

Katherine M. Nelson  
Achim Schlüter  
Colin Vance

**Funding Conservation Locally:  
Insights from Behavioral Experiments  
in Indonesia**

# Imprint

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Vogelpothsweg 87, 44227 Dortmund, Germany

Universität Duisburg-Essen, Department of Economics  
Universitätsstr. 12, 45117 Essen, Germany

RWI Leibniz-Institut für Wirtschaftsforschung  
Hohenzollernstr. 1-3, 45128 Essen, Germany

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Katherine M. Nelson, Achim Schlüter, and Colin Vance<sup>1</sup>

## Funding Conservation Locally: Insights from Behavioral Experiments in Indonesia

### Abstract

*Proximate stressors such as destructive fishing are key drivers of coral reef degradation. Conservation strategies that marshal local action and are tailored to the preferences of the target group are thus needed to sustain coral resources. We experimentally analyze the behavior of marine resource users in a coastal village in Indonesia to gain insight into whether people prefer to donate time or money to environmental or other charitable causes. Each person is subject to one of four treatments: monetary donation, monetary donation match, volunteer time donation, and volunteer time donation match. Contrasting with the existing literature, we find that participants give significantly more when donating money compared to time. We also find that matching donations increases the percent of people giving but does not increase the amount donated. This research furthers our understanding of what motivates resource users in a developing country to contribute to the provision of public goods.*

*JEL Classification: Q22, Z1*

*Keywords: Behavioral economics; conservation; donation; field experiment; funding; volunteer*

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## Introduction

Fisheries are among the key proximate stressors that threaten coral reefs and marine biodiversity. Conservation science often focuses on ecological research that documents losses and identifies causes for decline (Veríssimo et al. 2011). A paradigm shift is needed that addresses the problem from the perspective of local human drivers so that context appropriate strategies can be implemented (Smith et al. 2009). It is widely accepted that behavioral economic experiments are useful in identifying human preferences and behavior, yet conservation science has all but ignored this potential (Cowling 2014; Reddy et al. 2016).

Effective conservation is predicated on the management of biodiversity as a public good that requires collective action (Ostrom et al. 1999). The provision of public goods is essential for socio-economic development, yet there is limited experimental evidence testing various measures that influence contributions to *real* public goods in developing countries – where coral reefs are prevalent (Carlsson et al. 2015; Rode et al. 2015). And, to our knowledge, there are no *field* studies that compare voluntary contributions of money and time.

Indonesia depends heavily on the health of its coral ecosystems and marine resources. Yet the country's weak governmental financial support for conservation makes local community initiatives all the more important. Human behaviors regarding conservation action, such as when an individual donates money, volunteers time, or otherwise expends effort for the purpose of conservation, are of particular research interest.

This paper contributes to the gap in research between the charitable giving literature and contributions to public goods in developing countries by employing a behavioral economics field experiment in a coastal village in Indonesia. We focus on two types of contributions: 1) donating money, and 2) donating time. In addition, we examine the effects of matching donations of money and time at a rate of 1:1 (i.e. the value of contributions is doubled). Participants, who are heavily dependent on marine resources, begin by selecting a charity and then performing a task to earn income. Each participant is subject to a donation decision under one of the four treatments: monetary donation (D), monetary donation match ( $D_m$ ), volunteer time donation (V), and volunteer time donation match ( $V_m$ ).

Contrary to existing lab studies, which have identified higher donations of time than money among university students (e.g. Brown et al. 2013 and 2016; Lilley and Slonim 2014), we find that members of an Indonesian fishing community give significantly more when donating money compared to time. We also find that matching increases the percent of people giving but has a crowding-out effect on the percent of earnings donated under the monetary treatment.

Taken together, these results highlight the importance of factoring human behavior – and specifically the role of incentive schemes in influencing preferences for giving – into the design of conservation strategies (Reddy et al. 2016; Veríssimo 2013). Although we focus on marine resource users, the methods used are not restricted to a marine context and could be applied across different countries and settings.

### **Time is money?**

This research addresses the conventional economic assumption that whenever the value of cash donations equals the value of time donations, people are indifferent between giving monetary contributions or the value of volunteer labor to the charity (Andreoni et al. 1996). The validity of this assumption has largely escaped empirical scrutiny, with the majority of research from both the charitable literature and the public goods literature focusing on monetary contributions. To our knowledge, only three experimental studies compare monetary and time donations. Conducted with university students in developed countries, all three studies identify stronger preferences for time donations. Using a lab experiment, Brown et al. (2013) find that students give substantially more time – voluntarily performing tasks while the earnings accrue to the charity – rather than donating income they earn from completing tasks. Similarly, in the lab experiment by Lilley and Slonim (2014), subjects simultaneously choose how much time and money they want to donate to charity under different wage rates, tax rates, and endowments. Their results show that students give more time than money even when the time donations are less efficient than giving money. A follow-up study by Brown et al. (2016) tests additional treatments with varied wage rates and their results also show an inefficient allocation of time donations. We model our experimental design loosely on that of Brown et al. (2013). Our assumption regarding a fishing village in Indonesia is that people have stronger preferences for giving away time owing to the relative scarcity of money.

### **Matching**

In principle, matching effectively lowers the “price” of a charitable donation. By the basic law of demand, if the price of something falls, consumers should consume more. Nevertheless, the literature on donation matching is inconclusive. Some studies show increased propensity to donate and increased donation amounts with matching (Karlan & List 2007; Karlan et al. 2011; Meier 2007; Okunade & Berl 1997), while other studies report decreased individual giving (Eckel & Grossman 2008; Huck & Rasul 2011).

Even with inconclusive evidence, the ubiquitous prevalence of matching incentives among philanthropic industry practitioners begs the question of whether this technique works in a developing country context to increase either money or time donations. From the principle of downward sloping demand, we hypothesize that both individual gift amounts and the percentage of donors will increase with a one-to-one match offer.

**Methods**

302 individuals were recruited<sup>1</sup> from Bajo Mola village on Wangi-Wangi Island in South East Sulawesi, Indonesia. The location’s coral ecosystem hosts remarkably high levels of biodiversity that are currently under threat from anthropogenic stressors, such as overfishing. The village is home to the majority of fishers in the area and almost all households depend directly on fishing for their livelihood and nutrition.

In all treatments (see Table 1) respondents choose one charity from a list of six. Then each person performs the same piece rate task for one hour and makes a donation decision. Finally, they complete a survey questionnaire (see Figure 1).

**Table 1: Between-subject treatments**

(D)	Donate	Participants can donate money at the end of the experiment after payment for work.
(DM)	Donate Match	Participants can donate money at the end of the experiment after payment for work and donation will be matched 1:1.
(V)	Volunteer	Participants choose to switch between working for themselves or volunteering.
(VM)	Volunteer Match	Participants choose to switch between working for themselves or volunteering. The value of beads produced for charity is matched 1:1 by monetary donations.

**Treatments**

Each participant is involved in only one treatment. In the monetary donation (D) treatment subjects earn money performing a task and then decide if they will donate money to charity. The volunteer time donation (V) treatment allows subjects to choose continuously as they work whether each bead would accrue money for themselves or for their chosen charity (see Figure 1).

To examine the effects of matching, the experiment includes two additional treatments – monetary donation match (D<sub>m</sub>) and volunteer time donation match (V<sub>m</sub>). These are identical to

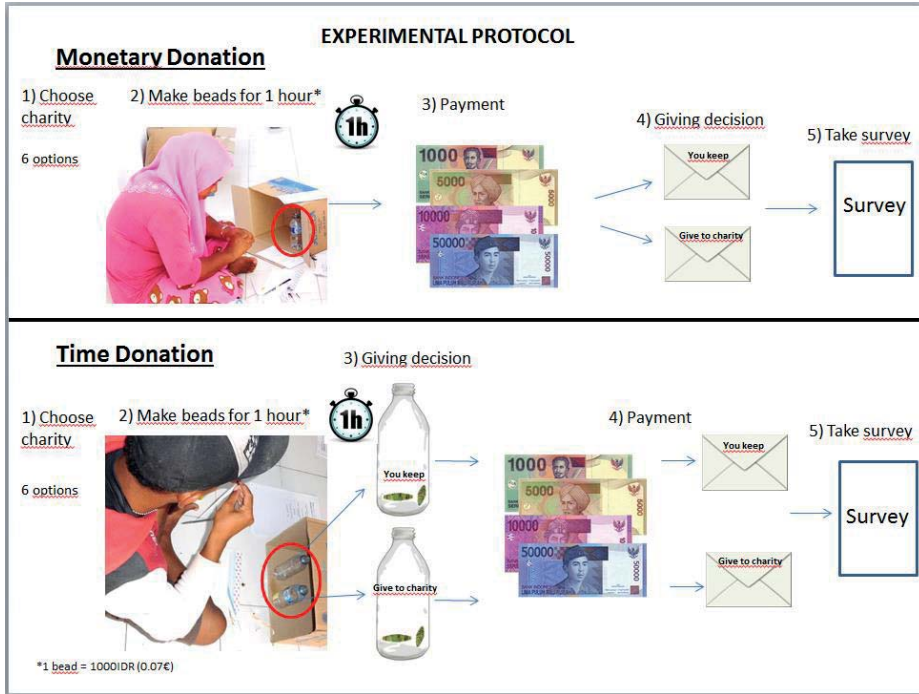
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<sup>1</sup>Participants were recruited by a hand delivered invitation letter indicating the date and time of the session. All households in the village received an invitation and one-third of all households participated.



the previous treatments except that the value of the individual’s contribution to charity in either case is matched at a rate of 1:1, so that double the amount will go to their chosen charity.

Figure 1: Treatment diagram



### Charities

Participants receive a list of six charities with descriptions of their missions in randomized order (see Appendix 1). They are instructed to confidentially select one charity to which they can contribute<sup>2</sup>. Two of the six charities target marine conservation while the remaining four do not have an explicit environmental focus. We followed the standard protocol of other charitable giving studies, which provide several options of different charitable causes to create a clear treatment effect and increase the likelihood that participants will find a cause they feel worthy of supporting (Brown et al. 2013; Gallier, Reif, & Römer 2014). This design is a methodological necessity with the added virtue of revealing preferences with respect to marine protection. We hypothesize there will be no differences in the patterns of giving behavior across the charity options.

<sup>2</sup>Each participant was informed that all donations would be sent to the charities within 90 days and that signs would be posted publicly in the village showing the total amounts donated to all of the charities.

### ***Real effort task***

Participants earn the money they donate to charity rather than receiving it as an endowment – the more common practice in experiments (Davis & Millner 2005; Eckel & Grossman 2003; Gallier et al. 2014). This is an important distinction because it is more similar to behavior in the real world<sup>3</sup>. Participants are given one hour to roll paper beads (see Appendix 2) and are paid 1000 Indonesian Rupiah (IDR)<sup>4</sup> for each bead completed. This type of task was chosen because it does not require any prior knowledge; it is simple and easy to teach to a person of any education level or age; it does not require any particular skill; and the activity is commonly taught by NGO's as an income-generating activity in developing countries (Holt & Littlewood 2016).

Participants are instructed to deposit each bead into a collection receptacle (see Figure 1). The D and D<sub>m</sub> treatments have only one receptacle while the V and V<sub>m</sub> treatments have two, such that any beads placed in the unmarked receptacle will earn private income and any beads placed in the receptacle marked “charity” will earn money directly for their chosen charity.

After sixty minutes, the beads are counted and the respondent is paid privately in cash in bills of various denominations. In D and D<sub>m</sub>, participants are handed the envelope with their name, which contains their personal earnings, and the empty charity envelope. There is a separate private area where they make their donation decision. They are asked to seal both envelopes before leaving the area so that their decision is confidential and to minimize the influence that observation by others can have on the donation decision. In V and V<sub>m</sub>, the value of the beads from the unmarked receptacle is paid in cash and placed into the envelope labeled with the participant's name. The value of the beads from the charity receptacle is paid in cash into the envelope labeled with the name of the charity the participant selected. In the case of the match treatments, the donated amount is doubled and placed into an envelope in front of the participant. In all treatments, after the pay-out participants are paired with an enumerator to complete a survey questionnaire.

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<sup>3</sup>*Reinstein and Riener (2012) find that those subjects who earned their compensation choose to donate less than those who received an endowment.*

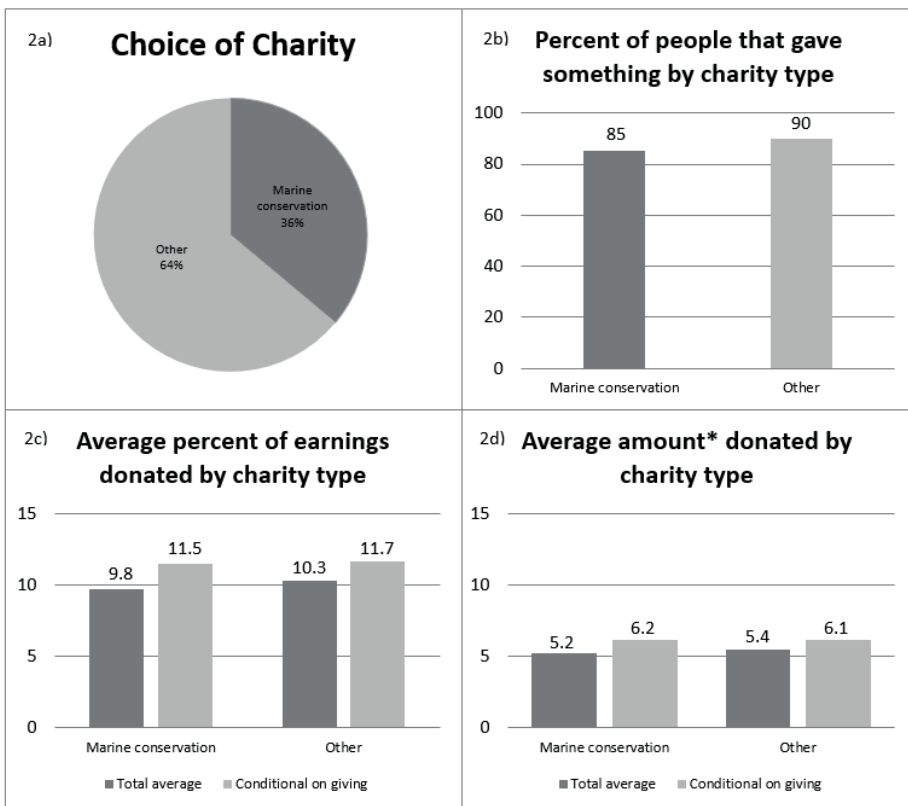
<sup>4</sup>*European Central Bank exchange rate 7 October, 2015 is EUR 1 = IDR 15,492. Therefore, 1000IDR is equivalent to 0.07€.*

## Results

Summary statistics of the donations by treatment are presented in Table 2. The table is split into the averages across all participants plus the averages conditional on donating a nonzero amount. Due to the wide range in earnings, we focus our discussion on the percentage of earnings donated rather than the absolute amount.

**Result 1.** There are no significant differences in the pattern of donations between marine conservation charities versus those dedicated to other objectives.

Figure 2: Charity selection and donations by charity type



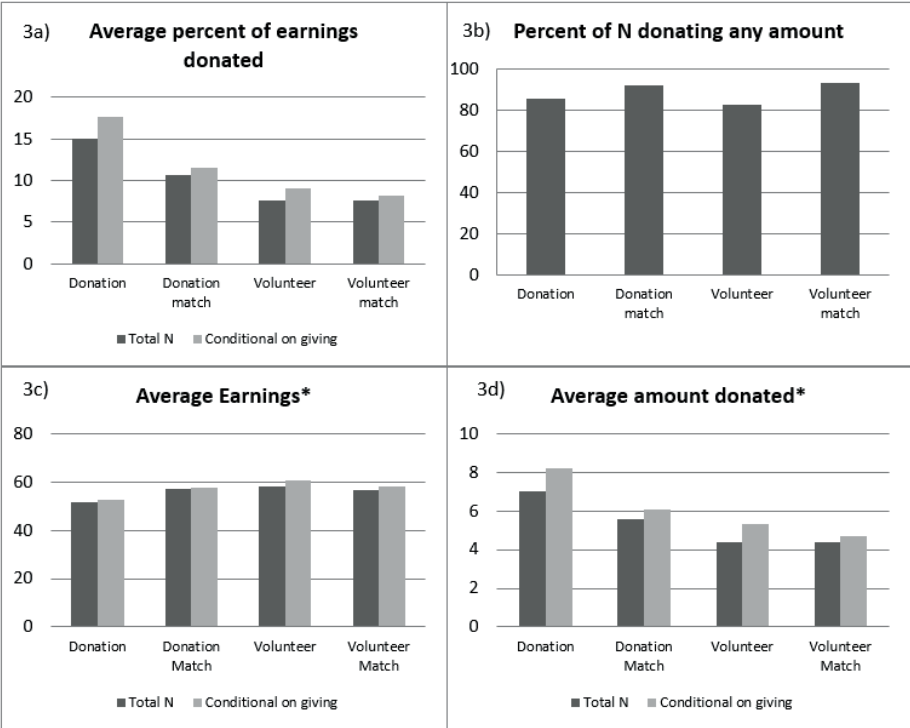
Note: None of the differences are significant at  $p < 0.05$

\*Amounts shown in Indonesian Rupiah divided by 1000 (1000IDR = 0.07€)

As seen in Figure 2a, 36% of the sample select a marine conservation charity, which is slightly higher than the 33% representation among the list of charities. Figure 2b shows no significant difference between charity types in the percent of participants that make a donation based on a Chi-square test ( $p=0.21$ ). A one-way analysis of variance (ANOVA) test with Bonferroni

correction for multiple comparisons shows that there are also no significant differences in the percent of earnings donated ( $p=0.61$ ), nor in the amount donated ( $p=0.28$ ) when comparing the marine conservation charities to the other charity options (see Figures 2c and 2d).

Figure 3: Bar graphs of treatment comparison



Note: Refer to Table 2 for values and significant differences between treatments  
 \*Amounts shown in Indonesian Rupiah divided by 1000 (1000IDR = 0.07€)

**Result 2.** The average percent of earnings donated is significantly higher in the monetary donation (D) compared to the volunteer time donation (V).

The ANOVA test with Bonferroni correction shows a highly significant difference ( $p=0.00$ ) between D and V in the average percentage of earnings donated. Participants in D give an average of 15.03% of their income to charity while those in V give an average of 7.54%. This holds true whether we include those that donated nothing at all in the average donation or whether we analyze the results conditional on giving ( $p=0.00$ ) (see Figure 3a). We can therefore reject the hypothesis suggested by Andreoni et al. (1996) that there should be no differences in the average amounts of money or time donated when they are of equal value. On the other hand, our results are the opposite of the findings of Brown et al. (2013), Lilley and Slonim (2014) and Brown et al. (2016) who showed that participants prefer to donate time rather than money.

**Result 3.** The percent of participants that give a nonzero amount increases significantly with the presence of the match.

As seen in Figure 3b, the percentage of participants that give to charity increases significantly in both of the matching treatments. There is a seven percentage point increase in the percent of people giving, from 85% in D to 92% in D<sub>m</sub> (p=0.05) (see Table 2). The difference is even greater in V<sub>m</sub>, with nearly an eleven percentage point increase in frequency of giving (from 82.7% to 93.4%; p=0.001) with the offer of the match.

**Table 2: Summary Statistics by treatment**

<b>Total Sample</b>	<b>Donation</b>	<b>Donation Match</b>	<b>Volunteer</b>	<b>Volunteer Match</b>
N	75	76	75	76
Average percent of earnings donated	15 <sup>a</sup> (16.7)	10.6 <sup>ab</sup> (9.7)	7.5 <sup>b</sup> (9.8)	7.6 <sup>b</sup> (7.3)
Percent of N giving something	85.3 <sup>a</sup>	92.1 <sup>b</sup>	82.7 <sup>a</sup>	93.4 <sup>b</sup>
Average earnings*	51.7 <sup>a</sup> (15.6)	57.2 <sup>a</sup> (16.8)	58.2 <sup>a</sup> (16.4)	57 <sup>a</sup> (14.7)
Average amount donated*	7.0 <sup>a</sup> (6.0)	5.6 <sup>ab</sup> (4.2)	4.4 <sup>b</sup> (6.5)	4.4 <sup>b</sup> (4.6)
<b>Conditional on giving</b>	<b>Donation</b>	<b>Donation Match</b>	<b>Volunteer</b>	<b>Volunteer Match</b>
N	64	70	62	71
Average percent of earnings donated	17.6 <sup>a</sup> (16.8)	11.6 <sup>b</sup> (9.6)	9.1 <sup>b</sup> (10.1)	8.2 <sup>b</sup> (7.2)
Average earnings*	52.7 <sup>a</sup> (16.2)	57.7 <sup>ab</sup> (16.5)	60.9 <sup>b</sup> (16.3)	58.0 <sup>ab</sup> (14.1)
Average amount donated*	8.2 <sup>a</sup> (5.7)	6.1 <sup>ab</sup> (4.0)	5.3 <sup>b</sup> (6.8)	4.7 <sup>b</sup> (4.6)

*(a,b) Different letters between the means indicate significant difference at p<0.05 in One-way ANOVA test with Bonferroni correction, or Binomial probability test, as appropriate (means that share the same letter, even if it is in combination with another letter, are not significant)*

*\*Amounts shown in Indonesian Rupiah divided by 1000 (1000IDR = 0.07€)*

*Standard deviations in parentheses*

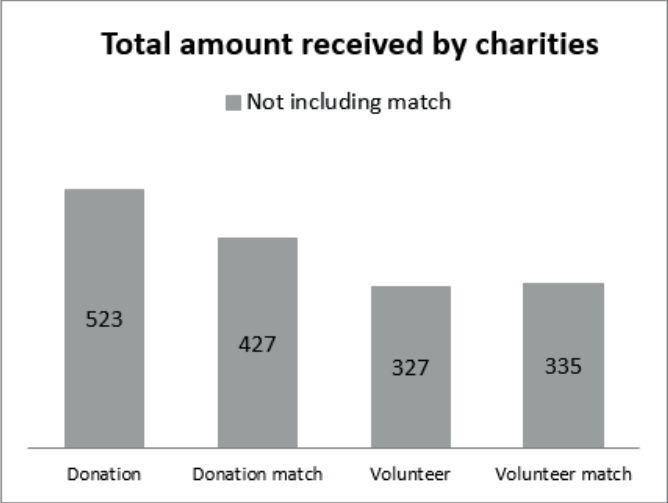
**Result 4.** Matching does not increase donations in either the money or time treatments.

Table 2 shows the average percent of earnings donated is 15% for D and 10.6% for D<sub>m</sub> (p=0.461). Conditional on giving some amount, this decrease in percent of earnings donated becomes significant with D at 17.6% and D<sub>m</sub> at 11.6% (p=0.008). There is no significant difference in the average percent of earnings donated between V and V<sub>m</sub>.

Thus, offering a match is a counterproductive fundraising mechanism, according to Result 4. However, in a dynamic strategy of identifying and developing a new donor sub-population, the

significant increase in the percentage of participants giving something in both match treatments (from Result 3) may be of strategic importance to charity organizations (see Figure 4).

Figure 4 Total amount of funds received by charities\*



\*Amounts shown in Indonesian Rupiah divided by 1000 (1000IDR = 0.07€)

**Result 5.** Among the participants who gave some amount, average earnings are significantly higher in the volunteer time donation (V) compared to the monetary donation (D).

In Figure 3c, the ANOVA test with Bonferroni correction reveals that among those participants that give, the efficiency of work in V is significantly higher than in D ( $p=0.013$ ) with a 13.5% increase in productivity (i.e. average earnings of 52.7 versus 60.9<sup>5</sup>). However, when the match is introduced, there is no significant difference in productivity (D vs. D<sub>m</sub>  $p=0.31$  and V vs. V<sub>m</sub>  $p=1$ ). This result is similar to that observed by Balakrishnan (2011) where labor productivity increased when employers introduced a corporate giving program.

### Discussion

Voluntary contributions to conservation are highly important yet receive little research attention in the conservation sciences (Scarlett et al. 2013). Here we present the first experimental methodology designed to evaluate resource users' preferences for contributing time or money and their response to matching incentives. This method allows for evidence-based design of conservation campaigns based on the preferences of the target audience.

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<sup>5</sup>Amounts are in Indonesian Rupiah (IDR) divided by 1000.

Participants from this fishing community display similar preferences for selecting and donating to marine conservation charities as compared to other charitable causes. Marine conservation charities represented one-third of the charity choices and slightly more than one-third of participants selected this type of charity. Additionally, participants that choose marine conservation charities donate an equivalent percent of their earnings as those participants that chose other charities. We find clear treatment effects regardless of the type of charity selected. These are important findings for conservation organizations trying to involve communities in engagement and investment in sustaining their natural resources.

Contrary to previous studies (all of which were done in the lab), we find that participants donate a higher percentage of earnings as monetary contributions than time to charities. This result shows the risk in extending insights from university lab experiments in developed countries to behavior in a field setting in a developing country when designing conservation campaigns. Several plausible explanations exist to explain why monetary donations would be larger, but more research testing these explanations is necessary.

One possibility is that participants may gain more gratification from giving away the relatively scarcer resource (MacDonnell & White 2015) – cash in the case of a low-income fishing community in Indonesia. Religious background may also play a role. With 99.7% of the sample self-identifying as Muslim, it is possible that the effects are based on the deeply engrained tradition of ‘Zakat’ giving in Islam (Lambarraa & Reiner 2015), which requires that a certain percent of income is given to charity. Indeed, from our questionnaire, the sample’s self-reported frequency of donating money to charity annually is 93% compared to only 76% for volunteering, confirming the pattern seen in the data. Differences may also be due to risk aversion, given that those in the monetary donation treatment (D) are aware of the total amount they earned before they have to make the donation decision, thus making it easier to calculate how much private income they will take home after giving. Referring to Figure 1, the monetary giving decision in D takes place in step 3, after the participant is paid, whereas, those in the volunteer time treatment (V) are not aware of the total amount they will ultimately earn as they decide continuously with every bead made whether to earn for themselves or for charity.

## **Conclusions**

Some practical insights have emerged that are useful to conservation researchers and practitioners, especially given the paucity of evidence on donation behavior, community engagement in conservation, and fundraising in non-western countries where far less data on giving behavior exists. If the goal is to increase monetary donations, matching does not appear

to be effective, but if the goal is to increase the donor base, matching significantly increases the percentage of people donating, which can have great value over the long-term. If the goal is to get people actively involved through participation and volunteering, announcing that their time will be matched can allow organizations to better recruit new volunteers. An overwhelming majority of conservation organizations are non-profit and depend on grants, donations, and volunteer time. Re-framing secured funds as matches does not incur additional cost to the charity and it significantly increases the number of money and time donors; however, matching does not increase the amount given. This evidence paves the way for additional studies that focus on whether people are more likely to participate in meetings and activities if the value of their individual volunteered time is known and matched with monetary funds.

The experiment further demonstrates that giving behaviors are not universal and are highly context-dependent (Henrich 2004; Lambarra & Reiner 2015). We recommend that similar methods be applied across different cultural settings to provide more understanding whether our results are idiosyncratic or whether there is widespread cultural variation in giving behavior.



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## Appendix 1

Table A.1: Charity Organizations

Charity	Focus	Description
Terumbu Karang Indonesia (TERANGI)	Environment	TERANGI is dedicated to coral reef conservation in Indonesia. They focus on improving marine management and community-based conservation to reduce threats to local coral reef habitats.
Karang Taruna	Environment	Karang Taruna is a village-level organization and support will go towards community clean-up activities to protect the marine environment from pollution.
SINTESA	Rural Potential	SINTESA focuses on women's empowerment and provides training programs on alternative livelihood projects, potable water resources, and managing finances. They provide savings and loan services in addition to tourism training.
Oxfam	Rural Potential	Oxfam has been operating in Indonesia since 1957 and focuses on improving rural livelihood and income opportunities, equal access to resources, food security, and disaster relief.
Islamic Relief Worldwide	Religious organization	Islamic Relief Worldwide has been working in Indonesia since 2000 and focuses on climate change relief, food security, sustainable livelihoods, sanitation, women's empowerment, and access to potable water.
Nahdatul Ulama	Religious Organization	NU is an Islamic organization that focuses on children's education, religious learning, and women's empowerment.

# Appendix 2

Figure A.1: Step-by-step visual guide to rolling paper beads

