Social capital in encouraging the food security enhancement for fishermen families

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Abstract. One of the indicators in society poverty assessment is the realization of the families’ food security which consists of (1) the food availability for families, (2) food accessibility for families, and (3) food consumption for families. The high dependence of fishermen on the marine resources leads to income vulnerability. In such condition, social capital is often considered as a lifeline in providing food for the fishermen, both in quantity and quality. This study, which was conducted in Cipatujah and Cikalong Sub-district, Tasikmalaya, West Java Province, involved 50 samples of fishermen from each of those sub-districts. The study aims at examining the differences of the social capital as well as testing the effect of the social capital in the two sub-districts on the food security of fishermen families. To test whether there is a difference between the social capital of the fishermen in Cipatujah and Cikalong, the Mann-Whitney-Wilcoxon test is used for cases of large samples (n₁, n₂≥10), while simple regression is employed to identify the effect of social capital. The result of the study shows that there are differences in the social capital in each sub-district and there is an effect of the social capital on family food security in both Cipatujah and Cikalong Sub-districts.

Keywords: food availability, food consumption, food security, fishermen, social capital

1. Introduction
Similar to fishermen in other coastal areas in Indonesia, fishermen in the coastal area of Tasikmalaya has encountered vulnerable condition including the climate change that is assumed to influence the fluctuations of fish catch particularly during fish famine, leading to the uncertain income of the fishermen. Subair, et. al. (2014) in their study state that the fishermen community has felt the ecological change in the last 10 years, including the sea level rise, the intensity of storm and high wave, the change of fishing ground, and the uncertain fishing season. The understanding about environmental changes, therefore, is not due to the knowledge in climate change. Basically, the changes occurred are not realized directly considering the process has lasted for quite a long time and they are not sporadic. Thus, such understanding can be obtained through the adaptation changes in the livelihood of fishermen and analyze the available adaptation choice. In the coastal area of Tasikmalaya, the similar phenomenon occurred so that in such condition, fishermen are required and urged to carry out various strategies to improve their livelihood by exploiting various necessary capital such as human resource, natural resource, financial, physical, and social capital (DFID, 1999).
The ownership of fisherman livelihood capital such as human resource, natural resource, financial, and physical capital is considered low in number and access. Meanwhile, the social capital is considered higher so that it can be expected to support the increase of fishermen’s livelihood outcome in terms of the increasing in income, improvement in welfare, food security, environmental sustainability, and the decrease in vulnerability.

2. Research objectives
The objectives of the study were:
1. Analyze each livelihood capital owned by each fisherman including human resource, natural resource, financial, physical, and social capital.
2. Test the difference of social capital in two coastal areas to the livelihood outcome

3. Research methodology
The method used in this study was survey method. According to Nazir (2003), survey method is the critical observation or investigation aims at obtaining information on a particular problem in certain area. Singarimbun (1989) states that the survey research involves sample from one population and use questionnaire as the main data collection instrument. The subjects of this study are fishermen, both owners and laborers, as well as their household members, staff of marine and fishery office as the key informant, the leader of fishermen group, and community leaders at the research sites. The objects of the study are livelihood capital and social capital of the fishermen. The study was conducted in the sub-district of Cipatujah and Cikalong, two coastal areas in Tasikmalaya. To test whether there was a difference between the social capital of the fishermen in Cipatujah and those in Cikalong, the Mann-Whitney-Wilcoxon test was employed for the case involving large sample ($n_1, n_2 \geq 10$) by using this following steps:

Hypothesis:
$H_0$: $\mu_1 - \mu_2 = 0$; both population (Sub-district Cipatujah and Cikalong) are identical in the social capital (the cognitive social capital; the structural social capital)
$H_1$: $\mu_1 - \mu_2 \neq 0$; both population (Sub-district Cipatujah and Cikalong) are different in the social capital (the cognitive social capital; the structural social capital)

In which:
$\mu_1$: the average score of social capital (the cognitive social capital; the structural social capital) in Cipatujah, in the population level
$\mu_2$: the average score of social capital (the cognitive social capital; the structural social capital) in Cikalong, in the population level

Critical value:
$\alpha = 0.05 \Rightarrow \pm z_{table} = \pm z_{0.05/2} = \pm z_{0.025} = \pm 1.96$

Criteria: $H_0$ is rejected $z < z_{table} = -1.96$ or $z > z_{table} = 1.96$

4. Result and discussion

4.1. Difference in social capital
In table 1, it can be concluded that there is a difference in the cognitive social capital between the fishermen in Cipatujah and Cikalong. If it is viewed from the number of rating the number of cognitive social capital rating in Cipatujah is 3259, greater than the number of Cikalong which is 1791. It indicates that the cognitive social capital in Cipatujah is higher than in Cikalong.
Table 1. Statistical test results.

| Variable                | Statistical Value z | Test Decision | Conclusion                                                                 |
|-------------------------|---------------------|---------------|----------------------------------------------------------------------------|
| Cognitive Social Capital| 5.06                | Reject $H_0$  | The cognitive social capital between Cipatujah and Cikalong in the population level is different |
| Structural Social Capital| 3.45                | Reject $H_0$  | The structural social capital between Cipatujah and Cikalong in the population level is different |

Likewise, for the structural social capital, based on table 1 it can be concluded that there is a difference in the structural social capital between the fishermen in Cipatujah and Cikalong. The number of structural social capital in Cipatujah is 3025 while in Cikalong is 2041.5. It indicates that the structural social capital of the fishermen in Cipatujah is higher than in Cikalong. Ellis (2001) states that based on the framework of sustainable livelihood approach, cooperative can be considered as structural social capital. The existence of *Mina Bangkit* cooperative in Cipatujah has been established and been active longer than *Mina Bahari* cooperative in Cikalong. The performance of the fishermen cooperative in the sub-district is good enough, at least it has designed as a destination for comparative study for some other fishermen cooperative around West Java as well as from outside the island of Java. Moreover, it is also supported by some fishermen groups that have been active and function well in those two sub-districts, particularly in Cipatujah. For example, *Rukun Nelayan*, the fishermen’s KUB that has become a place to accommodate various programs and assistance activities from both government and other parties, which in fact, could improve livelihood capital owned by the fishermen in terms of human resource, physical, and financial capital.

4.2. The effect of cognitive social capital

Table 2. The effect of cognitive social capital on fishermen's outcome livelihood in Cipatujah and Cikalong Sub districts.

| Variables                          | The sub district of Cipatujah | The sub district of Cikalong |
|------------------------------------|-------------------------------|-------------------------------|
|                                    | Coefficient | t Score | Note          | Coefficient | t Score | Note          |
| Cognitive social capital on the increase in income | 0.604       | 3.047   | Significant***| 0.105       | 0.605   | Insignificant |
| Cognitive social capital on the welfare improvement | 0.180       | 1.020   | Insignificant | -0.078      | -0.496  | Insignificant |
| Cognitive social capital on the improvement of food security | 0.307       | 1.295   | Insignificant | 0.159       | 0.642   | Insignificant |
| Cognitive social capital on the decrease in vulnerability | -0.007      | -0.036  | Insignificant | 0.431       | 1.879   | Significant*  |

Note: (*) significant with a confidence level of 90%
(**) significant with a confidence level of 95%
(***) significant with a 99% confidence level

Based on table 2, it can be seen that cognitive social capital has a significant and positive effect on the improvement of income in Cipatujah. Meanwhile, the cognitive social capital has a significant and
positive effect on decreasing vulnerability in Cikalong. The cognitive social capital that becomes indicators in this study are the unwritten rules between the fishermen’s household, traditional values underlying social relationship, household trust in food fulfilling, household trust in muffling social chaos, and household trust in cooperating. In the subdistricts Cipatujah and Cikalong, those values are still strongly held by the fishermen, indirectly coloring their social relationship. The fishermen obedience on the rules of social organization structurally is mainly due to their adherence on existing social institutions. For example, the cooperation and the solidarity that have existed between them do not happen spontaneously. Instead, it has existed in the form of various local wisdom.

In other words, the relations and stronger social relation in Cipatujah have led the fishermen to have stronger solidarity in establishing a relationship with network outside them so that the assistance for facilities and infrastructure for fishery can be intensively carried out. Similarly, this will also be applied in the sub district Cikalong. The establishment of a harbor in Cipatujah has become a program for the fishermen to be more dynamic in exploiting their fishery production potential. Thus, in this context, the cognitive social capital has become a livelihood capital, causing the fishermen depend more on their living and livelihood on natural resources. Meanwhile, the condition of natural resource for fishery is very vulnerable especially when there is less fish in the sea. The condition has not applied yet in Cikalong so that when there is an uncertain season and the fishermen encountered difficult situation, the fishermen in Cikalong has adapted themselves by doing more various works. This condition can be seen from the monthly average income of the fishermen in Cipatujah that is higher in Cikalong in table 2. From the table, it is found a gap in income between peak catch season and low catch season in the two sub districts. However, despite its lower average in income, the composition of the fishermen’s income from fishing and non-fishing in Cikalong turns out to be more stable. Thus, the income vulnerability due to the uncertain season is lower.

4.3. The effect of structural social capital

| Variables | The sub district of Cipatujah | The sub district of Cikalong |
|-----------|-------------------------------|-----------------------------|
|           | Coefficient | t Score | Note     | Coefficient | t Score | Note     |
| Structural social capital on the increase in income | 0.440 | 3.635 | Significant*** | 0.311 | 2.402 | Significant** |
| Structural social capital on the welfare improvement | 0.129 | 1.157 | Insignificant | 0.134 | 1.092 | Insignificant |
| Structural social capital on the improvement of food security | 0.187 | 1.244 | Insignificant | 0.432 | 2.339 | Significant** |
| Structural social capital on decrease in vulnerability | 0.058 | 0.494 | Insignificant | 0.664 | 4.142 | Significant*** |

Note: (*) significant with a confidence level of 90%
(**) significant with a confidence level of 95%
(**) significant with a 99% confidence level
Based on table 3, it can be seen that in both sub districts, the structural social capital has a significant and positive effect in increasing income. The structural social capital in Cikalong has a significant and positive effect in increasing food security while the structural social capital in Cipatujah has no significant effect on the increase of food security.

In addition, the structural social capital in Cikalong has significant and positive effect on reducing vulnerability while the structural social capital in Cikalong has no significant effect on reducing vulnerability.

Meanwhile, in both sub districts, structural social capital does not significantly influence the welfare improvement. The existence of organizations in both sub districts can indeed support activities related to their main livelihood as fishermen.

The increasing income has been experienced during the peak catch season in the sea. On those days, fishermen’s cooperative, ideally, should have taken a crucial role in managing some fishermen’s income from fishing in the form of saving which can be used during the times when they could not go fishing.

In this condition, these types of social capital, both cognitive and structural social capital, have influence on living strategies of fishermen who depend their livelihood on natural resource and fishery. Thus, greater support will be given to the fishermen in achieving the livelihood outcome if it is supported by the livelihood strategies that fishermen must do in overcoming the vulnerability due to seasonal changes in marine resource and fish catch.

5. Conclusions and suggestions

5.1. Conclusion

1. There are differences in social capital in the two sub-districts
2. Cognitive social capital and structural social capital influence the fisherman’s livelihood outcomes such as food security

5.2. Suggestion

The establishment of new organizations as part of community empowerment activities should consider the existed social capital because basically fishermen tend to appreciate norms, value, institutions, and organizations within their own circle than those from outside.

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