Community capacity in dealing with drought in gesi district, sragen regency

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Abstract: This study aims to determine community capacity in terms of livelihood assets owned by families. Livelihood assets consist of human capital, natural capital, social capital, environmental capital and physical capital. This research was conducted in Gesi Village, Sragen Regency which consists of seven villages, namely Pilangsari, Tanggan, Slendro, Poleng, Blangu, Gesi, and Srawung villages. The data obtained were analyzed quantitatively and qualitatively by giving a score of 1 to 4 assuming the greater the score the greater the effect of an asset. To facilitate calculation and interpretation, the scoring results are converted on a scale from 0 to 10 then visualized in the pentagonal diagram of the asset. The results are the human capital in Gesi District is still low, sufficiently in natural capital, sufficiently in financial capital, sufficiently in physical capital and have a good social capital.

1. Introduction

Drought is a condition where the availability of water is significantly below the normal level for a certain period, leading to a significant impact on water resources, its management, and the social community at large. As a natural occurrence, drought characterizes long periods of low water accessibility, and is spatially combined temporarily with climate variability in the area [1]. Drought creates a real threat to agriculture. This has a big influence on lost production. It is calculated that rice faces the highest losses due to drought. Rice production is highly dependent on water availability [2]. Such a difference makes farmers vulnerable to the effects of drought.

Vulnerability is a condition of a community or people that leads to or causes inability to face the threat of disaster. Vulnerability in an area will be influenced by the natural and social conditions of the area. To deal with vulnerability requires the capacity of the people living in the disaster area. Capacity is the ability of regions and communities to take action to reduce threats and potential losses from disasters in a structured, planned and integrated manner [3].

The capacity of an area can be assessed from a livelihood strategy. The livelihood strategy illustrates the efforts made by the community in achieving adequate livelihoods. A livelihood strategy relates to how the community manages or combines livelihood assets that are available or owned, responds to changes that occur, and determines priorities for maintaining or improving livelihoods [4]. A livelihood asset is anything that is valuable or is a collection of capitals that are used to make a living. Livelihood
assets consist of 5 (five) capital, namely human capital, social capital, natural capital, physical capital, and financial capital [5].

Drought is one of the disasters that often occur in several areas of Sragen Regency. According to Sragen regency BPBD data, in Sragen regency there are seven districts, 36 villages and 146 neighborhoods which are predicted to experience drought. The seven districts are Sumberlawang, Jenar, Miri, Mondokan, Tangen, Gesi and Sukodono. The administrative area of Gesi District is depicted on figure 1. To deal with drought, people must have the capacity in order to survive. They have a different livelihood strategy, depending on the available livelihood assets and the vulnerabilities they face [6]. The sustainable livelihoods approach can be used as a method to find out the community's capacity to deal with drought. The approach considers the assets owned and which can be accessed by the community in carrying out their lives. The assets owned are related to the management of social and institutional resources and natural resources [7].

![Figure 1. Administration Map of Gesi Sub-district, Sragen Regency](image)

2. Methods

This research was conducted in Gesi District, Sragen Regency. The purpose of this study is to determine the community's capacity in terms of livelihood assets. Livelihood assets consist of human capital, natural capital, social capital, natural capital and physical capital. The area sampling technique is used
to divide the study area based on village administrative boundaries. Primary data obtained from structured observations and interviews.

The first primary data is human capital, obtained from the number of working families, level of education, health conditions of the family, length of work experience, knowledge and skills, workforce ownership, and motivation to work. Second is natural capital. Natural capital is determined by the area of land owned, water resources and land productivity. Third is social capital. Social capital is obtained from community participation in social organizations, community participation in social organizations, community participation in cooperation, and kinship relations. Fourth is financial capital. Financial capital consists of business capital assistance, fertilizer / seed capital assistance, agricultural equipment assistance, the presence or absence of counselling to increase productivity, use of cropping patterns and irrigation maintenance. Fifth is physical capital. Physical capital consists of the availability of facilities, the availability of infrastructure, and the ownership of work equipment [8][9].

Secondary data was obtained from literature study and data sourced from disaster event data from Sragen Regency BPBD and Administrative Map from Sragen Earth Indonesia Map. The data obtained were analyzed quantitatively and qualitatively by giving a score of 1 to 4 assuming the greater the score the greater the effect of an asset. To facilitate calculation and interpretation, the scoring results are converted on a scale from 0 to 10 then visualized in the pentagonal plane of the asset. Qualitative techniques are used to interpret the data obtained.

3. Result and Discussion

3.1 Pilangsari Village

The number of family members who work is only one person. Education has a fairly low value because the average family member only has an elementary and junior high school education. Health capital has a very high value because in the village it is very rare to find family members who suffer from a deadly disease. In terms of work experience, family members who work have quite good experience because they have done their work for years. Their work as farmers is also because it is a work passed down from generation to generation. Families who live in Pilangsari rarely have workers or domestic helpers. Families do not have many other skills that can be used as a source of additional income; some people have side jobs in the craft field. While the main motivation for someone to work is their family.

![Figure 2. Pentagonal diagram of the assets of Pilangsari Village](image-url)
Land tenure by the family in the village is not very extensive, on average only around 100 to 300 square meters. Water resources in this village for consumption and irrigation needs are not always available so families experience disruptions during the dry season. This is possible because the soil and rocks in this village tend to be limestone types that easily escape water. With limited land tenure and water resources, the amount of agricultural production per family is also not too large, especially in the dry season. In connection with access to clean water for family consumption, in this village do not mind buying it. Apart from the PDAM or PAM, the family also gets water from the well.

Almost all families involved in community organizations. However, participation is low because they only meet in the organization on average once a month. Mutual cooperation is maintained and the intensity of involvement in mutual cooperation is frequent and always involved. In addition, most of them have relatives who live in the same village.

The financial capital owned by Pilangsari Village is not high with a value of 5.2. This value is low because none of the families receive venture capital assistance, fertilizer / seeds, agricultural equipment assistance and do not receive agricultural extension. The physical capital owned by Pilangsari Village is 7.35. This value is quite high due to good road conditions so that accessibility is smooth. Some families have a water pump that is used to access clean water. In the status of land ownership, most farmers work their own agricultural land so that they do not have to pay rent and most families have sufficient working equipment (figure 2).

3.2 Tanggan Village

The average number of family members working is one to two people. The level of education in Tanggan is relatively low because the average is elementary and junior high school graduates. The level of health is relatively high because not many family members have a deadly disease. As for the experience of family members in their field of work is good because they on average become farmers more than ten years. Not many families have workers or helpers. Families also don't have many other skills. Only a few people have side jobs in the fields of crafts and cooking and the main motivation for someone to work is family.

![Figure 3. Pentagonal diagram of the assets of Tanggan Village](image)

Most families in this village do not have vast land, on average only around 100 to 300 square meters. Water resources in this village for consumption and irrigation are almost always there so families are not so worried about water problems. Land productivity is quite good because access and water
acquisition is quite easy in this village. Even though they have to pay for water, some families do not mind. Apart from the PDAM or PAM the family village also gets water from wells and rivers.

Unlike other villages in Gesi Subdistrict, in Tanggan Village, most families are not involved in community organizations. Intensity and participation to meet only once a month. While the intensity of involvement in mutual cooperation is seldom and often. Only a small number of families have relatives living in the same village.

None of the families in Desa Tanggan received venture capital assistance. There are a small number of families that receive fertilizer/seed assistance and some others get agricultural equipment. There are a small number of families that receive agricultural extension.

The physical capital of Tanggan Village is relatively good, supported by good road conditions. Some families have their own water pumps. Most work on their own farmland and most families have sufficient farming tools (figure 3).

3.3 Srawung Village

Human capital of Srawung Village is quite low. Although in an average family two people work, their education level is still low, at the level of elementary and junior high school. The health quality of family members is very good because no one is deadly sick. The average family member who has worked has more than ten years of farming experience. Not many families have workers or helpers. Families also don't have many other skills, only a few people have side jobs in the fields of crafts and cooking. While the main motivation for someone to work is family.

![Pentagonal diagram of the assets of Srawung Village](image)

**Figure 4.** Pentagonal diagram of the assets of Srawung Village

Families in this village do not have vast land, on average only around 100 to 300 square meters. Water resources for consumption and irrigation do not always available in this village so families must buy water or search from various sources. Productivity is quite good in the rainy season but during the dry season crop yields will decrease due to lack of water supply.

Some families in this village have objections when they have to spend money for water needs. Apart from the PDAM or PAM the family village also gets water from wells and rivers. Almost all families are involved in family organizations in this village. They can have a meeting more than once in a month. The families are still willing to participate in mutual assistance activities in the village. Most families have relatives living in the same village.
No family received business capital assistance and fertilizer or seeds in Srawung Village. But some families who get help from farming tools. No family gets agricultural extension. Road conditions in Srawung Village are good so as to facilitate the distribution of people and goods. Some families have a water pump. Most work on their own farmland. Every family has enough farming tools to work (figure 4).

3.4 Gesi Village

Gesi Village has enough human capital. On average each family has more than two people working. This happens because the children in the family are adults but have not married or leaving their parents. Education is sufficient because there are still many who have graduated from elementary school, junior high school and some have studied in high school. The level of health is very good because almost no family member has a deadly disease. Family members who work on average already have more than ten years experience in farming because it is a livelihood for generations. Not many families have workers or helpers. Families don't have many other skills, some people have side jobs in the craft and cooking fields. Family and social environment motivate a person to work.

Many families do not have their own agricultural land in this village, but there are some who have very large land. The availability of water for consumption and irrigation is not always available. Only a small part of this village always gets water. Different land tenure and water availability make the family yields also vary from 100 kg to more than 1000 kg. Spending to buy water is considered burdensome for some families. Apart from the PDAM or PAM the family village also gets water from wells and rivers.

This village's social capital is quite high. Almost all families are involved in social organizations. They can meet each other more than twice in one month. Families are often involved in mutual cooperation. Some families have relatives who live in the same village. This village's financial capital is not very good. No family received venture capital assistance, fertilizer or seeds. Only a few families get agricultural equipment. In addition, no family received agricultural extension.

![Pentagonal diagram of the assets of Gesi Village](image)
Physical capital is quite good. Family activities are supported by good road conditions. To get water, some have a water pump. Most families work their own farms. Some families also have agricultural equipment that is sufficient to support their work (figure 5).

3.5 Blangu Village

Blangu Village has sufficient human capital. Every family on average has two people working. This happens because the children in the family are adults but have not married or leave their parents. Education in this village is not very good because the average people are elementary and junior high school graduates. While high school or college graduates are still limited. Very good health, almost no family member who has a deadly disease. The average family already has more than fifteen years of experience in farming because it is hereditary. Almost all families do not have workers or helpers. Families don't have many other skills. Only a few people have side jobs in the fields of crafts and cooking. While the main motivation for someone to work is family and social environment.

![Pentagonal diagram of the assets of Blangu Village](image)

**Figure 6.** Pentagonal diagram of the assets of Blangu Village

Blangu Village's natural capital is quite good. Families in this village do not have vast land, on average only around 100 to 300 square meters and very rarely families who have more than 500 square meters of agricultural land. Not all families can get water for consumption and irrigation needs continuously. Land productivity is quite good and produces around 500kg to 1000kg each harvest. Even though they have to pay for water, some families do not mind. Apart from the PDAM or PAM the family village also gets water from wells and rivers.

Blangu Village's social capital is quite good. Almost all families involved in social organizations. They can meet more than once a month. Almost all families are involved in mutual assistance activities. Most families have relatives living in the same village. Financial capital is relatively low. No family received venture capital assistance, fertilizer or seeds. However there are some families who get agricultural equipment. There are a small number of families that receive agricultural extension. Sufficient physical capital. Road conditions are not good so distribution activities are not going well. Only a few people have a water pump for water access. Most work on their own farmland and some families have sufficient farming tools (figure 6).

3.6 Slendro Village
Slendro Village has low human capital. Although in one family there are more than two people who work, their education level is still an elementary and junior high school graduate. The level of family health is very good and almost no one suffering from deadly disease. In their work, on average they already have more than ten years experience in farming because it is a source of income for generations. Almost no family has workers or helpers. Families don't have other skills to use as side jobs. The main motivation for someone to work is family.

Families in this village do not have vast land, on average people only have around 100 to 300 square meters. Water supply in this village is not always available throughout the year so that consumption and irrigation needs are disrupted during the dry season. Productivity is quite good around 500kg to 1000kg on harvest time. Even though they have to pay for water, some families do not mind. Apart from the PDAM or PAM the family village also gets water from wells and rivers.

Almost all families are involved in social organizations. They can meet more than once a month. The family is very active in mutual assistance activities in the village. Most families have relatives living in the same village. No family gets venture capital assistance. Only a small proportion of families receive fertilizer or seed assistance. There are some families who get agricultural equipment assistance and there are a small number of families who receive agricultural extension. Enough physical capital. But the road conditions are not good. Some families have a water pump to get water. Most families work their own farms. Some have enough farming tools to work (figure 7).

Figure 7. Pentagonal diagram of the assets of Slendro Village

Families in this village do not have vast land, on average people only have around 100 to 300 square meters. Water supply in this village is not always available throughout the year so that consumption and irrigation needs are disrupted during the dry season. Productivity is quite good around 500kg to 1000kg on harvest time. Even though they have to pay for water, some families do not mind. Apart from the PDAM or PAM the family village also gets water from wells and rivers.

Almost all families are involved in social organizations. They can meet more than once a month. The family is very active in mutual assistance activities in the village. Most families have relatives living in the same village. No family gets venture capital assistance. Only a small proportion of families receive fertilizer or seed assistance. There are some families who get agricultural equipment assistance and there are a small number of families who receive agricultural extension. Enough physical capital. But the road conditions are not good. Some families have a water pump to get water. Most families work their own farms. Some have enough farming tools to work (figure 7).
3.7 Poleng Village

Human capital quality in Poleng Village is not very high. Although the average family member who works per family is around two to three people, their education level is still low. Elementary school graduates for older families and high school graduates for younger families. The level of health in the village is very good, almost no one suffers from the deadly diseases. On average they already have many years of experience in farming because farming is a hereditary livelihood. Most families do not have workers or helpers. Families don't have many other skills, only a few people have side jobs in the cooking field. The main motivation for someone to work is the family.

Families in this village do not have vast land, on average only around 100 to 300 square meters. In this village water for consumption and irrigation is almost always available so that families are not too worried about water problems. Land productivity is quite good around 500kg to 1000kg. Not all families have objections spending money to buy water. Apart from the PDAM or PAM, people also get water from wells and rivers.

Social capital is quite good. Almost all families are involved in social organizations. They meet more than once every month. Most families are involved in mutual assistance activities. Most families have relatives living in the same village.

Financial capital is not very good. No family gets venture capital assistance. A small number of families receive fertilizer or seed assistance. There are some families who get help from farming tools. But no family gets agricultural extension.

Physical capital is quite good even though the road conditions are not good. A small number of villagers have a water pump for water access. Most of them work on their own farmland and most have sufficient farming tools to work (figure 8).

4. Conclusion

The capacity of the family in dealing with drought can be seen from the assets of their assets. Asset capacity is determined by livelihood assets consisting of human capital, natural capital, social capital, natural capital and physical capital. From the research results it is known that human capital in Gesi District is still low, sufficiently in natural capital, sufficiently in financial capital, sufficiently in physical capital and have a good social capital.
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