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Is Communication Necessary for Sustainable Practices? Further Evidence from Indigenous Villages in Maharashtra, India

Environmental management requires a good understanding of how people make decisions related to resource use. One key issue is the role of communication and whether it changes the way people act. This Brief examines the effect of communication on forest management decisions. It builds on a SANDEE working paper by Rucha Ghate, Suresh Ghate and Elinor Ostrom. The study examines the implications of good communication on decisions made by indigenous communities, who have strong social norms regarding mutual cooperation and a culture of sustainable resource use.

The study finds that the shared norms in indigenous communities are so deeply embedded, that communication is not essential for decisions that lead to sustainable forest management. However, communication does tend to make the behaviour of groups and individuals more similar. Thus, communication reduces divergent opinions around joint decisions, which may make implementation of programs easier.

Communication in Indigenous Communities

A large body of laboratory and field experiments have been conducted on human behaviour related to public goods and common-pool resources (such as forests). This literature highlights the importance of communication amongst individuals and suggests that communication can lead to significantly higher levels of cooperation.

Field experiments are typically decision-making games that are played by a number of participants in a particular setting. The objective of the game is to understand some type of behaviour under relatively controlled settings. However, thus far, no field experiments have been conducted in homogeneous, indigenous communities where strong norms of mutual cooperation are present. This raises the questions: is communication superfluous in close-knit communities where there is culture of judicious resource use? Does it have any substantial role to play other than encouraging sustainable practices?

It is important that policy makers understand the attitudes of tribal communities towards forests. Along with many other developing countries, India has accepted the concept of 'sharing authority' on forest use with communities. This has been put into law through the Forest Rights Act and the Joint Forest Management (JFM) program. Since the JFM program encourages communities to take decisions collectively regarding forest use, it is important to understand the role played by cultural norms, with or without communication, in resource use.

Using Field Experiments to Capture Actual Behaviour

Many studies in India emphasize the dependence of tribal communities on forests for their survival. However, as with many indigenous societies around the world, those in India face challenges that are changing their relationship with their forest homes. These challenges include improvements in infrastructural facilities, exposure to mainstream society, increased commerce, and specific government policies and programs that are reducing indigenous people's dependence on forests. The aim of this research was to understand indigenous use of forest products in changing times. Thus, in addition to traditional research methods such as household surveys and focused group discussions, this study undertook field experiments to assess harvesting behaviour and the role of communication.

In this study, the objective of the field experiments was to understand the importance of communication

This policy brief is based on SANDEE working paper No. 64-11, 'Indigenous Communities, Cooperation, and Communication: Taking Experiments to the Field' by Rucha Ghate (SHODH: The Institute for Research and Development) Suresh Ghate (Nagpur University), Elinor Ostrom (Indiana University). The full report is available at www.sandeeonline.org

Experiments in Communication and Resource Use

The past half-century has seen a substantial rethinking amongst researchers about how individuals make decisions related to harvesting common-pool resources (CPRs) such as forests, fisheries and water bodies. In the 1950s and 1960s many scholars and policy makers presumed that individuals would always maximize short-term profit opportunities. Thus, without external regulation, individuals would over-harvest and destroy resources over time.

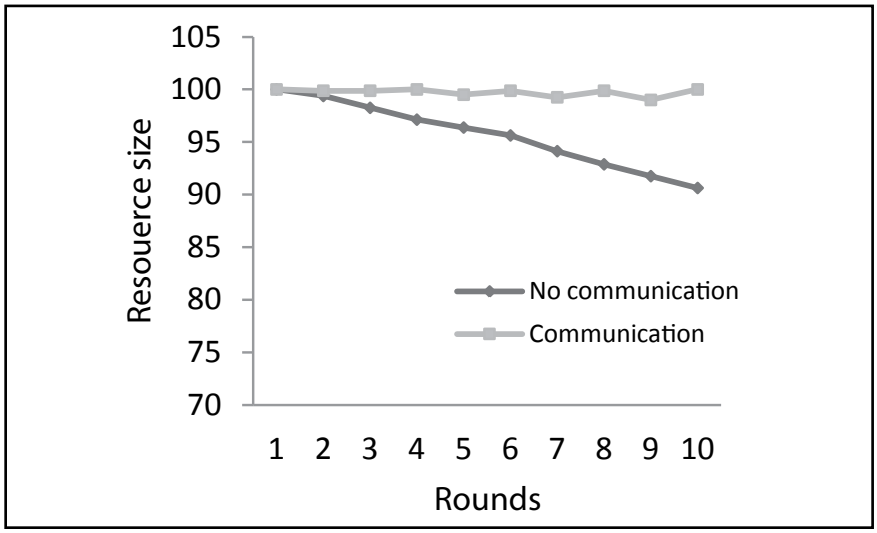
During the 1980s, however, a large number of case studies drew attention to settings where the users of common-pool resources had organized and successfully managed CPRs. Since then, multiple meta-analyses of case studies demonstrate that many resource users, albeit not all, self-organize and cooperate to reduce harvesting to a sustainable level.

Other researchers have also begun to examine the presumption of universal maximization of short-term material returns in laboratory experiments. They find mixed evidence depending on the structure of their experiments. Experiments on common-pool resources, where the subjects were unknown to each other and did not communicate, found substantial over-harvesting of resources. When allowed to communicate, subjects tended to cooperate and achieve higher returns than predicted.

Many of the initial experiments on public goods and common-pool resources took place in laboratory settings in U.S. or European universities. While laboratory experiments do have strong internal validity, they were mostly conducted with students who did not face a CPR or public goods problem on a regular basis. They were also usually carried out with heterogeneous groups of participants. This made it impossible to be sure of the experiments' external validity. Since then, researchers such as Juan Camillo Cardenas have run field experiments and validated findings externally. Cardenas's research in Colombia suggests that cooperation increases substantially when farmers are able to engage in face-to-face communication. The findings from Maharasthra indicate that cooperation can be high even without communication in indigenous communities.

in influencing sustainable forest use behaviour. Thus, two field experiments (with and without communication) were conducted in each of eight villages. Five villagers from each village participated in each experiment. This small and controlled experimental design is based on previous research by Cardenas et al.[1], whose work also involved five individuals from each community. Villagers were well aware of how their fellow participants used forest resources – this made it easy for them to guess the likely behaviour of their fellow participants. It is important to note that such understanding does not normally occur when researchers conduct experiments in laboratory settings using participants who can be complete strangers.

Figure 1: Round-wise Average Forest Stock Size in the two games



The Experimental Design

Taking experiments to the field presents several challenges. The most difficult of these is to make the experiment relevant to participants, so that their behaviour in the experiment collates with their behaviour in the "real world". Keeping this in mind, the study team kept the number of participants small and developed two basic experimental designs.

[1] Cardenas, J.C, M.A. Janssen, and F. Bousquet (2011). Dynamics of Rules and Resources: Three New Field Experiments on Water, Forests and Fisheries, *Handbook on Experimental Economics and the Environment* edited by John List and Michael Price. Edward Elgar.

The first was a "no-communication game" in which none of the participants were allowed verbal or written communication. The second was a "communication game" in which the same five participants were allowed to communicate with each other at the beginning of each round of the experiment. Both games included a maximum of ten rounds, where participants were allowed to make a forest harvesting decision in each round.

Each game started with 100 trees (made of paper) stuck on a board. The five participants were informed that this board represented the forest about which they would have to make harvesting decisions. Taking turns, participants went to a separate room and dropped the number of trees that they wished to harvest in that round into a box. The organizer then recorded the number harvested and placed the trees back on the table. Thus, the next participant in the same round had the same number of trees available to harvest, without knowing the number of trees harvested by the previous participant.

Forest Regeneration and Pay-offs

At the end of each round, the total number of trees harvested by the five participants was disclosed to the group. The researcher then added 10% of the trees remaining at the end of the each round to the forest. This was meant to represent forest regeneration. The forest was never allowed to exceed its maximum size of 100 trees. If the resource size fell to less than four trees after taking regeneration into account, the game was stopped but, otherwise, the game ended after the tenth round.

Participants received a pay-off of INR 10 for each tree harvested during the experiment. The funds were paid at the end of the game openly to each participant. This is contrary to the practice adopted in other experiments, where payments are generally made in private. It was done to capture the reality of a small community where everyone knows who is harvesting what and what the pay-offs are.

Since the objective of the field experiment was to understand the role of the communication, the researchers recorded the total number of trees harvested at the end of each experiment (of ten rounds or less). It was hypothesized that playing the game 'with communication' would lead to less number of trees harvested at the end relative to the experiment where 'no communication' is allowed.

The Study Area

The study was conducted in the state of Maharashtra, the second largest state in India. Slightly over 10% of India's 84 million tribal population resides in Maharashtra, which makes it home to the second largest population of tribal people in India. The study was undertaken in six districts (eight villages) of the state that have a relatively high proportion of land categorized under 'forest' and are populated with indigenous, tribal people.

Participants for the field experiment were identified during the course of undertaking household surveys in the chosen villages. The five selected participants in each village were largely representative of different age groups, education levels, and land ownership categories. Women did not volunteer for the study. This was consistent with the fact that women in the study villages were not active participants in village forest management committees.

Assessing the Results

A sustainable set of decisions in the context of this field experiment are decisions that did not affect the regenerative capacity of the forest resource and ensured the long-term sustainability of the forest. Thus, if at the end of ten rounds of harvesting, it was found that the number of trees remaining un-harvested was above 90, then this was considered sustainable management or decision-making.

The most striking result of the field experiment was that many participants cooperated even in the absence of communication. This was shown in three explicit ways. Firstly, the average number of trees harvested by all eight communities in each round with or without communication was less than7.5. This was below the sustainable harvest level of nine trees per round (given regenerative capacity). Secondly, the average resource size at the beginning of the tenth round (across villages) was above 90 trees in the no-communication game. Thus, forests were left with 90 + trees, which would easily regenerate given their 10% growth rate to close to the original stock of 100 trees. What's more, the average group

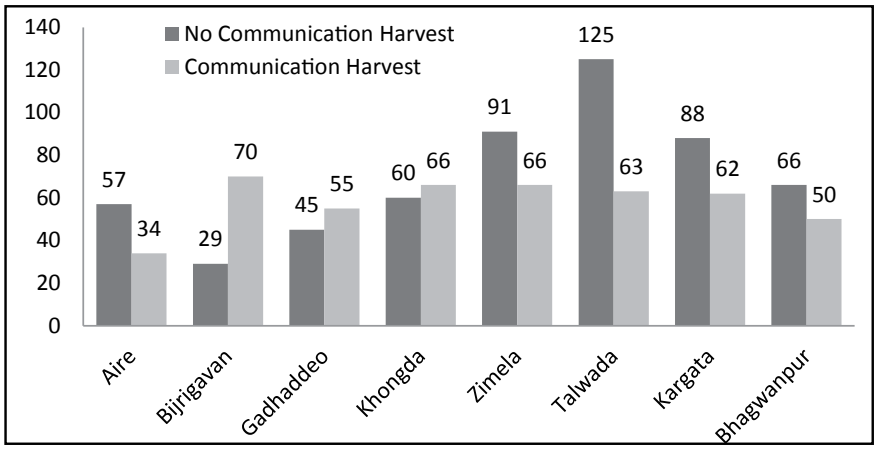
harvest was just 70 trees in the no-communication game – this was significantly below the sustainable group harvest size of 90 trees.

The Impact of Communication

Although communication was not necessary for decision making to be sustainable, the study found that communication did have an effect on harvesting decisions. Communication resulted in both moderation and homogenization of harvesting behaviour and consequently, a more equitable distribution of pay-offs.

This meant that individuals who harvested a low quantity in the no-communication game increased their harvest rates in the communication game. However, individuals who harvested a higher quantity in the no-communication game reduced their harvest rates and thus moderated the behaviour of over-harvesting individuals. This homogenization effect of communication was also seen between communities.

Figure 2: Total number of trees harvested in each game in eight villages



Community-based Forest Management Can Work

Through the series of experiments run during this study, it is clear that there is minimal need for communication to enhance cooperative behaviour in traditional societies. This finding differs from earlier common-pool-resource laboratory and field experiments. However, it is clear that communication still has an important role to play in helping to enhance equity and moderation in harvesting.

The study underscores the general characterization of indigenous communities as those that are governed by shared norms of behaviour that dissuade individuals from adopting commercial or exploitative strategies. Furthermore, it shows that these norms are so deeply embedded that they do not need to communicate with each other significantly when making private decisions regarding the use of a resource.

The results provide justification for current forest management and decentralization efforts such as the JFM program and the Forest Rights Act, which envisage community control of forest lands. This Brief re-emphasizes the findings of a previous policy brief (No. 48-10, Nov 2010) that indigenous communities are basically conservative with regard to forest harvests. Further analysis indicates that decentralized decision making can deal with issues of equity along with sustainability.

SANDEE

The South Asian Network for Development and Environmental Economic (SANDEE) is a regional network that seeks to bring together analysts from the different countries in South Asia to address their development-environment problems. Its mission is to strengthen the capacity of individuals and institutions in South Asia to undertake research on the inter-linkages among economic development, poverty, and environmental change, and to disseminate practical information that can be applied to development policies. SANDEE's activities cover Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka.

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