

Improving village officer competence through statistics training as an effort to accelerate development in Cikanyere Village

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Abstract: Village data and information are crucial for supporting village development. The availability of data and information will facilitate the development planning process and enable the making of appropriate and accurate decisions to advance the village based on its characteristics. However, in Cikanyere Village, problems were encountered, including incomplete data, a lack of skills and knowledge among village officials, and limited access to the latest information and technology for collecting and processing basic data. Therefore, training and assistance are needed for Cikanyere Village officials in collecting and processing simple statistical data. This activity equips 12 Cikanyere village officials with statistical skills in collecting data through Google Forms, processing data and presenting data using Excel, analyzing and interpreting results, with guidance from lecturers in utilizing technology for processing village demographic statistical data. The program was implemented through five stages: needs assessment, pretest, theoretical and practical statistics training, post-test accompanied by mentoring, and program evaluation through participant feedback. The results of the activity showed that the pretest and post-test scores increased significantly. This indicates that participants have made encouraging progress in their understanding of basic concepts related to statistical data and its role in development, as well as in data collection using Google Forms and the ability to operate Microsoft Excel to process data. The feedback results indicate that this community service activity aligns with the initiative's objectives and meets the needs of its partners. Respondents assessed that the implementing team demonstrated a professional, communicative, and responsive attitude. The community service program was not only well-received by the participants, but was also anticipated to continue in the future.

Keywords: data processing ; data visualization; statistical training; village apparatus ; village development.

1. INTRODUCTION

The village is the smallest administrative unit of government, playing a crucial role and serving as the starting point for the development of community economic centers (Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi, 2016). The task of the village government is to manage the village-level area and is directly related to the community (Amar, 2021; Jeddawi, 2018). When creating a policy, the central government and regional governments must understand the conditions of their communities, considering

both social, economic, educational, cultural, and environmental perspectives (Andi and Guntur, 2019). This is the most crucial part, ensuring that the policies created are precisely targeted and can effectively address existing problems.

Village data and information are crucial for supporting village development, particularly as basic data required in the preparation of village development plans. The availability of data and information will facilitate the village development process by enabling the implementation of development programs that are tailored to village characteristics (Direktorat Jenderal Bina Pemerintahan Desa, 2023). The data produced can serve as the basis for making informed and accurate decisions to advance the village. Important data that the village government must own is demographic data (Sukur and Listiyono, 2014). Information on the number of residents and the composition of the population, including age, gender, education, residence, occupation, is important to know, especially for developing human development planning, whether economic, social, political, environmental, or other developments related to improving human welfare. Policy formulation certainly requires quality data. Good and correct data will significantly determine the quality of the desired results. Population data always increases over time, and, of course, will not provide helpful information if it is not analyzed, processed, and presented correctly (Virgantari, 2020).

Statistics play a crucial role in supporting development planning and policy-making based on data. In the digital era, with its rapidly advancing technological developments, the need for accurate, valid, and reliable data is becoming increasingly crucial. Without strong data, the planning and policies created can be off-target and less effective in responding to the community's needs (Wijayant and Herman, 2023). Statistics training is a strategic step to increase the capacity of village officials in managing, analyzing, and presenting higher-quality sectoral data.

Based on this, the performance of implementing administrative processes in each village is significantly influenced by the availability of human resources and the effective use of technology. Therefore, village officials need skills in handling population data so that development planning is more effective in meeting targets, including those in Cikanyere Village. Cikanyere Village is one of 11 villages in Sukaresmi District, Cianjur Regency, West Java Province (**Figure 1**). Cikanyere Village has an area of approximately 618.68

hectares (BPS Kabupaten Cianjur, 2020) with a population of approximately 6,552 people (Kementerian Desa, 2022). The majority of the population is involved in the agricultural sector, which has created a strong identity as an agricultural area. Farmers in Cikanyere Village utilize the fertile land by planting primary commodities, including rice, corn, and various types of vegetables. This village has a clear vision and mission to build a better village, one of which is to improve village government governance and provide maximum service to the community, regardless of social status. The Cikanyere Village Government consistently strives to deliver the best service to the community and continually improves the quality of village governance.

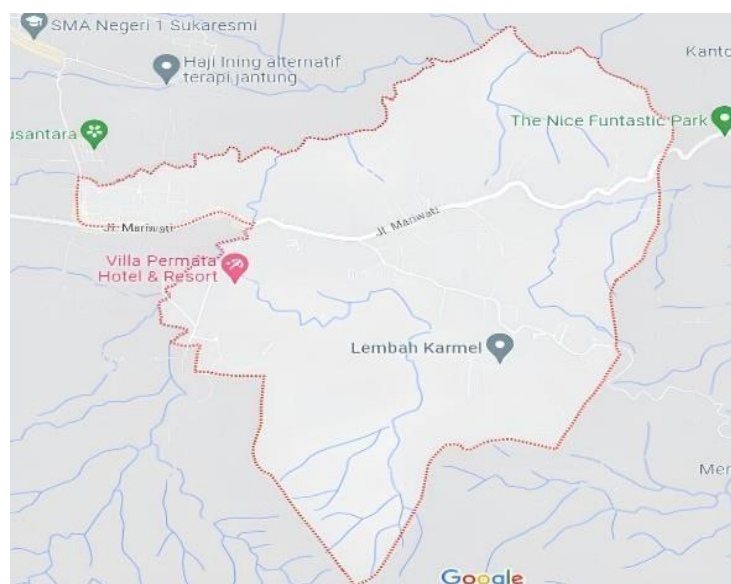


Figure 1. Location of Cikanyere Village Area, Sukaresmi District, Cianjur Regency

Based on observations and interviews with Cikanyere Village officials, the management of population data remains suboptimal because the data is not integrated into a single database and is not updated regularly. This situation hinders village officials in compiling village profiles, identifying program targets, and formulating data-driven development plans. Furthermore, the officials' ability to collect, process, analyze, and present data using data processing applications is limited; consequently, the quality of the resulting data does not fully support accurate decision-making.

In implementing the program, a comprehensive situational analysis regarding the village officials' capabilities is crucial for designing effective and targeted training (Kurniawati, 2021). A needs assessment survey revealed that 80% of the officials had never attended statistics training, 70% were unable to process

data using Microsoft Excel, 60% struggled with compiling population data, and 90% expressed a need for training in data processing and visualization. These findings indicate that enhancing statistical competence is an urgent necessity to support the digitalization of village governance, thereby enabling officials to produce valid, up-to-date, and accessible data to serve as a foundation for development planning, public services, and the evaluation of village programs.

To overcome these problems, training and mentoring programs are necessary to enhance the skills and knowledge of village officials in accurately and efficiently processing and collecting data. This program will help village officials enhance the quality of the data they produce. By overcoming these problems, it is hoped that village officials can work more effectively and efficiently in managing the village government. In addition, services to the community can also be improved with accurate data that meets the needs..

The training and mentoring program that will be implemented aims to enhance the skills and knowledge of village officials in data processing and collection. In addition, this program also aims to improve village officials' access to the latest information and technology that can be used to process and collect data..

The training materials will cover data collection techniques, data analysis, and data processing using the latest software. In addition, village officials will also be given access to and training in the use of the latest information technology, which can help them process and collect data. This program will also help village officials make informed decisions and develop effective policies for the village government. With accurate and relevant data, village officials can make more effective and efficient decisions and policies for the village community.

2. METHOD

The training and mentoring program in data collection and processing using statistics in Cikanyere Village aims to enhance the skills and understanding of village officials in collecting, analyzing, and presenting relevant and accurate data to support informed decision making in village development (Figure 2). This program will be implemented through several stages (**Figure 2**), namely:

1. Identifying program needs and objectives: This initial stage involves identifying program needs and objectives, as well as determining appropriate training and mentoring methods and techniques to

achieve these objectives. At this stage, the program implementation team will conduct an initial assessment of the knowledge and skills of village officials in data collection and processing, and analyze the data needs required for village development.

2. Pre-test: Before the training began, participants completed a pretest to assess their initial knowledge of basic statistical concepts, data collection techniques, and data processing using digital tools. The pretest results served as baseline data for evaluating the effectiveness of the training.
3. Training and mentoring: Following the identification of program needs and objectives, training and mentoring are conducted for village officials on collecting and processing data using statistics. The training will be conducted face-to-face, with the duration and frequency adjusted to the needs and schedule of village officials. The training will cover various topics, such as data collection, data analysis, data interpretation, and data presentation. The training will also be complemented by demonstrations and direct practice using statistical software. After training and mentoring, village officials will be allowed to implement and use the data that has been collected, analyzed, and presented. Village officials will be guided and assisted by the program implementation team in implementing data-driven village development, as well as in monitoring and evaluating the results.
4. Post-test: After completing the training, participants completed the same set of questions as the pretest to evaluate improvements in their knowledge and practical competencies. The post-test results were compared with the pretest scores to measure the effectiveness of the training program.
5. Evaluation: The final stage of the program is an evaluation to assess the impact of the program in improving the skills and understanding of village officials in collecting and processing data using statistics, as well as its impact on village development. The evaluation will be conducted through surveys and interviews with village officials and other related parties.

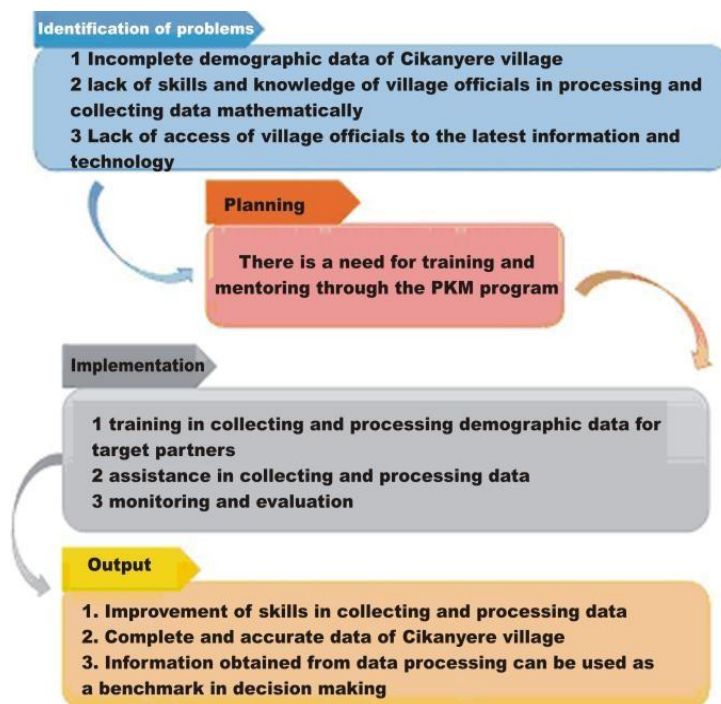


Figure 2. Activity Implementation Method

This program is expected to provide benefits for village officials, enabling them to make better and more effective decisions in village development, as well as increase community participation in data collection and processing. Thus, this program can help improve the overall quality of village development.

3. RESULT AND DISCUSSION

The implementation of community service in Cikanyere Village took the form of a training and mentoring program on collecting and processing data using statistics, held on June 3 from 10:00 to 15:00 WIB, including a break. The village apparatus that participated in this activity amounted to 12 people (**Table 1**).

Table 1. Training Participants

NO	Full name	Last education	Position
1	SAEPUL MALIK, S.AP	STRATA 1/S.1	village secretary
2	PEPEP RIVAI	High School/ Equivalent	General Affairs Staff
3	RAHMAN PEBRIADI, S.Pd	STRATA 1/S.1	Planning Section Hea
4	ASEP SAEPULOH, S.AP	STRATA 1/S.1	Finance Coordinator
5	IYAN SUPARMAN	High School/ Equivalent	Head of Public Administration
6	MOH. REZA NUR ALAM, S.Pd	STRATA 1/S.1	HEAD OF WELFARE
7	YULIA EMAWATI	High School/ Equivalent	SERVICE OFFICER
8	NINA KUSMIATI	High School/ Equivalent	Head of Sub-village 1
9	AI NURHAYATI	High School/ Equivalent	Head of Sub-village 2
10	MAWI ISMAIL	High School/ Equivalent	Head of Sub-village 3
11	HENDRIAWAN	High School/ Equivalent	Head of Sub-village 4
12	MUHAMAD AWAL MAULANA	High School/ Equivalent	STAFF

The Head of Cikanyere Village, Mr. Dadang Sulaeman, opened the event and also signed the document on the Implementation of Cooperation between the Mathematics and Computer Science Study Programs and Cikanyere Village (**Figure 3**). The community service program was implemented in five sequential sessions. The first session consisted of a needs assessment conducted through initial surveys, observations, and interviews with village officials to identify their knowledge, skills, and needs related to statistical data management.



Figure 3. Signing of the Implementation of Cooperation

The second session was a pretest to assess participants' initial understanding of the training materials. The third session consisted of theoretical presentations and hands-on practice delivered by the community service team on statistical concepts, data collection using Google Forms, and data processing and visualization using Microsoft Excel. The fourth session was a posttest to evaluate participants' learning outcomes after the training. The final session involved program evaluation through participant feedback questionnaires to assess the relevance, effectiveness, and overall implementation of the training. The pretest/posttest situation can be seen in Figure 4.



Figure 4. Pretest and Posttest Situation of Training Participants

The results of the training pretest showed that most participants were unfamiliar with the concepts of data, its types, data summarization, and basic data processing. The training participants did not understand what data is, the types of data, how data collection methods work, how to describe data, present it, and interpret it. Not a single participant had ever used Google Forms to collect data. After conducting a mini-pretest covering the above materials, training was conducted that covered both theory and practice. During this session, participants received training modules and notebooks.

The participants appeared serious as they listened to and studied the material, and were enthusiastic in asking questions to the community service team. The situation regarding the provision of theoretical and practical training materials is illustrated in **Figure 5**. The next stage of the training is the posttest. The posttest was conducted by distributing the same question sheets. The participants' answers were generally much better than during the pretest. The average scores and standard deviations before and after the training

are presented in **Table 2**.



Figure 5. Training Implementation Situation

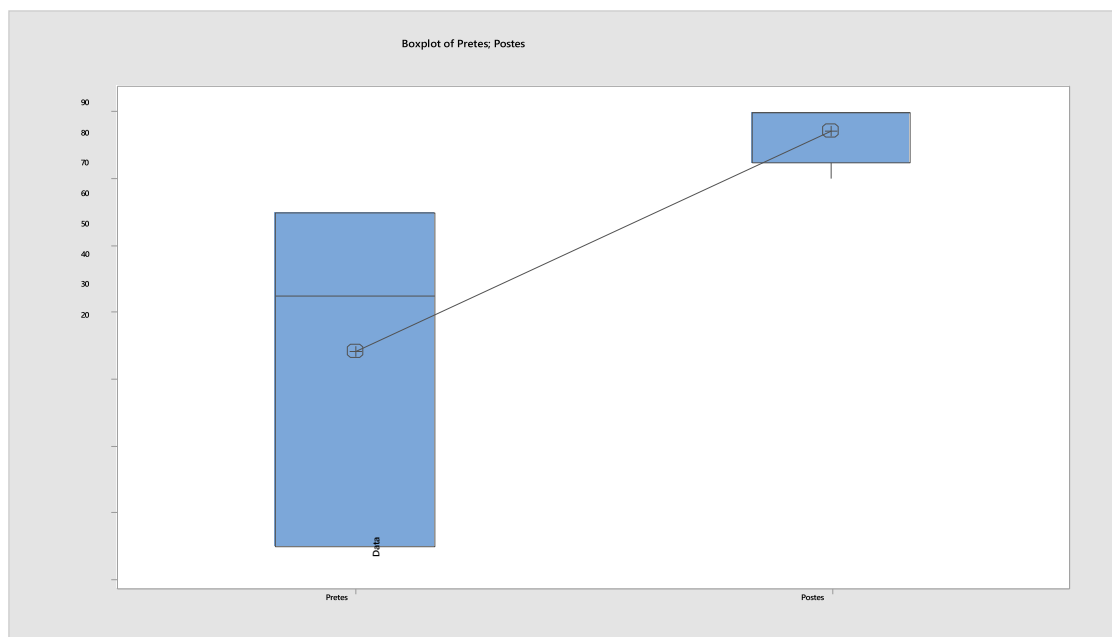
Table 2 shows that participants' statistical competence improved substantially after the training, as indicated by the increase in the mean score from 54.2 to 87.2 and the decrease in the standard deviation from 23.4 to 4.41. These findings suggest that the training effectively enhanced participants' understanding of statistical concepts and data processing while producing a more uniform level of competence among participants. The findings are in line with the community service program conducted by Kusuma and Khoiri (2023), which introduced the Desa Cinta Statistik (CANTIK) program to strengthen village development planning.

Table 2. Comparison of Scores Before and After Training

Statistics	Pre-test	Post-test
Average score	54.2	87.2
Standard deviation	23.4	4.41

Although their evaluation focused on the relationship between the duration of training participation and participants' infographic production skills, they reported a very strong positive correlation (Pearson's $r =$

0.970, $p < 0.05$), indicating that greater participation in training led to better learning outcomes. Similarly, the present study demonstrates that structured statistical training significantly improved participants' competencies, as reflected by the substantial increase in posttest scores. Both studies therefore highlight that practical and participatory statistical training can effectively strengthen the capacity of village officials to manage village data and support evidence-based development planning, despite using different evaluation methods.



Difference = μ (Pretest) - μ (Posttest) Estimate for
difference: -33,06
95% CI for difference: (-51,35; -14,76)
T-Test of difference = 0 (vs $\neq$): T-Value = -4,17 P-Value =
0,003 DF = 11

Figure 6. Results of the Average Difference Test of Scores Before and After the Test

The consistency of these findings suggests that training programs emphasizing practical exercises and direct mentoring are effective in improving village officials' statistical competencies across different village settings. The results of the t-test comparing the average scores before and after training, along with the corresponding graphs, shown in **Figure 6**, which presents a boxplot comparing participants' pretest and posttest scores, together with the results of the paired t-test. The boxplot illustrates a clear upward shift in participants' performance after the training. The center marker (mean) increased substantially from

approximately 54.2 in the pretest to 87.2 in the post-test, indicating a considerable improvement in participants' understanding of statistical concepts and data processing. Likewise, the median score increased markedly, demonstrating that the improvement occurred across most participants rather than being driven by only a few individuals with exceptionally high scores. The spread of the data also changed considerably after the training.

The pre-test box is much wider than the post-test box, indicating greater variability in participants' initial knowledge and skills. In contrast, the narrower post-test box and shorter whiskers show that participants' scores became more concentrated around the mean after completing the training. This observation is consistent with the decrease in the standard deviation from 23.4 to 4.41, suggesting that the training not only improved participants' performance but also reduced differences in competency among participants, resulting in a more homogeneous level of understanding. The paired t-test further confirms that the observed improvement was statistically significant.

The estimated mean difference between the pretest and post-test scores was -33.06 (Pre-test – Post-test), indicating that the post-test scores were, on average, 33.06 points higher than the pretest scores. Furthermore, the 95% confidence interval for the mean difference ranged from -51.35 to -14.76 and did not include zero, providing strong evidence that the improvement was not due to random variation. The t-value of -4.17 with a p-value of 0.003 ($p < 0.05$) indicates that the increase in participants' scores after the training was statistically significant. These findings demonstrate that the training effectively improved participants' competencies in understanding basic statistical concepts, the role of data in village development, data collection using Google Forms, and data processing and visualization using Microsoft Excel.

Participants showed better abilities in entering and managing data, performing simple statistical summaries, and presenting information through tables and graphical displays such as bar charts, pie charts, and histograms. The combination of higher average scores, lower score variability, and statistically significant test results indicates that the training successfully enhanced both the knowledge and practical data management skills of the village officials. The final stage of the activity is program evaluation. This

stage involves distributing a questionnaire with assessment items as feedback on the activity's implementation to all participants. The results of the feedback are presented in **Table 3**.

Table 3. Feedback on Activity Assessment Items

Assessment Items (<i>Feedback</i>)	Agree	Disagree
1. This community service program is in accordance with the objectives of the activity itself.	100%	0%
2. This community service program is in accordance with the needs of partners	91%	9%
3. The implementation time for this community service program is relatively sufficient according to needs.	100%	10%
4. The team of lecturers and students were friendly and responsive in helping during the activities.	100%	0%
5. Partners accept and expect community service programs now and in the future.	100%	0%

The results of the feedback on the implementation of activities in Table 3 indicate that the community service program is considered very relevant and on target according to the objectives of the activity, namely statistical training. Not a single respondent expressed disagreement, indicating a very high level of satisfaction and suitability of the program. Respondents felt that the community service program had been designed and implemented in a manner that was responsive to the community's needs. Although a small portion, 9%, did not fully agree, the program's suitability to the community's needs was still very high.

The duration or time of the program implementation was considered very adequate by all participants. This reflects proper and efficient time planning, enabling community service activities to occur optimally in response to the community's needs. The attitude and service of lecturers and students during the implementation of the activity were responded positively by all participants. Respondents assessed that the implementation team demonstrated a professional, communicative, and responsive attitude, which significantly contributed to the success of the community service program.

The community service program was not only well-received by the community, but is also expected to continue in the future. This reflects the success of the program in building positive relationships and trust between Pakuan University and the community, and confirms the relevance and real impact of the activities

carried out.

4. CONCLUSION

The community service program on statistical training for village officials in Cikanyere Village was successfully implemented and effectively improved participants' competencies in collecting, processing, analyzing, and presenting village data. This was evidenced by the significant increase in the average posttest score (from 54.2 to 87.2), the reduction in score variability (standard deviation from 23.4 to 4.41), and the paired t-test results ($p = 0.003$), indicating that the improvement was statistically significant. Participants also demonstrated better practical skills in using Google Forms for data collection and Microsoft Excel for data management, statistical summaries, and data visualization. The findings suggest that practical, hands-on statistical training combined with mentoring is an effective approach to strengthening the data management capacity of village officials. Improved statistical competence enables village governments to produce more accurate, reliable, and up-to-date data, which are essential for evidence-based development planning and public service delivery. Therefore, similar capacity-building programs should be implemented continuously and expanded to other villages to support the digitalization of village governance and promote sustainable, data-driven rural development.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest regarding the publication of this article. There are no financial, professional, or personal relationships that could have influenced the conduct or outcomes of this community service activity.

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