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## Distributional preferences and donation behavior among marine resource users in Wakatobi, Indonesia

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### ABSTRACT

This study examines the effect of distributional preferences on donations of money and time using a field experiment with marine resource users in Indonesia. Individuals participate in a real effort task to earn money and are faced with a donation decision under different treatments – monetary donation, time donation, monetary match, and time match. In the distributional preferences elicitation task we classify individuals' preferences as benevolent, egalitarian, own-money-maximizing, and malevolent. We find that the different distributional preference types are a significant indicator of participants' donation behavior. The people showing malevolent preferences and those who focus only on maximizing their own payoff are less likely to donate any amount compared to those that make egalitarian choices. Furthermore, we find strong evidence that individuals who choose payoff structures characterized as “benevolent” donate a significantly higher amount. We analyze the results econometrically in two stages to better understand the determining factors for whether an individual donates and those factors that determine how much one donates. Practical implications involve developing targeted messages that integrate the resource-users and their needs into the center of local conservation campaigns and goals.

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### 1. Introduction

Human behavior is widely accepted as the key driver that threatens biodiversity (Wright et al., 2015). Humans have been dependent on marine resources for thousands of years and this dependency has altered the oceans through direct and indirect means (Halpern et al., 2008). Coral reefs sustain the livelihoods of millions of people around the world but they are facing serious decline and elevated levels of extinction (Carpenter et al., 2008; Mascia, 2003). Coral reefs represent both local and global public goods in that they provide a source of food for millions of people; they are hotspots of marine biodiversity; they protect coastlines against storm surges; they provide habitat, spawning, and nursery grounds for diverse fish species; they provide jobs and income to local economies from fishing, recreation, and tourism; and they are a source for new medicines (Mumby et al., 2008). The destruction of

coral reefs can be attributed to human behaviors such as pollution, overfishing, destructive fishing, coastal development, climate change resulting in rising sea temperatures, ocean acidification, and increases in the global demand for fish (Hilmi et al., 2017).

The marine conservation sciences often focus on documenting losses and identifying causes for declines in biodiversity. In order to move toward identifying the underlying drivers and implementing solutions, conservation practitioners must shift the focus from fish, reefs, and the underwater environment to equally focus on communities, people, and human behavior. Research suggests that management success depends upon social factors more so than biological or physical variables (Mascia, 2003). The compelling logic is that damage is likely to be worse where natural resources are open-access because some people will be able to enjoy the benefits without contributing to the costs of provision. Maintaining large-scale cooperation for the provision and management of open-access goods is fraught with this infamous cooperation dilemma in which people tend to free-ride, both by overusing resources and underinvesting in their maintenance. Coral reef ecosystems are the archetypal example of a natural resource that suffers from this cooperation dilemma. In countries that have few resources to

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support conservation, the situation is often exacerbated.

Much of the major funding for coral reef conservation comes from individuals and corporate philanthropy in Europe, North America, and Australia. However, a great deal of coral reef conservation work is focused in less wealthy countries. Countries in the Coral Triangle (i.e. Indonesia, Philippines, Malaysia) have been recognized as the global center of marine biodiversity and a priority for conservation (Allen, 2008). In many cases where resources for regulation and enforcement are lacking, conservation activities require community involvement in the form of voluntary contributions and behavioral change on behalf of resource users. These contributions can be in the form of time or money (i.e. attendance at meetings, participation in training and events, donations, proper disposal of waste, following rules, etc.). The experiments in this paper are inspired by the need to better understand the contributive behavior of marine resource users to collectively sustain the conservation of coral reef public goods. McClanahan et al. (2006) provide evidence that marine management regimes designed to meet community goals can be more successful than those designed primarily for biodiversity conservation.

Indonesia has the highest diversity of corals and reef fishes and is home to one of the most biologically diverse and economically valuable marine ecosystems on earth (Allen, 2008). Coral reefs in Indonesia sustain millions of people, providing the majority of protein and income for many coastal communities (Cinner, 2014). Mass mortality events related to coral bleaching are increasing in frequency which threaten coral reef habitats and the high levels of biodiversity (Descombes et al., 2015; Pandolfi et al., 2011). The lack of sustainable funding for marine protected areas, coupled with low community involvement and ownership, contribute to the somber outlook for reef conservation in Indonesia (Bos et al., 2015). Therefore, we selected Wakatobi National Marine Park as our research site within Indonesia, which has large and vulnerable areas of reef, a relatively dense population (compared to other marine parks), a history of non-compliance, a strong fishing economy, and a rapidly growing tourism industry.

## 2. Wakatobi National Marine Park

The Wakatobi National Marine Park is the third largest national marine park in Indonesia covering 1.3 million hectares. The area was declared a marine national park in 1996 in an attempt to reduce destructive fishing practices and the threat of overfishing (Caras and Pasternak, 2009) (see Fig. 1). Wakatobi district is located in the province of Southeast Sulawesi and is made up of four larger islands: Wangi-Wangi, Kaledupa, Tomia, and Binongko. The marine environment includes extensive fringing shallow reefs and reef walls and boasts some of the highest recorded levels of marine biodiversity in any ecosystem in the world. It is ranked as one of the highest priorities for coral reef conservation in the Coral Triangle due to numerous human threats to the ecosystem including destructive fishing practices from bomb and cyanide fishing, overfishing, pollution, tourism development, and coral mining. The decentralization of government in Indonesia placed financial pressure on district governments which led to increased external involvement (e.g., non-governmental organizations or NGOs) into marine protected area plan production (von Heland et al., 2014). With input from the World Wildlife Fund (WWF) and The Nature Conservancy (TNC), the park regulation and zonation was significantly revised in 2009 due to a lack of community inclusion and participation in the initial zonation plan resulting in poor compliance and management (Clifton, 2003).

With approximately 100,000 people living within the park, Wakatobi is one of the most densely populated marine national parks in Indonesia. The majority of residents rely on marine

resources for food and income. Ninety-two percent are of local Butonese origin and the remaining eight percent (about 7000 people) belong to the Bajo (sometimes spelled Bajao or Badjo) ethnic group residing in six settlements across the islands (von Heland et al., 2014). The term 'Bajo' refers to several Austronesian ethnic groups across South East Asia. Historically, they are a seafaring people that live much of their nomadic lives at sea or in huts erected on stilts over reef flats. They identify strongly with the ocean, calling other ethnicities 'land people', and their culture is strongly intertwined with the sea. They are linguistically and ethnically distinct from their Butonese neighbors. Even though they are strongly dependent on marine resources, in the past the Bajo have been systematically left out of participating in marine governance in Wakatobi because of their minority status. They represent key fisheries knowledge that is fundamental to the establishment and compliance of marine protected zones.

## 3. Distributional preferences and contributive behavior

Conventional economic reasoning is typically based on the self-interest hypothesis, i.e. the assumption that rational people are exclusively motivated by their material self-interest (Fehr and Fischbacher, 2002). However, most economists recognize this assumption of pure selfishness is made mostly for simplicity. And there is overwhelming experimental evidence refuting the self-interest hypothesis by showing that people often behave with un-selfish preferences, which can help explain how and why communities are able to manage collective resources. Yet, the experiments used to elicit these preferences are typically played in small groups of only a few players. It is unclear if these preferences are stable when the exchange is between one to two individuals versus an organization (Schumacher et al., 2016). A core question pertaining to conservation economics is: what are the conditions necessary for encouraging successful collective action for conservation? Behavioral studies that focus on individual decisions are crucial because they offer the possibility to understand environmental issues in connection with economic theory (Cecere et al., 2014). Although the need for human behavioral studies is well-documented, there is a knowledge gap in research delivering empirical results based on conservation behavior (Arkema et al., 2015; Partelow et al., 2017).

Social preferences for the distribution of wealth (hereafter referred to as distributional preferences) shape individual behavior on a range of issues related to: competition in the labor market (Balafoutas et al., 2012; Charness and Rabin, 2002), political party affiliation (Fisman et al., 2014), collective behavior (Fehr and Fischbacher, 2002; Hedegaard et al., 2011) and charitable giving (Kamas and Preston, 2010, 2015). Relatively little is known about how the distributional preferences of resource users relates to contributions to public goods. It is unclear how distributional preferences factor in situations where the costs of an action are large, but the benefits are dispersed among many individuals, such as in the situation of environmental goods (Schumacher et al., 2014). Additionally, it is not clear whether concern for the welfare of others extends to the environment and open-access resources or whether they are linked at all. While there is literature showing that personal values affect contributions, the majority of research does not distinguish between the heterogeneity in pro-social motivations, such as differences between benevolence, inequity aversion, and efficiency or how this information could be useful to practitioners (Kamas and Preston, 2012). We also contribute to the literature that focuses on the stability of distributional preferences across social domains (i.e. distribution of funds to individuals vs. charitable organizations) (De Oliveira et al., 2012; Schumacher et al., 2014, 2016).

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