

Policy framework for updating and utilizing poverty data using MULTIPOL method in Bekasi Regency, Indonesia

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CHRONICLE

Article history:

Received: April 24, 2024

Received in the revised format:

July 30, 2024

Accepted: August 5, 2024

Available online:

August 5, 2024

Keywords:

Poverty data

MULTIPOL

Social welfare

ABSTRACT

Poverty is a complex and multidimensional social problem faced by almost all countries including Indonesia. Poverty alleviation efforts require accurate and up-to-date data to ensure that social welfare programs can effectively run and target appropriate beneficiaries. Bekasi Regency, as one of the regions that faces significant challenges in managing poverty, needs the right strategy in updating and utilizing poverty data to support social welfare programs. This study analyzes a policy framework for updating and utilizing the poverty data. The data were collected from focus group discussions with experts and stakeholders who were competent in updating and utilizing the poverty data. MULTIPOL method was used to analyze the data. The results of the study show that the best strategy for updating and utilizing poverty data in the scenario is to integrate scenarios with priority policy with digital budgeting policy, as well as priority actions providing incentives. This study makes an important contribution to regional development planning, especially poverty alleviation strategies based on accurate and integrative data.

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1. Introduction

The essence of development, as implemented by the government, aims to address economic, environmental, and social problems using indicators such as welfare, poverty, the human development index, and environmental quality (Sen, 1988). Poverty is a challenging problem particularly in Indonesia (Purwono et al., 2021). In general, social life is negatively impacted by poverty; it is more detrimental to friendships and family relationships than to social support, and it is more detrimental to political engagement than to organizational activities (Mood & Jonsson, 2016). The differentiation between poverty categories is significant not only for the goal of accurate poverty measurement but also for policy implications. Different policy alleviation techniques are needed to alleviate poverty (Alisjahbana & Yusuf, 2003). For instance, redistributing assets and offering fundamental human and physical capital infrastructure are acceptable strategies in a country or region where the poverty problem is typified by chronic impoverishment (Hulme & Shepherd, 2003). Similarly, if temporary poverty is the main cause of poverty, the approach would focus on offering safety nets and coping skills to lessen vulnerability and assist them in reintegrating into society. The elimination of poverty could be a major obstacle to SDGs' implementation of SDGs (Filho et al., 2021). Government policies to ease the burden of poor and vulnerable groups involve handling social welfare problems through social assistance programs (bansos) and providing safety nets for affected communities (Sumarto et al., 2005). Social protection accounts for a sizable portion (36%) of global government spending.

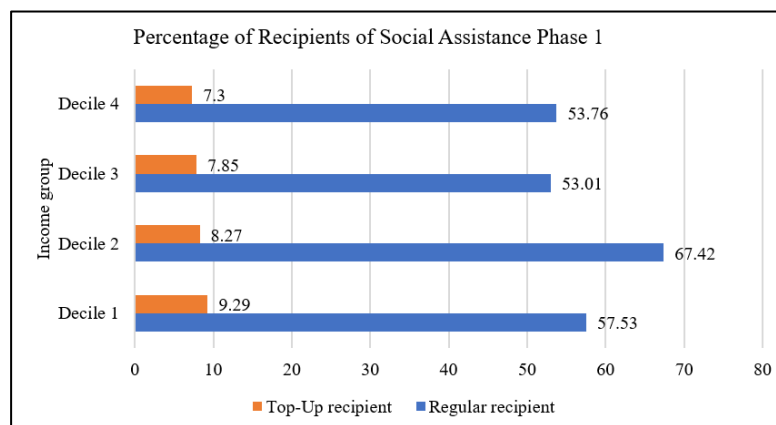
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However, low-income and middle-income nations only receive 10% of the total amount spent on social protection (Lowder et al., 2017). The most obvious finding regarding government expenditure on social protection is probably the requirement for time-series data that are measured independently for each of the three categories of social protection (i.e., social assistance, social insurance, and labor market programs)(Lowder et al., 2017). Based on the category of beneficiaries of the social assistance program, the targets of the program include individuals and/or households in Indonesia, such as rice subsidies for the poor (Raskin), National Health Insurance (Jamkesmas), Direct Cash Assistance (BLT), Poor Student Assistance (BSM), and the Family Hope Program (PKH). However, some cases in the field show that these problems cannot be solved because of a lack of information and data, leading to misguided policy implementations.

An important aspect of social protection programs is the availability of accurate poverty data. Policymakers utilizing poverty data for fund allocation and welfare program targeting should acknowledge that the data may possess greater uncertainty and error than previously suggested in the literature on poverty data and the subsequent misallocation of funds resulting from the misidentification of target beneficiaries (Tarozzi & Deaton, 2009). Moreover, the poverty line plays a crucial role in determining empirical bias in the poverty headcount ratio (Minoiu & Reddy, 2014). Accurate data can help governments to determine the beneficiaries of social protection programs and ensure that social assistance is distributed to those in need. However, the current condition regarding the validity of poverty data remains questionable. One reason is that three agencies publish poverty data: The Ministry of Social Affairs through Integrated Social Welfare Data (DTKS), the Central Statistics Agency (BPS), and the Coordinating Ministry for Human Development and Culture through the National Team for the Acceleration of Poverty Reduction (TNP2K). These three sources present different types of poverty data. For example, in 2022, the poverty data presented by DTKS in the Bekasi Regency was 1,035,382 people, while BPS reported 229,367 people and TNP2K/P3KE reported 1,317,098 people.

The Findings from the Social Assistance Program Effectiveness Survey (SEPBS) conducted by BPS in December 2021 show that the Integrated Database for Social Welfare (DTKS) is less effective in reaching the extremely poor (TNP2K, 2022). BPS through SEPBS found that the accuracy of the first phase of social assistance program interventions was still not optimal. Social assistance in the form of top-ups or meal cards was received by households from Decile 1 (the poorest 10 percent) to Decile 10 (the richest 10 percent). Only 57.53 percent of extremely poor Decile 1 people received a regular program, and 9.29 percent of extremely decile 1 families received a food card refill program by 2021 (Fig. 1).



Source: SEPBS BPS (2021)

Fig. 1. Percentage of Social Assistance Recipients in Phase 1.

The results of the SEPBS 2021 show that the intervention program is not optimal. SEPBS compares the welfare of families as of March 2021, before the top-up food card/BLT-DD intervention, with the condition of residents in December 2021 after the intervention. In March 2021, 7.24 percent of the families in the 35 priority areas were classified as very poor. The reduction in extreme poverty is only 0.18 percentage points, dropping to 7.06 percent by December 2021. Of these, 7.06 percent of the extremely poor population and 6.64 percent remained in extreme poverty from March 2021 to December 2021, and the remaining 0.60 percent were classified as very poor. During this period, 0.53 percent of families managed to escape extreme poverty from March 2021 to December 2021.

There are two factors that cause mistargeting of poverty alleviation interventions. The first is weak micro-data management, which targets extremely poor populations. In this context, the existence and accuracy of targeted data are essential for implementing extreme poverty intervention programs (BPS, 2021). Extreme poverty alleviation programs require the availability of accurate data on the hardcore poor, based on names and addresses (Kinseng, 2022). Occasionally, there is still debate regarding which agency data should be used. Villages are not free to revise data on the poor from supra-village institutions even though the data are inaccurate. Currently, several supra-village institutions collect data on the poor in their villages. Without accurate data, extreme poverty alleviation programs cannot be achieved and may fail to reduce extreme poverty rates. Second, the target group (TNP2K, 2022) was based on information on extreme poverty alleviation programs.

The phenomenon of poverty data issued by the three state institutions caused misallocation of social assistance. The Ministry of Social Affairs updates the monthly poverty data (Ministerial Regulation No. 3 of 2021). The Central Statistics Agency (BPS) updates poverty data every year, and the Coordinating Ministry for Human Development and Culture revises the poverty data on a semesterly basis. The use of various data sources has an impact on the lack of accuracy in setting social assistance goals. For example, recipients of temporary cash assistance (BST) may be considered wealthy if the estimated number of poor people is too high (overestimated), and poor people may not receive BST if the estimated number of poor people is too low (underestimated).

Errors in collecting data on the poor cause uncertainty in achieving the poverty alleviation targets. Misidentification is particularly susceptible to individual changes because poverty is dynamic. This year is classified as poor; the next year, it is classified as not poor because of the improvement in the residents' economy, and vice versa, which this year is classified as capable, and the next year is classified as poor. Owing to inaccurate and unclear data, conflicts can arise among residents, especially against officers or assessors in villages or urban environments, including village heads, who can be targeted by the anger of residents who do not receive social welfare programs.

Currently, there are currently three remaining sources of poverty data in Indonesia: Central Statistics Agency (BPS), Ministry of Social Affairs (DTKS), and Coordinating Ministry for Human Development and Culture (TNP2K), which also released data on the acceleration of extreme poverty eradication (P3KE). The disparity in data significantly affects the precision of directing social welfare to impoverished individuals (Leite, 2014). The implementation of evidence-based policies requires precise, accurate, and consistent poverty data to ensure that various assistance programs, such as social assistance, the Family Hope Program (PKH), food assistance, pre-employment, and other subsidies, effectively target the poor (Juanda, 2023a). Another difficulty in obtaining accurate poverty data is the challenge of predicting income. One approach is to predict income based on observable household characteristics and distribute transfers (Glewwe & Kanaan, 1989). Therefore, seriousness is needed to develop and update single poverty data in accordance with the mandate of Presidential Decree No. 39 of 2019 concerning One Data Indonesia. Although the One Data Indonesia policy has been in operation for four years, many challenges remain. Bappenas, as a center for coordinating poverty data sources, feels that it is not easy to do so because each ministry or institution feels that data collection has become its main task and function (Juanda, 2023b).

Harmonizing efforts to integrate poverty data from the Ministry of Social Affairs, BPS, and TNP2K are necessary to overcome differences in the definition, collection methods, and priority of poverty data that are regularly published or updated by each institution (Ramani et al., 2020). Data harmonization using this approach is difficult and tends not to succeed in obtaining accurate poverty data (Juanda, 2023b). The Integrated Database for Social Welfare (DTKS) is the primary database used to distribute social protection programs. Several studies have shown that problems in the allocation of social assistance are caused by DTKS. Based on the available data from the Ministry of Social Affairs in May 2021, the national DTKS update rate was only 19.05% for 140,483,575 people, equivalent to 26,757,147 poor people. The low level of DTKS updates has not been very effective or integrated into a database to formulate social protection policies, particularly in rural areas.

2. Literature review

Accurate and updated poverty data are essential for designing effective poverty alleviation policies and programs. This literature review explores various methodologies and approaches for updating and utilizing poverty data, focusing on both traditional and innovative techniques. It also examines challenges and strategies related to the effective use of poverty data in policymaking. Based on these methodologies, there are household surveys and population consensus. Regular household surveys, such as the Living Standards Measurement Study (LSMS), provide detailed data on income, expenditure, and living conditions. The surveys are being conducted often used to estimate poverty rates and analyze the determinants of poverty (Grosh & Glewwe, 2000). However, censuses are carried out every ten years in many countries; censuses collect comprehensive demographic and socioeconomic data, which are essential for understanding poverty dynamics at a granular level (United Nations, 2008). Many countries maintain social registries that include information on beneficiaries of social programs. These registries can be updated regularly to reflect changes in household circumstances, and are linked to poverty estimates (Leite et al., 2017). Administrative data from tax authorities and employment records can be used to track income and employment status, and provide timely updates on poverty levels (Chetty et al., 2014).

Advances in remote-sensing technology have enabled the estimation of poverty levels using satellite imagery. Studies have shown that features such as night-time lights and land-use patterns can be associated with economic activities and poverty (Jean et al., 2016). Mobile phone usage patterns and call detail records (CDRs) can be analyzed to infer socioeconomic status and mobility patterns, offering a real-time data source for poverty estimation (Blumenstock, 2016). Predictive models using machine learning can enhance the accuracy of poverty predictions by combining traditional survey data with big data sources (Engstrom et al., 2017).

There are many challenges to updating poverty data, such as incomplete data and timeliness. Surveys and administrative data often suffer from missing or incomplete information, which can bias poverty estimates (Deaton, 2018). Traditional data collection methods such as censuses are infrequent, leading to outdated information. There is a need for more frequent data updates to capture the dynamic changes in poverty levels (Chandy, 2015). Collecting and processing data, especially through large-scale surveys, is resource-intensive and requires significant financial and human resources (Ravallion, 2016). Implementing advanced data collection and analysis techniques requires specialized technical skills that may be lacking in certain contexts (Hilbert, 2016). Utilizing poverty data for policy-making through evidence-based policy. Accurate poverty data enables policymakers to design evidence-based interventions tailored to the needs of the poorest populations (Banerjee & Duflo, 2015), which helps identify and target beneficiaries for social protection programs, ensuring that assistance reaches those most in need (Hanna & Olken, 2018). Regular updates of poverty data are essential for monitoring the impact of poverty alleviation programs and adjusting strategies as needed (Khandker et al., 2010). Setting clear performance metrics and using data to track progress helps evaluate the effectiveness of policies and interventions (Bamberger et al., 2016). Engaging communities in the data collection process ensures that local knowledge and perspectives are incorporated, enhancing the accuracy and relevance of poverty data (Chambers, 1994). Public access to poverty data promotes transparency and accountability in government and donor-funded programs (Fox, 2007). Updating and utilizing poverty data is critical for effective policymaking and poverty alleviation. While traditional methods such as household surveys and censuses remain important, integrating innovative approaches such as big data and machine learning can enhance the accuracy and timeliness of poverty estimates. Addressing the challenges related to data quality, technical capacity, and ethical concerns is essential for maximizing the utility of poverty data in achieving development goals.

3. Method

3.1 Subjects of study

The study was carried out in Bekasi Regency, West Java Province, Indonesia. The research location was purposefully selected based on the phenomena of variations in poverty data from three sources: BPS, Ministry of Social Affairs, and Coordinating Ministry for Human Development and Culture. The objectives have been achieved by the utilization of MULTIPOL, which is a technique that combines multicriteria analysis and policy prospective analysis. MULTIPOL method has been used in many research fields including sustainable tourism management (Ariyani & Fauzi, 2023; Rustini, Budhi, Setyari, & Suasih, 2023), low-carbon development in the agricultural sector (Adetama et al., 2022), urban railway service sustainability (Wijayanto et al., 2022), and strategic planning in educational institutions (Gomez et al., 2020). However, studies on updating and utilizing poverty data using MULTIPOL are rare. This method identifies and evaluates a variety of criteria, policies, and actions that can be implemented in scenarios to facilitate the systematic enhancement of decision-making in the updating and utilization of poverty data. The analysis of the policy framework for updating and utilizing poverty data was conducted through a Focus Group Discussion (FGD) with 11 participants from local governments, village governments, NGOs, community leaders, and academics. The expert committee was convened to ensure that each stakeholder's opinion was given equal consideration. MULTIPOL has a dual evaluation approach for its two distinct types of assessment (Fauzi, 2019): evaluation of actions related to policies, and evaluation of policies related to scenarios.

3.2 Research stage and techniques analysis

The MULTIPOL method follows the principle of multi-criteria, utilizing scores and weights to establish a hierarchy or identify the optimal choice (Fauzi, 2019). What sets MULTIPOL apart from other multicriteria methods is its incorporation of a participatory approach, involving stakeholders in the assessment and evaluation of alternative action options or programs. This approach takes into account not only the criteria used, but also the interplay between three key components: actions, policies, and scenarios. The FGD covers four main topics: (1) evaluation criteria, which are measurable aspects determined by stakeholder evaluations; (2) scenarios, which are organized future developments designed to meet goals; (3) policies and strategies to accomplish goals; and (4) actions and potential interventions aimed at implementing policies. The MULTIPOL framework comprises several stages. The first and second stages are carried out through a participatory approach, the third and fourth stages use software, and the fifth stage presents the formulated policy strategy. The overall stages are presented in Fig. 2 (Panagiotopoulou & Stratigea, 2014). In the initial phase, the evaluation problem was defined through the utilization of a participatory approach, which included criteria (K_n), scenarios (S_i), policies (P_j), and actions (A_k). Evaluation criteria delineate the fundamental components used to ascertain the quantitative achievement of an undertaking. Evaluation criteria are fundamental for measuring the efficacy of different scenarios, programs, and policy efforts during the evaluation process. The study's criteria are outlined in Table 1.

Table 1
Criteria for updating and utilizing poverty data

Criterion	Weight	Description
Objective	5	The objectives guide the processes and methodologies employed to handle data, ensuring that it serves the intended purpose effectively and efficiently
Represent	5	Represent refers to how data is depicted or symbolized to reflect real-world entities, conditions, or phenomena accurately and comprehensibly
Trusted	5	The term trusted refers to the reliability, accuracy, and integrity of the data
Relevance	5	Relevance refers to the appropriateness and applicability of the data for its intended purpose
Up to date	5	The state of data being current, reflecting the most recent information available

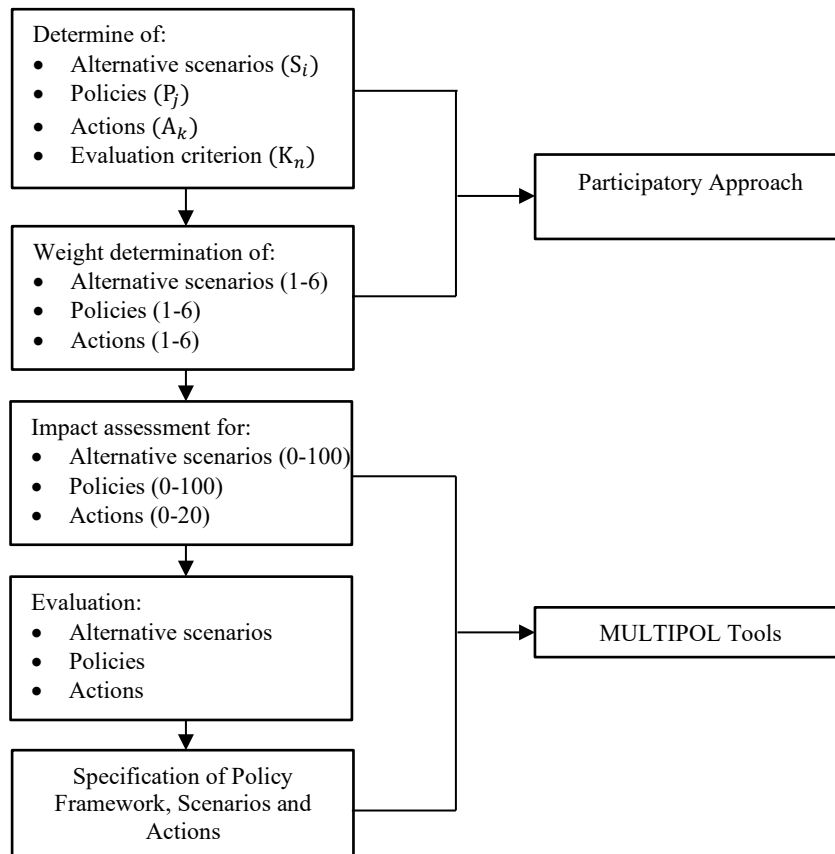


Fig. 2. MULTIPOL analysis stages

After determining the criteria, the next step is to identify the scenarios used to update and utilize the poverty data. Scenarios offer a distinct depiction of the future when the desired goals and objectives are successfully accomplished. The different scenarios derived from the outcomes of the focus group discussion (FGD) in this study are as follows: (1) top-down scenario, (2) bottom-up scenario, and (3) integrated scenario (Table 2).

Table 2
Alternative scenarios for updating and utilizing poverty data

Scenario	Weight	Description
Top-down	5	Centralized control and decision-making, where higher authorities dictate the processes, strategies, and actions to be taken based on the data, ensuring consistency and strategic alignment
Bottom-up	5	Focuses on local-level involvement and decision-making, leading to data and policies that are more reflective of and responsive to the specific conditions and needs of individual communities.
Integrated	5	Comprehensive approach that combines both top-down and bottom-up methods. This approach leverages the strengths of centralized decision-making and local-level insights to create a more robust, accurate, and actionable system for addressing poverty.

Policies outline strategies for achieving goals. Stakeholders have developed four key policies: (1) regulation, (2) digital infrastructure development, (3) capacity building, and (4) digital budgeting. Table 3 presents the suggested alternatives to the existing strategy.

Table 3
Alternative policies for updating and utilizing poverty data

Policy	Weight	Description
P1: Regulation	5	A set of rules, guidelines, and standards established by governing bodies or organizations to ensure the systematic, accurate, and ethical collection, maintenance, and use of poverty-related data.
P2: Digital infrastructure development	5	Building and enhancing the digital systems and technologies necessary for effective data collection, processing, storage, and dissemination.
P3: Capacity building	5	Enhance the skills, knowledge, resources, and capabilities of individuals, organizations, and communities involved in the collection, management, analysis, and application of poverty-related data.
Q4: Digital budgeting	5	Outlines the allocation, management, and monitoring of financial resources using digital tools and technologies to support the effective collection, processing, analysis, and application of poverty-related data.

Action refers to a series of steps and interventions that are designed to facilitate policy implementation. Table 4 outlines ten distinct plans for updating and utilizing the poverty data:

Table 4
Alternative actions for updating and utilizing poverty data

Action	Description
A1: Community empowerment	Involves actively engaging and empowering local communities to participate in and benefit from data processes, fosters community ownership and responsibility, and ensures that data-driven decisions are informed by local knowledge and priorities.
A2: Government enumerator	Trained to use standardized data collection tools and methodologies to ensure consistency and accuracy across different regions and populations. Enumerators play a critical role in bridging the gap between data collection and its practical application in policy and program development.
A3: Data center	Managing a data center involves complex technical tasks, including network management, server maintenance, and data integration.
A4: Collaboration	The cooperative efforts among various stakeholders—such as government agencies, non-governmental organizations (NGOs), academic institutions, private sector entities, and local communities—to enhance the accuracy, relevance, and effectiveness of poverty-related data. Collaboration ensures a multi-faceted approach to data collection, analysis, and application, leveraging the strengths and resources of different organizations.
A5: Incentives	Motivate and encourage stakeholders, including data collectors, analysts, government officials, NGOs, community members, and other relevant parties to actively participate in and contribute to the processes of data collection, management, and application. Incentives are designed to enhance engagement, ensure data quality, and foster a collaborative environment.
A6: IT facilities development	Establishment and enhancement of technological infrastructure and resources.
A7: Social media	Utilizing social media platforms to crowdsource data, running campaigns to engage the public and encourage participation in data collection efforts, and collecting feedback from the community on existing data and findings to validate and enhance the accuracy and relevance of the data.
A8: Data awareness	Educate and inform various stakeholders, including the public, policymakers, community leaders, and organizations, about the importance of accurate and comprehensive poverty data.
A9: Verification	Verify and validate the data collected to ensure its accuracy and reliability, often by cross-checking with other sources or conducting follow-up visits.
A10: Data analyst	Conducting detailed analyses using statistical methods, data mining techniques, and machine learning algorithms to extract insights and identify key factors influencing poverty. Data analysts play a crucial role in transforming raw data into actionable information.

The participative technique seeks to comprehend priorities by assigning weights based on the outcomes of interactions or agreements among stakeholders in focus group talks (Panagiotopoulou & Stratigea, 2014). Each weight for criterion, scenarios, and policies is set to five, with variations determined by the individual scores of scenarios and policies against criteria, as well as actions against criteria. The implementation of MULTIPOL evaluation uses two types of evaluations: (1) action evaluation related to policy, Assessing the relative efficiency of policies and selecting activities based on their performance across various policies, and (2) policy evaluation related to scenarios, evaluating the relative effectiveness of policies in each scenario. Policy plan formulation involves the creation of a policy framework, which includes a set of scenarios and specific actions in the form of potential policy routes. These policy pathways are policy alternatives and activities that help achieve the targets and objectives outlined in each scenario.

4. Results and discussion

4.1 Evaluation of Actions Related to Policies

The average score quantifies the collective effectiveness of each activity in relation to the policy, whereas the standard deviation signifies the responsiveness of each action to the policy (Stratigea, 2013). Generally, the best performance is indicated by a high average score and low standard deviation. The combination of these two indicators is shown by the action's placement inside the hierarchy: the higher the position number, the better is the performance of that action. However, actions with a relatively high standard deviation can also have a relatively better position as long as they are supported by a high score for a particular policy. According to the findings of the data analysis, the three acts that received the highest rankings were providing incentives, developing IT facilities, and community empowerment.

The ranking of action evaluations against policies was based on the average scores, from highest to lowest. The evaluation results presented in Table 5 illustrate the influence of offering incentives (A5) to encourage the updating and utilization of poverty data in regulatory (P1) and digital budgeting (P4) policies. Meanwhile, the action of developing IT facilities (A6) is dominant in the digital infrastructure development policy (P2), and the action of community empowerment (A1) excels in the capacity building policy (P3). These action evaluations of policies are illustrated in a graphical profile map (Fig. 3).

Table 5
Evaluation score of actions related to policies

Action/Policy	P1: Regulation	P2: Digital Infrastructure Development	P3: Capacity building	P4: Digital Budgeting	Moy	Ec. Ty	Number
A1: Community empowerment	13.8	13.7	14	13.8	13.9	0.1	8
A2: Government enumerator	9.6	9.5	10.1	9.7	9.7	0.2	2
A3: Data center	13.4	13.6	13.2	13.8	13.5	0.2	7
A4: Collaboration	12.1	12	12.6	12.2	12.2	0.2	6
A5: Incentives	14	14	13.9	14.3	14.1	0.1	10
A6: IT facilities development	13.8	14.1	13.8	14.2	14	0.2	9
A7: Social media	9.8	9.3	9.7	9.5	9.6	0.2	1
A8: Data awareness	9.9	9.7	9.6	9.9	9.8	0.1	3
A9: Verification	10.5	10.2	10.1	10.4	10.3	0.2	4
A10: Data analyst	11.1	11	11.4	11.2	11.2	0.2	5

Source : MULTIPOL analysis output

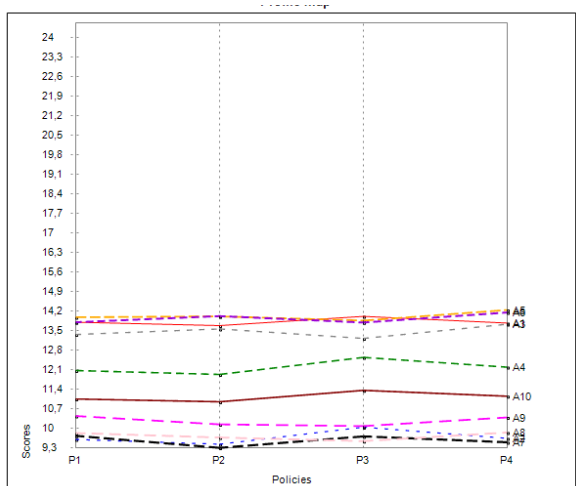


Fig. 3. Profile map Action to Policy

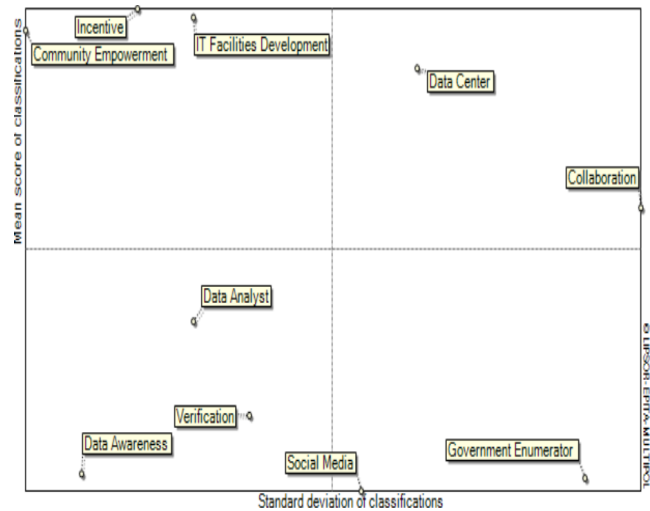


Fig. 4. Classification sensitivity map Action to Policy

Based on Fig. 3, the data processed in Table 5 was used to create MULTIPOL analysis results in the form of a profile map, revealing the relevant relationships between actions and policies. The action of providing incentives for updating and utilizing poverty data excelled in regulation and digital budgeting policies, with an average score of 14.1. The development of IT facilities is dominant in the digital infrastructure development policy with a score of 14, while the action of community empowerment excels in the capacity building policy with a score of 13.9. The relationship between the average scores and standard deviations of the actions is depicted in the classification sensitivity map (Fig. 4). It can be seen that the three actions with the highest scores and low standard deviations are located in the upper left quadrant. The correlation between actions and policies is demonstrated by the closeness map, which visually represents the connection between actions and policies (Fig. 5):

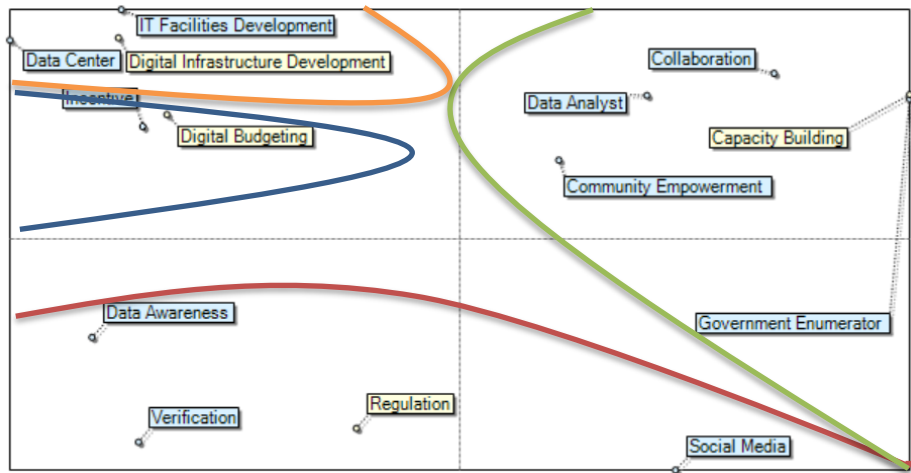


Fig. 5. Action/policy closeness map

- 1) Regulation policy (P1): The acts that are being performed most closely related and relevant include increasing stakeholder awareness of the importance of poverty data (A8), improving the quality of poverty data verification (A9), and encouraging the community to provide valid data and information through social media (A7).
- 2) Digital infrastructure development policy (P2): The actions that are most closely associated and pertinent are developing IT facilities (A6) and establishing a poverty data center (A3).
- 3) Capacity building policy (P3): The actions that are most closely related and relevant are enhancing the capacity of government enumerators (A2), increasing collaboration among stakeholders (A4), improving the quantity and quality of data analysts at both central and local levels, including in rural areas (A10), and strengthening community empowerment in data collection and utilization of poverty data (A1).
- 4) Digital budgeting policy (P4): The most closely related and relevant action is providing incentives for updating and utilizing poverty data (A5).

Adequate budgeting is essential to support updating poverty data because it allows the government or related agencies to conduct surveys and research, invest in technology and infrastructure, finance data processing and analysis, and conduct necessary monitoring and evaluation. Without adequate funding, efforts to update poverty data may not be carried out effectively, thus reducing the ability of the government or related agencies to formulate effective policies in the fight against poverty.

A coordinated approach or mechanism at the village level will function sustainably if the APBD fund incentive mechanism is applied in managing the update and maintenance of the poverty database (Juanda, 2023a). As an evidence-based policy in updating poverty data, incentives can be regulated through the allocation of at least 10 percent of the General Allocation Fund (DAU) and Revenue Sharing Fund (DBH), or at least 10 percent of profit sharing to villages. It is then associated with the performance of updating poverty data in each village which is coordinated and determined by the regional government. Similarly, the mechanism of financial assistance from provinces to villages can be linked to the performance of updating poverty data or social records.

The scheme of updating data for poverty involves the head of the RT/RW or local residents who have received training. Essentially, all assistance that goes to villages from the government (Central, Provincial, Regency/City), as well as from the private sector, must be reported to the database in each village by including the Population Identification Number (NIK) and Family Number (KK). The NIK consists of 16 digits that include the area code of the province, regency/city, and sub-district where a person lives when registering for an ID card, as well as the date, month, and year of birth, and the NIK issuance number, in order. This process is carried out online, and the NIK is valid for life, does not change, and does not follow a change in domicile. The NIK is issued after recording the biodata of the residents, which is the basis for the issuance of the KK, KTP, and civil registration documents by the local Population and Civil Registration Office. As a result, residents classified as capable or poor can be monitored periodically so that the government can implement its various programs in an integrated and more efficient manner (Juanda, 2023a).

Villages can enhance their infrastructure and human resources by utilizing additional sources of revenue from village fund allocations, such as the General Allocation Fund (DAU) and Revenue Sharing Fund (DBH) incentives. These funds can be used for personnel training and upgrading technological facilities that aid in the data collection process. Through budget efficiency policies with incentives, the government can increase efforts to update poverty data more effectively, improve data quality, and encourage local governments to participate actively in poverty alleviation. The implementation of this policy is expected to produce more accurate and reliable poverty data, support village development planning, and ensure that poverty alleviation programs are run effectively and efficiently.

This may be because of the importance of a strong infrastructure to support the various activities and programs carried out

by the organization or entity being evaluated. Infrastructure plays an important role in updating poverty data by providing a strong foundation for accurate and relevant data collection, processing, and analysis. Some of the reasons why infrastructure is an important element in efforts to update poverty data include the following:

1. **Accessibility:** Adequate infrastructure allows researchers and field workers to reach a wide range of communities, including remote and hard-to-reach areas. Good roads, reliable public transportation, and extensive Internet access ensure that no society is isolated from the data update process. With easy access, surveys can be used to cover a wider and more representative population.
2. **Technology:** Modern infrastructure facilitates the use of technology for data collection and processing. For example, mobile devices, digital survey apps, and online data management systems accelerate the update process and reduce manual error. This technology also allows for deeper and more accurate data analysis, resulting in more valuable information for policymakers.
3. **Data Quality:** Reliable infrastructure helps maintain the quality of the generated data. Stable electricity is required to keep electronic devices and computers operational. Meanwhile, a good communication network ensures secure and smooth data transfer between various points from the field to the data center. With good infrastructure, the risk of data loss or damage can be minimized.
4. **Community Engagement:** An adequate infrastructure allows for better community involvement in the data update process. By building local capacity, such as training local citizens to become surveyors, infrastructure creates opportunities for active community participation. This not only improves the accuracy of the data but also strengthens the bond between the community and the institutions responsible for data updates.
5. **Policy Analysis:** A good infrastructure provides a solid foundation for in-depth data analysis, which is an essential basis for effective policy decision-making. With regularly updated and accurate data, policymakers can identify trends, analyze the impact of existing policies, and design more effective and targeted intervention strategies to reduce poverty.

Therefore, infrastructure plays a key role in supporting the updating of poverty data by facilitating better access, use of technology, and community engagement as well as ensuring optimal data quality for better policy analysis. Furthermore, data centers are essential for providing the necessary infrastructure to store, manage, and access the data needed to support various activities and programs. The development of data centers, in the context of digitization and increasingly complex data management, is very important for providing the information technology infrastructure needed to store, manage, and access data that supports various activities and programs. With data center action, the government can establish consistent standards and procedures for collecting, processing, and reporting poverty data. This helps ensure the consistency and accuracy of the integrated data, making the information used for analysis and decision-making more reliable. With integrated data available in data centers, governments can conduct a more comprehensive analysis of poverty and its influencing factors. This analysis can identify patterns, trends, and relationships among different variables, providing deeper insights for policy planning. Data centers provide a secure environment for storing poverty data, including protection against unauthorized access or the leakage of sensitive information. With data center policies that regulate data security standards, the government can ensure that information about poverty remains well-protected. With a structured data center, the government can respond to changes or the urgent need to update poverty data more quickly.

Integrated data enables more effective and accurate decision-making in human resource allocation, as well as strategic planning for rural community development. Integrating updated poverty data is crucial in this process, because up-to-date data provide an accurate picture of poverty levels and profiles of communities in need. Integrated and real-time data enable timely decision-making and responsive actions to poverty dynamics. Data center policies are important for integrating poverty data updates because they facilitate integrated, consistent, and efficient data management. Through data center development, organizations can ensure that the necessary IT infrastructure is adequately available to support strategic infrastructure development goals.

4.2 Evaluation of policies related to scenarios

Based on Table 6, the two policies have the highest scores for updating and utilizing poverty data: the digital budgeting policy (P4) in the integrated scenario (S3) followed by the capacity building policy in the bottom-up scenario (S2). Among the three scenarios, the digital budgeting policy (P4) had the highest average score of 20.3, followed by the digital infrastructure development policy (P2), with an average score of 20.2. The analytical results indicate that the scores of the integrated scenario (S3) are higher than the scores of the top-down (S1) and bottom-up (S2) scenarios.

Table 6
Evaluation score of policies related to scenarios

Policies/Scenarios	S1: Top-down	S2: Bottom-up	S3: Integrated	Moy	Ec. Ty	Number
P1: Regulation	19.6	20.5	20.2	20.1	0.3	2
P2: Digital infrastructure development	20.3	19.9	20.5	20.2	0.3	3
P3: Capacity building	19.1	20.6	20	19.9	0.6	1
P4: Digital budgeting	20	20.2	20.7	20.3	0.3	4

Source : MULTIPOL analysis output

The subsequent analysis compared each policy with the same policy in different scenarios. The regulation policy (P1) excels in the bottom-up scenario, whereas the digital infrastructure development policy (P2) excels in the integrated scenario. Similarly, the capacity building policy (P3) performs best in the bottom-up scenario, and the digital budgeting policy (P4) excels in the integrated scenario. On average, the digital budgeting policy (P4) had the highest average score compared with the other policies across all scenarios.

The scenario analysis results show that in the top-down scenario (S1), the highest scores are for the digital infrastructure development policy (P2) with a score of 20.3 and the digital budgeting policy (P4) with a score of 20. In the bottom-up scenario (S2), the highest policy scores are for the capacity building policy (P3) with a score of 20.6, and the regulation policy (P1) with a score of 20.5. In the integrated scenario (S3), the highest scoring policies were the digital budgeting policy (P4) with a score of 20.7, and the digital infrastructure development policy (P2) with a score of 20.5 (Fig. 6).

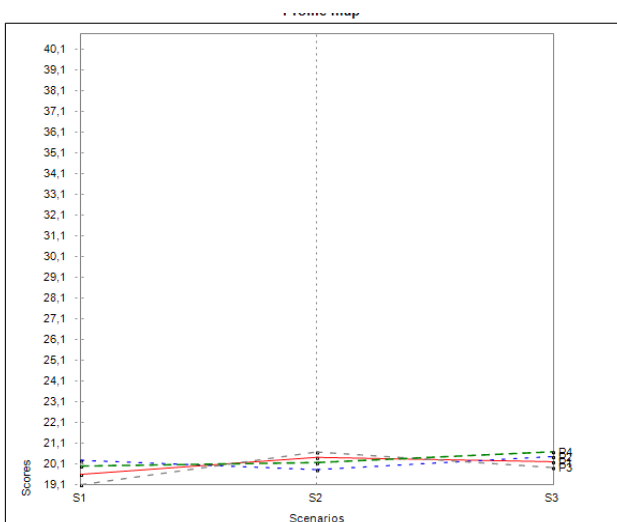


Fig. 6. Profile map Policy to Scenario

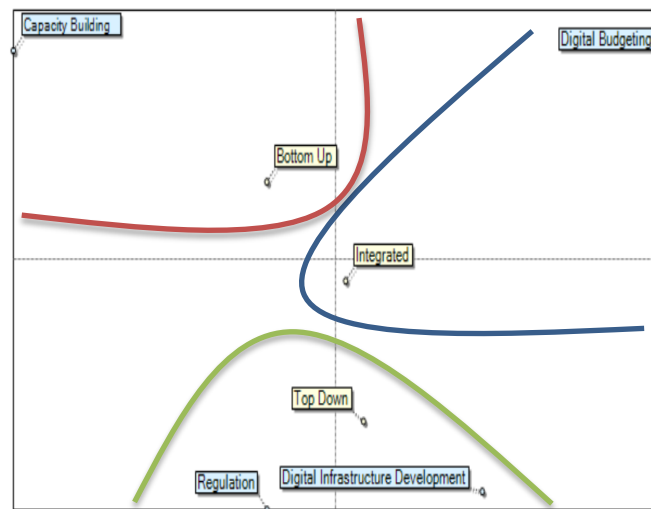


Fig. 7. Policy/scenario closeness map

A closeness map of the scenarios and policies is shown in Fig. 7. Based on the closeness relationships, the results show that the regulation policy (P1) and digital infrastructure development policy (P2) are more relevant or closely related to the top-down scenario (S1). The capacity building policy (P3) is more relevant to the bottom-up scenario (S2). In the integrated scenario (S3), the relevant policy was the digital budgeting policy (P4).

3.3 Policy Framework for Updating and Utilizing Poverty Data

According to Panagiotopoulou and Stratigea (2014) in Fauzi (2019), the comprehensive outcomes of the MULTIPOL research can be expressed as prospective policy trajectories attained by implementing various policies and scenarios. Potential policy pathways are determined based on a combination of scenarios, policies, and programs that are best suited for implementation. The best actions for a particular policy are identified, and the policy is then connected to the scenario that represents the best strategy for achieving the objectives (illustrated in Fig. 8).

Within the policy framework outlined in Figure 8 for updating and exploiting poverty data, the top-down scenario can be enacted through the implementation of policies focused on digital infrastructure development and digital budgeting. In this scenario, emphasis is placed on prioritizing policies related to digital infrastructure development. This is analogous to the integrated scenario; however, digital budgeting policies take precedence in the integrated scenario. In the bottom-up scenario, the course is determined by implementing capacity-building policies and enhancing the regulatory measures.

Data-based village development efforts can be conducted using village funds and various legitimate funding sources. The development policy involves a financial regulation mechanism between the central, regional, and village governments. Transfers to villages are used for village development activities, funded with a minimum of 10% of regional revenue sharing (regional taxes and levies), at least 10% of the Village Fund Allocation (ADD) from the revenue sharing fund (DBH) and general allocation fund (DAU), and Village Funds (DD) transferred from the State Budget.

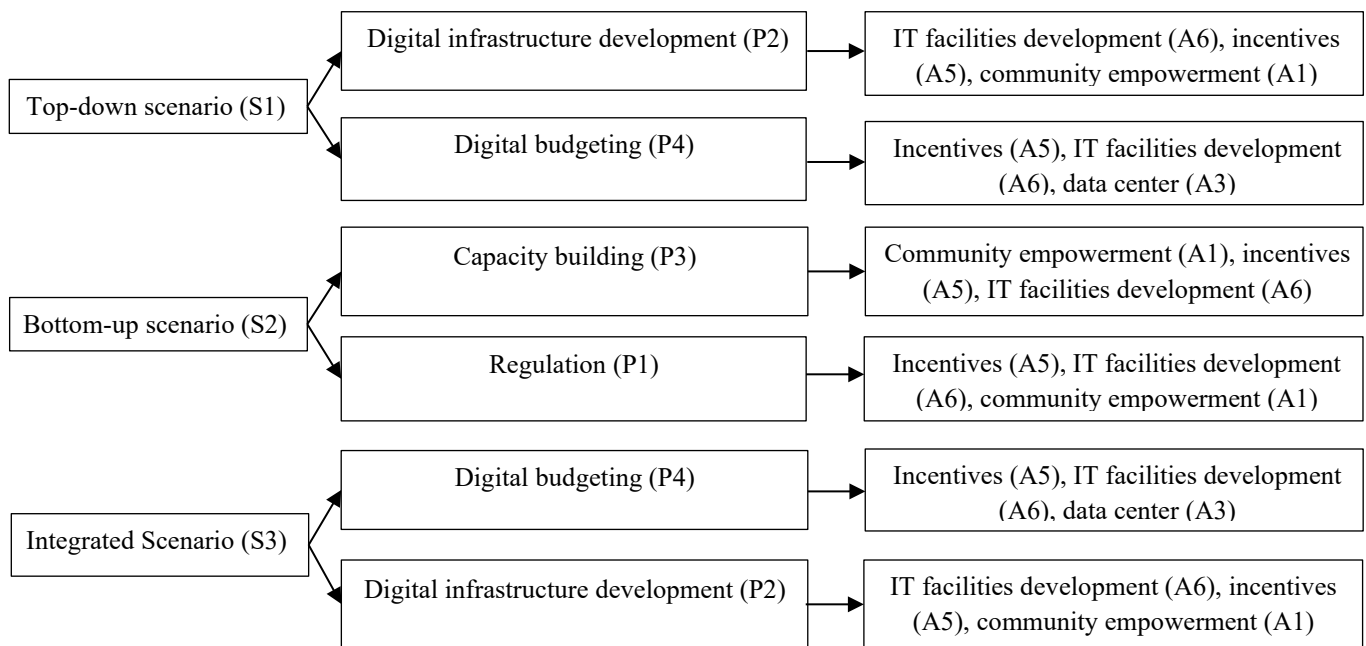


Fig. 8. Policy framework through scenario, policy, and action for updating and utilizing poverty data

5 Conclusion

The strategy for updating and utilizing poverty data had the highest average score in the integrated scenario (S3) compared to the top-down (S1) and bottom-up (S2) scenarios. The policy alternative that received the greatest score among the three scenarios was the digital budgeting policy (P4). The results show that the action with the highest score provides incentives (A5). Additional actions that received high ratings following the provision of incentives included the establishment of digital infrastructure, buildup of data centers, and the promotion of community empowerment. The comprehensive scenario promotes the need for higher-level governments to improve digital infrastructure and allocate funds for updating and utilizing poverty data. It also aims to motivate local governments to focus on community empowerment and to develop their capabilities. The results can be considered when planning the updating and utilization of poverty data. Therefore, future policy implications include increasing financial incentives for village governments to updating and utilizing village poverty data. The allocation of Village Funds (ADD) is at least 10% of the General Allocation Fund (DAU), and the Revenue Sharing Fund (DBH) from taxes or regional levies, at least 10%, can be implemented through an incentive mechanism. Budget allocation can be determined based on the performance of the village government in updating and utilizing village poverty data, with an equal distribution if the conditions of the village are relatively similar or based on the portion of the result. This mechanism allows for fair distribution of funds and encourages high-performing villages to receive greater incentives.

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