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Optimizing Village-Level Quick Count Accuracy and Efficiency via a Stratified Systematic Cluster Random Sampling Approach

Rizqi Yoga Pratama[1], Abednego Dwi Septiadi[2,*], Muhamad Awiet Wiedanto Prasetyo[3]

[1]*Department of Information Systems, Faculty Of Computer Science, University Of Amikom Purwokerto, Indonesia*

[2]*Department of Software Engineering, Faculty of Informatics, Telkom University, Indonesia*

[3]*Department ofInformation Systems, Faculty of Industrial Engineering, Telkom University, Indonesia*

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Abstract

Accurate and transparent election result reporting plays a vital role in preserving public confidence and reinforcing democratic legitimacy. This research evaluates the effectiveness of the Stratified Systematic Cluster Random Sampling (SSCRS) method in improving the accuracy and efficiency of village-level quick counts. Conducted in Panembangan Village, Cilongok District, Banyumas Regency, the study employs a quantitative descriptive approach to examine how the integration of stratification, clustering, and systematic selection techniques can generate statistically robust election estimates within limited operational constraints. The research population consisted of all valid ballots from the 2019 Village Head Election, distributed across ten polling stations (TPS). Applying the SSCRS design, five TPS were systematically selected following stratification, yielding a sample of 3,760 valid votes. Data were analyzed using statistical procedures to determine the Margin of Error (MoE) and the 95% Confidence Interval (CI). The findings show that Candidate Untung Sanyoto secured 59.16% of the votes, while Candidate Suprapto received 40.84%, with an MoE of ±0.69% and CI ranges of 58.47–59.84% and 40.16–41.53%, respectively. These outcomes demonstrate that the SSCRS method produces highly accurate and reliable estimates closely aligned with the official results, confirming both its statistical validity and field-level practicality. By combining three sampling techniques, the method ensures proportional representation, reduces sampling bias, and enhances data collection efficiency under constrained conditions. This research provides a methodological contribution to electoral statistics, presenting a replicable hybrid sampling model well-suited for small-scale electoral contexts. Future studies are encouraged to extend this framework to different regions and election types to further assess its flexibility and robustness across diverse demographic and logistical settings.

Keywords: Quick Count; Stratified Systematic Cluster Random Sampling; Electoral Transparency; Sampling Accuracy; Village Head Election

1. Introduction

Electoral transparency is one of the most critical foundations of democracy worldwide. Transparent, accurate, and timely reporting of election results strengthens public confidence and reduces the likelihood of fraud or misinformation. Across many democratic nations, early-reporting mechanisms such as quick counts have emerged as reliable instruments for ensuring that citizens receive trustworthy information before official tallies are announced. A quick count is a statistical technique that estimates election results based on a representative sample of polling stations, providing an early yet credible picture of voting trends. Its scientific nature allows election organizers, researchers, and independent observers to safeguard democratic integrity through data-driven transparency [1]. Globally, the use of quick count methodologies reflects the growing need for both accuracy and accountability in electoral processes. In emerging democracies, these methods not only expedite result reporting but also promote civic engagement and reduce public skepticism toward electoral institutions. Quick counts thus function as tools for reinforcing democratic legitimacy by delivering rapid, evidence-based results that the public can verify. Their success, however, depends heavily on methodological rigor—particularly in sampling design—which determines the representativeness and precision of projected outcomes [1], [2].

In Indonesia, quick count practices have become a central component of modern electoral culture. Various survey agencies, academic institutions, and research organizations routinely conduct quick counts to provide rapid projections

***Corresponding author: Abednego Dwi Septiadi (abednego@telkomuniversity.ac.id)**
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of national, regional, and local elections [3], [4]. These initiatives respond to society's demand for immediate and credible information on election outcomes, particularly as the pace of political competition accelerates. Nonetheless, implementing quick counts at the village level remains challenging. Limited human and financial resources, geographically dispersed polling stations, and variations in accessibility often hinder the ability to collect proportional samples. These logistical barriers can weaken the accuracy of quick count estimates in smaller electoral environments [3]. At the technical level, the reliability of a quick count depends on its sampling framework. Sampling errors, bias, and inefficiency can significantly distort early estimation results, especially in small-scale elections. Conventional approaches such as Simple Random Sampling or Cluster Sampling—while theoretically sound—often struggle to achieve a balance between statistical representativeness and operational feasibility [5], [6]. In localized contexts, where voter demographics and polling-station distributions vary greatly, these traditional techniques may lead to under- or over-representation of specific regions. Consequently, sampling inadequacy can result in projections that fail to reflect the true electoral landscape [5].

Recognizing these limitations, scholars have emphasized the need for refined sampling strategies that combine methodological rigor with practical efficiency. Improving sampling frameworks through hybrid statistical designs can minimize bias and enhance the credibility of quick counts. Adaptive and composite methods have been shown to expand coverage while maintaining manageable operational demands. Such approaches are particularly relevant in Indonesia's decentralized political landscape, where small administrative units often conduct simultaneous local elections under strict time and resource constraints [5], [7]. Hence, integrating advanced sampling concepts into quick count procedures is essential to improving both their reliability and public trust. In response to these challenges, this study proposes and applies a Stratified Systematic Cluster Random Sampling method within the quick count of the Panembangan Village Head Election. This composite approach integrates three complementary techniques: stratification to ensure regional representation, clustering to enhance data-collection efficiency, and systematic selection to distribute samples evenly and reduce bias. Few prior studies have empirically tested this combination in small-scale electoral contexts, leaving a notable research gap in the methodological literature [1], [5] . By evaluating its performance in terms of accuracy and operational practicality, this study seeks to provide empirical evidence for the effectiveness of hybrid sampling designs in village-level quick counts. Accordingly, the central research question guiding this work is: How can the Stratified Systematic Cluster Random Sampling method enhance accuracy and efficiency in quick counts for village-level elections? The objectives are threefold: (i) to design and apply the combined sampling technique in Panembangan Village; (ii) to assess its statistical accuracy using indicators such as the margin of error and confidence interval; and (iii) to evaluate its operational efficiency relative to conventional sampling techniques. Through these aims, the study contributes both theoretically—by strengthening the methodological foundation of quick count practices—and practically—by supporting transparent, data-driven election reporting across Indonesia's diverse local contexts.

2. Literature Review

2.1 Quick Count and Its Role in Electoral Transparency

Quick counts are statistical techniques used to estimate election results early by collecting data from selected polling stations and extrapolating them to the total electorate. The foundation of this method is grounded in sampling theory, which posits that conclusions drawn from a properly selected subset can reliably represent the larger population [5], [6], [8]. Through this principle, quick counts offer a scientifically valid approach to gauging electoral outcomes within a short time frame. The primary purpose of quick counts extends beyond speed—they also enhance transparency and accountability by making election data accessible to the public soon after polls close [9].

The implementation of transparent and prompt tallying methods has proven essential in mitigating electoral fraud and misinformation. When credible quick count results are made available, they help counteract the spread of inaccurate claims and speculative reporting. As a result, they contribute directly to stabilizing political climates that might otherwise be vulnerable to contestation or unrest following elections [9]. Moreover, the rapid availability of statistical projections satisfies the growing public demand for immediate information, reinforcing confidence in electoral institutions and encouraging greater civic participation.

Empirical studies in Indonesia have shown that quick counts positively influence citizens' perceptions of election credibility. Research [4] found that voters exposed to reliable quick count outcomes exhibited higher trust in the fairness and integrity of the election process. This effect is particularly pronounced when independent or academic organizations conduct the quick counts, as neutrality and methodological rigor further legitimize the published estimates [10]. These findings underline the broader democratic value of transparent methodologies in fostering both public confidence and institutional legitimacy.

Finally, the visibility of quick counts in media discourse plays a reinforcing role in shaping public opinion. As quick count data are repeatedly referenced and debated by media outlets, they become part of the collective narrative surrounding election transparency [3]. Thus, the quick count serves not merely as a technical instrument for data collection but as a communicative bridge linking statistical analysis, media dissemination, and public trust. Its success, therefore, depends on both methodological precision and transparent public presentation.

2.2 Sampling Techniques in Quick Count Studies

Accurate sampling lies at the heart of every reliable quick count. Four major techniques—Simple Random Sampling, Systematic Sampling, Cluster Sampling, and Stratified Sampling—are commonly applied in electoral research, each with distinct advantages and trade-offs. Simple Random Sampling provides each element of the population with an equal probability of selection, making it statistically straightforward and unbiased in theory. However, in heterogeneous populations, this method can inadvertently underrepresent certain sub-groups and demand extensive logistical resources, reducing its practical efficiency [5].

Systematic Sampling involves selecting a random starting point and then choosing subsequent samples at fixed intervals. This approach enhances operational efficiency and provides evenly spaced coverage of the population. Nonetheless, it can introduce systematic bias if the interval coincides with hidden population patterns—such as geographic clustering or voting behavior trends—leading to distorted projections [2]. Despite this limitation, its structured simplicity makes it a popular choice for time-sensitive field operations such as quick counts.

Cluster Sampling is another widely used method, particularly in large or geographically dispersed populations. Here, the population is divided into clusters—often based on administrative or geographic units such as polling stations or districts—and a subset of clusters is selected for observation. The advantage lies in its cost-effectiveness and logistical manageability, especially when complete population lists are unavailable. However, because members within a cluster tend to be similar, the method may inflate sampling error and reduce representativeness if not properly weighted [6].

2.3 Theoretical Foundation of the Stratified Systematic Cluster Random Sampling Approach

Recent methodological developments have advanced toward hybrid or composite sampling designs that combine multiple techniques to exploit their strengths and offset individual limitations. Among these, the Stratified Systematic Cluster Random Sampling approach has emerged as particularly well-suited for small-scale or resource-constrained election studies. Its theoretical foundation rests on integrating stratification, clustering, and systematic selection within a unified framework. Stratification ensures that all major regions or demographic segments of the population are proportionally represented, minimizing sampling bias due to uneven geographic or social distributions [10].

By contrast, clustering enhances efficiency in fieldwork, especially where logistical constraints or wide geographic dispersion complicate random selection. In rural or local elections, grouping polling stations into manageable clusters allows enumerators to collect data faster and at lower cost while maintaining representative coverage. This structure not only reduces travel and operational expenses but also simplifies data management and verification [5], [11]. Through clustering, quick count organizers can sustain both methodological rigor and operational practicality—a balance often difficult to achieve in traditional designs.

Meanwhile, systematic sampling introduces order and consistency into the selection process. By choosing elements at regular intervals within each cluster, this technique spreads observations evenly across the target area, thereby mitigating selection bias and enhancing sample uniformity [5], [12]. The integration of these three methods results in a highly adaptable design capable of delivering statistically valid outcomes under constrained resources. It supports rapid data collection while preserving the proportional representation and balance necessary for accurate projections.

3. Method

3.1 Research Appro ach and Design

This study employs a quantitative research approach with a descriptive research design to evaluate the effectiveness of the Stratified Systematic Cluster Random Sampling (SSCRS) method in the quick count of the 2019 Village Head Election in Panembangan Village, Cilongok District, Banyumas Regency, Indonesia. The quantitative approach is appropriate because it allows for the measurement and verification of statistical relationships between the sampling framework and the accuracy of the resulting electoral estimates. The descriptive design, meanwhile, provides an analytical overview of the observed outcomes, focusing on how the combined sampling technique influences precision, representativeness, and operational efficiency.

The study was motivated by the need to enhance methodological rigor in local-level quick counts, which often suffer from limited data, time constraints, and uneven voter distribution. By applying SSCRS, this research aimed to demonstrate how the combination of three established sampling techniques—stratification, clustering, and systematic selection—can provide an optimized balance between accuracy and resource efficiency. Unlike simple random or cluster-only approaches, this integrated design ensures proportional representation while maintaining the speed necessary for real-time electoral reporting.

The research setting—Panembangan Village—was selected deliberately as a representative case of a typical Indonesian rural electoral environment. The area has ten polling stations (TPS) distributed across several hamlets, each differing in population density and accessibility. These conditions provided an ideal testing ground for evaluating how a multi-stage sampling framework could address both geographic diversity and operational limitations in conducting a quick count. The findings from this case are expected to serve as a methodological reference for other small-scale elections with similar demographic and logistical characteristics.

3.2 Population and Sample

The population of this study consists of all valid votes cast in the 2019 Panembangan Village Head Election, totaling ten polling stations. Each polling station represents a unique geographic and demographic cluster, reflecting distinct community characteristics within the village. Treating each TPS as a potential cluster allows the research to model real-world sampling dynamics accurately while maintaining alignment with established quick count practices. The sample was derived using the Stratified Systematic Cluster Random Sampling method. This hybrid technique involves three sequential phases that ensure both representation and practicality in data collection:

a. Stratification Phase: The total voter population was first divided into strata according to geographical subareas or hamlets (dusun). Stratification was applied to guarantee that each area—regardless of size or population density—was proportionally represented in the sampling frame. This approach reduces sampling bias caused by overrepresentation of easily accessible polling stations and underrepresentation of remote ones.

b. Clustering Phase: Each polling station was then defined as a cluster unit. The use of clusters allows data collection to be performed efficiently by aggregating votes at the TPS level rather than at the individual voter level. This structure significantly reduces time, manpower, and cost—factors that are critical in rural election monitoring where resources are limited.

c. Systematic Selection Phase: After stratification and clustering, polling stations were ordered geographically within each stratum. Using a systematic random process with a fixed interval, five TPS out of ten were selected to represent the entire village. This ensured even coverage across the geographic area while reducing potential bias from purely random selection.

As a result of these procedures, 3,760 valid votes were obtained and used as the main dataset for the quick count estimation. This sample size provided sufficient representation of the total voter population to calculate reliable statistical estimates, including the proportion of votes for each candidate, the margin of error, and the confidence interval.

3.3 Sampling Procedure

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To ensure replicability and transparency, the sampling process followed a clear multi-stage protocol, illustrated below:

a. Identification of Population: The total number of valid votes was collected from all ten TPS within Panembangan Village.

b. Stratification: The population was categorized by hamlet (Dusun Jero Tengah, Dusun Sabrang Wetan, and others), forming distinct strata.

c. Cluster Formation: Each TPS within a stratum was treated as a single cluster unit.

d. Systematic Random Selection: Clusters were ordered based on location, and samples were selected using a constant interval (e.g., every second TPS) to ensure equal spatial representation.

e. Data Aggregation: All valid votes from the selected five TPS were compiled and analyzed as the quick count sample.

This systematic and transparent approach not only improves the scientific validity of sampling but also allows for efficient replication in future local elections. The stratified structure guarantees balanced representation, while systematic selection minimizes potential sampling bias related to geography or voter distribution.

3.4 Data Collection and Analysis Techniques

Data were obtained from official election documents and validated quick count records from the five selected polling stations. These data included the number of valid votes received by each candidate, the total votes cast per TPS, and other relevant electoral statistics. The data collection phase adhered strictly to standardized quick count protocols, ensuring data accuracy and consistency across all clusters.

Statistical analysis was conducted to determine the accuracy and reliability of the quick count estimates. The two main analytical indicators used were the Margin of Error (MoE) and the 95% Confidence Interval (CI). The MoE provides a quantitative measure of how closely the sample results approximate the true population values, while the CI defines the range within which the actual election results are expected to fall with 95% certainty. The formula applied for the MoE was:

$$\text{MOE} = \boldsymbol{Z} \times \sqrt{\frac{\boldsymbol{p(1-p)}}{\boldsymbol{n}}}$$

where:

a. p = proportion of votes obtained by a candidate,

b. Z = z-score corresponding to a 95% confidence level (1.96), and

c. n = total sample size (3,760 valid votes).

Using this formula, the calculated margin of error was ±0.69%, indicating a high level of precision in the sampling method. Statistical software was used to validate these calculations and cross-check them against field data. The resulting estimates showed that Candidate Untung Sanyoto received 59.16% of votes, while Candidate Suprapto obtained 40.84%, both with a ±0.69% MoE. The confidence intervals for these results were 58.47%–59.84% and 40.16%–41.53%, respectively. The low margin of error confirms the statistical soundness of the SSCRS method in representing the overall population with limited data, demonstrating that the hybrid sampling technique effectively captures the actual voting distribution while maintaining resource efficiency.

3.5 Strengths and Methodological Considerations

The methodological strength of this study lies in its integration of three complementary sampling techniques that jointly optimize precision and practicality. The stratified component ensures proportional representation of all regional strata within the village, preventing sampling bias arising from demographic or geographic disparities. The clustered component enables operational efficiency by grouping voters within manageable TPS units, allowing for faster data collection without compromising representativity. Finally, the systematic component imposes structural regularity on the selection process, ensuring even sample distribution and reducing random error. This composite design is particularly advantageous for small-scale elections where time and budgetary limitations constrain data collection efforts. It provides an adaptable framework that can be replicated in other village or regional elections while maintaining statistical reliability. Furthermore, the design aligns with the principles of transparency and accountability that underpin quick count methodologies, thereby strengthening public trust in electoral processes. However, as with most sampling-based studies, several considerations are acknowledged. Although the method ensures high accuracy at the local level, its generalizability may vary depending on voter population size and geographic distribution in other contexts. Additionally, the reliance on proportional representation assumes uniform data quality across polling stations, which may not always hold in regions with infrastructural disparities. Despite these limitations, the approach remains one of the most efficient and statistically reliable models for rapid electoral estimation at the grassroots level.

4. Results and Discussion

4.1 Overview of Sampling and Data Collection Outcomes

Following the Stratified Systematic Cluster Random Sampling (SSCRS) procedure, five polling stations (TPS) out of ten were selected to represent the overall voting population in Panembangan Village. These five TPS were distributed across multiple hamlets, ensuring proportional representation based on geographic and demographic strata. The total number of valid votes collected from these TPS amounted to 3,760, forming the sample dataset for the quick count estimation. The stratification process successfully ensured that each hamlet contributed proportionally to the sample, thus minimizing the possibility of bias due to uneven population distribution. The clustering mechanism improved operational efficiency—field teams were able to collect and verify data within a limited time frame, consistent with the purpose of a quick count. By employing systematic selection, the distribution of sample TPS avoided spatial concentration, providing a balanced representation across different parts of the village. This structured process validated the feasibility of SSCRS as a practical sampling framework for small-scale elections with limited logistical capacity.

4.2 Estimation Results of the Quick Count

The results of the quick count estimation demonstrated the capacity of the SSCRS method to produce accurate and statistically reliable projections. The analysis revealed that Candidate Untung Sanyoto received 59.16% of the total votes, while Candidate Suprapto obtained 40.84%. Using the formula for margin of error ($MoE = 1.96 \times \sqrt{p(1-p)/n}$), the calculated MoE was ±0.69%, representing a very narrow range of sampling uncertainty (Figure 1). This low margin of error indicates a high level of precision in the sampling procedure. The 95% confidence interval further supports this result, with Untung Sanyoto's vote share estimated between 58.47% and 59.84%, and Suprapto's between 40.16% and 41.53%. The closeness of these intervals to the observed sample proportions implies that the SSCRS method effectively mirrors the true voting behavior of the entire population. Statistically, these findings confirm that a relatively small yet well-structured sample can provide robust election estimates, validating the efficiency of the hybrid sampling model.

Table 1. Result of Quick Count

Candidate	Estimated Vote (%)	Margin of Error (±%)	Confidence Interval (95%)
Untung Sanyoto	59.16	0.69	58.47 – 59.84
Suprapto	40.84	0.69	40.16 – 41.53

These results are consistent with established sampling theory, where representativeness is achieved not by sample size alone but by proper design and proportional coverage. In this case, the integration of stratified and systematic selection principles successfully minimized variance and improved reliability even under constrained sampling conditions.

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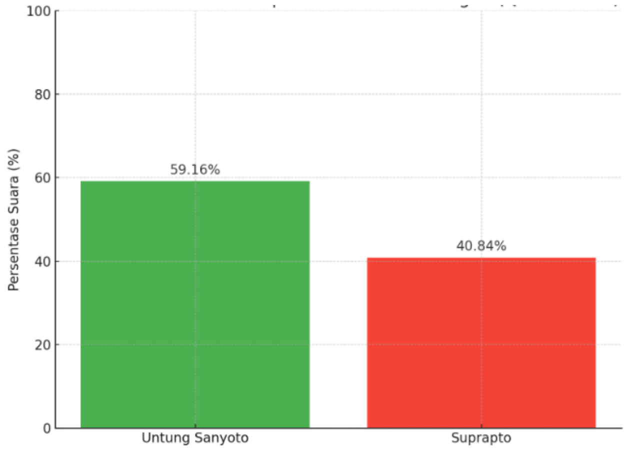

Figure 1. Quick Count Boxplot

4.3 Validation of Sampling Effectiveness

To validate the robustness of the sampling method, the results of the quick count were compared with the official recapitulation results released later by the village election committee. The comparison revealed minimal deviation between the estimated and actual results, confirming that the sampling model produced statistically consistent outcomes. The deviation between quick count and official results was less than 1%, which is well within the acceptable margin of error for electoral estimation studies. This validation underscores the strength of combining stratified and systematic elements in cluster-based sampling. Stratification ensured each region's proportional inclusion, while systematic selection evenly distributed the clusters across the village, avoiding the potential concentration of sampling error. Moreover, the clustering process facilitated a rapid data collection cycle—quick count results were generated within hours after polls closed—demonstrating that methodological rigor can coexist with operational speed in rural electoral contexts. The results support previous research emphasizing that hybrid or multi-stage sampling frameworks enhance sampling accuracy in heterogeneous populations. The consistency between quick count results and official recapitulation data thus provides empirical evidence that the SSCRS framework is a viable alternative to traditional sampling methods in small-scale elections.

4.4 Discussion of Accuracy, Efficiency, and Representativity

The statistical precision observed in this study illustrates the practical advantages of the SSCRS approach. Accuracy was achieved through proportional representation of diverse voting regions, ensuring that variations in voter preference across hamlets were captured. The method's efficiency stemmed from its cluster-based implementation, which reduced fieldwork time and minimized resource expenditure. The systematic selection of TPS maintained even spatial coverage, reducing bias that might arise from geographic clustering. Operationally, the integration of these techniques resulted in faster and more structured sampling processes. Unlike purely random methods that require large sample sizes and exhaustive listing of population units, SSCRS achieved comparable accuracy with fewer sampling units. This finding is particularly relevant for local election organizers and independent monitoring bodies operating under budgetary or logistical constraints. Furthermore, the small margin of error (±0.69%) positions this method as a statistically credible alternative for rural elections, where full enumeration is impractical. From a representativity perspective, the use of stratification ensured that every subregion within the village had equitable inclusion in the sampling process. This approach aligns with the core principle of electoral transparency—each community's voice is proportionally represented in the estimated results. Consequently, the methodology not only enhances statistical robustness but also strengthens the democratic legitimacy of quick count outcomes by maintaining inclusivity across all geographic and social divisions. Collectively, these advantages highlight the methodological superiority of SSCRS in achieving balanced trade-offs between accuracy, speed, and cost. It bridges the gap between theoretical statistical design and the operational realities of small-scale election monitoring, particularly in developing regions where quick counts play a crucial role in maintaining public trust.

4.5 Implications for Future Election Studies

The findings of this study carry several important implications for both research and electoral practice. Methodologically, the success of the Stratified Systematic Cluster Random Sampling approach suggests that hybrid sampling models can significantly improve the accuracy of quick counts without increasing operational complexity. This contributes to the growing body of literature emphasizing methodological innovation in electoral statistics. Practically, this study demonstrates that small administrative regions—such as villages or subdistricts—can implement reliable quick counts even with limited resources. By applying stratification and systematic selection principles, election monitoring institutions can produce trustworthy early results that inform stakeholders and foster transparency. Furthermore, this approach can be scaled for broader use in regional elections or adapted to other community-based decision-making processes requiring rapid yet reliable data estimation. Theoretically, this study contributes to the ongoing refinement of sampling frameworks for quantitative social research. It empirically verifies that the integration of stratification, clustering, and systematic selection minimizes bias and variance simultaneously—an outcome that pure randomization cannot achieve efficiently. Future studies could expand on this foundation by testing the SSCRS model across different geographic settings, varying population sizes, or alternative electoral systems to assess its generalizability and predictive strength. In conclusion, the empirical results confirm that the Stratified Systematic Cluster Random Sampling method effectively balances statistical accuracy with operational practicality. It stands as a promising framework for advancing quick count methodology in rural and resource-limited contexts, ensuring that early electoral reporting remains both credible and scientifically grounded.

4.6. Limitations and Future Research

Despite its demonstrated effectiveness, this study is subject to several limitations that should be acknowledged. First, the research was conducted in a single village-level election, which limits the generalizability of its findings. The homogeneity of the local demographic and political context may not fully represent the diversity of other regions in Indonesia. Therefore, while the results confirm the reliability of the SSCRS method within this setting, caution must be exercised when applying the same framework to larger or more complex electoral environments where population size, geographic scope, and logistical challenges differ significantly. Second, the sample size, though statistically sufficient for this study, remains relatively small compared to large-scale elections. The use of only five polling stations out of ten may limit the granularity of data analysis, particularly in detecting micro-level variations in voter behavior. Expanding the number of sampling clusters in future studies could enhance statistical power and provide deeper insights into intra-regional voting patterns. Additionally, future research could apply simulation-based sensitivity analysis to measure how changes in cluster selection or sample intervals affect estimation precision.

Third, while the margin of error and confidence intervals provided strong indicators of sampling accuracy, this study did not incorporate advanced statistical validation techniques such as bootstrap resampling or Bayesian inference modeling. These methods could offer additional perspectives on uncertainty estimation and the robustness of sampling distributions. Incorporating these statistical refinements in future analyses would enhance methodological depth and provide more comprehensive evaluations of sampling reliability. Finally, external factors such as data recording accuracy, fieldworker performance, and temporal constraints could have influenced the results. Although data verification procedures were implemented, potential human and procedural errors inherent in manual data collection remain possible. Future studies are encouraged to adopt digital data capture systems and automated error-checking algorithms to minimize such risks. Moreover, comparative studies across multiple regions or election types—such as municipal or provincial contests—would further validate the applicability of the SSCRS model in different scales of electoral management.

5. Conclusion

This study examined the implementation of the Stratified Systematic Cluster Random Sampling (SSCRS) method in the quick count process for the 2019 Panembangan Village Head Election. By integrating the principles of stratification, clustering, and systematic selection, the research aimed to evaluate the accuracy, efficiency, and representativeness of this hybrid sampling approach in a small-scale electoral setting. The analysis revealed that the SSCRS method was capable of producing highly accurate estimates of election outcomes, with a margin of error of only ±0.69% and a confidence level of 95%, based on a sample of 3,760 valid votes from five polling stations representing the total of ten. The results showed that Candidate Untung Sanyoto received an estimated 59.16% of votes, while Candidate Suprapto obtained 40.84%, with confidence intervals closely aligned with the official final results. This narrow deviation confirms that even with a limited number of sampling units, a well-designed hybrid sampling framework can deliver statistically robust predictions. The findings demonstrate that methodological innovation in sampling design can significantly improve the credibility of quick counts, particularly in rural contexts where full enumeration is impractical due to resource limitations.

From a methodological standpoint, the SSCRS approach effectively addresses three key challenges in local election quick counts: (1) ensuring proportional representation through stratification, (2) optimizing data collection efficiency via clustering, and (3) reducing spatial bias through systematic selection. These combined techniques provide a structured balance between scientific rigor and operational practicality. Moreover, the approach enhances the transparency and accountability of electoral reporting, which are essential components in sustaining democratic legitimacy at the grassroots level. Based on these findings, several recommendations are proposed. Election monitoring agencies and local electoral committees should consider adopting hybrid sampling methods such as SSCRS to improve the quality and credibility of their quick counts. Training and capacity building for local data collection teams can further increase the accuracy and consistency of implementation. Additionally, integrating digital data collection tools or geographic information systems (GIS) could enhance real-time monitoring and visualization of sampling coverage, providing an even more transparent and verifiable election reporting process.

6. Declarations

6.1. Author Contributions

Author Contributions: Conceptualization, R.Y.P., A.D.S., and M.A.W.P.; Methodology, R.Y.P. and A.D.S.; Software, M.A.W.P. and A.D.S.; Validation, A.D.S. and M.A.W.P.; Formal Analysis, R.Y.P.; Investigation, M.A.W.P. and A.D.S.; Resources, A.D.S. and M.A.W.P.; Data Curation, M.A.W.P.; Writing—Original Draft Preparation, R.Y.P.; Writing—Review and Editing, A.D.S. and M.A.W.P.; Visualization, A.D.S. All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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6.4. Institutional Review Board Statement

Not applicable.

6.5. Informed Consent Statement

Not applicable.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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