

**Online appendix: Instructions pertaining to the IFG and MIFG protocols reported in the paper “A field experiment on the impact of weather shocks and insurance on risky investment”**

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Notes:

- Text in *italics* was not part of the original subject instructions.
- *Each (modified) investment in fertilizer game protocol, (M)IFG, was preceded by a willingness to pay protocol. Accordingly, the instructions made references to things observed “before”.*
- *The instructions were explained orally by the experimenter in English with live translation into Amharic.*

### 0.1 Introduction

















- Hello.
- As mentioned before, today we will do two types of sessions.
- The first session was on weather insurance and has been completed.
- The second session is on fertilizer purchases.
- I will now explain the second session. Then, you will make your decisions in this session.
- Remember:
  - If there are any questions at any point, please raise your hand and ask.
  - Please do NOT talk to one another during the session unless we ask you to do so. The decisions you make are personal.
  - At the end of this session as well, you will be paid in cash for any earnings you make. So, it is very important that you (1) understand what is expected of you and (2) take the decisions you make seriously.
  - These are REAL decisions that affect your earnings, so you should (1) think them through carefully and (2) always make your preferred decision-just as you do when you make any other decision.

### 0.2 Initial earnings

- If you would like to buy fertilizer, you should use the earnings from the first session (those contained in the white envelope) to do so.

### 0.3 Describing the probability of bad (good) weather

- *The experimenter was physically showing the bag and the pen tops while discussing the text below.*
- Similarly to before, we will draw a pen top from the following bag.
- The bag will contain  $X$  pen tops:  $X - 1$  black and 1 blue.<sup>1</sup>
- The  $X - 1$  black pen tops represent good weather and the blue pen top represents bad weather, which means that Kiremt rains failed.
- Just as before, there are  $X - 1$  black pen tops and 1 blue pen top in the bag, which means that there is an  $(X - 1)/X$  chance that the weather is good and  $1/X$  chance that the weather is bad.
- So, as we saw previously, any time we pick a pen top from the bag, it may be black or blue.
- But, the black pen tops are more likely because there are more black pen tops (than blue pen tops) in the bag.

WITHOUT INSURANCE			
WEATHER	FERTILIZER	BAGS	NET EARNINGS
 NO RAIN		0	Harvest: +5 Consumption: -8 Net earnings: -3
		1	Harvest: +5 Consumption: -8 Net earnings: -3
		2	Harvest: +5 Consumption: -8 Net earnings: -3
 		0	Harvest: +10 Consumption: -8 Net earnings: +2
		1	Harvest: +11.25 Consumption: -8 Net earnings: +3.25
		2	Harvest: +12.50 Consumption: -8 Net earnings: +4.50
WITH INSURANCE 			
WEATHER	FERTILIZER	BAGS	NET EARNINGS
 NO RAIN	 	0	Harvest: +5 Consumption: -8 Insurance: +3 Net earnings: +0
	 	1	Harvest: +5 Consumption: -8 Insurance: +3 Net earnings: +0
	 	2	Harvest: +5 Consumption: -8 Insurance: +3 Net earnings: +0

ALL ELSE EQUAL SINCE INSURANCE ONLY PAID IN TIMES OF BAD WEATHER

**Fig. 1** Graphical display of IFG and MIFG protocols

#### 0.4 Fertilizer and weather

- The picture in figure 1 was displayed on a large board at the front of the room. This was used to illustrate the basics of the game protocol (such as the choice set and earnings conditional on the choice and weather) as explained below.

<sup>1</sup> X was varied according to the probability of bad weather which varied from 1/3 to 1/4 to 1/5 across sessions.

- In a moment, you will make a choice whether or not to buy fertilizer and if so, how much. You can choose to buy 0, 1 or 2 bags of fertilizer. Each bag of fertilizer costs 1 birr.
- As before, just like in the case of your harvest, you will make more money when there is good weather and you put more fertilizer on your field. So, the earnings from your plot in any given year depend BOTH on the weather-i.e., if the weather is good or Kiremt rains fail-AND the amount of fertilizer you purchase and apply to your plot.
- If a black pen top occurs, you will make:
  1. 10 birr if no fertilizer is applied. This 10 birr represents the income earned from 1 hectare of land in a year when there is good weather and NO fertilizer is applied.
  2. 11.25 birr if 1 bag of fertilizer is applied. This 11.25 birr represents the income earned from 1 hectare of land in a year when there is good weather and 1 bag of fertilizer is applied.
  3. 12.50 birr if 2 bags of fertilizer are applied. This 12.50 birr represents the income earned from 1 hectare of land in a year when there is good weather and 2 bags of fertilizer are applied.<sup>2</sup>
- On the other hand, if the blue pen top is drawn (i.e., bad weather occurs), you will make 5 birr REGARDLESS of how much fertilizer you put on your plot. So, if we pull the blue pen top and the Kiremt rains fail, you will ALWAYS make 5 birr-REGARDLESS of how much fertilizer you buy-0, 1 or 2.
- Similarly to before and everyday life, you will need to spend some of your earnings on food, clothing, school fees, doctor visits and so on. As you know, this money needs to be spent REGARDLESS of the weather or how much fertilizer you apply.
- So, as before, when you get paid for your earnings, we will take 8 birr from it to represent these different things you need to buy.
- Is this clear?
- Any questions at this point?
- *At this point the experimenter briefly reviewed the steps in the IFG.*
- *In the MIFG, the experimenter also announced the following prior to reviewing the procedures and practicing. He used the lower part of figure 1 to illustrate.*

### 0.5 Insurance

- Now, we will introduce one more step: You are now insured.
- In addition to deciding whether or not you buy fertilizer, you will also buy insurance.
- In other words, now you need to do two things:
  - Decide whether or not you want to buy fertilizer and if so, how many bags.
  - Buy insurance.
- So, when you make your next decision, you MUST pay for insurance and you will also get the benefits of insurance. In other words, while you can choose whether or not to buy fertilizer (and if so, how many bags), insurance is mandated.
- What are the costs and benefits of this insurance?
- Well, they are similar to before:
  - The insurance will cost  $m$  birr.  $m$  varied such that insurance was actuarially fair according to the session probability.
  - If bad weather occurs, the insurance pays an additional 3 birr (as before) REGARDLESS of how much fertilizer you apply.
  - On the other hand, if good weather occurs, the insurance does NOT pay any additional amount.
- Does this make sense?

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<sup>2</sup> These numbers apply to the sessions that gave 25% return to fertilizer. Those sessions that gave 100% return paid 12 birr and 14 birr for 1 and 2 bags respectively.

## 0.6 Procedures

- As before, you will receive a yellow envelope.
- You then have a decision to make: “Do you want to buy fertilizer or not and if so, how much?”
- Suppose you decide you want to buy fertilizer. Then, place the payment equal to the cost of 1 or 2 bags of fertilizer in the yellow envelope.
- *In the MIFG, the experimenter also announced that regardless of the subject’s choice s/he was supposed to put the cost of insurance  $m$  in the yellow envelope. If the insurance was out-of-pocket this money came from the white envelope, otherwise it came from the experimenter.*
- If you decide NOT to buy fertilizer, DON’T put anything in the yellow envelope.
- We will collect the yellow envelopes, take them to the cashier and the cashier will record your decision to buy fertilizer or not and if so, how many bags.
- We will then return the yellow envelope to you.
- If you decide to buy fertilizer, you will receive 1 or 2 fertilizer vouchers in the yellow envelope.
- SHOW FERTILIZER VOUCHER.
- *In the MIFG, the subject was informed that s/he would also receive an insurance voucher and the experimenter showed the voucher.*
- If you decide NOT to buy fertilizer, your yellow envelope will not contain any fertilizer vouchers.
- We will then draw the pen top from the bag to determine the weather.
- You will be paid according to the draw of the weather and your decision to buy fertilizer or not.
- *In the MIFG the expression “in the presence of insurance” was added to the sentence above.*
- You will go to the cashier one by one with your envelope to get paid.
- Once this is done, you return to your seat.

## 0.7 Things to remember

- All the decisions you make are individual. Do NOT talk to one another.
- There are no right or wrong decisions.
- You should always think about your decision carefully and make your most preferred decision—the same as you do when making any other decision.
- If you have any questions at any point, do NOT hesitate to ask the experimenter by raising your hand.

*At this point the experimenter did standard practice questions on decision making (choices and earnings) and procedures for revealing decisions and receiving payment. Since subjects were already familiar with the basic procedures for decision-making and the situations in which insurance paid out (due to the WTP protocol), practice did not typically take very long. Once all questions were addressed, the experimenter instructed subjects to raise the dividers in order to guarantee privacy of decision making. Then, decision making would start.*