Settlement infrastructure management for universal access in Ngantang District, Malang Regency, Indonesia

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Abstract. The pillars of sustainable development do not look at the three main pillars, namely economic, social and environmental. Sustainable Development Goals (SDGs) are divided into 17 goals to be achieved by 2030, one of which is the sixth goal to ensure sustainable clean water and sanitation management for all. The infrastructure problem related to sanitation in Ngantang Regency is the community’s low awareness to adopt a clean and healthy lifestyle, which is the main cause of problems with wastewater, garbage, or drainage in settlements. Fits to target of 100-0-100 Universal Access. The role of government and society is important in meeting the goal of universal access. Measurement of participation in implementing universal access priority handling uses Social Network Analysis (SNA), which is differentiated by pre-activity, activity implementation, and post-activity. The final result of this research is the settlement from the perspective of social conditions through measuring the level of participation, the value of relationship density, and finding a central actor who plays a role in bridging the community and government in implementing universal access programs.

1. Introduction

The pillars of sustainable development are inseparable from the three main pillars, namely economic, social and environmental so that the SDGs objectives can be grouped into several sectors. The pillar of social conditions has the aim of ensuring healthy community life, equitable quality education and inclusive education and lifelong learning for all, ending poverty and achieving gender equality, and empowering all communities, especially women [1]. The goals of the Sustainable Development Goals (SDGs) are divided into 17 goals to be achieved by 2030, one of which is the sixth goal of ensuring the availability and management of clean water and sustainable sanitation for all [2].

According to BAPPEDA (2018), sanitation infrastructure and the community’s low awareness to adopt a clean and healthy lifestyle are the main causes of problems with wastewater, solid waste, and drainage in settlements [3]. The priority of drinking water and wastewater treatment is needed to overcome the multi-dimensional water pollution crisis, requiring serious efforts and commitment from all parties to overcome it. This is in line with meeting the target of 100 - 0 - 100 Universal Access.

Problems related to settlement infrastructure in Ngantang District can be resolved through a program that has been created and implemented by the government, but for the sustainability of the program, universal access, awareness and ability of the community are needed to participate actively. The social conditions of the community can be a new perspective on poverty resolution [4]. Therefore, social capital is considered a non-economic factor that can bridge the community and access productive
resources [5]. The purpose of this study was to determine the condition of settlement infrastructure related to universal access and the social conditions of the community in Ngantang District, whether the community has played an active enough role to support the sustainability of the universal access program.

The problem of achieving universal access in Malang Regency is still difficult to do. One of the efforts that can be made is to increase the community's capacity related to universal access. One of the efforts that can be done is to increase community participation in order to achieve effective and efficient utilization of productive resources by increasing community participation [6].

Social capital is considered a non-economic factor that can bridge the community and access to productive resources [5]. Social capital has a function to help the community gain access to information and opportunities to gain knowledge [5]. Solving poverty with social capital can be done through the exchange of information, job opportunities, financial assistance, and knowledge among poor and non-poor communities [7].

2. Methodology
Data collection was carried out using primary data collection methods and made use of some secondary data. Primary data collection is done through observation and questionnaires, which will be asked of each respondent. Determination of the number of research samples taken in Ngantang District using the Slovin formula, with each village's proportion in the Ngantang District. The number of samples is proportional to the total population in each village in Ngantang District, with a total sample size of 144 respondents. The details of the number of respondents in each village are as follows: Pagersari Village 9 respondents, Sidodadi 11 respondents, Banjarejo 10 respondents, Purworejo 10 respondents, Ngantru 9 respondents, Banturejo 8 respondents, Pandansari 11 respondents, Mulyorejo 9 respondents, Sumberagung 12 respondents, Kaumrejo 13 respondents, Tulungrejo 13 respondents, Waturejo 8 respondents, and Jombok 10 respondents.

The one method that can be used to measure community social networks is to use Social Network Analysis (SNA), which is an analytical tool used to explain the relationships and interactions between individuals in a local institution that involves individuals or community groups, information delivery, and social services [8]. Social Network Analysis (SNA) describes social networks by using nodes and ties, namely nodes are individual actors in the network, and ties or ties of relationships between actors.

This research uses regional values so that the approach that can be taken is to measure social capital using the approach of the level of participation (rate of participation), the density of relationships (density) [9], and centrality or finding a key figure (centrality) [10].

3. Results and discussion
Ngantang District has an area of 147.70 km², or 4.96% of the total area of Malang Regency divided into 13 villages and 57 sub-villages [11]. Ngantang Sub-district is located in Malang Regency at coordinates 112,215 - 112,229 East Longitude and 7,495 - 7,560 South Latitude. The administrative boundaries of Ngantang District are:
North : Jombang Regency
East : Pujon District
South : Blitar Regency
West : Kasembon District
Potential and problem analysis are used to determine the potential and problems in Ngantang District. The potential analysis is useful for knowing points that can be developed. Problem analysis is useful for finding out points that are problematic and need to be fixed.

Table 1. Potential and problem in Ngantang District.

| Potential                                                                 | Problem                                                                 |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------|
| ● Ngantang District is close to a water source, and people can easily get water, but the water still needs further management to become safe water for a drink. | ● Clean water in Ngantang District uses several water sources, such as PERUMDAM, water well, etc. |
| ● There is a road that connects Malang Regency to Kediri Regency so that it has the potential to be passed by vehicles originating from outside Malang Regency. | ● There is still open defecation (BABS) 61.54% community do BABS in Ngantang District. Namely in Pagersari, Banjarejo, Purworejo, Ngantru, Pandansari, Mulyorejo, Tulungrejo, and Jombok Village. |
| ● There are Jambanization activities in Pagersari 125 units, Purworejo 61 units, Ngantru 65 units, Pandasari 80 units, Sumberagung 7 units, and Jombok Village 154 units. | ● There is no specific household waste disposal channel because the whole community discharges their household waste in the drainage channel. |
| ● There are house renovation activities in Pagersari 4 units, Sidodadi 4 units, Banjarejo 5 units, Purworejo 4 units, Ngantru 5 units, Pandasari 3 units, Sumberagung 12 units, Tulungrejo 5 units, Waturejo 3 units, Jombok Village 1 unit. | ● There are still uninhabitable houses in Pagersari, Sidodadi, Banjarejo, Purworejo, Ngantru, Banturejo, Pandansari, Mulyorejo, Sumberagung, Kaumrejo, Tulungrejo, Waturejo, Jombok Village. |

Community activities that show changes in behavior towards universal access in Ngantang District include changes in large water behavior, washing hands with soap, drinking water management, waste management through 3R, and household wastewater management.

Table 2. Universal access activities in Ngantang District.

| No. | Activity                                                                 | Village                      | Activity Period | Forms of Engagement                  |
|-----|--------------------------------------------------------------------------|------------------------------|-----------------|--------------------------------------|
| 1   | Change in behavior of bowel movements and wash hands with soap           | Banturejo, Mulyorejo, Sidodadi, Kaumrejo, Ngartru, Pagersari, Pandansari | 2013 – 2017     | ● Join the socialization              |
|     |                                                                          |                              |                 | ● Wash your hands with soap           |
|     |                                                                          |                              |                 | ● Own and use a private latrine       |
3.1 Rate of participation

The community participation level can be seen from the community's participation in the involvement of each stage of the activity. The level of community participation is described through community participation in activities in an area. The higher the RoP, it indicates respondents' active participants who will form a network [12]. The assumption used in calculating the level of community participation is that if the community follows a stage, they will get to know each other with other communities. The higher the value of community participation, the better. By following the activity stages, the community will get more information and knowledge than people who do not follow each stage. The classification division in the participation score for the total level of participation is as follows:

- Low = 0 – 1,33
- Medium = 1,34 – 2,67
- High = 2,68 – 4

Table 3. Rate of participation in Ngantang District.

| Amount of Respondent | Pre-activity | Implementation Activity | Post Activity |
|----------------------|--------------|-------------------------|---------------|
| RoP                  | 2.74         | 3.84                    | 3.14          |
| Classification       | Med          | High                    | High          |

Based on the results of the analysis of the level of community participation in Ngantang District at the three stages of implementing activities to achieve goals 100-0-100 from 4 activity programs as in table 3, it was found that the community was most active in participating in the implementation stage, that is almost all respondents participated in the four activity programs. It can be seen from the value at the implementation activity stage, the value is 3,84, which means that the average community participates in 4 activity programs. Meanwhile, the pre-activity obtained an RoP value of 2,74 which means the community participated in only 3 program activities. In the post-activity stage, the RoP value was 3,14, which means that the community only participated in 3 activity programs.

Density can be measured using a formula developed by Wasserman et al. (2009) [8]. The value of the density of the relationship is given the number notation 0-1. The more 0 it is, the less tight the relationship between communities is, and the more the value is 1, the closer the relationship between communities is so that the social relations are better for exchanging information, solving problems, and so on—calculation of density using UCINET 6.3 software. Density can be seen from the total number
of relations in relation to the total number of possible relationships that occur. The division of classifications in the value of participation [13] is as follows:

- **Low** = 0 – 0.33
- **Medium** = 0.34 – 0.67
- **High** = 0.68 – 1

Table 4. Ngantang District community density level.

| Activity  | Pre-Activity | Implementation Activity | Post Activity |
|-----------|--------------|-------------------------|---------------|
| Density Value | 0.66         | 0.73                    | 0.40          |
| Classification | Medium       | High                    | Medium        |

It is known that the density value at pre-activity and post-activity is classified as medium. For the implementation stage of the activity, it is in high classification. This shows that many people participated so that the relationship between communities was tighter than during pre-activity or post-activity at the time of implementing the activities.

3.2 Centrality

Centrality is used to determine the central figure in the implementation of the universal access program in Ngantang District, using the degree centrality approaches. To measure the level of centrality that can be compared across networks of different data sizes. Degree centrality shows the central figure most widely recognized by the public. Degree centrality can be calculated using a formula [14], but in this research, centrality calculation using UCINET 6.3 software. The following are the results of the analysis of degree centrality (C_D) carried out in the people of Ngantang District in accordance with the activities in table 5.

Table 5. Centrality in Ngantang District.

|                  | Pre-Activity | Implementation Activity | Post Activity |
|------------------|--------------|-------------------------|---------------|
| Mean             | 0.65         | 0.91                    | 0.65          |
| Min              | 0            | 0.45                    | 0             |
| Max              | 0.89         | 0.99                    | 0.97          |
| Level of Centrality | 0 – 0.333    | 16                      | 0             |
|                  | 0.334 – 0.666 | 18                     | 5             |
|                  | 0.667 - 1    | 99                      | 128           |

Figures 2, 3, and 4 are pictures that illustrate the results of the analysis of the degree centrality (C_D) of the community in Ngantang District at the pre-activity, implementation and post-activity stages. The blue node is the actor with the highest or most popular degree centrality (C_D) in Ngantang District. The number of actors based on the analysis of degree centrality (C_D) in the pre-activity and implementation stages was 133 actors.
Net draw centrality describes actors who have a high role and influence for the community based on activeness in pre-activities, implementation, and post-activities carried out as an effort to implement universal access in Ngantang District. Actors who have roles and influence are assumed to be role models who can invite people to change and sustainably implement universal access activities.

4. Conclusion
The main focus in the Ngantang District related to universal access is clean water, solid waste, sanitation, and liveable houses. Based on all the results of the analysis that has been carried out, it can be concluded that the problems related to solid waste, sanitation and clean water, such as there is no wastewater management, solid waste management, a few people do not have toilets, clean water resource not from water management institution such as PERUMDAM, HIPPAM, or another water management institution. All the problems related to solid waste, sanitation, and clean water will impact livable houses. The program related to reaching the goals of 100-0-100 or universal access has been proposed and implemented by government agencies. However, another problem is that the Ngantang District's human resources condition is still limited, causing these programs to not sustainably. The problem can be solved by empowering the community, creating a working relationship or good cooperation between the community in Ngantang District and government institution, and finding a central figure. Empowering the community can be solved by giving education, training, counseling, etc. Through community empowerment, they will be better able to manage their living environment and fulfill settlement infrastructure. Finding a central figure who can become a mediator between the community and the government trusted by the community can invite the public to play an active role in running the universal access program. Therefore, cooperation between the community and the government will be easier. The resolution of problems related to settlement infrastructure can be resolved and run in a sustainable manner without the need for assistance from the government.

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