Strategy to increase knowledge and awareness of spring management in drawati village through the SMAJA program

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ABSTRACT

The Campaka spring is one of the water sources used by the community in Drawati for consumption and agriculture. Since 2018, it has several problems: garbage which hinders irrigation and water quality decreases, the lack of awareness and knowledge of the local community and managers. Based on this background, the SMAJA program was initiated and implemented with the objectives of (1) increasing public awareness and knowledge through imah cai pancarama adopted from the house model; (2) Strategies and recommendations to sustainability of the SMAJA program. The method used is the kaizen method which consists of seiri, seiton, seiso, seiketsu and shitsuke. The collaboration of three techniques, namely counseling, training and mentoring. The number of target involved was 12 people but some activities could be attended by more than 40 people. The results are an increase in test scores of knowledge and concern. The value of knowledge from the original 2.00 to 3.70 on a scale of 1-5 and the value of concern for interests from 4.58 to 4.90 which was also measured from action from 2.50 to 3.80. The sustainability is formed in a quadruple helix.

KEYWORDS
Empowerment;
Kaizen;
Water springs;
Quadruple helix

1. Introduction

Springs are water that comes out of the ground because the groundwater table is cut [1], [2], [3]. Springs play an important role in human life, including access to consumption such as drinking water [4], agricultural irrigation [5] and tourism [6]. In Indonesia, the number of springs continues to decline. Reporting from Media Indonesia, according to the Director of Planning and Evaluation of Watershed Control at the Ministry of Environment and Forestry, Yuliarto Joko, in 2018 there were 10,321 springs in Indonesia. This number has decreased in just 10 years, namely about 20-40% of spring water sources dry up and disappear. This can be caused by various factors, one of which is caused by human resources around the springs, both in terms of awareness and knowledge of the community. In a study conducted by reference [7], overexploitation and lack of public awareness can cause springs to disappear. This is in line with the results of research conducted by reference [8] which states that springs have discharge limits so that their existence needs to be maintained, especially from human resource problems around the springs, even the knowledge of the community can have a major influence on how the community manages it.

Drawati Village, Bandung Regency has one of the springs known as the Campaka Spring or Sirah Cai Cijagra. The Campaka Spring not only supplies water for the consumption of more than 3,548 households but is also used as a water supply for 527 hectares of rice fields [9]. In fact, several neighboring villages such as Cijagra, Karang Tunggal and Loa also benefit from the existence of the Campaka Spring.

DOI: https://doi.org/10.59247/jppmi.v1i7.33

After conducting observations and in-depth interviews with the Drawati Village Head, the Campaka Spring Self-Help Management Group and 9 residents in Dusun 06 Drawati Village or where the Campaka Springs are located, several problems were found. First, the lack of awareness and knowledge of the community around the springs on the importance of managing the springs. This can also be proven by the presence of garbage around the springs due to tourism activities, but there is no effort from the community to clean it up. On the other hand, the location of the Campaka Spring is at the foot of Mount Kasur with a less forest population, but there has been no community effort to take reforestation actions to reduce the problems that occur. Actually, in the past few years several agencies have planted around the Campaka Springs, but some residents have cut them down by using the planted tree seeds as animal feed. Second, currently at the Campaka Springs location there are tourism activities, especially water tourism which was accidentally formed in 2018 due to the Bandung Regency Government and the 2 Campaka Farmer Group building water reservoirs [10]. Of course, the attraction of visitors will allow damage to the environmental ecosystem if it is not managed properly. Therefore, the problem of the Campaka Spring is not only about the practical-operations or the community's actions towards the spring, but also the conceptual-theoretical or the understanding and knowledge of the community about the importance of the spring.

Based on these problems, a strategy is needed to increase the knowledge and awareness of the community in Drawati Village, especially the community around the Campaka Spring regarding the importance of managing the Campaka Spring accompanied by best practice efforts in stimulating the community to be more proactive. One way that can be done is through the SMAJA program.

The SMAJA program is an activity initiated by the Community Service PKM Team, IPB University. SMAJA means the guardian warrior of the Campaka Springs with the kaizen method [11]–[13] Kaizen is a 5S philosophy (Seiri, Seiton, Seiso, Seiketsu, Shitsuke) for Japanese society to rise up after World War II which means *kai* (change) and *zen* (increase) [14]–[16]. The kaizen method became very popular after being adopted by many companies to make changes starting from simple things continuously [17]–[19]. The kaizen method is also very suitable for community service that focuses on changing mindsets and a sustainable work culture [20]–[22]. This is in accordance with the results of the service that has been carried out by reference [23]. The concept of the kaizen method is designed in The house model written by reference [24] in the book "the dream with deadline". While in the SMAJA program, a knight is someone with a character who puts interests forward in various ways (zero sum game) based on an ideal [25]. Therefore, this program is expected to be able to create a warrior who has character and knowledge in managing the Campaka Springs starting from simple things that include knowledge in managing the Campaka Springs ranging from forest protection to knowledge in managing tourism. In addition, in terms of community awareness, it is also increased through activities that involve the community in managing the springs. The spring conservation service program by improving the quality of human resources (HR) is very important because humans are the subject of the management itself [8].

The objectives of this community service program are (1) to increase public awareness and knowledge regarding the management of Campaka Springs; (2) Strategies and recommendations for the sustainability of the SMAJA program. The benefits for target communities are the realization of people who have higher knowledge and concern in managing springs. The benefit for the manager is that it can become the basis and media for getting more information specifically about more effective and efficient management. Finally, in terms of academics, it can be used as a reference in carrying out community service in the future. In addition, this service can also be useful in various fields such as social, economic and environmental.

2. Method

2.1. Target Community Overview

The Campaka Spring is a fundamental spring for the community around the Paseh District, especially Cempaka Village, Drawati Village. The Campaka Spring irrigates more than 12,259 people in which there are 3,548 families with the main livelihood as farmers and farm laborers. Many people in Drawati Village use Campaka Springs as a source of life, not only for consumption but also for other activities such as agricultural irrigation and other activities. Almost 50% of the population in Drawati Village only has education up to Elementary School (SD). The population age is dominated in the range of 20-55 years [9].

The results of observations in Fig. 1 and in-depth interviews with several people in Drawati Village, it was found that many people in Drawati Village believed that the Campaka Spring would never subside. This is evidenced by the Campaka Spring which still emits water until now even hundreds of years ago. However, if you look at the situation and conditions in Drawati Village, it is possible that the springs will disappear and dry up. Some farmers are currently complaining about the lack of water flow that irrigates their rice fields. In fact, it is exacerbated by the existence of water conflicts that occur in the middle of the management of the springs. Conflicts occur largely due to the lack of community knowledge about the management of springs and community awareness which only focuses on utilization but is still lacking in conservation efforts. In addition, in 2018 the Bandung Regency Government and Farmers 2 built water reservoirs which then added to the burden of becoming water tourism.

Fig. 1. Garbage generation due to tourism activities

2.2. Troubleshooting

Problem solving includes pre-implementation, program implementation and program evaluation. Pre-implementation was carried out by observing around the Campaka Springs, in-depth analysis of the Drawati Village profile book and in-depth interviews with the Drawati Village Head, the Campaka Spring Self-Help Management Group and 9 residents in Dusun 06 Drawati Village or the location of the Campaka Springs. , and conducted a pre-test on 12 targets communities. Pre-implementation is done to dig deeper information about the problem. The problem formulation process is carried out twice in February and once in March 2021. Then the problems that have been collected are discussed and the

concept of implementing an appropriate program is designed and needed for the target community. The framework of the problem formulation is shown in Fig. 2. In the kaizen method there are 5 philosophies used, namely seiri, seiton, seiso, seiketsu and shitsuke [26]–[28]. The scheme of the kaizen method used is modeled on Imah cai pancarama in Fig. 3 [29]–[31].

The foundation of the SMAJA program is leweung ruksak, cai beak, manusa balangsak. The sentence is a Sundanese proverb to protect nature from being damaged, especially related to human resources as managers. The implementation of the SMAJA program consists of five pillars with 11 activities that support to increase knowledge and public awareness. It is expected to be able to create a more aware, caring and understanding community in managing the Campaka Springs.

Empowerment techniques are carried out by collaborating between counseling such as providing materials given to the community regarding the love of springs and methods of managing the Campaka Springs, training techniques in which the community is trained to be more proactive in maintaining the Campaka Springs such as making signs and cleaning, and techniques empowerment of assistance, namely by conducting Focus group discussions (FGD) to discuss the future management of Campaka Springs with various stakeholders including the government, farmer groups, communities and academics.

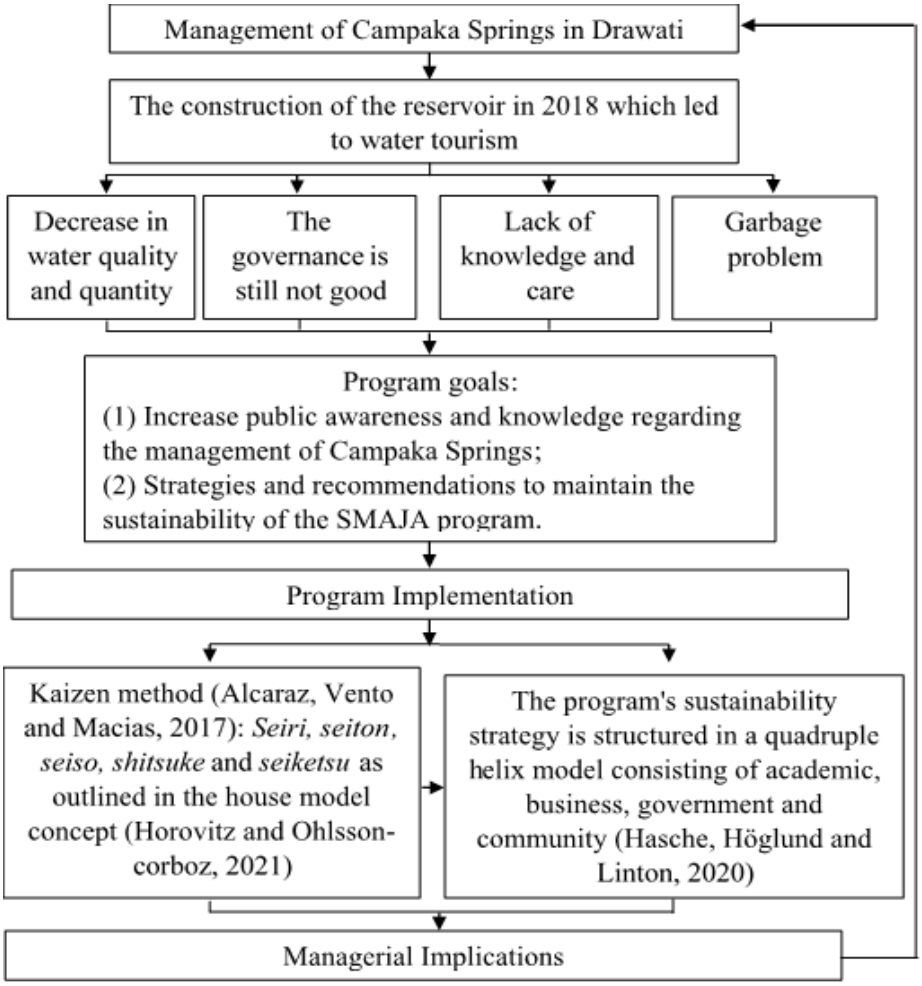

Fig. 2. Garbage generation due to tourism activities

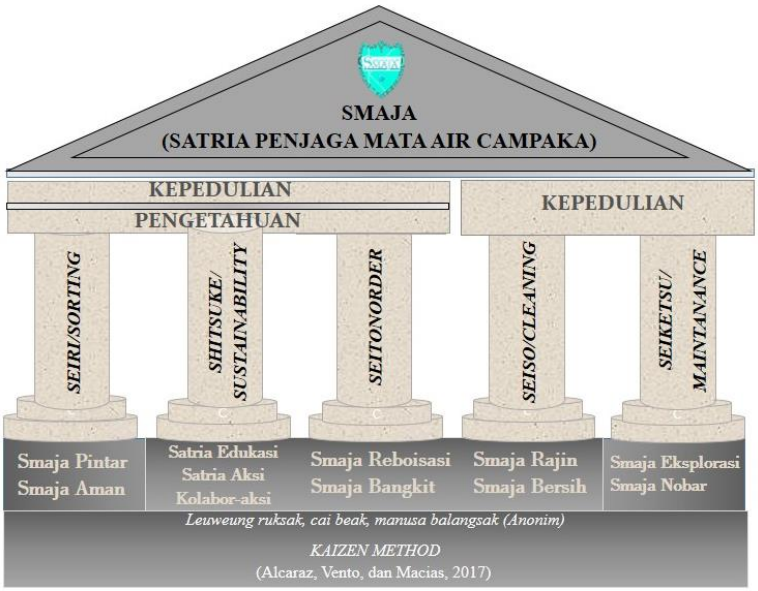

Fig. 3. Imah cai pancarama

The evaluation of the SMAJA program is carried out by measuring through post-tests, observations and testimonials from targets. The observation process was carried out by visiting Campaka Springs after the activity 3 times after the activity ended. Meanwhile, targets testimonials are obtained by asking questions to targets either directly or using social media. In addition, each activity in the 5S program is also assessed for effectiveness using key performance indicators (KPI). SMAJA program KPIs are presented in Table 1.

Table 1. SMAJA program key performance indicators

No	Program	Activities	Key Performance Indicators
1	Seiri	SMAJA Aman	Minimum 80% of targets are satisfied with making signs.
		SMAJA Pintar	Minimum 80% of targets understand
2	Seiketsu	SATRIA Bangkit	Minimum 2 learning media to increase motivation in managing Campaka Springs
		SMAJA-Reboisasi	At least there is cooperation to carry out planting actions
3	Shitsuke	SATRIA Edukasi	There are at least 5 videos that educate targets
		SATRIA Aksi	Minimum 10 volunteers join in SATRIA Aksi activities
		Kolabo-Aksi	At least there is the initiation of verbal academic, business, community, government (ABGC) collaborations
4	Seiso	SMAJA Rajin	There are at least 3 targets who are willing to take part in picket activities
		SMAJA Bersih	Minimum 10 targets attend SMAJA Bersih activities
5	Seiton	SMAJA Ekspolarasi	Minimum tourist map generated, but still sketch
		SMAJA Nobar	Minimum 8 targets attend and are motivated in SMAJA Nobar activities

The SMAJA program is carried out in a blended manner (online and offline). The eleven SMAJA program activities are divided into eight offline activities and three online activities. Online activities consist of SATRIA Edukasi, SMAJA Eksplorasi and SMAJA Bangkit. Offline activities are carried out by utilizing social media such as WhatApp, Instagram, Facebook, Google site, Spotify, Tik Tok and YouTube.

This community service activity was carried out in several places, namely at the Campaka Spring location, the Village Hall to the house of the hamlet head 06 Drawati Village. The number of people involved are 12 community targets, 10 people from Drawati Village voluntarily come to SMAJA Bersih and SMAJA Reforestation activities, 40 people voluntarily come to Collabora-Action and 20 volunteers from SMA around Campaka Springs. Some of the tools used are projectors, stationery, health protocol tools (masks and hand sanitizer) as well as several other tools and materials that are adapted to each activity such as cleaning tools (broomsticks, plastic trash bags and trash cans) for seiso, or plant seeds for seiketsu activities. The period used is starting from June 1 to September 20, 2021.

3. Results and Discussion

3.1. Increasing Community Knowledge and Awareness

The SMAJA program is able to increase the awareness and knowledge of targets in managing Campaka Springs. This is evidenced by changes in the results of the pre-test and post-test that have been carried out. The measurement of targets' awareness and knowledge in managing Campaka Springs is calculated through observations and in-depth interviews conducted with targets in Table 2.

Table 2. Variables, questions and indicators

No	Variables	Questions	Indicators
1	Knowledge	Do you understand how to manage Campaka Springs?	Definition, conditions, surrounding components, functions and benefits
2	Concern	Do you think that the Campaka Spring is important?	Likert scale from not very important to very important
		What activities have you done to protect the Campaka Springs?	Reforestation, cleaning activities, participating in discussions related to the management of the springs, visiting to see the condition of the springs and making sure they are not damaged, making signs for visitors to obey.

Concern is measured by using 2 questions, namely the urgency of the springs for targets and the actions taken by targets as an effort to maintain the Campaka Springs. The results of changes in pre-test and post-test values are shown in Fig. 4.

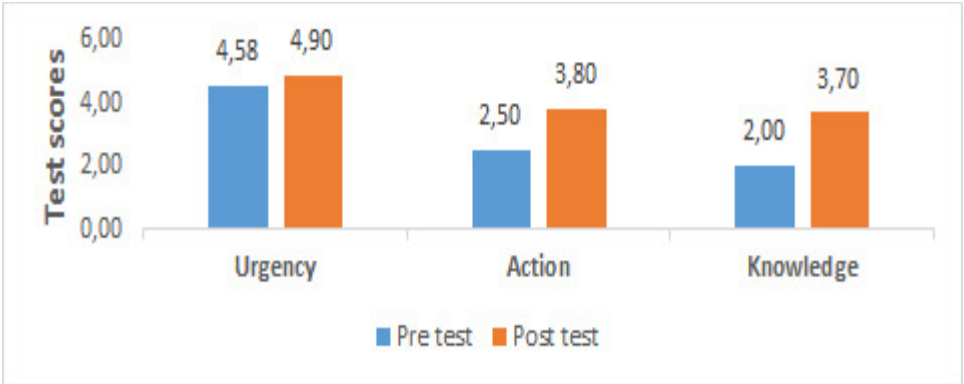

Fig. 4. Bar chart of pre-test and post-test results

There was a change before and after the targets. Targets knowledge changed from an average of 2.00 to 3.70 or by 85%. In addition, the level of targets concern has also increased as evidenced by the movement of values from interests and performance. Interest increased 6%, while performance had a 52%

percentage change. The activities carried out to increase the awareness and knowledge of targets as outlined in the kaizen method are mentioned in Table 3 [32]–[35].

Table 3. SMAJA program achievements

No	Programs	Activities	Results
1	**Seiri**	**SMAJA Aman**: Making safety signs around the Campaka Springs	100% targets are satisfied with making signs
		SMAJA Pintar: Learning about the basics of spring management (forest area management, water tourism, and water management systems) offline.	90% of targets understand how to manage springs with an average score of 3.7 for knowledge or 85% increase.
2	**Seiketsu**	**SATRIA Bangkit**: Program to increase motivation and share media in managing Campaka Springs. It explains the basics of managing springs, forests, and online water management systems.	There are 6 learning media to increase motivation in managing Campaka Springs (KULWAP, Spotify, Google Sites, Tiktok, Instagram, Facebook)
		SMAJA-Reboisasi: Planting water guard tree seedlings around Campaka Springs	There is cooperation in planting and realization of planting
3	**Shitsuke**	**SATRIA Edukasi**: educating targets through online tutorials by student volunteers and Bandung students on spring management	There are 7 videos
		SATRIA Aksi: we do community service with targets and volunteer students and Bandung students offline to manage springs	20 volunteers joined in the SATRIA Aksi activities
		Kolabo-Aksi: Initiation of collaboration with ABCG targets (Academic, Business, Community, Government) for sustainability programs	There was a verbal initiation delivered at the FGD activity on August 15, followed by a FGD on August 24, 2021 between academics and government
4	**Seiso**	**SMAJA Rajin**: carry out picket management for spring hygiene and procurement of cleaning equipment	10 targets with 2 additional people (Mr. Jaja and Mr. Upit)
		SMAJA Bersih: Gotong royong to clean the Campaka Springs	10 targets and 10 residents of Drawati Village attended the SMAJA Bersih activity
5	**Seiton**	**SMAJA Ekspolarasi**: Making tourism maps	100% tourism map generated and applied
		SMAJA Nobar: Watch Bumiku Satu	12 targets and 46 people from various walks of life

Activities that are more focused on increasing targets knowledge consist of SMAJA Pintar which contains education provided to the community regarding the management of springs. Spring management includes descriptions and definitions of springs which refer to reference [1] in his writing on Spring Setting. In SMAJA Pintar also presented how to conserve springs with the theory of spring conservation quoted from reference [36] which discussed conservation methods related to history and sustainability, then also presented the description and characteristics of the Campaka Springs which obtained based on observations, in-depth interviews and materials from several media. In addition, activities that support targets' knowledge increase, namely SATRIA Edukasi, are carried out by volunteers from various high

schools or universities around Bandung, especially those close to Campaka Springs regarding tips and tricks on how to protect springs.

In addition, there is a curative effort as shown in Fig. 5 in maintaining the Campaka Spring which has also been successfully carried out through the SMAJA program together with targets. Activities carried out to reduce problems that have occurred are by cleaning activities or as outlined in seiso activities. In addition, seiton activities are also presented as a complement in the form of curative efforts by forming targets characters and a proactive stimulus for the community to take part in maintaining the cleanliness of the springs. The tourism maps were made on the basis of the absence of a visual landscape that mapped the springs, forests and other details of locations around the Campaka Springs.

Fig. 5. Before SMAJA program (A); after SMAJA program (B)

3.3. Program Sustainability Efforts

SMAJA program sustainability efforts were formed in the quadruple helix concept from reference [37] with academic, business, government and community (ABGC) target ships is shown in Fig. 6.

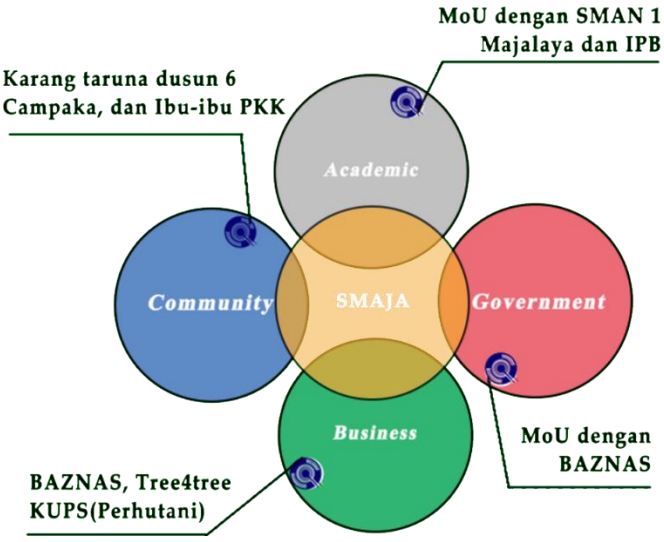

Fig. 6. Sustainability of the SMAJA program

The role of the Drawati Village Government, namely the SMAJA program is poured into PERDES (Village Regulations), which contains the management of the springs held by KUPS, BUMDES and Karang Taruna. This is in accordance with the results of the focus group discussion (FGD) conducted on August 15, 2021 at the Drawati Village office; (2) Establishment of a memorandum of understanding (MoU) between the Drawati Village Government and the National Amil Zakat Agency (BAZNAS) or

other related targets; (3) Establishment of an MoU between the Drawati Village Government and students through OSIS; (4) Making innovations from seiso activities in the form of products from waste with PKK Desa Drawati; (5) Implementation of planting tree seedlings in the Kasur Mountain area involving other Government Agencies.

4. Conclusion

The SMAJA program is proven to be able to achieve the goals needed by targets such as increasing targets knowledge and awareness and there are ongoing efforts to protect springs. In addition, the SMAJA program has also succeeded in making simple changes from various aspects, both social, economic and environmental, which was able to continue with various agreements and joint commitments related to the management of springs from various stakeholders.

Acknowledgment

The author would like to thank the Ministry of Education, Culture, Research and Technology in particular the Directorate General of Learning and Student Affairs for funding. Then, Bogor Agricultural University which has supported the sustainability of the program. Drawati Village Government, targets and other stakeholders who participated in the success of the SMAJA program.

Author Contribution

All authors contributed equally to the main contributor to this paper. All authors have read and agreed to the published version of the manuscript.

Funding

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Conflict of Interest

The authors declare no conflict of interest.

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