

## Supplemental materials

(Can be posted if the paper is accepted)

### Farming Knowledge Quiz

1. What is the dominant system of modern farming in the US?
  - a) Organic agriculture
  - b) Large scale monoculture
  - c) Biannual root crops
  - d) Small scale permaculture
2. What practice does NOT lead to an increase of ecological damage from agriculture?
  - a) Slash and burn system used to increase biodiversity
  - b) Using natural fertilizers (such as manure) on erosion-prone land
  - c) Recycling nutrients
  - d) Substituting pesticides and herbicides with intensive tillage practices
3. Which technology best describes organic farming?
  - a) Biological pest control
  - b) Genetically modified products
  - c) Intensive aquaculture
  - d) Stock-free gardening
4. What is the farm bill?
  - a) This is a bill that a farmer sends to the USDA (US Department of Agriculture) each year to get farming subsidies
  - b) This is a bill that outlines the agricultural and food policy in the US for the next 5 years
  - c) This is a bill that the government sends to each farmer to pay for crop insurance
  - d) This is a special bill of the IRS (Internal Revenue Service) which outlines the tax responsibilities of farmers
5. What is a primary problem associated with using monoculture?
  - a) Low biodiversity leads to build up of pests necessitating the greater use of pesticides and fertilizers
  - b) Greater use of shifting cultivation systems and perennial crops
  - c) Nutrient use is uniform and pests tend to build up which leads to a necessity for manual pest control and cultivation of annual and then perennial crops for several years
  - d) In some environments the timing and extent of agriculture may be limited by rainfall which requires irrigation when using monoculture
6. What is NOT a sustainable alternative to the conventional agriculture approach?
  - a) Integrated farming and holistic management
  - b) Agricultural diversification
  - c) Community supported agriculture
  - d) Intensification, concentration, and specialization
7. What are the adverse effects of intensive (conventional) tillage practices?

- a) Soils get warm and hence lead to less controlled and less successful planting
  - b) Incorporation of fertilizer and control of weeds
  - c) Soil is more prone to erosion and chemical runoff
  - d) A necessity for intensive rotational nutrient management
8. What statement describes *integrated pest management*?
- a) It integrates chemical practices into biocontrol and mechanical (i.e. tillage) practices
  - b) It stresses the use of crop rotation, culling, intercropping, and composting
  - c) It outlines the use of selective breeding techniques to make crops more resilient against weeds, insects and diseases
  - d) It integrates pests eradication with fertilization to achieve an optimal growing environment for plants
9. What does “Roundup ready” seed mean?
- a) A genetically modified herbicide-tolerant crop
  - b) A genetically modified insect-resistant crop
  - c) A hybridized or cross-pollinated with wild species crop
  - d) A glyphosate-resistant weed
10. What is the Federal Crop Insurance Program?
- a) The multi-peril crop insurance offered by the USDA under the Noninsured Assistance Program
  - b) The subsidized crop insurance provided to agricultural producers through the Risk Management Agency of the USDA
  - c) The hybrid private insurance program subsidized by the Federal Farm Assistance Bureau (FFAB)
  - d) The program that offers catastrophic (CAT) coverage to agricultural producers who do not want to buy private crop insurance

Answers:

- |      |       |
|------|-------|
| 1. B | 6. D  |
| 2. C | 7. C  |
| 3. A | 8. B  |
| 4. B | 9. A  |
| 5. A | 10. B |

## Summary of Experimental Instructions

### 1. Baseline (2008 Farm Bill), rounds 1-10 [distributed to all players]

#### Basics:

- The game will be played for 20 rounds with the same person
- Your earnings will consist of the sum of your net profit in 20 rounds
- The exchange rate is \$1=500 tokens
- Your cash earnings will be paid to you privately
- Your decisions are confidential and anonymous
- Communication with other participants is not allowed

#### Stages of a round:

##### Stage 1: Upstream Farmer's decision on Conservation Tillage

Upstream Farmer decides how much of his/her 500 acres of farming land to place under Conservation Tillage (CT). Various possible payoffs (in tokens) are presented in the table below.

**NOTE: UF can choose any amount of acres between 0 and 500, it does not have to be a number from the table.**

Level of CT, acres	UF's profit from farming	Crop Insurance Subsidy to UF	Direct Payment to UF	UF's net profit	DWU's profit	Part of CIS paid by DWU	Part of DP paid by DWU	DWU's net profit
0	1500	200	0	1700	500	67	0	433
50	1400	200	0	1600	600	67	0	533
100	1300	200	0	1500	700	67	0	633
150	1200	200	0	1400	800	67	0	733
200	1100	200	0	1300	900	67	0	833
250	1000	200	100	1300	1000	67	33	900
300	900	200	100	1200	1100	67	33	1000
350	800	200	100	1100	1200	67	33	1100
400	700	200	100	1000	1300	67	33	1200
450	600	200	100	900	1400	67	33	1300
500	500	200	100	800	1500	67	33	1400

##### Stage 2: Information about profit:

Downstream Water User and Upstream Farmer will be given information about:

- (1) Level of Conservation Tillage chosen by Upstream Farmer
- (2) Net profits of UF and DWU

### 2. Treatment 1 (No nudging), rounds 11-20 [distributed only to the players in the respective treatment]

#### Stages of a round:

##### Stage 1: Upstream Farmer's decision on Conservation Tillage

Same as in rounds 1-10, Upstream Farmer decides on CT. The new payoffs (in tokens) for various choices of CT are presented in the table below.

**NOTE: UF can choose any amount of acres between 0 and 500, it does not have to be a number from the table.**

Level of CT, acres	UF's profit from farming	Crop Insurance Subsidy to UF	UF's net profit	DWU's profit	Part of CIS paid by DWU	DWU's net profit
0	1500	300	1800	500	100	400

<b>50</b>	1400	300	<b>1700</b>	600	100	<b>500</b>
<b>100</b>	1300	300	<b>1600</b>	700	100	<b>600</b>
<b>150</b>	1200	300	<b>1500</b>	800	100	<b>700</b>
<b>200</b>	1100	300	<b>1400</b>	900	100	<b>800</b>
<b>250</b>	1000	300	<b>1300</b>	1000	100	<b>900</b>
<b>300</b>	900	300	<b>1200</b>	1100	100	<b>1000</b>
<b>350</b>	800	300	<b>1100</b>	1200	100	<b>1100</b>
<b>400</b>	700	300	<b>1000</b>	1300	100	<b>1200</b>
<b>450</b>	600	300	<b>900</b>	1400	100	<b>1300</b>
<b>500</b>	500	300	<b>800</b>	1500	100	<b>1400</b>

*Stage 2: Information about profit:*

Same as in rounds 1-10.

### **3. Treatment 2 (Financial Nudging), rounds 11-20 [distributed only to the players in the respective treatment]**

Stages of a round:

*Stage 1: Upstream Farmer's decision on Conservation Tillage*

Same as in rounds 1-10, Upstream Farmer decides on CT. The new payoffs (in tokens) for various choices of CT are presented in the table below.

**NOTE: UF can choose any amount of acres between 0 and 500, it does not have to be a number from the table.**

<b>Level of CT, acres</b>	<b>UF's profit from farming</b>	<b>Crop Insurance Subsidy to UF</b>	<b>UF's net profit</b>	<b>DWU's profit</b>	<b>Part of CIS paid by DWU</b>	<b>DWU's net profit</b>
<b>0</b>	1500	0	<b>1500</b>	500	0	<b>500</b>
<b>50</b>	1400	0	<b>1400</b>	600	0	<b>600</b>
<b>100</b>	1300	0	<b>1300</b>	700	0	<b>700</b>
<b>150</b>	1200	0	<b>1200</b>	800	0	<b>800</b>
<b>200</b>	1100	0	<b>1100</b>	900	0	<b>900</b>
<b>250</b>	1000	300	<b>1300</b>	1000	100	<b>900</b>
<b>300</b>	900	300	<b>1200</b>	1100	100	<b>1000</b>
<b>350</b>	800	300	<b>1100</b>	1200	100	<b>1100</b>
<b>400</b>	700	300	<b>1000</b>	1300	100	<b>1200</b>
<b>450</b>	600	300	<b>900</b>	1400	100	<b>1300</b>
<b>500</b>	500	300	<b>800</b>	1500	100	<b>1400</b>

*Stage 2: Information about profit:*

Same as in rounds 1-10.

### **4. Treatment 3 (Empathy Nudging), rounds 11-20 [distributed only to the players in the respective treatment]**

Stages of a round:

*Stage 0: Downstream Water User's message to Upstream Farmer*

Before Upstream Farmer makes a decision, Downstream Water User can send Upstream Farmer a message.

*Stage 1: Upstream Farmer's decision on Conservation Tillage*

Same as in rounds 1-10, Upstream Farmer decides on CT. The new payoffs (in tokens) for various choices of CT are presented in the table below.

**NOTE: UF can choose any amount of acres between 0 and 500, it does not have to be a number from the table.**

Level of CT, acres	UF's profit from farming	Crop Insurance Subsidy to UF	UF's net profit	DWU's profit	Part of CIS paid by DWU	DWU's net profit
0	1500	300	<b>1800</b>	500	100	<b>400</b>
50	1400	300	<b>1700</b>	600	100	<b>500</b>
100	1300	300	<b>1600</b>	700	100	<b>600</b>
150	1200	300	<b>1500</b>	800	100	<b>700</b>
200	1100	300	<b>1400</b>	900	100	<b>800</b>
250	1000	300	<b>1300</b>	1000	100	<b>900</b>
300	900	300	<b>1200</b>	1100	100	<b>1000</b>
350	800	300	<b>1100</b>	1200	100	<b>1100</b>
400	700	300	<b>1000</b>	1300	100	<b>1200</b>
450	600	300	<b>900</b>	1400	100	<b>1300</b>
500	500	300	<b>800</b>	1500	100	<b>1400</b>

*Stage 2: Information about profit:*

Same as in rounds 1-10.

#### **5. Treatment 4 (Empathy & Financial Nudging), rounds 11-20 [distributed only to the players in the respective treatment]**

Stages of a round:

*Stage 0: Downstream Water User's message to Upstream Farmer*

Before Upstream Farmer makes a decision, Downstream Water User can send Upstream Farmer a message.

*Stage 1: Upstream Farmer's decision on Conservation Tillage*

Same as in rounds 1-10, Upstream Farmer decides on CT. The new payoffs (in tokens) for various choices of CT are presented in the table below.

**NOTE: UF can choose any amount of acres between 0 and 500, it does not have to be a number from the table.**

Level of CT, acres	UF's profit from farming	Crop Insurance Subsidy to UF	UF's net profit	DWU's profit	Part of CIS paid by DWU	DWU's net profit
0	1500	0	<b>1500</b>	500	0	<b>500</b>
50	1400	0	<b>1400</b>	600	0	<b>600</b>
100	1300	0	<b>1300</b>	700	0	<b>700</b>
150	1200	0	<b>1200</b>	800	0	<b>800</b>
200	1100	0	<b>1100</b>	900	0	<b>900</b>
250	1000	300	<b>1300</b>	1000	100	<b>900</b>
300	900	300	<b>1200</b>	1100	100	<b>1000</b>
350	800	300	<b>1100</b>	1200	100	<b>1100</b>
400	700	300	<b>1000</b>	1300	100	<b>1200</b>
450	600	300	<b>900</b>	1400	100	<b>1300</b>
500	500	300	<b>800</b>	1500	100	<b>1400</b>

*Stage 2: Information about profit:*

Same as in rounds 1-10.