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I think about you: Group mentality and altruism among farmers.

by

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I think about you: Group mentality and altruism among farmers.

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Abstract

Does exposure to reminder of resource scarcity lead individuals toward generous or selfish behavior? I estimate the effect of resource scarcity information on the number of farmers applied for the new crops program that provides temporary income subsidy using a field experiment. The result shows that the number of applicants in villages that received resource scarcity information, indicating that the number of farmers joining the program was limited in each village, is significantly lower than that of the villages that received no such information. And, a lab-in-thefield experiment reveals that when resource scarcity is salient, farmers tend to sacrifice their benefit to increase the benefit of others who are identified as their ingroup members. However, I do not find this generous behavior toward outsiders. Together, the results suggest that the exposure to resource scarcity information would not always guide people to focus on maximizing their own welfare, rather it may lead people to behave generously if resources are shared among their ingroup members.

Keywords: Resource scarcity; Group identity; Generosity; Field experiment, Lab-in-the-field experiment

JEL: C92; C93; D64; D81; D91

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Introduction

Resource scarcity is one of the constant struggles of human life. People have regularly experienced various resource-shortages, such as time, food, and money (Banerjee and Duflo, 2007; Griskevicius et al., 2013; Hamilton et al., 2019). Modern economies center on how to manage limited resources to meet endless demand. In addition, even people who live in the situation where resources are relatively abundant still report or feel that such resources are insufficient to meet their needs (Mullainathan and Shafir, 2013). Resource scarcity has thus received attention across a variety of academic disciplines such as economics (i.e. Banergee and Duflo, 2011; Grossman and Mendoza, 2003; Nie et al., 2020), psychology (i.e. Griskevicius et al., 2013; Rodeheffer et al., 2012), and marketing (i.e. Goldsmith and Roux, 2020; Roux et al., 2015).

There is a large amount of research that has tried to investigate the impact of resource scarcity on social behavior, which centers on how resource scarcity influence individuals' decision making regarding tradeoffs between outcomes that benefit self and outcomes that benefit others. Many previous studies had found that reminders of resource scarcity promote competition, which guides individuals' decision making toward maximizing their own welfare, usually leading to behaviors that appear selfish (i.e. Cuadrado et al., 2017; Grossman and Mendoza, 2003; Holland et al., 2012; Petersen et al., 2014; Roux et al., 2015)¹. However, I argue that reminder of resource scarcity may not always lead individuals to focus on maximizing their

¹ On the other hand, some findings suggest that resource scarcity may increase generosity toward others especially if such generosity behavior would indirectly benefit to the self through the assistance of others, which actually reflects self-interested motive (Kraus et al., 2012; Roux et al., 2015).

welfare, especially when social identity is involved. Previous studies of social identity suggest that individuals behave differently toward ingroup and outgroup members (Chen and Li, 2009). People tend to behave more favorably to their ingroup members than outgroup members (Baldassarri and Grossman, 2013; Ritov and Kogut, 2017; Yamagishi and Kiyonari, 2000). Even though group identity's effect on resource allocation behavior between ingroup and outgroup members has been investigated, to my knowledge, little is known about the individuals' decision making when the reminder of resource scarcity is salient, and when there is a complete conflict of self-interest between outcomes that benefit self and outcomes that benefit others who are identified as either ingroup or outgroup members.

Specifically, I am interested in whether reminder of resource scarcity would create more generosity toward ingroup members than outgroup members. To answer to this question, I employ field experiment to compare the number of farmers who apply for agricultural extension program. One group of famers receives the reminder of resource scarcity, informing them that the number of farmers joining the program was limited in each village, while another group does not receive this information. In addition, I adopt lab-in-the-field experiment, which provides more control to distinguish the effect of reminder of resource scarcity on generosity behavior toward ingroup and outgroup members. My lab-in-the-field experiment focuses on how famers make decisions when the reminder of resource scarcity is salient, and their decision could either benefit themselves but reduce others' benefit or sacrifice their own benefit but increase others' benefit.

Key results that emerge are as follows. First, based on the field experiment, the number of farmers applied for the agricultural extension program in villages where the information of limited number of farmers joining the program was mentioned is significantly lower than that of

villages without this information. This result still holds when other relevant variables that may affect the number of applicants were controlled. Second, the lab-in-the-field experiment reveals that when resource scarcity was mentioned, farmers tend to sacrifice their benefit to increase the benefit of others who are identified as their ingroup members, especially if the benefit gained by their ingroup members is higher than that gained by them. However, I do not find this generous behavior toward others who were identified as outgroup members. Namely, whether benefit gained by self was higher or lower than that gained by others who were identified as outgroup members, these farmers' decision focused on maximizing their own benefit. From the results of the field experiment and lab-in-the-field experiment, it seems that the reminder of resource scarcity would guide individuals' decision making toward maximizing social welfare when the benefit of such scare resource is shared among their ingroup members.

The remaining of the paper is organized as follows. In the next section, the details of the field experiment and lab-in-the-field experiment are highlighted. Next, the details of sampling procedure including randomization and data description are presented. This is followed by the reporting of results. Finally, implications of the findings are outlined in discussion and conclusion.

Experimental Design

I next present experiments that test our hypotheses described as follows. The first hypothesis to be tested is whether the reminder of resource scarcity prompts individuals to heighten competitive orientation, which leads them to behave selfishly. To answer to this hypothesis, the field experiment was employed. I also adopt lab-in-the-field experiment, which provides more

control, to answer the first hypothesis. In addition, my lab-in-the-field experiment focuses on testing the second hypothesis, which aims to identify whether reminder of resource scarcity shifts individuals' preferences toward advancing their own benefit when such benefit can be shared with ingroup or outgroup members.

Field Experiment

The field experiment was conducted in Kalasin province located in Northeast region of Thailand. It was part of an agricultural extension program implemented by the Royal Initiative Discovery Foundation, which is a non-profit organization focusing on rural development in Thailand. Like most farmers in Thailand, farmers in this study come from low-middle income households, with income just enough to feed family members while allowing little saving and leading to high debt (Attavanich et al., 2019). Most of them grow an annual crop of rice during the rainy season. During dry season, less than 15 percent of agricultural areas can access to irrigation system and few farming activities take place (Mahasuweerachai and Fongtong, 2019).

The foundation first started to build reservoir and irrigation system to increase water supply and water distribution during dry season. These reservoir and irrigation systems can cover about 20 percent more of agricultural area during dry season when growing less water-intensive crops. In addition, off-seasonal rice grown during dry season generates slim profit or sometime no profit at all to farmers (Mahasuweerachai and Fongtong, 2019). To increase income of farmers during dry season and to use water more efficiently, the foundation developed a new crop adoption program to encourage farmers to switch from off-seasonal rice to crops that are suitable for the dry season and would generate more profit. The program provides short-run subsidies,

including all inputs necessary for growing the new crops and temporary income insurance to incentivize farmers to join the program^{2, 3}.

The temporary income insurance was the main incentive to encourage farmers to participate in the program, and it works as follow. Farmers received 5,000 Baht⁴ (about 167 USD) per month for four months during the dry season planting⁵. This payment will be deducted from revenues generated from the crops sold to the foundation after harvesting. However, if the revenues cannot cover this payment, farmers are not required to pay the loss and can keep that monthly payment. The foundation will bear the loss. The income insurance worked as an incentive by transferring the risks of growing the new crops, which farmers have no experience before, from farmers to the foundation. The farmers were therefore ensured that they will surely receive at least a minimum income guaranteed by the foundation from adopting the new crops.

To recruit farmers to this project, first the foundation visited each village to meet a headman and ask the headmen to help schedule the meetings with villagers and announce the meeting times.

² This temporary income insurance was offered as temporary risk transfer mechanism because most farmers have no experience growing other crops before. They were very concerned of getting low or no yields from new crops. This means that they saw new crops as risky choice when compared to rice resulting in low adoption rate during the program started.

³ The income insurance was provided only in the first year of cropping. The foundation continued supporting for agricultural inputs in the second year. For the third year of the program, inputs subsidy was dismissed, however, farmers can borrow inputs from the foundation and paid back with no interest rate charged to the foundation after selling the crops.

 ⁴ From the household survey conducted in this area between 2015-2017, the average monthly household income in dry season is about 4,500 Baht (about 150 USD), which mostly comes from working outside agricultural sector.
 ⁵ To prevent moral hazard and help farmers to grow the new crops, the foundation provided field experts for general guidance and problem-solving. Farmers maintained personal contact with their field experts throughout the process. The field experts visited the farmers regularly to monitor progress and learn about problems. If needed, the field expert will contact technical support for more difficult problems.

Regardless of whether villagers participate in the meeting, they are all allowed to apply for the program.

Since this program required a lot of resources and personnel, specifically income insurance and field experts who visited farmers regularly to monitor progress and provided basic assistances, the number of participants in each village was limited at ten households. To test whether information of resource scarcity leads farmers toward maximizing their own welfare or social welfare, I created three experimental groups. These groups vary in the degree of scarcity communicated. I compare the number of program takers across these experiment groups to measure the impact of reminder of resource scarcity on the likelihood of participation in the program.

The first experimental group acted as the control group (C). Subjects in the control group received details of the new crops adoption program during the village meeting. At the end of meeting, the foundation staffs asked all villagers who were interested to register within three days after the meeting and told them that they will follow up with them later^{6, 7}. The next experimental group was the first treatment group, later called scarcity-lottery group (SL). Subjects in this group received the same information as the subjects in the control group, but the foundation staffs told them in the meeting that the number of households participated in this program was limited to ten households per village. If more than ten households register, we will have a lottery to choose who

⁶ To register to the program, applicants had to submit their names to the headman. This process was the same for all experimental groups. The information of the program and its conditions were posted in the headmen houses to make sure farmers who did not attend the meeting known the information.

⁷ For the control group, after we had names of farmers who applied for the program, the foundation staffs arranged the meeting in each village to tell them that the program can have at most ten households per village to join the program. For villages with more than ten households applied for the program, lottery to randomly select participated households was employed.

can join the program. The final experimental group was the second treatment group, later called scarcity-headman group (SH). The information provided to farmers in this experimental group was the same as those in scarcity-lottery group. However, the selection process was different: the headman of the village will select the ten households to participate in the program if more than ten households registered.

With this experimental design, subjects in scarcity-lottery group and scarcity-headman group received information of resource scarcity as they knew that the number of households joining the program was limited to just ten per village. This would make resource scarcity salient in their mind. On the other hand, farmers in control group had no such information until they made their decision. Hence, the effect of resource scarcity in terms of limited number of farmers joining the program would not affect the decision-making process of subjects in the control group.

Lab-in-the-Field Experiment

Though field experiments have an advantage of operating in a real-world setting, it is often difficult to identify the mechanism driving the observed results (Gneezy and Imas, 2017). In field experiment, even though I can test whether a reminder of resource scarcity would affect the number of applicants, I cannot identify the psychological processes behind the effect, especially if the number of applicants in the treatment groups is significantly lower than that of the control group. In addition, since, I cannot assign farmers from different villages to the same group in our field experiment setting, the experiment cannot test the effect of group identity on farmers' decisions. To deal with these issues and answer whether individuals behave selfishly or generously toward ingroup and outgroup members when resources are scarce, I carried out a lab-in-the-field experiment consisting of five experimental groups with varying scarcity situations and group identities.

The experiment started by randomly assigning farmers to sessions of 10 farmers. Participating farmers received 100 Baht (about 3 USD) for participation in the experiment. In each session, each farmer was individually visited by experimental team in his/her house. Each farmer was told that he/she and nine other participants in his/her village (other villages for treatment group 4) were in a group of ten people⁸. To answer whether subjects behave selfishly or generously toward ingroup and outgroup members especially when benefit gains by themselves is lower than that of others I create a set of lotteries that contains two different prizes, 100 Baht prize lottery (about 3 USD) and 300 Baht prize lottery (about 10 USD). I then observe their decisions regarding to whether they design to play the lottery when their decisions can alter others' chance to win the lottery and also when their decisions interact with in-group and outgroup members.

Each farmer was presented with ten lottery tickets. He/she was told that five of them had a prize of 100 Baht (about 3 USD), and the other five lottery tickets had a prize of 300 Baht (about 10 USD). The lotteries had a winning probability of 50 percent, meaning an equal probability to win or lose. A coinflip was used to determine whether the farmers received prize from the lottery. If the coin lands on head, the farmer receives money according to the prize value of his/her lottery. If the coin lands on tail, the farmer receives no money and only participation fee. The price of lottery ticket was 50 Baht (about 1.5 USD). Farmers can use their participation fee to buy the lottery.

⁸ We did not provide them information of who were their group members. Therefore, they did not know who were other nine members in their group.

And, all payments were scheduled to be paid in the next visit, a week later. The experimental team then asked the farmer to randomly select one lottery out of ten. After checking the prize of the lottery he/she had, our experimental team provided the farmer with additional information depending on what experimental group the farmer is in.

The first experimental group serves as a control group (C). Farmers in this group received no more information, and they were asked to decide whether to buy the lottery. The next experiment group is treatment group 1 (T1). Farmers in this group were told that there were only five people in their group who could play the lottery. If more than five people want to buy lottery tickets, we would randomly select the five players⁹. The farmers in this group received reminder of resource scarcity, which was the limited number of people in their group who can play the lottery. Choosing to play the lottery means that they have a chance to get more money, but by doing so reduce the probability of others in their group (their village) to win the money from the lottery, especially those who have the high-value lottery. After understanding the condition, they were asked to decide whether to buy the lottery.

The next experimental group is treatment group 2 (T2). Farmers in this group received the same information as farmers in treatment group 1 (T1). However, instead of asking them to choose whether to buy the lottery instantly, we gave them three days to make their decisions. This was to

⁹ We told farmers that randomly drawing who will play the lottery will be done by the foundation staff. And, the drawing will be broadcasted through Facebook live. We provided them information of Facebook live address, date and time of drawing, which was five days later after the first visit. And, if they want to join the drawing event in the foundation field office, they are allowed to do so. We also told the farmers that we will record the video of drawing event and present to them in the second visit. This was done so to make them feel that designing who will play the lottery is really random.

mimic the field experiment in which farmers had three days to make their decision, making it possible for them to find and talk to others in their groups.

The fourth experimental group is treatment group 3 (T3). Farmers in this group were informed that if they choose to buy the lottery, we would come back a week later and ask them to draw a ball from a bag to determine whether they can play the lottery. The bag contains 5 orange balls and 5 white balls. If they draw an orange ball, they can play the lottery. If they draw a white ball, they cannot play the lottery. From this design, farmers in this group faced the similar resource scarcity situation as those in T1 and T2, as the limited number of people who were allowed to play the lottery depends on chance. However, each participant's decision on whether to buy the lottery did not affect the others' probability in the group to play and win the lottery. The design was to identify whether farmers tend to avoid the situation where they could be rejected by chance (Schaan et al., 2020; Vorauer et al., 2003). It would be possible that farmers may try to avoid this situation, which would lead them to refuse the lottery and stick with the guaranteed minimum payment instead of seeking for higher payment¹⁰ (Kahneman and Lovallo, 1993; Tversky and Kahneman, 1986). After they clearly understood the condition, we asked them to decide whether to buy the lottery.

The last experimental group is treatment group 4 (T4). Farmers in this group received the same information and condition of playing the lottery as those in treatment group 1 (T1). For this

¹⁰ Subjects in T3 who design to buy the lottery will receive 100Baht participation fee either they win or lose the lottery. The expected payoffs for those who choose to play the lottery are 125 Baht and 175 Baht for those who have 100Baht prize lottery and 300Baht prize lottery, respectively. This means farmers can seek for higher payoffs with certainty to have at least 100Baht participation fee.

group, however, farmers were informed that the nine other participants in their group did not live in their villages. In other words, all members in their group session came from different villages, which could be identified as outgroup members. This allows us to test the effect of reminder of resource scarcity on generous and selfish behavior toward ingroup and outgroup members. Table 1 provides the summary of each experimental group.

[Table 1. About here]

Sampling Procedure

The field experiment was conducted in four sub-districts consisted of 38 villages of Kalasin Province, located in the Northeast region of Thailand. Our randomization unit was at the village level, where every subject in the same village received the same information. To randomly assign villages to control and treatment groups, the randomization was first stratified by four sub-districts to ensure villages from different sub-districts were allocated in closely even numbers to the different experimental groups. We then checked the distance between villages to make sure the villages that were located less than one kilometer apart were in the same experimental group. This was done to prevent spillover effect. There was one village that was reassigned from the control group to the scarcity-lottery group in this step.

The control group consists of 11 villages. The scarcity-lottery group and scarcity-headman group contained 14 villages and 13 villages, respectively. Table 2 presents the number of villages in each experimental group stratified by sub-districts.

[Table 2. about here]

Lab-in-the-field experiments were conducted in 21 villages in three of the four sub-districts employed for the field experiment about a year after the first season of the new crops program finished¹¹. The randomization unit for the lab-in-the-field experiment was also at the village level. The process of randomly assigning villages to experimental groups was the same as in the field experiment in that all villages were first stratified by three sub-districts. Villages in each sub-district were then randomly assigned to every experimental group to ensure that villages from different sub-districts were allocated in similar numbers to the different experimental groups. We then randomly selected 12 household heads from each village to be our samples. The first ten were used for samples of experimental groups C, T1, T2, and T3, which contained ingroup members. Another two household heads were assigned to T4 experimental group containing outgroup members, in which they were grouped with nine other household heads from nine different villages. Note that these two household heads from the same village were assigned to different sessions of T4 group to ensure that all ten participants in each session of this experimental group were really from different villages. Table 3 presents the number of sessions in each experimental group stratified by sub-districts.

[Table 3. about here]

After getting the list of the samples, my field team contacted the headman in each village to make appointments with them. Those who refused to participate or were not available were

¹¹ Villages in another sub-district were used to pretest the lab-in-the-field experiment. We therefore excluded all villages in this sub-district from lab-in-the-field experiment sample to make sure all samples did not know the information of the experiment before it was conducted.

replaced by substituted samples drawn by us¹². The lab-in-the-field experiment was carried out in the participants' house to make sure that they made the decision anonymously and without opinions and pressure from others. For each subject, we first asked them to answer a short questionnaire that took about five to ten minutes to finish. Then, the experiment started and lasted about seven to ten minutes. We gave them a copy of information sheet that contained their decision on whether to buy the lottery and the value of lottery. They were also informed of the date and time of the second visit, which was a week later.

For the second visit, subjects in the control group who decided to play the lottery were asked to toss the coin to determine whether they received the prize from the lottery, and the payments were made after that. Subjects who did not decide to buy the lottery received participation fee. Subjects in T1, T2¹³, and T4 experimental groups who decided to buy the lottery, conditional on their sessions having more than five subjects who decided to buy the lottery, were first presented with the video demonstrating the random selection process of the five eligible farmers who can play the lottery. They were then informed of whether they were selected to play the lottery subjects who were selected to play the lottery then tossed a coin and received payments depending on the outcome of the lottery. Subjects who were not selected to

¹² To ensure the subjects did not know who participated in the experiment before it start, we asked village heads to visit each subject in his/her house individually for making appointment. We also checked by asking every subject during the experiment whether they know the name of others in their villages (other villages) who join the experiment. No subject reported they know this information.

¹³ We visited subjects in T2 three days after the first visit to ask their decision whether to buy the lottery. The very short survey asking for whether subjects tried to find and talked to others in their group about our lottery was conducted in this visit. The third visit for subjects in this group was four days after the second visit. The process of third visit was the same as the second visit of subjects in T1 and T4.

play the lottery or did not decide to buy the lottery received participation fee. Subjects in T3 group who decided to buy lottery were asked to draw a ball from the bag that contained 10 balls, 5 orange and 5 white balls. If they drew the orange ball, they were allowed to play the lottery and were then asked to toss a coin to determine whether they received the prize from the lottery. Subjects who drew the white ball or decided to not buy the lottery received participation fee.

Results

Field experiment

I start with the result of the field experiment that tests the impact of reminder of resource scarcity on the number of applicants applied for new crop program. I begin by looking at the characteristics of villages that may affect the number of applicants in each experimental group. Table 4 provides the details of the characteristics balance test. The information in table 4 indicates no evidence of different characteristics that may alter the number of applicants among these experimental groups. Villages in all experimental groups have, on average, the same size in terms of the number of households per village and the same number of households attending the meeting.

[Table 4. about here]

I next consider the average number of farmers per village who applied for the program in each experimental group. Figure 1 presents this number for each treatment. The average number of farmers per village registered for the program in the control group is about 13, which is higher than those in scarcity-lottery (SL) and scarcity-headman (SH) treatments, in which the number of applicants is about 6 – 7 farmers.

[Figure 1. about here]

To estimate the treatment effect of reminder of scarcity resources on the number of farmers applied to the program, I employ OLS regression based on the following equation:

$$App_{i} = \alpha + \beta_{1}SL + \beta_{2}SC + \sum_{i=3}^{5} \beta_{i}X_{i} + \varepsilon_{i}$$
(1)

where App_i is the number of applicants for village *i*. SL=1 if village *i* is in the scarcity-lottery treatment and SC=1 if village *i* is in the scarcity-headman treatment, while the control group is used as reference. X_i is the list of control variables, including the average number of households in villages, the average number of households attending the meeting per village, and the average proportion of households attending the meeting. Table 5 reports the estimation results of equation (1).

[Table 5. about here]

The results presented in table 5 report statistically significant decreases in the number of farmers applying to the program for villages in scarcity-lottery treatment (SL) and scarcityheadman treatment (SH) when compared to the villages in the control group. This evidence still holds even when other relevant control variables are included into the estimation, shown by (2) column in table 5. On average, the number of applicants of villages in SL and SH groups is about 5-6 farmers lower than that of villages in the control group. I also test whether the number of farmers applied to the program is the same between villages in SL and SH groups. The Wald test reveals there is no significant difference in number of applicants between these two groups (at *p-value*>0.10), suggesting that the difference in methods of selecting participating farmers, randomly selected versus selected by headman, does not significantly alter the number of applicants. It seems that only the reminder of resource scarcity affects the decision of farmers on whether to apply for the program. From previous studies, people who are exposed to reminder of resource scarcity tend to be more likely to demonstrate behaviors that confer personal benefits, which could lead to behaviors that appear selfish. With this tendency applied in our study context, the reminder of resource scarcity should have led farmers in SL and SH groups to apply for the program more than those in the control group.

However, results from field experiment instead suggest that farmers who were exposed to reminder of resource scarcity were more likely to not apply for the program. The generous behavior toward others might be explained by benefit sharing, especially when they realized that the benefits from the program would be more valuable to their neighbors than that gained by themselves. Or, it could be possible that the uncertainty disincentivizes farmers in the resourcescarce situation to not apply for the program because they do not want to be rejected from the program by chance. While my field experiment could not answer what would be the psychological processes behind this decision, results from our lab-in-the-field experiment may shed a light on this issue.

Lab-in-the-field experiment

The lab-in-the-field experiments aim to clearly identify the psychological processes of farmers under resource scarcity situation. Table 6 presents the balance test of subjects by treatment groups. The table displays the means of subjects' characteristics, which cover risk characteristics (risk behavior, luck compared to others, and monthly lottery expenditure), gender, income, and size of agricultural land. Generally, characteristics of subjects in every treatment group are similar, except for the risk behavior and monthly lottery expenditure. Subjects in treatment groups 2 (T2) and 3 (T3) seem to be less risk-averse than those in the other groups.

[Table 6. about here]

Figure 2 shows the average proportion of subjects who choose to buy the lottery by experimental groups. From this figure, it is clear that the proportion of subjects who buy the lottery in treatment 1 (T1) and treatment 2 (T2) is clearly significantly lower than that of subjects in other experimental groups. The proportion of subjects who buy the lottery in control group (C) is the highest followed by those in treatment 4 (T4) and treatment 3 (T3). However, the difference of proportion is small among these experimental groups and statistically insignificant.

[Figure 2. About here]

I then estimate the effects of reminder of resource scarcity on subject decision by logit regression with the following equation:

$$De_i = \mu + \gamma_1 T_1 + \gamma_2 T_2 + \gamma_3 T_3 + \gamma_4 T_4 + \gamma_5 \mathbf{E}_i + \gamma_6 \mathbf{X}_i + \varepsilon_i$$
⁽²⁾

where De_i is the decision of subject *i* on whether to buy the lottery. It is equal to 1 if the subject decides to buy the lottery and 0 otherwise. T_1 , T_2 , T_3 , and T_4 are dummy variables presenting treatment groups 1, 2, 3, and 4, respectively. Control group is used as reference. E_i is the vector of experimental characteristics of subject *i*, which includes the prize of lottery and the sequence of visiting by experimenters. X_i is the vector of subjects' characteristics, consisting of risk behavior, luck compared to others, monthly lottery expenditure, gender, and household income.

The results provided in table 7 show the significant impact of reminder of resource scarcity on subjects' decision. The regression results reveal that when the subjects face resourcescarce situation and their decision can affect others' benefits, they are less likely to buy the lottery, especially those who have the 100 Baht lottery prize. This pattern could be captured through the coefficients of T1 and T2, which are negative and statistically significant in every model reported in the table 7. We also test whether the coefficients of T1 and T2 are statistically different to determine the effect of time and more information on subjects' decision. The results show that even when the coefficients of T2 in all model specifications are larger than those of T1, there is no significant difference between these two coefficients, with *p-value*>0.10 in all model specifications. Interestingly, about 54 percent of subjects in T2 group reported that within three days before making the decision on whether to buy the lottery, they met and talked to at least one member in their session about the lottery. This reveals that firstly some subjects in T2 can identify who were in their session. Secondly, they may also know the lottery's prize of such people in their group. Some subjects in T2 therefore had more information than those in T1 in terms of who exactly in their villages were in their group and how much the lottery was worth to them. Even though additional information was available, the decision of subjects in T2 group is not statistically different from those in T1, suggesting that it does not matter whether they can or cannot exactly identify their ingroup members, as people tend to behave generously toward their members in both situations.

As predicted, this generous behavior is observed only when the members of their experiment groups were identified as coming from the same village. I do not find a statistically significant difference in the rate of buying lottery of subjects in T4, in which members in each session came from different villages, compared to those in the control group. This result suggests that when subjects in T4 face resource scarcity and their decision could decrease or increase benefits of other players who are not from their village, they tend to focus on maximizing their own benefits. This pattern can be seen in all model specifications reported in table 7.

Regarding reminder of resource scarcity and generosity, when the benefits of resources are shared among ingroup members, this study's findings suggest that exposure to reminder of resource scarcity would increase generosity toward others identified as ingroup members. Hence, reminder of resource scarcity would not always lead individuals' decision making toward maximizing their own welfare, especially when group identity is involved.

Another interesting point worth mentioning is the coefficient of T3 variable, which identifies whether subjects try to avoid situation in which they could be rejected by chance under resource-scarce situation. The coefficient of this variable is insignificant in the (1) and (2) columns reported in table 7. However, it turns to significant with the negative sign in (3) and (4) specifications when characteristics of subjects were controlled, suggesting that when facing reminder of resource scarcity with the chance of receiving the resource being determined

randomly, subjects tend to avoid seeking for such resource even though the expected benefit is higher and there is no chance of loss. From this result, it appears that when facing resource scarcity and getting resource determined by chance, the concern of being rejected would prompt individuals' decision making toward certainty even when the outcome of such choice is not optimal.

The significance of T3 coefficient prompts the argument of whether the reminder of resource scarcity increase famers generosity toward ingroup members, or it is the uncertainty avoidance that leads to that result. The findings suggest that prosocial behavior would be the key explanations of why reminder of resource scarcity reduces number of applicants in the agricultural extension programs, and why the number of lottery buyers in lab-in-the-field experiment falls when members in their experiment groups are ingroup members. If the fear of being rejected were the main factor behind farmers' decision, the number of lottery buyers in treatment group 4 (T4), where participants are from different villages, would have been significantly lower than that of control group. However, the number of farmers who bought the lottery in treatment group 4 is insignificantly different from the control group, suggesting that they seek to maximize their own welfare not others', and concerning of being rejected is not a factor that drives their decision whether to buy the lottery.

[Table 7. about here]

Discussion and Conclusion

A reminder of resource scarcity usually guides individuals' decision making toward maximizing their own welfare and selfish behavior (Cuadrado et al., 2017; Roux et al., 2015). However, this may not always hold if individuals realize that their selfish behavior affects those among their in-

group. This study aims to answer the resource allocation behavior toward ingroup and outgroup members when the resource scarcity is salient and there is conflict of self-interest between outcomes that benefit self and outcomes that benefit others.

The first part of the study employed field experiment to test the effect of reminder of resource scarcity on the number of farmers who apply for the new crops program. I find that the number of farmers who applied for the program in the villages that received resource scarcity information is significantly lower than that in the villages without such information. In addition, the method of selecting who would join the program, either by random or by respected people in villages, does not seem to alter the number of applicants, suggesting that only the reminder of resource scarcity is the main factor in reducing demand for the program. The psychological processes that may drive farmers' decision in this direction would be either generosity toward others in their villages or concern of rejection from the program. The real drivers that affect farmers' decision could not be clearly revealed by the field experiment.

The second study employed lab-in-the-field experiment to shed a light on this question. Firstly, the results show that when resource scarcity is salient, farmers tend to behave generously toward their ingroup members by rejecting their chance to access the resource, especially when the benefit from the resource gained by self is lower than that gained by others in their group. This decision would increase the chance of others in their group to receive the resource. However, I do not find this generous behavior toward others who were identified as outgroup members. Farmers in this case mainly focused on maximizing their own benefit. Secondly, the results from lab-in-the-field experiment also point to the concern of rejection from getting the resource when the resource is scarce. This result shows that when resource is scarce and application for the resource can be rejected by chance, farmers seem to avoid this situation even though there was no chance of a loss from choosing such option. I do not know what is exactly the psychological process behind this concern of rejection with our study set up.

Even though, there would be two factors that drive farmers' decision our empirical evidences lean to conclusion that the generous behavior toward ingroup members would be the main explanation of why reminder of resource scarcity reduces number of applicants in the new crop adoption program, and why the number of lottery buyers in lab-in-the-field experiment falls. This is because if concerning of rejection were the key driver, the number of lottery buyer in treatment group 4 where group members came from different villages would have also been significantly lower than that of control group. Rather, the number of lottery buyer in treatment group 4 is indifferent from that of control group suggesting they seek to maximize their own benefit with no sign of concerning for being rejected.

The empirical results from field experiment and lab-in-the-field experiment provide similar evidence of generous behavior toward ingroup members when resource is scarce. This result indicates that ingroup identity would induce people to be more helpful to each other and would also lead to actions that raise social welfare. However, exposure to resource scarcity prompts people to engage in behaviors that advance their own welfare when the resource is allocated among people who are identified as outgroup members.

In terms of practical implementation of developmental program's promotion, using reminder of resource scarcity may not increase demand of the program. Rather, it could reduce the demand of the program due to either the social identity involved in resource sharing among ingroup members, or the concern of rejection from the program. In this circumstance, allowing targeted subjects of the program to decide on how to allocate the resource would provide more benefit to society and the program.

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Reference

- Attavanich, W., Chantarat, S., Chenphuengpawan, J., Mahasuweerachai, P., & Thampanishvong,
 K. (2019). Farms, Farmers, and Farming: A Perspective through Data and Behavioral
 Insights (PIER Discussion Papers No. 122). Puey Ungphakorn Institute for Economic
 Research. https://www.pier.or.th/wp-content/uploads/2019/09/paper2_paper_SommaratJirath-Phumsit-Witsanu-Kannika.pdf
- Baldassarri, D., & Grossman, G. (2013). The effect of group attachment and social position on prosocial behavior. evidence from lab-in-the-field experiments. *PLos ONE*, 8(3), e58750. https://doi.org/10.1371/journal.pone.0058750.
- Banerjee, A. V., & Duflo, E (2007). The economic lives of the poor. *The Journal of Economic Perspectives*, 21(1), 141-67.
- Banerjee, A. V., & Duflo, E. (2011). Poor economics: A radical rethinking of the way to fight global poverty. New York, NY: Public Affairs.
- Chen, Y., & Li, S. X. (2009). Group identity and social preferences. *American Economic Review*, *99(1)*, 431-457.
- Cuadrado, E., Tabernero, C., García, R., Luque, B., & Seibert, J. (2017). The role of prosocialness and trust in the consumption of water as a limited resource. *Frontiers in Psychology*, *8*, https://doi.org/10.3389/fpsyg.2017.00694.
- Gneezy, U., & Imas, A. (2017). Lab in the field: Measuring preferences in the wild. In Banerjee, Abhijit Vinayak, and Esther Duflo (Eds.), *Handbook of Field Experiments*, (pp. 439-464). <u>https://doi.org/10.1016/bs.hefe.2016.08.003</u>.

Goldsmith, K., & Roux, C. (2020). Can thoughts of having less ever promote prosocial preferences? The relationship between scarcity, construal level, and sustainable product adoption. *Journal of the Association for Consumer Research*, *5(1)*,

https://doi.org/10.1086/706506.

- Griskevicius, V., Ackerman, J.M., Cantu, S. M., Delton, A. W., Robertson, T. E., Simpson, J. A., Thompson, M. E., & Tybur, J. M. (2013). When the economy falters, do people spend or save? Responses to resource scarcity depend on childhood environments. *Psychological Science*, 24(2), 197-205.
- Grossman, H. I., & Mendoza, J. (2003). Scarcity and appropriative competition. *European Journal of Political Economy*, 19(4), 747–58.
- Hamilton, R., Thompson, D., Bone, S., Chaplin, L. N., Griskevicius, V., Hill, R., John, D. R., Mittal, C., O'Guinn, T., Piff, P., Roux, C., Shah, A., & Zhu, M. (2019). The effects of scarcity on consumer decision journeys. *Journal of the Academy of Marketing Science*, 47, 532–50.
- Holland, J., Silva, A.S., & Mace, R. (2012). Lost letter measure of variation in altruistic behaviour in 20 neighbourhoods. *PLos ONE*, 7(8), e43294.
- Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012).
 Social class, solipsism, and contextualism: How the rich are different from the poor.
 Psychological Review, *119(3)*, 546–72.

Mahasuweerachai, P., & Fongtong, S. (2019). Evaluation of intergraded rural development program: A case study of rural area with small scale irrigation systems (Royal Initiative

Discovery Foundation Working Paper). The Royal Initiative Discovery Foundation.

- Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. New York, NY: Times Books.
- Nie, Z., Yang, X., & Tu, Q. (2020). Resource scarcity and cooperation: Evidence from gravity irrigation system in China. *World Development*, 135, 105035. <u>https://doi.org/10.1016/j.worlddev.2020.105035</u>.
- Petersen, M. B., Aarøe, L., Jensen, N. H., & Curry, O. S. (2014). Social welfare and the psychology of food sharing: Short-term hunger increases support for social welfare. *Political Psychology*, 35(6), 757–73.
- Ritov, I., & Kogut, T. (2017). Altruistic behavior in cohesive social groups: The role of target identifiability. *PLos ONE*, *7(8)*, https://doi.org/10.1371/journal.pone.0187903.
- Rodeheffer, C., Hill, S., & Lord, C. (2012). Does this recession make me look black? The effect of resource scarcity on the categorization of biracial faces. *Psychological Science*, 23(12), 1476-78.
- Roux, C., Goldsmith, K., & Bonezzi, A. (2015). On the psychology of scarcity: When reminders of resource scarcity promote selfish (and generous) behavior. *Journal of Consumer Research*, 42(4), 615–31.
- Schaan, K. V., Schulz, A., Bernstein, M., Scha¨chinger, H., & Vo¨gele, C. (2020) Effects of rejection intensity and rejection sensitivity on social approach behavior in women. *PLoS ONE*, 15(1), e0227799. doi: 10.1371/journal.pone.0227799.

- Vorauer, D. J., Cameron, J. J., Holmes, J. G., & Pearce, D. G. (2003). Invisible overtures: Fears of rejection and the signal amplification bias. *Journal of Personality and Social Psychology*, 84(4), 793-812.
- Yamagishi, T., & Kiyonari, T. (2000). The group as the container of generalized reciprocity. Social Psychology Quarterly, 63(2): 116-32.
- Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science*, *39(1)*, 17-31.
- Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *The Journal* of Business. 59(4): S251-S278.

	2	1 0	1	
Group	Decision to play	Playing lottery by	Group identity	Time to make
	lottery affects	chance/ not effect		decision
	others	others		
С	No	No	Ingroup members	Instantly
T1	Yes	No	Ingroup members	Instantly
T2	Yes	No	Ingroup members	3 days
T3	No	Yes	Ingroup members	Instantly
T4	Yes	No	Outgroup members	Instantly

Table 1. Summary of lab-in-the-field experimental groups

Sub district	Number of villages in experiment groups							
Sub-district	С	T1	T2					
A	2	4	5					
В	3	2	1					
С	2	2	5					
D	4	6	2					
Total	11	14	13					

Table 2. Number of villages in field experimental groups stratified by sub-districts

Sub district	Numbe	r of villages	sessions in	experiment	groups
Sub-district	С	T1	T2	Т3	T4
А	2	2	2	2	-
В	1	1	1	2	-
D	2	3	2	2	-
Total	5	6	5	6	5

Table 3. Number of villages in experimental groups for lab-in-the-field experiment stratified by sub-districts

Note: Numbers represented in total row indicate number of villages and sessions for C, T1, T2, and T3 groups. However, since subjects assigned to each session in treatment 4 (T4) came from different villages, the total number of T4 represents number of sessions only.

Table 4. B	Balance test	of field	experiment	
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Variable	Expe	rimental g	group	p-value			
variable	С	SL	SH	C vs SL	C vs SH	SL vs SH	
Average household attending the meeting per village	31.54	31.35	33.84	0.65	0.64	0.52	
Average household per village	132.63	97.29	92.10	0.29	0.22	0.82	
Average proportion of household attending the meeting per village	0.28	0.36	0.40	0.13	0.15	0.90	
Observations	11	14	13				

Note: The *p-value* is generated from Wilcoxon rank-sum test.

Variable	(1)	(2)
SL	-6.13***	-5.28**
	(21.3)	(2.25)
SH	-7.73***	-6.62***
	(2.17)	(2.35)
Number of households		0.02
		(0.03)
Number of households attending the meeting		-0.07
		(0.12)
Proportion of households attending the meeting		1.40
		(11.35)
Constant	13.27***	11.46**
	(1.59)	(5.07)
R ²	0.29	0.32
Observations	38	38

Table 5. OLS estimations on number of applicants for field experiment

Notes: Numbers in parentheses are standard error. ***, **, and * are the significant level at 1%, 5%, and 10%, respectively.

Variable	Experimental group					<i>p</i> -value									
Variable	С	T1	T2	T3	T4	CvsT1	CvsT2	CvsT3	CvsT4	T1vsT2	T1vsT3	T1vsT4	T2vsT3	T2 vs T4	T3 vs T4
Risk behavior	3.20	3.77	4.36	4.81	3.92	0.36	0.09	0.00	0.28	0.38	0.08	0.81	0.48	0.54	0.15
Exp_lottery (per month)	129.20	95.33	247	310	178.7	0.33	0.05	0.03	0.36	0.00	0.00	0.08	0.49	0.32	0.14
Luck compared to others	0.08	-0.35	0.56	0.9	0.02	0.21	0.32	0.06	0.90	0.04	0.00	0.39	0.49	0.34	0.08
Male	0.16	0.25	0.34	0.27	0.22	0.25	0.04	0.18	0.45	0.31	0.83	0.71	0.41	0.18	0.57
Agricultural land (Acre)	5.43	5.69	6.33	4.63	4.92	0.72	0.21	0.22	0.47	0.39	0.12	0.31	0.01	0.06	0.65
Income	18,062	7,454	11,042	6,620	9,067	0.00	0.17	0.00	0.04	0.23	0.57	0.37	0.13	0.54	0.12
Observations	50	60	50	60	50										

Table 6. Balance test of lab-in-the-field experiment subjects

Note: The p-value is generated from t-test.

Variable	(1)	(2)	(3)	(4)
T1	-0.77**	-0.82**	-0.95**	-0.96**
	(0.39)	(0.40)	(0.43)	(0.45)
T2	-0.82**	-0.84**	-1.36***	-1.52***
	(0.41)	(0.42)	(0.47)	(0.49)
T3	-0.31	-0.32	-0.97**	-0.99**
	(0.39)	(0.40)	(0.45)	(0.47)
T4	-0.17	-0.14	-0.28	-0.23
	(0.41)	(0.42)	(0.46)	(0.47)
Lottery prize		0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)
Order of experiment		0.02	0.00	0.00
		(0.04)	(0.04)	(0.04)
Risk behavior			0.20***	0.21***
			(0.04)	(0.00)
Luck compared to other			0.13**	0.13**
			(0.06)	(0.06)
Lottery expenditure/month			0.00	0.001*
			(0.00)	(0.00)
Male				0.80**
				(0.33)
Household income				0.00
				(0.00)
Constant	0.57*	-0.47	-1.01**	-1.45***
	(0.29)	(0.46)	(0.49)	(0.54)
Log-likehood	-182.96	-175.73	-157.99	-153.48
Observations	270	270	270	270

Table 7. Logit regression on decision whether to buy the lottery for lab-in-the-field experiment

Notes: Numbers in parentheses are standard error. ***, **, and * are the significant level at 1%, 5%, and 10%, respectively.



Figure 1. The average number of farmers per villages applied for the program



Figure 2. Average proportion to buy the lottery in lab-in-the-field experiment groups