

## **Supplemental Information**

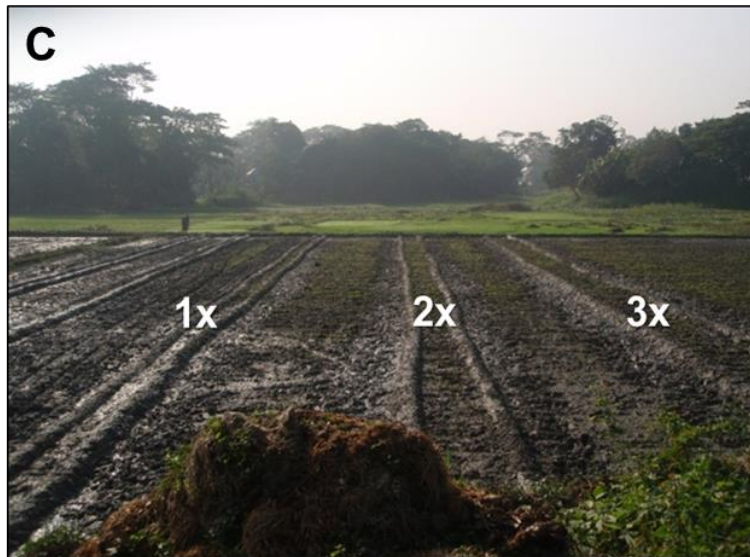
### **Arsenic Removal from Flowing Irrigation Water in Bangladesh: Impacts of Channel Properties**

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**Supplemental Figure S1. Field Pictures.** **A.** 45-cm-wide, 45-m-long control channel prior to experimentation. **B.** Tarp-lined, soil-free channel, prior to experimentation. Plastic tarp was held down with mounded soil on the top of channel walls. **C.** 1x-, 2x-, and 3x-width channels, prior to experimentation. **D.** Turbid irrigation water flowing along the wetting front in a 3x-width channel.



**Supplemental Table S1. Arsenic (III) Data.** Averages and ranges of the percent total arsenic ( $As_T$ ) found as  $As(III)$ . For each experimental trial,  $As(III)$  was measured at the beginnings and ends of channels, along the wetting front and during the final full-flow sampling time point. Filtered samples were passed through speciation cartridges that retained  $As(V)$ , and all  $As$  in the eluent was considered to be  $As(III)$  (see section 2 of the main text for complete methods). In tables below, asterisked numbers in parentheses indicate recalculated averages which omit an outlying  $As(III)$  measurement that was  $> 110\%$  of  $As_T$ .

**A. Control Channels**

	0 m		45 m	
	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)
<b>Wetting Front (0 min)</b>	63.3	45.3-81.3	73.9	70.8-76.1
<b>Full Flow (35 min)</b>	91.5	90.1-94.0	96.4	90.3-99.6

**B. Soil-free Channels**

	0 m		45 m	
	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)
<b>Wetting Front (0 min)</b>	72.3	66.4-78.2	92.4	89.2-95.6
<b>Full Flow (35 min)</b>	83.1	82.1-84.1	92.5	78.9-106.0

**C. Channels with 2x Width**

	0 m		45 m	
	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)
<b>Wetting Front (0 min)</b>	92.4	90.1-96.1	144.6 (89.4*)	79.9-255.1
<b>Full Flow (35 min)</b>	85.8	74.4-92.2	88.0	82.2-96.2

**D. Channels with 3x Width**

	0 m		45 m	
	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)	Average $As(III)/As_T$ (%)	Range of $As(III)/As_T$ (%)
<b>Wetting Front (0 min)</b>	90.3 (76.9*)	75.8-116.9	80.4	72.6-89.9
<b>Full Flow (35 min)</b>	115.0 (101.4*)	97.5-142.2	89.0	81.3-95.4

### E. Channels with Increased Length

	0 m		200 m	
	Average As(III)/As <sub>T</sub> (%)	Range of As(III)/As <sub>T</sub> (%)	Average As(III)/As <sub>T</sub> (%)	Range of As(III)/As <sub>T</sub> (%)
<b>Wetting Front (0 min)</b>	97.1 (90.4*)	86.7-110.4	94.7 (84.2*)	69.8-115.6
<b>Full Flow (45 min)</b>	118.0 (104.9*)	104.9-135.7	100.9 (92.0*)	87.1-118.8

**Supplemental Table S2. Dissolved Oxygen, pH, Conductivity, and Redox Potential (ORP) Data.** Data were collected for select experimental trials during full-flow conditions. Multiprobe calibration varied slightly from day to day, and accordingly, data within given experimental trials are more comparable than data across trials.

**A. Control Channel, after 35 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	2.55	7.03	657	-136
15	2.61	7.04	655	-132.5
30	2.6	7.03	655	-132.5
45	2.51	7.05	654	-130

**B.1. Soil-free Channel, Trial 1, after 35 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	2.5	6.81	669	-125.5
15	2.58	6.9	667	-127.4
30	2.76	6.93	665	-125
45	2.65	6.94	663	-123.3

**B.2. Soil-free Channel, Trial 2, after 35 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	2.7	7.05	657	-140.4
15	2.69	7.07	655	-137.5
30	2.37	7.06	654	-135.8
45	2.43	7.08	653	-133

**C. Channel with 2x Width, after 35 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	2.13	7.05	649	-120.1
15	2.07	7.07	647	-125.6
30	2.06	7.08	640	-124.9
45	2.38	7.14	610	-120.2

**D. Channel with 3x Width, after 35 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	1.58	7.02	648	-126.7
15	1.97	7.05	693	-124.3
30	3.06	7.06	640	-122.7
45	1.99	7.08	634	-122.1

**E. Channel with Increased Length, after 45 minutes of channel flow**

Distance along Channel (m)	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
0	1.47	7.16	643	-133
50	1.34	7.15	637	-125
100	1.17	7.14	630	-121.3
150	1.33	7.14	628	-118.3
200	1.47	7.2	623	-116.3

**F. Manifold Channel**

Location	Dissolved Oxygen (mg/L)	pH	Conductivity ( $\mu\text{S/cm}$ )	ORP (mV)
Irrigation well	1.41	6.83	680	-139.6
Manifold channel, midway	2.47	6.96	671	-137.5
Manifold channel, near field inlet	2.57	6.98	668	-132.8