



ASSISTANCE FOR VILLAGE OFFICIALS IN THE IMPLEMENTATION OF GIS-BASED DIGITAL ASSET DIGITIZATION IN DURBUK VILLAGE, PADEMAWU DISTRICT, PAMEKASAN REGENCY

Aang Kisnu Darmawan¹, Busro Akramul Umam², Ibnu Ali³, Mohammad Bhanu Setyawan⁴,
Muhsi⁵, Anwari⁶

^{1,2,3,5,6}Universitas Islam Madura, Indonesia

⁴Universitas Muhammadiyah Ponorogo, Indonesia

Email: ak.darmawan@gmail.com*

Abstract

Digital Village or Smart Village is applying ICT based on Big Data and Smart Systems to make village resource management more efficient. **However**, the implementation of Digital Village in Durbuk Village, Pademawu District, Pamekasan Regency, East Java, experienced **two main problems**, namely (1) the weakness of the village asset management system and (2) the weakness of village apparatus human resources in managing village assets. This community service activity has **two main objectives**: (1) to build a digital village asset information system based on the Geographical Information System (GIS) and to strengthen technical village officials in digital-based village asset management. **Seven steps** of the community service **method** take, namely, (1) Identification of problems, (2) Community Service Planning, (3) Coordination with Partners, (4) Digital Asset Map Creation and SIAD Application, (5) Socialization, Forum Group Discussion and SIAD Workshop, (6) Writing Modules and Books for Digitizing GIS-based Durbuk Village Assets, and (7) Implementation of Community Service Results in Seminar. This activity produced **three research outputs**, namely (1) digital village asset maps, (2) GIS-based digital Application software for the village asset information system, and (3) monograph modules/books on digitizing village assets GIS-based. This community service activity is expected to significantly **contribute** to village officials managing digital assets with the help of GIS spatial technology.

Keywords: Digital village, Digital asset, Digital map, Digital village information system

INTRODUCTION

The village sector is an important sector that is the focus of the development of the Indonesian government at this time (Lestari, 2021). Considering the number of villages (74,961) which is very large compared to cities (98), the village potential is a massive potential for working in the town. Out of 250 million people from 17,504 islands, 53.3% live in cities, indicating a large development gap (Faisal & Suharjito, 2021). For the development of Indonesia to be more advanced and not only rely on cities, but the government is also promoting the 1000 Digital Villages or Digidesa program, which prepares 1000 villages in Indonesia to become digital villages. For this, the government has prepared a village development roadmap with a tagline "Building Indonesia From The Periphery And Building Indonesia From The Village" (Kementerian Koordinator Bidang Kemaritiman dan Investasi & Republik Indonesia, 2021). Digital Village (Digital Village) or also known as Smart Village (Smart Village), is a model for rural development that uses all of the solutions offered by information and

communication technology (ICT) to help the village grow sustainably. This model is based on figuring out what rural development is and what it needs(Zhang & Zhang, 2020).

However, in developing the Digital Village, there are several obstacles faced, namely weak internet connection(Komorowski & Stanny, 2020), limited application of IoT(Cvar et al., 2020), inadequate socio-economic infrastructure (Adamowicz & Zwolińska-Ligaj, 2020). Various literature notes on the Implementation of Digital Village in Indonesia note various problems faced, namely weak design, supervision, socio-cultural(Faisal & Suharjito, 2021), talent management, and quite significant ICT disparities between villages and cities(Andari & Ella, 2021), weak data management and availability (Tosida, Suprehatin, et al., 2020), (Tosida, Herdiyeni, et al., 2020), weak infrastructure and a supportive environment(Fatimah et al., 2020), e-document governance and village information systems are inadequate(Saputra & Isnain, 2021). The problem, several previous works have been carried out, including the Application Of The Waterfall And Blackbox Testing Models In Making A Web-Based Village E-Asset Information System(Saifudin, 2021), Web-Based Village Fixed Assets Accounting Information System Design As a Pilot Project In Sigli City District (Mukrim & Evayani, 2020), Geographical Information System And Village Assets To Support Dumpil Village, Dukuhseti Sub-District, Pati District Development(Sukmono et al., 2019), Asset Management Information System in Barepan Village(Setyawan & Asroni, 2018), design of asset management information system in rajagaluh kidul village(Malik & Mardiana, 2018) and web-based information system for the management of villagers' assets in the town of Purwosari (Sudibyo, 2014).

Geographically, Durbuk Village is located at 2070'-8050' south latitude and 112024'-910 46' east longitude. Administratively, Durbuk Village is situated in the Pademawu District, Pamekasan Regency, with a position limited by the neighboring villages. In the north, it is bordered by Sumedangan Village. On the west, it is bordered by Kanganan Village; in the south, it is bordered by Jarin Village; on the east side, it is bordered by West Pademawu Village(Profil Desa Durbuk, Kecamatan Pademawu, Kabupaten Pamekasan, 2021). The distance from Durbuk village to the sub-district capital is 3 km, which can reach in about 10 minutes. At the same time, the distance to the district capital is 5 km, which can reach in about 0.5 hours.

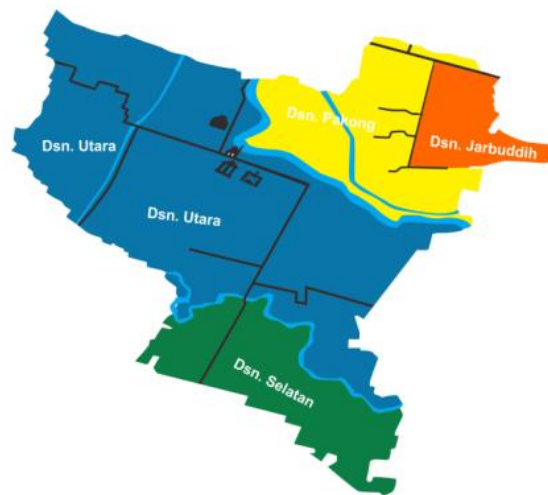


Figure 1. Map of Durbuk Village, Pademawu District, Pamekasan Regency, East Java

Based on the results of the Community Service Team's observations and interviews with village officials, there are two main problems faced, namely (1) the absence of an efficient village asset management system and (2) the weak capacity of village apparatus' human resources in ICT-based asset management. To find a solution to the issue, the stage is to build an information system or digital asset application based on a Geographic Information System (GIS). GIS technology handles village assets with a spatial shape so they can easily manage visually. In building this spatial-based village digital asset information system, web programming technology with PHP, Postgresql, and Quantum GIS languages are used. Meanwhile, to overcome the second problem, socialization, training, and assistance for village officials are carried out in managing digital-based village assets. The Community Service Team also wrote modules and books to guide managing digital-based village assets. The transfer of science and technology carried out in this community service activity has two (2) things, namely (1) a GIS-based Digital Village Asset Information System and (2) a GIS-based Digital Village Asset Map.

Table 1. Linkage of Specific Solutions with Partner Problems

No	Problems	Specific Solutions	Program Targets	Outcome Indicators
1	Durbuk Village currently does not yet have an efficient village asset management system	• create a digital map for village assets • complete a GIS-based digital	• Durbuk Village has a digital map of village assets	• Have a digital map for village assets • Have a GIS-based digital

		application for the village asset information system	• Durbuk Village has a GIS-based digital application for the village asset information system	application for the village asset information system
2	The human resources capacity of the Durbuk Village apparatus in managing ICT-based assets is still weak	• Conducting socialization of digital village asset SIMs • leading training and mentoring village officials in managing GIS-based digital village assets • creating modules and books on GIS-based digital village asset management	• Village officials understand the urgency and benefits of digital maps and GIS-based digital village asset SIMs • Village officials can manage and have technical skills in managing GIS-based Digital Village Asset SIMs	• Village officials understand the urgency of a GIS-based Digital Village Asset SIM • Village officials are capable of handling GIS-based Digital Village Asset SIMs

Figure 2. The description of The Transfer of Science and Technology for Community Partners

The outputs of this community service activity are (1) digital village asset maps, (2) GIS-based digital village information system applications, and (3) GIS-based digital asset management modules and books. This community service activity is expected to contribute significantly to village officials in digitally managing village assets with the help of spatial GIS technology.

METHOD AND PROCEDURES

This community service activity was carried out within two months, from 15 July to 15 September 2022, in Durbuk Village, Pademawu District, Pamekasan Regency, East Java. The implementation method in this activity consists of seven (7) stages, namely (1) identifying

problems, (2) planning community service activities, (3) coordinating with partners, (4) making digital asset maps and SIAD, (5) Socialization, Forum Group Discussion, and SIAD Workshop, (6) Writing modules and books on digitizing GIS-based digital villages and (7) Organizing Community Service Results Seminars. The steps for implementing this community service activity are given in the flow chart as follows:



Figure 3. Stages Of Community Service Activities: Assistance For Village Officials In The Application Of Gis-Based Village Asset Digitization

The first stage is identifying the partners' problems, which is done by observing the partners' conditions and in-depth interviews with Durbuk village officials. The study was carried out on 15-22 July 2022. From this activity, an overview of partner problems obtains: partners still had difficulties managing village assets, and the partner's human resources were still weak in managing village assets. **The second stage** is planning community service, which will carry out on July 25-29, 2022. The Community Service Team and LPPM carry out this activity to plan activities to solve the two partners' problems. In this activity, a community service activity plan obtains. **The third stage** is coordination with partners, which will be carried out on 1-2 August 2022 at 08.00-12.00 am in the Durbuk Village Hall. This activity is coordinated with the Community Service Team, LPPM Islamic University of Madura, and Village Officials, namely the village head, village secretary, and Durbuk village officials. A technical guideline for community service activities will produce in this activity.

--	--



Figure 4. The Steps of Community Service: (1) Identification of problems, (2) Community Service Planning, and (3) Coordination with Partners

The fourth stage is creating a digital village asset map and a digital village asset information system (SIAD). This activity carries out (1) inventorying village assets and locating and surveying coordination points on the map on 2-13 August 2022, (2) making digital maps and SIAD on 14-31 August 2022, and (3) testing the application on 5-6 September 2022. **The fifth stage** is Socialization, Forum Group Discussion, and SIAD workshop on 9 September from 08.00-12.00 in the Durbuk Village Hall. This activity takes the form of introducing and assisting partners in (1) using a digital map of village assets and (2) managing the Village Asset Information System (SIAD). **The sixth stage** is writing modules and textbooks on digitizing village assets based on GIS. Module writing was carried out on August 1-8, 2022, to assist partners in recognizing and managing GIS-based digital village assets. At the same time, textbooks are still being edited for book publication. **The seventh stage** is the holding of community service seminars. This activity was carried out on October 5, 2022, by

disseminating the results of community service at the National Seminar on Community Service (SENIAS) at the Islamic University of Madura.



Figure 5. The Steps of Community Service: (4) Digital Asset Map Creation and SIAD Application, (5) Socialization, Forum Group Discussion, and SIAD Workshop, (6) Writing Modules and Books for Digitizing GIS-based Durbuk Village Assets, and (7) Implementation of Community Service Results in Seminar

RESULTS

This community service activity **resulted in three (3) things**: (1) *a digital map of village assets*, (2) *a web-based application for the village asset information system*, and (3) *a GIS-based Monograph Book and Module on Digitizing Durbuk village assets*. The digital map produced is in the form of digitizing the assets of Durbuk Village, which have been inventoried, namely land, buildings, and other immovable assets. The resulting digital map display is as follows:

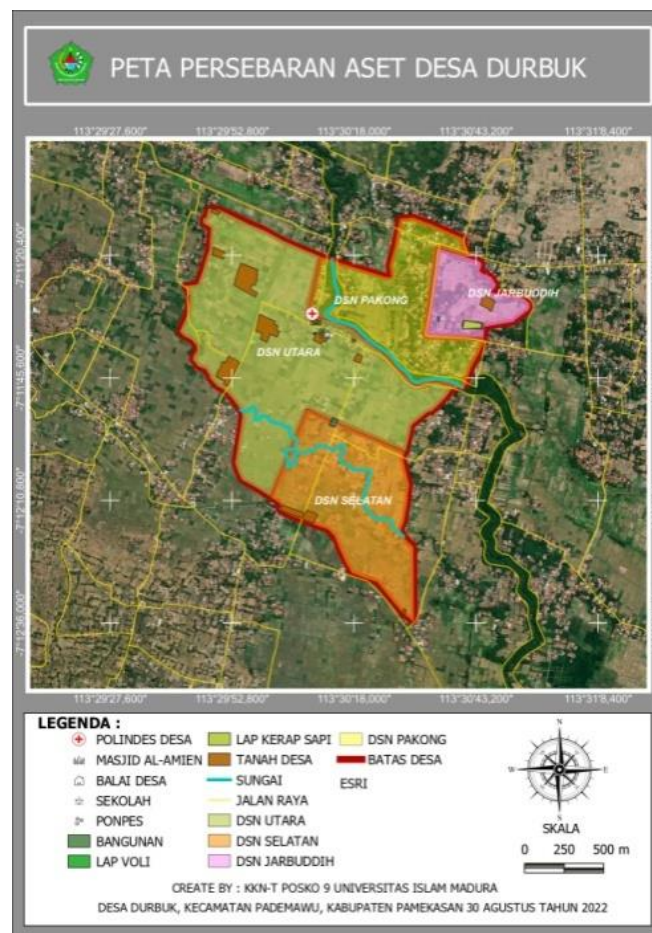


Figure 6. Digital Map Of Durbuk Village Assets

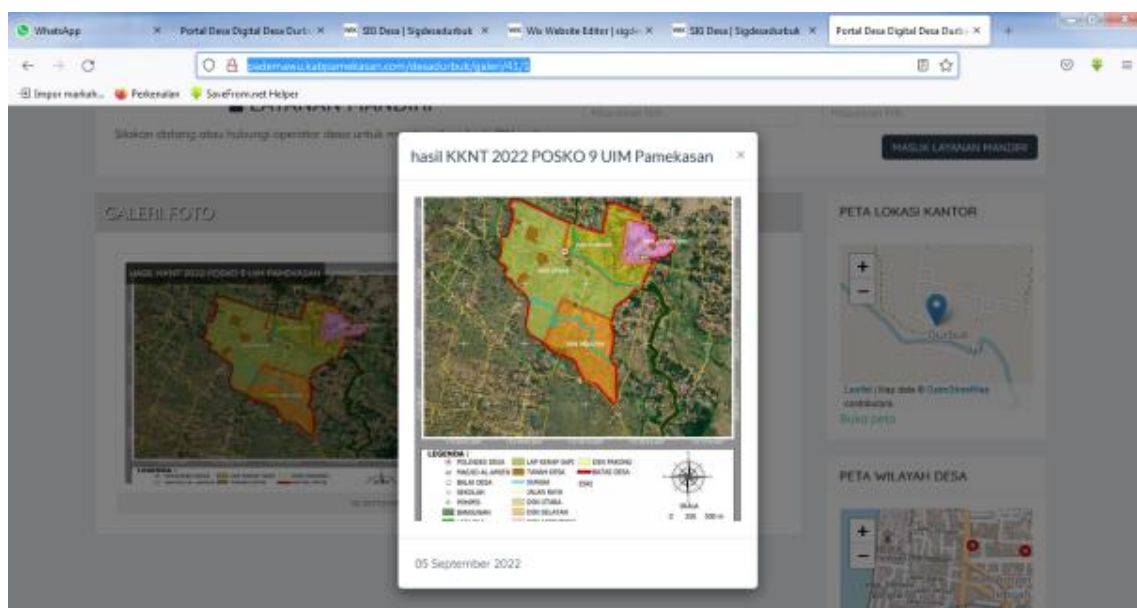


Figure 7. Display Of The Durbuk Village Map On The Sub-District Website User

The resulting Digital Village Information System (SIAD) application is a digital village management application that contains digital village information that village officials can manage. The display of SIAD is as follows:

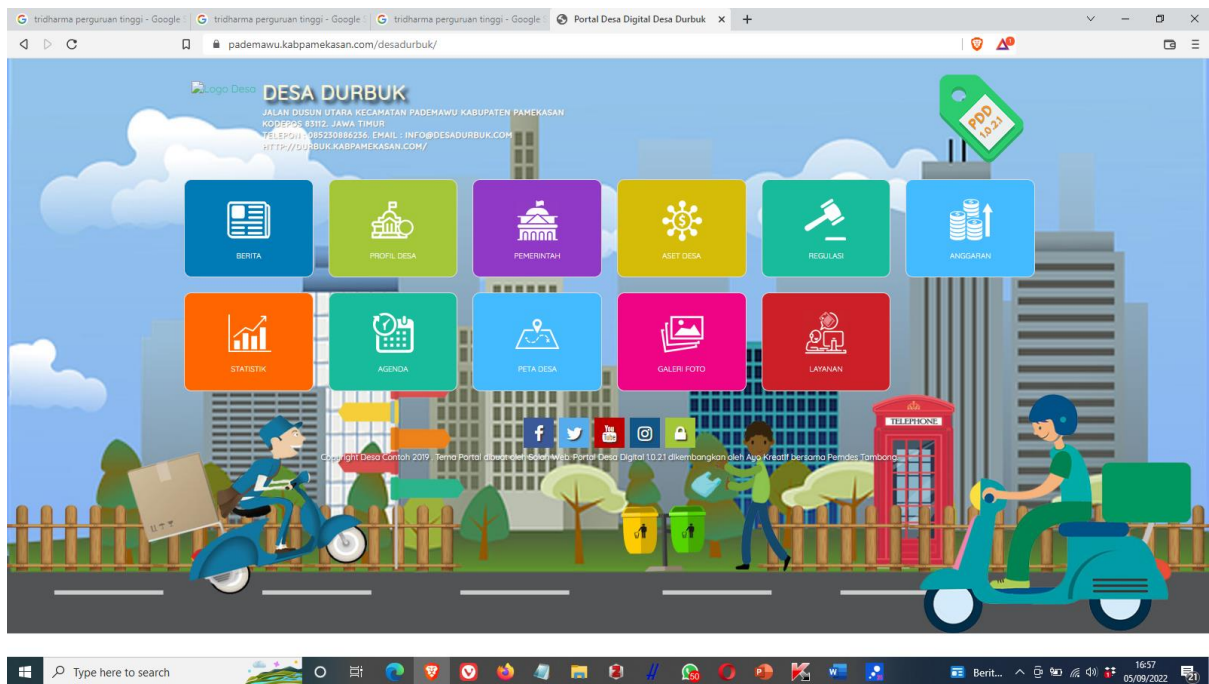


Figure 8. Digital Village Information System (SIAD) application

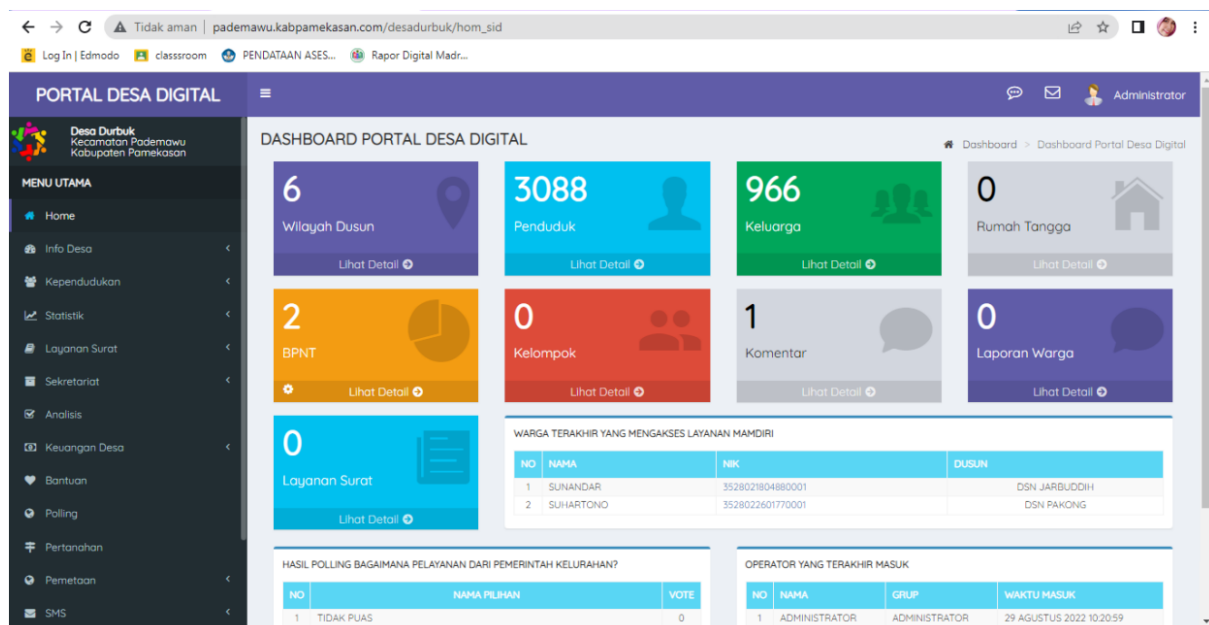


Figure 9. Digital Village Information System (SIAD) Dashboard's Display

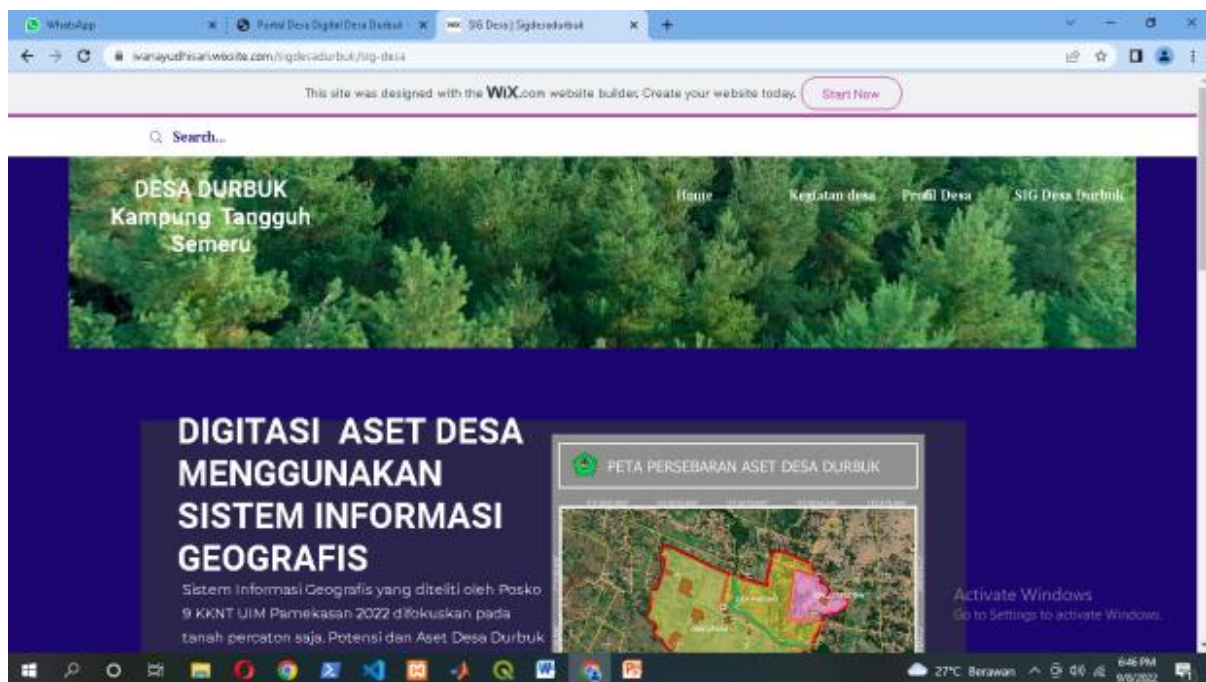


Figure 10. Display of The Durbuk Village Map on The Wix.Com Website

The SIAD Teaching Module guides village apparatus users in implementing the SIAD that was made previously. Once upon a time, village officials were given training and mentorship in implementing SIAD using this module. The monograph book has been produced as a draft and is in the final editing process to be sent to the publisher. And the title of the resulting monograph book is **VILLAGE ASSET INFORMATION SYSTEM BASED ON GEOGRAPHIC INFORMATION SYSTEM: An Effort Towards Digitalization of Durbuk Village, Pademawu District, Pamekasan Regency, Madura Island in 2022.**

Evaluation of Partner Workshop Activities and Assistance:

The normalized gain or N-gain score aims to determine the effectiveness of using a particular method or treatment in one group pretest-posttest design research (experimental design or pre-experimental design) as well as research using a control group (quasi-experiment or actual experiment). The N-gain score test is carried out by calculating the difference between the pretest value (the trial before a particular method or treatment is applied) and the post-test value (the test after a specific procedure or treatment is used).

By calculating the difference between the pretest and post-test scores or the gain score, we will be able to determine whether a particular method's use or application can be said to be effective. Below is the gain score distribution table:

Table 2. Distribution of Gain Scores

N-Gain Value	Category
$g > 0,7$	High
$0,3 \leq g \leq 0,7$	Medium
$g < 0,3$	Low

Source : (Arikunto, S, 2010)

Meanwhile, to determine the effectiveness of a result can be seen in the table below:

Table 3. Interpretation of the effectiveness of N-Gain

Percentage(%)	Interpretation
<40	Ineffective
40-55	Less effective
56-75	Effective enough
>76	Effective

Source : (Arikunto, S, 2010)

Based on the above, the following is a pretest and post-test comparison table.

Table 4. Comparison of pretest and post-test results

Activity	Results
Pretest average	37
Post-test average	88
Different percentage	77,18%

Based on the results of the pretest, it can see that the average workshop participant gets a score of 37. This result indicates that the participant's mastery of geographic information system knowledge needs to be improved. In a separate interview, one of the participants shared that their obstacle was a lack of a more comprehensive understanding of mastery of technology or information systems.

During the workshop, participants paid close attention to the material presented. The study record in the documentation was carried out and seen in several questions raised during the discussion session. Many questions arise regarding managing information systems, especially digitizing village assets using geographic information systems.

After delivering the material, post-test questionnaires were distributed to the workshop participants. After calculating the results, the average score is 88, which means there is an increase in understanding of the workshop material by 77.18%. Indicates that the delivery of the material gave positive results because there was an increase in the average score after the

workshop participants received material on digitizing village assets using a geographic information system.

CONCLUSION

This Community Service activity **aims** to (1) create a digital map of village assets and build a digital village asset information system based on a Geographic Information System (GIS), (2) train and assistance for Durbuk village officials in digital-based village asset management. **The outputs** of this community service activity are (1) digital village asset maps, (2) GIS-based digital village information system applications, and (3) GIS-based digital asset management modules and books. The workshop and mentoring **were** reasonably practical because there was an increase in the understanding of the workshop participants from 37% to 88%. This community service activity is expected to **significantly contribute** to village officials managing digital assets with the help of GIS spatial technology.

ACKNOWLEDGMENTS

LPPM, Madura Islamic University's Institute for Research and Community Service, deserves special recognition for its assistance in 2022.

REFERENCES

- Adamowicz, M., & Zwolińska-Ligaj, M. (2020). The “Smart Village” as a Way to Achieve Sustainable Development in Rural Areas of Poland. *Sustainability*, 12(16), 6503. <https://doi.org/10.3390/su12166503>
- Andari, R. N., & Ella, S. (2021). Digital Talent Management Model for Smart Village in Indonesia. *2021 2nd International Conference on ICT for Rural Development (IC-ICTRuDev)*, 1–6. <https://doi.org/10.1109/IC-ICTRuDev50538.2021.9656515>
- Arikunto, S. (2010). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.
- Cvar, N., Trilar, J., Kos, A., Volk, M., & Stojmenova Duh, E. (2020). The Use of IoT Technology in Smart Cities and Smart Villages: Similarities, Differences, and Future Prospects. *Sensors*, 20(14), 3897. <https://doi.org/10.3390/s20143897>
- Faisal & Suharjito. (2021). Smart Village Design using Enterprise Architecture Framework Model. *2021 International Conference on Information Management and Technology (ICIMTech)*, 212–217. <https://doi.org/10.1109/ICIMTech53080.2021.9535107>
- Fatimah, S., Judawinata, M. G., Barkah, M. N., Trimo, L., & Deliana, Y. (2020). Towards Smart Village: A Case Study of Genteng Village Development in Sumedang, West Java, Indonesia. *Society*, 8(2), 663–676. <https://doi.org/10.33019/society.v8i2.264>
- Kementerian Koordinator Bidang Kemaritiman dan Investasi & Republik Indonesia. (2021). *Pedoman Desa Wisata*.

- Komorowski, Ł., & Stanny, M. (2020). Smart Villages: Where Can They Happen? *Land*, 9(5), 151. <https://doi.org/10.3390/land9050151>
- Lestari, S. (2021). FRAMEWORK PEMBANGUNAN SMART VILLAGE INDONESIA (SVI). *Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST) 2021*, 5.
- Malik, M., & Mardiana, A. (2018). RANCANG BANGUN SISTEM INFORMASI PENGELOLAAN ASET DESA RAJAGALUH KIDUL. *Prosiding STIKMA*, 6.
- Mukrim, M., & Evayani, E. (2020). PERANCANGAN SISTEM INFORMASI AKUNTANSI ASET TETAP DESA BERBASIS WEB (PILOT PROJECT PADA KECAMATAN KOTA SIGLI). *Jurnal Ilmiah Mahasiswa Ekonomi Akuntansi*, 5(1), 159–164. <https://doi.org/10.24815/jimeka.v5i1.15485>
- Profil Desa Durbuk, Kecamatan Pademawu, Kabupaten Pamekasan*. (2021). Pemerintah Desa Durbuk.
- Saifudin, S. (2021). Penerapan Model Waterfall Dan Blackbox Testing Dalam Pembuatan Sistem Informasi E-Aset Desa Berbasis Web. *Jurnal Informatics and Computer Engineering Journal*, 1(2). <https://jurnal.bsi.ac.id/index.php/ijec/>
- Saputra, M. A., & Isnain, A. R. (2021). PENERAPAN SMART VILLAGE DALAM PENINGKATAN PELAYANAN MASYARAKAT MENGGUNAKAN METODE WEB ENGINEERING. *Jurnal Teknologi dan Sistem Informasi*, 2(3), 7.
- Setyawan, H., & Asroni, A. (2018). Sistem Informasi Manajemen Aset (Studi Kasus: Desa Barepan). *Semesta Teknika*, 21(2). <https://doi.org/10.18196/st.212221>
- Sudibyo, H. (2014). *SISTEM INFORMASI PENGELOLAAN ASET DESA BERBASIS WEB PADA DESA PURWOSARI*. 2, 13.
- Sukmono, A., Husodo, B. T., & Wijaningsih, D. (2019). *PEMBUATAN SISTEM INFORMASI GEOGRAFIS POTENSI DAN ASET DESA UNTUK MENUNJANG PEMBANGUNAN DESA DUMPIL KECAMATAN DUKUHSETI KABUPATEN PATI*. 1(1), 8.
- Tosida, E. T., Herdiyeni, Y., Suprehatin, S., & Marimin. (2020). The Potential for Implementing a Big Data Analytic-based Smart Village in Indonesia. *2020 International Conference on Computer Science and Its Application in Agriculture (ICOSICA)*, 1–10. <https://doi.org/10.1109/ICOSICA49951.2020.9243265>
- Tosida, E. T., Suprehatin, S., Herdiyeni, Y., Marimin, & Solihin, I. P. (2020). Clustering of Citizen Science Prospect to Construct Big Data-based Smart Village in Indonesia. *2020 International Conference on Informatics, Multimedia, Cyber and Information Systems (ICIMCIS)*, 58–63. <https://doi.org/10.1109/ICIMCIS51567.2020.9354323>
- Zhang, X., & Zhang, Z. (2020). How Do Smart Villages Become a Way to Achieve Sustainable Development in Rural Areas? Smart Village Planning and Practices in China. *Sustainability*, 12(24), 10510. <https://doi.org/10.3390/su122410510>