

Influence of Rural Women's Social Network on Attitude toward Water Conservation in a Loose Common-Pool Resource: Case Study of a Village in West Bengal, India

女性の社会ネットワークが共有水資源の環境への配慮に与える影響
—インド・ウェストベンガル州の農村を事例として—

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1. Background

A 'common-pool resource' (CPR) is defined as a resource jointly used by a group of people, referred to as resource community. According to Steins et al. (2000), CPR is a source of sustainable resources for poor, rural households. Concerning 'loose common-pool resource,' which takes away from ownership or use, and is used by multiple people. In this sense, loose commons would be regarded as a multilayered commons.

In the northwest part of West Bengal, India some rural villages are specifically characterized by the omnipresence of ponds. Residents regard the water in these ponds as loose common-pool resources.

Historically, most rural residents have used the water from tubewells in the households, whereas others have used ponds for domestic purposes such as fishing, bathing, and washing both clothes and kitchen utensils.

Now, in order to supply safe drinking water, water pipelines are installed in rural villages. In most of these villages, adequate sewerage systems have not been provided, causing drainage failure problems where the used water flows through. In this sense, water supply usage technologies like pipeline projects are inextricably linked to water conservation.

Along with such changes to water usage, a serious problem occurs: the residents' awareness of ponds seems to be decreasing since many do not own or use the resources and others live far from ponds. This creates a social dilemma as residents begin to regard the depletion of these ponds as unrelated to their own lives or welfares.

In order to resolve the social dilemma, over the past few decades, numerous empirical studies on the tragedy of commons and social dilemma problems have pointed out that social capital is a practical solution.

Social capital is referred as connections among individuals—social networks. The norms relating to reciprocity and trustworthiness arise from them (Putnam, 2000). Ostrom (2008) also deals with social network, focusing on man's interaction with natural resources and natural environments. CPR scholars (Jentoft and McCay

et al., 1998, etc.), however, have mentioned oversight of the necessary conceptual foundations to incorporate contextual analysis into the Ostrom's study. They have pointed out that only little research of the traditional CPRs were carried out in developing countries. Also, Ostrom did not pay much attention to tacit rules or norms on the traditional commons, which mobilize contextual factors (Newman and Dale, 2007) in the social network.

The social network is a network of social interactions and personal relationships. In social networks, there often exist the tendency of individuals to associate and bond with similar others. This is called homophily. Especially, the patterns of ethnic connections are related to how homophily affect the distribution of common sense in the social network (Bordin and Prell, 2011). Ethnicity has one of the most common attributes defining similarity and group membership throughout individuals, constructing their social identities. However, the previous literature contained little quantitative studies in the traditional CPRs through focusing on the aspects of homophily.

2. Objectives

The goal of this study is to seek a tacit norm determining social dilemma resolution and clarifying discrepancies residents' attitude toward ponds' conservation. The author deals with residents' interaction concerning community water resources. Additionally, the author examines the relation of rural women's awareness of loose common-pool resources and their homophily level. To achieve the goal, the author postulated the following two hypotheses:

Hypothesis 1: Local women's attitude toward CPRs will be affected by social context-dependency in their interactions and household-level heterophily.

Hypothesis 2: A norm that determines residents' attitude toward CPRs will differ from the homophily level of individuals and groups.

3. Methodologies

The household survey was conducted for rural

women in a village of West Bengal, India to grasp the situation of residents' use of water resources and relations of the unique rural lifestyle and social networks in September 2014. The additional data was collected in March 2015 and October 2015. In order to verify two hypotheses, the following methods were employed.

1) To detect closely interacting groups from a social network, the author used the Louvain method and extracted subgroups. 2) To test Hypothesis 1 and grasp the characteristics of subgroups, social network analysis was applied. In addition, to specify which factors of individual or subgroups influences more on residents' water resource consideration, Multi-level analysis was employed. 3) To understand the affection of attributes of homophily and to investigate women's connections within each subgroup, homophily test (Enter-Internal index) was conducted. 4) To test Hypothesis 2 for finding a norm and patterns regarding the respondents' attitude toward pond conservation, conditional inference tree was applied.

4. Results

From the results of the collected data, 140 valid women's respondents were applied to this analysis. By the Louvain method, eight subgroups were extracted from a social network of the respondents.

In this study, the two hypotheses stated above were supported by the following examinations.

As for Hypothesis 1, the author found some subgroups had strong cohesion ties within each subgroup and other subgroups connected well between others. Although previous research had stated that homophily might connect similar people effectively, the study noticed that, even in a same ethnic group in the study village, the rural women's connections indicated different homophily connections. Furthermore, some groups were heterophyllous and no significant affection of individual attributes for the group.

Regarding Hypothesis 2, the author found a unique norm that determined the difference of homophily level of rural women's attitude toward pond's conservation.

The homophily level varied by the norms: the experience of a traditional ritual, Brata and their voluntary behaviors, one's frequency to throw away garbage. Besides, there were three patterns to the differentiation of individual attitude of ponds. The first pattern was the non-experience of Brata. In this pattern, less homophily level of both individual and subgroup indicated a lower attitude of ponds. The second pattern represented the experience of Brata and never throwing garbage. In this pattern, the lower level of individual

homophily tended to be a lower attitude of ponds while a lower level of subgroups homophily tended to be higher attitude of ponds. The third pattern was the experience of Brata and throwing away garbage (always, sometimes, and rarely). This pattern showed that only less homophily level of subgroups tended to be the lower attitude of ponds.

5. Conclusions

In conclusion, the rural tacit norm was related to the rural women's attitude toward ponds, loose CPRs in the study village. Individuals' water environmental voluntary behavior was also the key to preventing the rural women, especially women who had experienced Brata, from lowering their attitude of pond values. It is also important to note that most of the women who had not experienced Brata had migrated from other sites, and their lifestyles and backgrounds were less stable and included different customs than the residents who originally had lived there and the same ethnic. That is why it seems that there were several different patterns for the attitude of ponds even in one village case.

In suggestions, before installing supply safe water systems, it is imperative to grasp some of the patterns causing the differences in residents' intimate interactions not to fall into a social dilemma in traditional commons.

As for the limitations, first, this study was conducted in only one rural village without comparing other villages in the study area. Second, this study focused on mainly women respondents' awareness and attitude. In this sense, further objective surveys are needed for all residents. Final, the affection of homophily may change in other kinds of social network structures such as predicting triadic closure or two-way link.

6. Main Bibliography

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