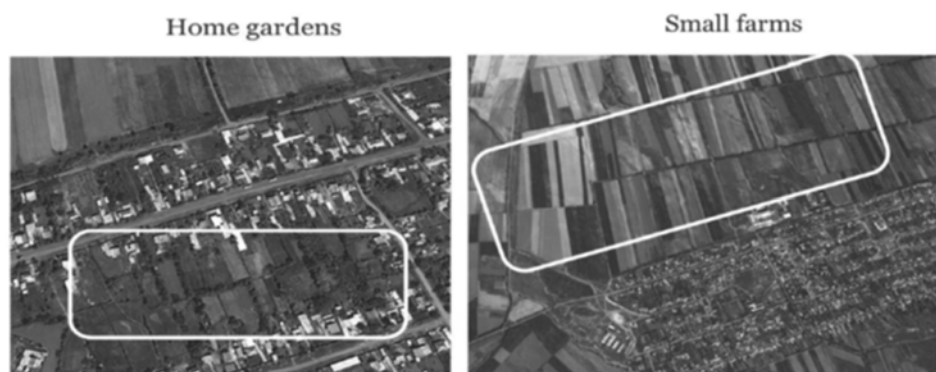Appendixes

Appendix 1A and 1B: Common characteristics of home gardens and small farms (2003)

	Home gardens	Small farms
Typical location	Adjacent to house	Outskirts of village
Average size	.29 acres	4.7 acres
Labor provided by	Both males and females	More males than females
Typical crops grown	Most fruits and nuts, some vegetables	All cereals, all fodder/hays, some vegetables
Income potential	83% of home gardens cultivated solely for household consumption	30% of farms cultivated solely for household consumption 67% of farms cultivated for both family consumption and sales
Irrigation	Typically households carry water from nearest source, only 11% of land is irrigated by canals	35% of land is irrigated by canals and 59% is irrigated by diverted river water

Source of map: Google Earth (accessed in 2013).

Appendix 1c: Alternative Farm Inputs, Difference-in-Differences

VARIABLES	(1) Farm expenditures (KGS)	(2) Cultivated land (hectares)	(3) Irrigated area (hectares)	(4) Log farm expenditures	(5) Log cultivated land	(6) Log irrigated area
Water system	-388.2	870.8	760.1	0.110	0.0773	0.0891
	(626.1)	(2,803)	(2,874)	(0.219)	(0.179)	(0.176)
Mean baseline	3216.6	22754.1	23195.6	3216.6	22754.1	23195.6
Household observations	3,221	3,208	3,208	2,464	3,189	3,195
Number of villages	42	42	42	42	42	42
R-squared	0.346	0.161	0.167	0.544	0.343	0.345

Notes: Results are for difference-in-differences regressions using the household survey data collected via the Kyrgyz Integrated HH Survey between

2003 and 20010. Sample is restricted to those villages that applied to receive a water supply system. Baseline means are calculated for 2003-2004.

Farm expenditures are in Kyrgyz soms (KGS); during this period of time the average exchange was approximately 41.32 KGS=1 USD. "Water system"

is an indicator of whether the village received the water infrastructure.   All columns include controls for (1) Controls for land characteristics; (2)

number of people and children 14 and younger in a household; (3) district-year fixed effects; and (4) village fixed effects. Controls for land

characteristics include: total plot size, proportion of land irrigated, number of land plots total, proportion of land that is privately owned, proportion of

land that is cultivated, and total farm-related expenditures. Standard errors are clustered at the village level and in parentheses. Statistical significance is

denoted by: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Appendix 2: Percent distribution of households according to the person collecting water used in the household (2006)

Region	Adult women	Girls < age 15	Adult men	Boys < age 15
Issyk Kul	28.2	6.8	47.4	13.4
Naryn	27.5	8.5	46.2	13.2
Talas	37.9	5.3	47	8.2

Source: UNICEF Multiple Indicator Cluster Survey, 2006.

Appendix 3: Village selection process description:

An effort was made to select villages for the intervention in a transparent and fair manner to receive the water supply systems. All villages in the three provinces, 322 in total, were informed of the upcoming large-scale project and the process of applying to participate, should their village require an improved water supply system. If interested, village heads were required to send a letter of intent on behalf of their constituents. This resulted in 255 eligible villages identified. Between 2003 and 2006, approximately 173 rural villages in the northern 3 provinces of Kyrgyzstan were selected to receive an improved water supply system, in the form of communal standpipes, through this effort.

Each eligible village was scored based on five factors:

1. Need for water: determined through a participatory community appraisal and through the observations of the project engineers (this was allocated twice the weight of the other score components);

2. Poverty levels: determined based on numbers of people living in poverty as calculated by the local government;

3. Economic and technical feasibility: based on the project engineers' calculations of the cost per person, which was typically higher if the water source was located far enough away to necessitate long distances of water pipes; and

4. Community participation: based on expressions of support from community groups and their participation in previous projects.

Efforts were taken to try to ensure that the scores were not manipulated for political reasons; final scores were an average of scores provided by a panel of representatives from government agencies and international organizations. Scores were used to determine when a village received a water supply system through this program. Selection occurred annually from 2003 to 2006, with some portion of villages selected in each of those years. Due to an effort to ensure that all districts in the three northern provinces would be represented, albeit not equally, scoring was stratified by district.

Appendix 4: Time between village selection and water supply system completion

Number of years
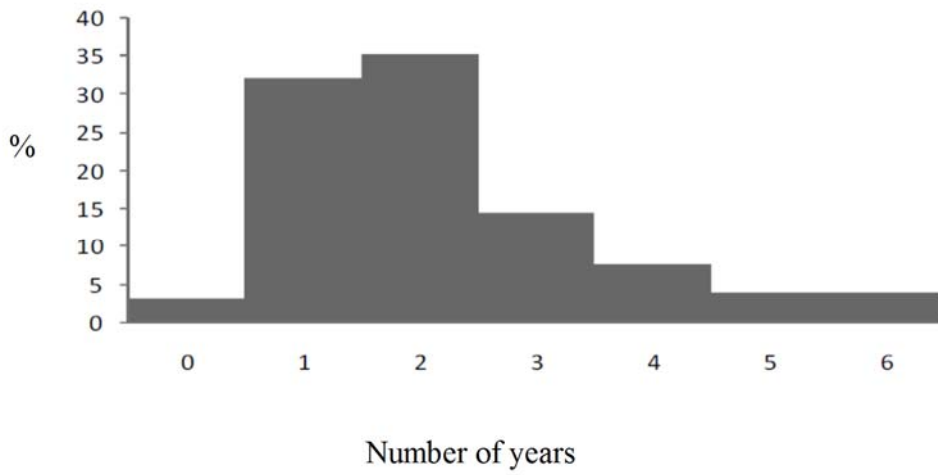
Notes: Calculations based on data from the PMC.

Appendix 5: Major Categories of Time Use

Variables	Description
Total work	Includes formal work, informal work, farm work, and work in home gardens.
Formal work	Includes work that is paid a salary.
Informal work	Includes work that is entrepreneurial, intermediary, trade, or individual working activity.
Work in farms	Includes work in farms for crops and livestock.
Work in home gardens	Includes work in home gardens for crops and livestock.
Transportation to/from work	Time spent commuting to work.
Housework	Includes rime spent buying groceries and non-food items, cooking, dishes, laundry, sewing, cleaning, taking care of elderly family members, and other types of domestic labor.
Education	Includes studies, training, and self-education.
Free time	Includes various leisure activities, such as time spent going to the cinema or theater, watching TV, listening to the radio, walking with friends, sports and exercise, hobbies, religious activities, and doing nothing.
Self care	Includes time spent sleeping, looking after oneself, eating, and going to hospitals and bath houses.
Care of children	Includes time spent feeding, washing, bathing, and attending to children.
Helping others	Includes helping relatives and acquaintances.

Appendix 6: Timing of main cereal crops: sowing and harvesting
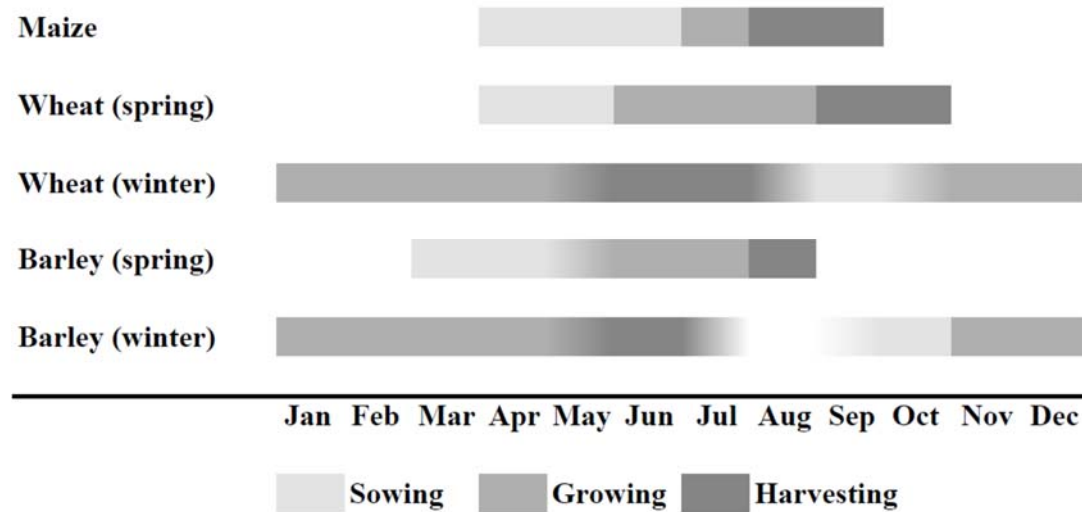
Notes: Created based on information from FAO (2009) and FAO GIEWS (2011).

Appendix 7: Time Use Impacts by Season

Seasons separated, the number of minutes spent…

	(1)	(2)	(3)
	Home Production	Market Work	Leisure
Panel A: Spring season only			
Water system	-100.900***	39.030**	61.870***
	(20.227)	(15.745)	(13.002)
	[0.005]	[0.025]	[0.000]
Mean (# minutes per day)	1018.20	89.24	332.55
Observations	887	887	887
R-squared	0.40	0.21	0.31
Number of villages	27	27	27
Panel B: Summer season only			
Water system	-141.362***	111.237***	30.124**
	(15.385)	(10.996)	(10.228)
	[0.005]	[0.000]	[0.000]
Mean (# minutes per day)	930.12	209.70	300.18
Observations	408	408	408
R-squared	0.41	0.39	0.25
Number of villages	10	10	10
Panel C: Fall season only			
Water system	-36.754*	63.467***	-26.713
	(19.070)	(20.913)	(20.865)
	[0.105]	[0.000]	[0.300]
Mean (# minutes per day)	973.37	148.58	318.05
Observations	889	889	889
R-squared	0.44	0.34	0.35
Number of villages	22	22	22

Notes: Time use data collected for household members 12 years and older via the KIHS (2005, 2010). Observations are individual level. Time use is measured in number of minutes per twenty-four hour period (totaling 1440 minutes). All regressions include the following controls: (1) season dummies, (2) day of week dummies, (3) respondent age and gender, (4) size of respondent's household, (5) district-year fixed effects, and (6) village fixed effects. Time use categories are described in the Appendix. Standard errors are clustered at the village level and in parentheses, with

statistical significance denoted by: *** p<0.01, ** p<0.05, * p<0.1. Wild bootstrap clustered

(village) p-values in brackets.

Appendix 8: Time Use Controlling for Village Score * Year

The number of minutes spent on…

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-------- Types of Home Production ---------			------------------- Types of Market Work -------------------				
	Work in home garden	Caring for children	Self care (excluding sleep)	Work on HH farm	Regular paid work	Other work	Transport to/from work	Leisure
Panel A: Males								
Water system	-84.693	-8.394	-51.511***	96.550**	15.528	-10.835	-0.825	114.533***
	(55.495)	(7.037)	(13.325)	(39.153)	(11.755)	(18.419)	(6.678)	(33.530)
	[0.428]	[0.400]	[0.092]	[0.192]	[0.260]	[0.580]	[0.928]	[0.016]
Mean (# of minutes)	96.40	8.59	152.48	210.82	22.46	13.85	14.37	325.77
Individual observations	816	816	816	816	816	816	816	816
Number of villages	27	27	27	27	27	27	27	27
R-squared	0.34	0.26	0.52	0.51	0.21	0.080	0.26	0.38
Panel B: Females								
Water system	-67.487	4.642	-91.026***	112.164***	-13.097	1.293	5.322	30.946
	(49.627)	(19.320)	(23.218)	(21.257)	(11.597)	(5.936)	(5.104)	(67.242)
	[0.536]	[0.956]	[0.108]	[0.024]	[0.320]	[0.932]	[0.508]	[0.820]
Mean (# of minutes)	61.89	51.56	168.16	51.57	38.71	4.93	6.36	278.21
Individual observations	820	820	820	820	820	820	820	820
Number of villages	27	27	27	27	27	27	27	27
R-squared	0.31	0.17	0.51	0.34	0.12	0.072	0.26	0.28

Notes: Results are for difference-in-differences regressions. Time use data were collected for household members 12 years and older via the

Kyrgyz Integrated Household Survey (2005 and 2010). Sample is limited to those villages that were scored and eventually receive the water

supply system. Time use is measured in number of minutes per twenty-four hour period (totaling 1440 minutes). All regressions include the

following controls: (1) season dummies, (2) day of week dummies, (3) respondent age and gender, (3) size of respondent's household, (4)

district-year fixed effects, (5) village fixed effects, and (6) score*year controls. Means are calculated for 2005. For a description of the time use

categories, see Appendix. Standard errors are clustered at the village level and in parentheses, with statistical significance denoted by: ***

p<0.01, ** p<0.05, * p<0.1. Wild bootstrap clustered (village) p-values in brackets.