JOURNAL OF CULTURAL ANALYSIS AND SOCIAL CHANGE

Journal of Cultural Analysis and Social Change,
2025, 10(4), 331-343
ISSN: 2589-1316

Model for Developing Technology-Based Extreme Poverty Data Collection in Semarang City

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Citation: Krisseptianna, Setiyono, B., Yuwanto, & Martadi, N. S. D. (2025). Model for Developing Technology-Based Extreme Poverty Data Collection in Semarang City. *Journal of Cultural Analysis and Social Change*, *10*(4), 331–343. https://doi.org/10.64753/jcasc.v10i4.2814

Published: December 4, 2025

ABSTRACT

This study aims to examine the technology-based extreme poverty data collection model to improve the accuracy and effectiveness of the Extreme Poverty Eradication Acceleration Program (P3KE) in Semarang City. Along with the complexity and dynamics of the socio-economic development, accurate and integrated extreme poverty data collection is key to determining targeted policies in Semarang City. However, challenges such as data inaccuracy, information fragmentation between regional apparatuses in Semarang City and other institutions, limited technological infrastructure, and low digital literacy among the community are still significant obstacles. This study uses a qualitative approach with case study methods and in-depth interviews to explore the effectiveness of using technology in extreme poverty data collection. The results of the study show that the integration and synchronization of data systems between regional apparatuses in Semarang City, the use of Big Data technology, and mobile applications for field data collection can significantly improve the quality and speed of data collection. In addition, regular data updates, community participation in the data collection process, and the application of a multidimensional approach to poverty are important factors that support the increase in the accuracy and effectiveness of the P3KE program. This study recommends the development of an integrated and synchronized database system in real time, optimization of the use of digital technology, and increasing human resource capacity through digital literacy training. In addition, collaboration with the private sector and non-governmental institutions is also identified as a strategy that can accelerate the eradication of extreme poverty. With the implementation of policies based on technology and innovation, it is hoped that the P3KE Program can run more effectively in reducing the level of extreme poverty in Semarang City.

Keywords: Extreme Poverty Data Collection, Digital Technology, P3ke, Data Accuracy, Semarang City.

INTRODUCTION

Extreme poverty is a global challenge faced by many countries, including Indonesia. This condition not only affects the economic aspect but also impacts access to basic services, education, health, and social welfare (Sutter et al., 2019; Kamruzzaman, 2021; Emara & Moheildin, 2020). Based on the global commitment in the Sustainable Development Goals (SDGs), the eradication of poverty in all its forms by 2030 is one of the main priorities. In Indonesia, the Government has set a target to eradicate extreme poverty by 2024 through various strategic programs, one of which is the Targeting for the Acceleration of the Eradication of Extreme Poverty (P3KE).Curious about Accelerating the Eradication of Extreme Poverty (P3KE)is a program of the Indonesian

Government that aims to accelerate the eradication of extreme poverty throughout Indonesia, with the main target being people living below the poverty line. This program is designed as part of the national strategy to eradicate extreme poverty by 2024.

In the P3KE program, the importance is emphasizedaccurate data collectionas a basis for formulating more targeted policies and interventions. This program aims to map the social and economic conditions of the community in more detail so that social assistance, empowerment programs, and economic interventions can be provided to the groups most in need. This approach uses digital technology and an integrated database to minimize errors in data collection, such as data duplication or inaccuracy of targeting. Semarang City, as the capital of Central Java Province, faces serious challenges in managing extreme poverty data. Accurate and up-to-date data is essential to support the implementation of poverty alleviation programs effectively. However, various problems, such as data duplication, limited access to technology among the poor, and poor coordination between government agencies, have become obstacles in efforts to improve the targeting accuracy of the P3KE program. In this context, the Technology-Based Poverty Data Development Model is key to ensuring the accuracy and effectiveness of interventions.

Table 1. Extreme Poverty (EC) Data for 2021-2023 in Semarang City

Year	Version	KE Number	Information
2021	BPS	0.42%	Not Yet By Name By Address
2022	BPS	0.61%	Not Yet y Name By Address
2023	National Population and Family Planning Agency	6.06%	Already By Name By Address, comes from the BKKBN Family Data Collection Program
	Semarang City Government	0.2036 %	Already By Name By Address Comes from the BKKBN Family Data Collection Program, 2021 data that has been verified by the sub-district

Current developments in digital technology, such as real-time integrated and synchronized databases, offer great potential to support more efficient, transparent, and reliable data collection processes. The use of digital technology can accelerate the process of collecting, validating, and analyzing data in real time, allowing governments and stakeholders in the eradication of extreme poverty to formulate more targeted and evidence-based policies (Brady & Parolin, 2020; Meyer et al., 2021).

Semarang City faces a major challenge in overcoming extreme poverty, where the efforts that have been made have not been able to provide a significant impact on reducing poverty rates. One of the main obstacles faced is the limited availability of accurate and real-time data on the conditions of the extreme poor. So far, the manual data collection system often produces information that is inaccurate, not up-to-date, and tends to be duplicated, making it difficult for the government to determine policies that are right on target. As a result, many social assistance programs do not reach recipients who actually need them or experience delays in their distribution. This causes efforts to eradicate extreme poverty to be ineffective and protracted.

The urgency of developing a technology-based extreme poverty data collection model in Semarang City is very high, considering the importance of valid, accurate, and quickly accessible data by various related parties in the policy planning process. Information and communication technology offers a solution to overcome these problems by enabling more efficient data collection, analysis, and dissemination, as well as updating information regularly (Parolin & Brady, 2019; Creamer et al., 2022; Shrider et al, 2021). By using a technology-based system, extreme poverty data can be integrated from various sources, minimizing errors and providing a more comprehensive picture of the real situation on the ground (Sullivan & Hickel, 2023; Wollburg et al., 2023; Jafino et al., 2020).

This research is also urgent in the context of the increasingly developing digital era, where digital transformation in public services has become a necessity, no longer an option. Semarang City, as one of the big cities in Indonesia, has the potential to be a pioneer in implementing a more sophisticated and integrated technology-based data collection system. With this development model, policies taken by the government can be more responsive to changing conditions in society, accelerate the process of eradicating extreme poverty, and support inclusive and sustainable development. Therefore, this research is expected to provide a significant contribution to efforts to overcome extreme poverty in Semarang City by prioritizing the use of technology as the main solution.

This study focuses on efforts to optimize the Development of extreme poverty data collection in Semarang City with the aim of increasing the accuracy and effectiveness of P3KE program data collection. Through this study, it is expected to identify key factors that influence the success of technology implementation in the Development of poverty data collection, as well as provide a formulation of extreme poverty data collection that can help Semarang City achieve the target of eliminating extreme poverty. Given that currently Semarang City is

preparing the Regional Long-Term Development Planning (RPJPD 2025-2045) and the Regional Medium-Term Development Planning (RPJMD 2025-2029). Including the planning of the extreme poverty eradication program in Semarang City.

LITERATURE REVIEW

Understanding Extreme Poverty

Poverty is closely related to the condition of primary needs or basic family needs, which we know so far include clothing, shelter (house), and food (food and drink). But currently some experts include education and health into primary needs. The reason is, education and health are very necessary to meet clothing, shelter, and food. Without both, the fulfillment of the three is difficult to do. The inability to meet these primary needs is poverty. Poverty can be said to be a very concerning social condition.

In accordance with the Decree of the Minister of Social Affairs of the Republic of Indonesia Number 262/HUK/2022 concerning the criteria for the poor, there are 9 criteria for the poor, namely:

1. A person does not have a shelter/daily residence
2. Head of family or family caretaker who does not work or does not have a fixed income
3. Ever worried about not eating or have not eaten in the past year
4. Food expenditure is more than half of total expenditure
5. No expenditure on clothing during the last 1 year
6. Most of the dwellings have dirt or plastered floors.
7. Most of the dwellings are made of bamboo, wire, wooden planks, tarpaulin, cardboard, unplastered walls, thatch, or zinc.
8. Not having their own toilet or using a community toilet
9. The lighting source comes from electricity with a power of 450 watts or non-electricity.

Extreme poverty is a condition of inability to meet basic needs, namely the need for food, clean drinking water, proper sanitation, health, housing, education, and access to information that is not only limited to income, but also access to social services (UN, 1996). So it can be said thatExtreme povertyem is the most severe form of poverty, involving an acute lack or even complete absence of basic human needs.

A person is categorized as extremely poor if their daily living expenses are below the extreme poverty line; equivalent to USD 1.9 PPP (Purchasing Power Parity). PPP is determined using an "absolute poverty measure" that is consistent across countries and over time. Or in other words, a person is categorized as extremely poor if their expenses are below IDR 10,739/person/day or IDR 322,170/person/month (BPS, 2021). So, for example, in 1 family consisting of 4 people (father, mother, and 2 children), they have the ability to meet their expenses equivalent to or below IDR 1,288,680 per family per month (BPS, 2021).

Table 2. Differences between Extreme Poverty and Ordinary Poverty (based on income)

Information	National Extreme Poverty	National Poverty
Expenditure/person/day	Rp. 10,739	Rp. 15,750
Expenditure/person/month	Rp. 322,170	Rp. 472,525

(Source: BPS, 2021).

Extreme poverty is part of the poor population, because they live below the national poverty line. The extreme poverty line is agreed upon by countries that are members of the UN and its measurement is carried out by the World Bank. In Indonesia, the extreme poverty line is determined by BPS. Determination of priority areas for accelerating the eradication of extreme poverty in 2022-2024 is based on the district/city extreme poverty index by considering: a. districts/cities with high levels of extreme poverty; and b. districts/cities with a high number of extremely poor people; (Referring to the decree of the Coordinating Minister for PMK No. 25 of 2022).

Discussing extreme poverty in Indonesia cannot be separated from national development planning, both long-term and medium-term. Some of these planning documents are mandatory planning of development direction and policy direction from the government in a structured manner to the regional government. So that it needs to get attention and become a guideline in the context related to extreme poverty.

National Long-Term Development Plan (RPJPN) 2025-2045: Vision of Golden Indonesia 2045,is a strategic roadmap prepared by the Indonesian government to achieve long-term development goals and realize the visionIndonesia Gold 2045. RPJPN among others carries social and economic transformation as an important foundation in advancing Indonesia to become a developed, inclusive, highly competitive, and sustainable country. The main target of social and economic transformation among others is to make Indonesia one of the five largest economies in the world, with a high level of community welfare and global competitiveness.

National Medium-Term Development Plan (RPJMN) 2025-2029: Initial Stage Towards Advanced Indonesia,is the first milestone in the implementation of the 2025-2045 RPJPN and is the initial step for Indonesia to begin the social and economic transformation planned for the next 20 years.Main Targets in Social and Economic Transformation in RPJMN 2025-2029One of which isPoverty Alleviation and Improving Community Welfareby targeting the elimination of extreme poverty, increasing social welfare, and providing productive employment. With these targets, the 2025-2029 RPJMN will be the foundation for realizing the long-term goals of the 2025-2045 RPJPN, namely achievingIndonesia Gold 2045, with a prosperous, just and highly competitive society at the global level.

Central Java Regional Long-Term Development Plan (RPJPD) 2025-2045,is a strategic document that sets the direction and targets for long-term development in line with the 2025-2045 RPJPN, with a focus on social and economic transformation aimed at improving the welfare of the Central Java community and strengthening regional competitiveness.Key Goals in Social and Economic Transformationincluding onImproving the Quality of Human Resources (HR)through Human Resource Development by increasing access to education and vocational training that is relevant to the needs of the labor market. Focus on quality education and skills training to face changes in technology and the global economy. AndHealth and Social Welfare Developmentto improve access and quality of health services and social security for the community in order to improve the quality of life.

Regional Medium Term Development Plan (RPJMD) 2025-2029,is a medium-term implementation of the 2025-2045 RPJPD that identifies specific targets and strategies for the next five-year period. This RPJMD focuses on achieving concrete results in various sectors to support the long-term vision of Central Java development.Main Targets in Social and Economic Transformation in RPJMD 2025-2029including includingPoverty Alleviation and Prosperity Improvementthrough programs to reduce poverty and improve the quality of life of the community, including more effective distribution of social assistance and empowerment of the local economy. Focus on areas with high poverty rates and development of programs that target vulnerable groups.

Regional Long Term Development Plan (RPJPD) 2025-2045Semarang City is a strategic document that sets the direction and targets of long-term development. This RPJPD aims to direct the city's social and economic transformation towards a vision of an inclusive, highly competitive, and sustainable city until 2045.Main Targets in Social and Economic Transformation in RPJPD 2025-2045including includingImproving the Quality of Life and Community Welfarewhich focuses on improving access and quality of health services, education, social security and strengthening social welfare programs to reduce social inequality. In addition, it also carries outInclusive Economic Developmentby encouraging the growth of economic sectors that can absorb labor and increase community income.

Of the various Main Targets of the planning document,including includingPoverty Alleviation and Social Welfare Improvementby Targeting poverty reduction by increasing access to social assistance and economic empowerment programs for vulnerable groups. Developing data-driven strategies to ensure targeted assistance. In an effective and sustainable poverty alleviation effort, the need for accurate and accountable data is very important. Accurate data not only supports evidence-based decision-making but also ensures that program plans and policies that will be implemented in the future actually reach their targets and provide the desired impact.

Extreme Poverty Overview

Extreme poverty is a condition in which individuals or families live with incomes below the internationally defined poverty line, which is less than 1.90 US dollars per day, or by more specific national standards. This condition reflects not only limited access to income, but also deficiencies in meeting basic needs such as food, clean water, health, education, and adequate housing. Its impacts are multidimensional, where extreme poverty reduces the overall quality of life and limits individuals' opportunities to participate in social and economic activities productively. Study byAlkire and Foster (2021)about the Multidimensional Poverty Index (MPI) also provides an important perspective in an effort to measure poverty more comprehensively. They argue that extreme poverty must be viewed from various dimensions, not only from income, but also including aspects of health, education, and standard of living. With the development of technology-based data collection, this multidimensional measurement can be carried out more efficiently and accurately, so that intervention programs can be more targeted.

Indonesia as a developing country with a large population, still faces challenges in overcoming extreme poverty. According to data released by the Central Statistics Agency (BPS) and various international institutions, although there has been a decline in poverty rates over the past few decades, extreme poverty rates remain significant, especially in remote and less developed areas. Efforts to eradicate extreme poverty have become one of the priorities in government policy, including in the 2020–2024 National Medium-Term Development Plan (RPJMN), which targets the eradication of extreme poverty by 2024.

Based on the target set in 2024, the Indonesian Government launched a programCurious about Accelerating the Eradication of Extreme Poverty, abbreviated as P3KE,as a strategic step to overcome these challenges. This

program focuses on collecting and managing more accurate extreme poverty data through the use of technology, such as integrated databases. This technology-based approach is expected to overcome the problem of data inaccuracy which has been an obstacle in the implementation of poverty alleviation programs. With more accurate and integrated data, government interventions, such as the distribution of social assistance, economic empowerment, and access to health and education services, can be more targeted and effective. However, in reality, there are still problems with this data collection. Research byJerven (2022) shows that inaccurate data collection is often the main cause of inaccurate targeting in poverty alleviation programs. Jerven suggests the need to develop an integrated data collection system that can be accessed by various government agencies to minimize data duplication and inconsistency. This is relevant to the challenges faced by the city of Semarang, where there are limitations in coordination between related agencies in terms of collecting and utilizing extreme poverty data.

Semarang City as one of the metropolitan cities in Indonesia, also faces challenges in dealing with extreme poverty. Although it is the center of economic growth in Central Java, there are still groups of people living below the extreme poverty line. The main challenges in overcoming this problem in Semarang are the uneven distribution of economic growth or economic disparities between community groups, limited access to public services, and the gap between the city center and the outskirts. In addition, efforts to eradicate poverty are often hampered by problems with inaccurate data collection, so that the intervention programs carried out are less effective. So that accurate data on extreme poverty is often an obstacle in formulating targeted policies. According to Sabina Alkire and James Foster (2007) the initiators of the Multidimensional Poverty Index (MPI), emphasize the importance of a broader understanding of poverty. According to them, poverty cannot be measured only through income, but must also take into account other aspects such as education, health, and living conditions. With this approach, the development of more sophisticated data collection can support the measurement of extreme poverty more accurately and comprehensively.

Unstructured and poorly integrated and synchronized data collection results in government programs aimed at overcoming extreme poverty not running optimally. The technology-based extreme poverty data development model is very important to address this condition. The use of digital technology not only enables real-time data collection, but also increases transparency and accountability in data management. It also enables the integration and synchronization of data from various regional government devices and related institutions, which ultimately can support the planning and implementation of extreme poverty eradication policies more systematically and efficiently. Experts emphasize the importance of a technology-based approach to address the problem of inaccurate poverty data. According toAsher and Novosad (2021), technology-based data collection such as the use of big data and artificial intelligence (AI) can provide a more accurate picture of extreme poverty by utilizing real-time data obtained from various sources, including satellite imagery and mobile device data. They emphasize that this approach can overcome the limitations of traditional survey methods which are often time-consuming and risk sample bias. This is in line with the viewGhosh and Banerjee (2020), which states that digital technology is able to increase the efficiency of data collection systems, especially in the context of areas that are physically difficult to reach.

In the P3KE program the main focus isAccurate data collection,Acceleration of aid distribution,Cross-sector collaboration, as well asMonitoring and evaluation. With P3KE it is hoped that this can be achievedintegration and synchronization of extreme poverty datathe better, andincreasing the effectiveness of poverty alleviation programsthroughout the region, including in vulnerable areas such as Semarang City. In line with this, the programCurious about Accelerating the Eradication of Extreme Poverty (P3KE)launched by the Indonesian government as part of a strategy to accelerate the eradication of extreme poverty. The program aims to more accurately record and map the population living in extreme poverty using a technology-based approach. The use of technology, such as integrated databases, digital applications, and Geographic Information Systems (GIS), is expected to accelerate the data collection process and minimize errors that often occur in manual data collection. However, the format that can be referred to by local governments is still not in line with expectations. According to Amartya Sen (1999), a development economist, poverty alleviation is not only about increasing income, but also about expanding individual freedom to access basic needs and social participation. Sen emphasized that poverty measurement must include non-economic dimensions, such as access to education, health, and social protection. Therefore, accurate and comprehensive data are very important to identify the multidimensional aspects of extreme poverty, so that policy interventions can be designed more precisely.

Extreme Poverty Data Collection Overview

The latest extreme poverty data collection from the Coordinating Ministry for Human Development and Culture (Kemenko PMK) focuses on more accurate and integrated data integration to ensure that program interventions are right on target. The government is targeting to eradicate extreme poverty throughout Indonesia by 2024 with various strategies. Based on the latest data from Kemenko PMK, there are three main strategies that

the government relies on to accelerate the eradication of extreme poverty, namely Reducing Expenditure Burden, Increasing Income and Community Empowerment and Reducing the Number of Poverty Pockets.

The extreme poverty eradication program requires current data and has a status/welfare level ranking for the entire population complete with names and addresses. Furthermore, the data becomes a reference for intervention targets for all programs. As long as the latest data is not yet available and has a status/welfare level ranking for the entire population, then the Targeting Data for Accelerating the Eradication of Extreme Poverty (P3KE) can be used.

One of the latest initiatives is the convergence approach, where extreme poor families do not receive just one type of assistance, but several interconnected social programs. This is done to ensure a more significant reduction in poverty rates. The data collected covers aspects of the economy, health, education, and access to basic services, and is updated regularly to adjust to current conditions.

In addition, the importance of data quality in the extreme poverty eradication acceleration program (P3KE) also emphasizes that accurate and up-to-date data is needed to ensure that the program targets are right and that the interventions provided can be more effective. Synergy between the central and regional governments, as well as collaboration with various ministries, institutions, and non-governmental parties, are the keys to the success of accelerating this program..

Policies that support the achievement of the Zero (0%) extreme poverty target include fiscal incentives for regions that show good performance in the extreme poverty eradication program. The government also encourages programs based on a convergence approach so that every poor household benefits from various interrelated programs.. Optimization of technology in data collection through P3KE, helps improve and update the database so that the targeting program becomes more precise and efficient. The 2021 Poverty Line is 9.54%, meaning that all families in decile 1 or 10% are included in the poor family group. While some deciles 2-4 or 20% are included in the vulnerable poor family group and some others are included in the non-poor family group.

Decile 1 is a household that falls into the 1-10 percent group and is the lowest level of welfare nationally. People who are classified as extremely poor are those whose daily needs or expenses are only IDR 10,739 per day or IDR 322,170 per month. Meanwhile, people who are classified as ordinary poor have expenses of IDR 15,750 per day and IDR 472,525 per month. P3KE is trying to find references for setting targets for extreme poverty eradication programs organized by the central government and local governments. So it is quite difficult to achieve the target of eliminating extreme poverty in 2024. In the P3KE data issued by TNP2K, a person is categorized as very extremely poor if they are in Decile-1, ordinary poor if they are in Decile-2, and almost or vulnerable to poverty if they are in Decile-3.

METHODS

This study uses a qualitative approach with case study methods and in-depth interviews to explore the effectiveness of technology use in extreme poverty data collection. This study aims to: a. identify the challenges faced in extreme poverty data collection in Semarang City, b. identify the ideal data collection format for extreme poverty data collection, c. analyze the potential use of digital technology in poverty data collection, d. propose a strategy for optimizing technology-based data collection that can improve the quality of data collection, and formulate policy recommendations that can support the implementation of technology-based extreme poverty data collection in Semarang City. The population is stakeholders in the P3KE program. Samples were taken from various backgrounds (Semarang City Government OPD, regional stakeholders, academics, other government and non-government institutions) in order to obtain a broader perspective on extreme poverty data collection. Data Collection Instruments through Questionnaires and Interviews and FGDs to dig deeper into the findings of extreme poverty data collection that are considered more ideal. Data Analysis uses Descriptive Analysis, namely describing preferences for extreme poverty data collection and the use of technology in data collection. With this method, research can answer the extreme poverty data collection which is considered more ideal based on technology.

RESULTS AND DISCUSSION

Challenges in Extreme Poverty Data Collection

Extreme poverty data collection in Semarang City faces various challenges that affect the quality and accuracy of the data needed to formulate appropriate policies. First, Data that is not Synchronized between regional devices or with other institutions. This misalignment can result in differences in extreme poverty figures and the absence of single data as a reference. This mismatch can cause overlapping or gaps in data that affect policy making as a whole.

Second, Inaccurate Data Quality. Extreme poverty data collected is often out of date or less valid. Some residents who are classified as extremely poor may be missed in the data collection, or the existing data does not reflect the actual conditions because it is not updated regularly. In addition, some people may be reluctant to be involved in the data collection process because they are worried about the stigma attached to poverty status. Another thing is that the economic situation of vulnerable poor people can change quickly, either due to job loss, natural disasters, or other factors that cause extreme poverty.

Third, Social and Digital Divide. Extreme poor communities often lack access to technology, whether in terms of devices, digital literacy, or internet access. This makes it difficult to apply technology in the data collection process and requires a manual approach that is slower and prone to errors. This can hinder the data collection process based on technology or digital applications.

Fourth, High Population Mobility. The dynamics of the poor population often move from place to place due to work, education, or housing factors. This mobility causes difficulties in conducting accurate data collection, because the data collected can quickly be inconsistent with reality. The challenge is how to develop a mechanism for updating data periodically.

Fifth, Limited Human Resources (HR), The data collection process requires sufficient manpower to conduct surveys and verification in the field. Limited number of officers, and the latest data review and lack of adequate training, can result in the quantity and quality of data collected being less than optimal.

Solutions to Overcome Challenges

The Acceleration Program for the Eradication of Extreme Poverty (P3KE) in Semarang City requires accurate, comprehensive, and up-to-date data as a basis for formulating targeted policies and interventions. Effective data collection will determine the success of this program in identifying, understanding, and addressing extreme poverty issues at the family and individual levels. Therefore, data needs analysis is an important step in ensuring that the data collected can optimally support the objectives of P3KE.

Accurate and accountable data collection and use is essential to designing programs that are right on target. In achieving poverty alleviation targets, data is needed that accurately describes the economic and social conditions of vulnerable groups by creating a data collection format by name by address. So that this information helps in designing specific interventions and in accordance with the conditions of each individual Extreme Poor Family in the area (Wang et al., 2020; Geldsetzer et al., 2024; Thompson & Dahling, 2019).

The biodata format for extremely poor families is based on the Family Card Number (KK) and each KK is further analyzed based on the Population Identification Number (NIK). Accurate data based on KK and NIK allows for in-depth evaluation of the effectiveness of ongoing poverty alleviation programs. This evaluation is important to determine the extent to which the program has achieved its stated goals and to identify areas that require improvement, as each KK and NIK has different needs. Accurate data supports the formation of policies that are responsive to the realities of families or family members in the field and provides a basis for more effective interventions.

The Data Development Model Offered

Accurate and accountable data is a key element of this P3KE program, the collection, management, and use of quality data will ensure that policies, programs or activities implemented can truly address the problem of extreme poverty effectively and sustainably. Through coordinated and data-based efforts, it will be possible to accelerate the achievement of the target of eliminating extreme poverty and improving the welfare of urban communities. The stages and steps of implementation are as follows.

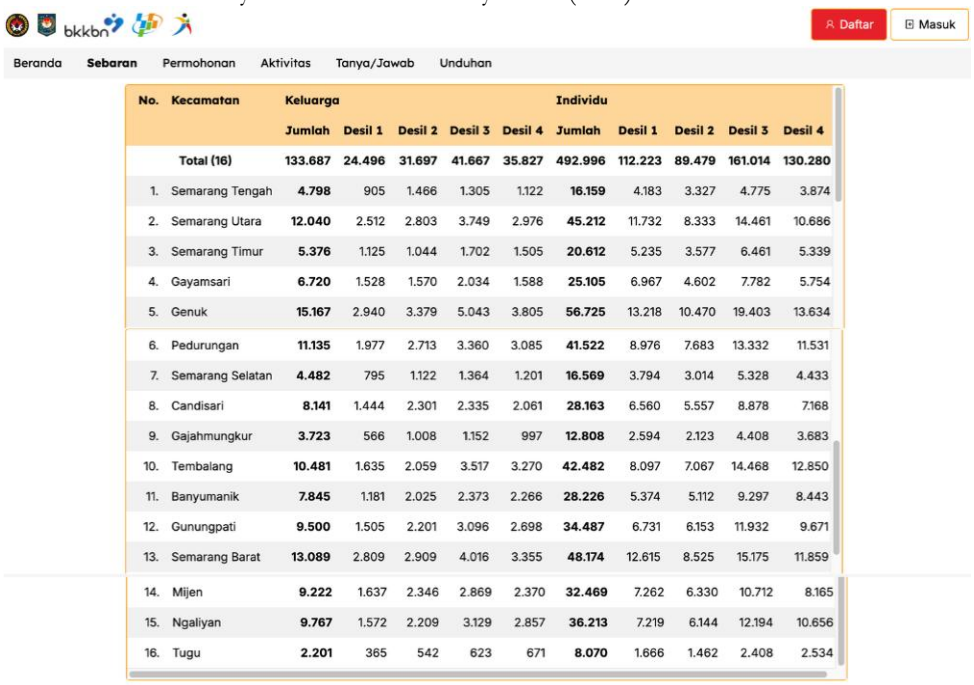
Data Collection and Implementation of Extreme Poverty Report

Stage 1: Determine single data as a reference

Complete information regarding P3KE data can be accessed via the page: http://p3ke.kemenkopmk.go.id contains data as a reference for setting targets for extreme poverty eradication programs organized by local governments.

First Steps, Semarang City Government submitted a request for P3KE Individual and Family data to be submitted through the service channel, namely via the website: p3ke.kemenkopmk.go.id. Individual and Family Data with name and address (by name by address) according to selected variables in Semarang City and its sub-districts. However, on the page, the results of the status, distribution and development of poverty can be seen.

Table 3. P3KE Data Results of Family and Individual Poverty Status (2023)



bkkbn

Daftar | Masuk

Beranda | **Sebaran** | Permohonan | Aktivitas | Tanya/Jawab | Unduhan

No.	Kecamatan	Keluarga					Individu				
		Jumlah	Desil 1	Desil 2	Desil 3	Desil 4	Jumlah	Desil 1	Desil 2	Desil 3	Desil 4
	Total (16)	**133.687**	**24.496**	**31.697**	**41.667**	**35.827**	**492.996**	**112.223**	**89.479**	**161.014**	**130.280**
1.	Semarang Tengah	**4.798**	905	1.466	1.305	1.122	**16.159**	4.183	3.327	4.775	3.874
2.	Semarang Utara	**12.040**	2.512	2.803	3.749	2.976	**45.212**	11.732	8.333	14.461	10.686
3.	Semarang Timur	**5.376**	1.125	1.044	1.702	1.505	**20.612**	5.235	3.577	6.461	5.339
4.	Gayamsari	**6.720**	1.528	1.570	2.034	1.588	**25.105**	6.967	4.602	7.782	5.754
5.	Genuk	**15.167**	2.940	3.379	5.043	3.805	**56.725**	13.218	10.470	19.403	13.634
6.	Pedurungan	**11.135**	1.977	2.713	3.360	3.085	**41.522**	8.976	7.683	13.332	11.531
7.	Semarang Selatan	**4.482**	795	1.122	1.364	1.201	**16.569**	3.794	3.014	5.328	4.433
8.	Candisari	**8.141**	1.444	2.301	2.335	2.061	**28.163**	6.560	5.557	8.878	7.168
9.	Gajahmungkur	**3.723**	566	1.008	1.152	997	**12.808**	2.594	2.123	4.408	3.683
10.	Tembalang	**10.481**	1.635	2.059	3.517	3.270	**42.482**	8.097	7.067	14.468	12.850
11.	Banyumanik	**7.845**	1.181	2.025	2.373	2.266	**28.226**	5.374	5.112	9.297	8.443
12.	Gunungpati	**9.500**	1.505	2.201	3.096	2.698	**34.487**	6.731	6.153	11.932	9.671
13.	Semarang Barat	**13.089**	2.809	2.909	4.016	3.355	**48.174**	12.615	8.525	15.175	11.859
14.	Mijen	**9.222**	1.637	2.346	2.869	2.370	**32.469**	7.262	6.330	10.712	8.165
15.	Ngaliyan	**9.767**	1.572	2.209	3.129	2.857	**36.213**	7.219	6.144	12.194	10.656
16.	Tugu	**2.201**	365	542	623	671	**8.070**	1.666	1.462	2.408	2.534

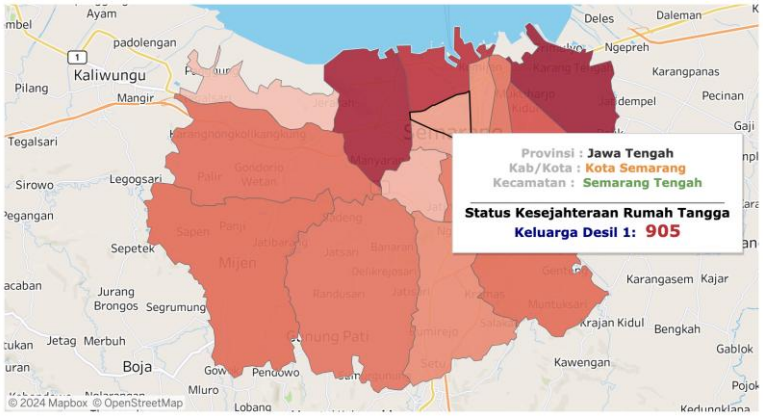


Figure 1. Map of Distribution of P3KE Poverty Per District in Semarang City (2023)

Sumber data: Badan Pusat Statistik (BPS)

Figure 2. Development of P3KE Poverty in Semarang City 2015-2023

Step Two, Extreme Poverty Data from the Coordinating Ministry for Human Development and Culture (data in decile 1) is verified by each sub-district with the Sub-district Coordinator according to their area. Each sub-district conducts Verification through the Semarang City Government's Poverty Data Collection Management Information System (SIM), based on by name by address. The results of verification from the sub-district are submitted to the sub-district and inputted by each sub-district. The results of the sub-district verification data recap are shown per sub-district.

Table 4. P3KE Data Recap Design Results of Family and Individual Poverty Status Year X

N0	KECAMATAN	Kemiskinan Ekstrem Keluarga	Kemiskinan Nasional Keluarga	Diatas Kemiskinan Keluarga	Tidak Terdefinisi Keluarga	Kemiskinan Ekstrem Individu	Kemiskinan Nasional Individu	Diatas Kemiskinan Individu	Tidak Terdefinisi Individu
1	BANYUMANIK								
2	CANDISARI								
3	GAJAHMUNGKUR								
4	GAYAMSARI								
5	GENUK								
6	GUNUNGPATI								
7	MIJEN								
8	NGALIYAN								
9	PEDURUNGAN								
10	SEMARANG BARAT								
11	SEMARANG SELATAN								
12	SEMARANG TENGAH								
13	SEMARANG TIMUR								
14	SEMARANG UTARA								
15	TEMBALANG								
16	TUGU								
	Total								

Step Three, Compiling detailed data on Families and Individuals according to the results of the Extreme Poverty recapitulation from the verification results from the sub-district. This data becomes the Single Data for Extreme Poor Families and Individuals. Each individual's data is given an identity number KE and written with full name, Address (according to KK), RW, RT, Occupation, Assistance, Access to capital, BPJS, physical residence and environment, and sources of funds obtained.

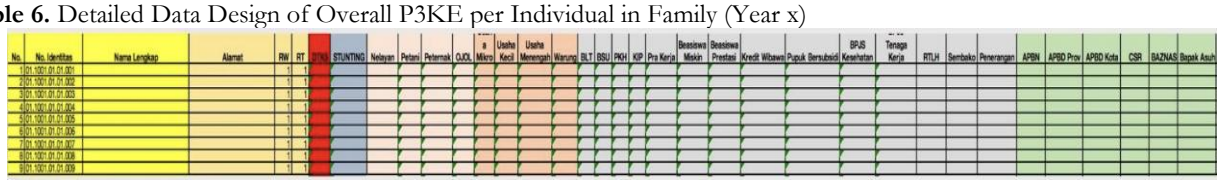
Table 5. Detailed Data Design per P3KE section per Individual in the Family (Year x)

No.	No. Identitas	Nama Lengkap	Alamat	RW	RT	DTKS	STUNTING	Nelayan	Petani	Peternak	OJOL	Usaha Mikro	Usaha Kecil	Usaha Menengah	Warung
1	01.1001.01.01.001			1	1										
2	01.1001.01.01.002			1	1										
3	01.1001.01.01.003			1	1										
4	01.1001.01.01.004			1	1										
5	01.1001.01.01.005			1	1										
6	01.1001.01.01.006			1	1										
7	01.1001.01.01.007			1	1										
8	01.1001.01.01.008			1	1										
9	01.1001.01.01.009			1	1										

No.	No. Identitas	Nama Lengkap	BLT	BSU	PKH	KIP	Pra Kerja	Beasiswa Miskin	Beasiswa Prestasi	Kredit Wibawa	Pupuk Bersubsidi	BPJS Kesehatan	BPJS Tenaga Kerja	RTLH	Sembako	Penerangan
1	01.1001.01.01.001															
2	01.1001.01.01.002															
3	01.1001.01.01.003															
4	01.1001.01.01.004															
5	01.1001.01.01.005															
6	01.1001.01.01.006															
7	01.1001.01.01.007															
8	01.1001.01.01.008															
9	01.1001.01.01.009															

No.	No. Identitas	Nama Lengkap	APBN	APBD Prov	APBD Kota	CSR	BAZNAS	Bapak Asuh
1	01.1001.01.01.001							
2	01.1001.01.01.002							
3	01.1001.01.01.003							
4	01.1001.01.01.004							
5	01.1001.01.01.005							
6	01.1001.01.01.006							
7	01.1001.01.01.007							
8	01.1001.01.01.008							
9	01.1001.01.01.009							

Table 6. Detailed Data Design of Overall P3KE per Individual in Family (Year x)



Step Four, After knowing the detailed data on the number of KE Families and Individuals, the next step is to create a Profile for each Family (which contains all family members and photos of the house). This profile data is used as Single KE data and its interventions as well as the latest KE status conditions.

Table 7. Design of KE Profile in Family (Year x)

PROFIL KEMISKINAN EKSTREM KELUARGA TAHUN X

a.	Kecamatan	:	j.	Status Kepemilikan Rumah	:
b.	Kelurahan	:	k.	Dinding Rumah	:
c.	Idp3ke	:	l.	Lantai Rumah	:
d.	Kepala Keluarga	:	m.	Atap Rumah	:
e.	Jumlah Anggota Keluarga	:	n.	Sumber Air Bersih	:
f.	Alamat	:	o.	Bahan Bakar Memasak	:
g.	Status Kemiskinan	:	p.	Sumber Listrik Rumah	:
h.	Total Pengeluaran Per Orang Per Hari	:	q.	Fasilitas Buang Air Besar	:
i.	Total Pendapatan Keluarga Sebulan	:			

No	Nama	Status	Usia	Disabilitas	Pekerjaan	Kebutuhan dan Intervensi	Periode	Tgl. Mulai	Tgl. Selesai	OPD / Unit Kerja	Status KE
1		Kepala Keluarga	60								
							-	-	-	-	-
							-	-	-	-	-
2		Lainnya	50	-			-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-
3		Lainnya	55	-			-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-
							-	-	-	-	-

FOTO RUMAH

Depan

Samping

Dalam

Stage 2: Extreme Poverty Intervention

First Step: Conducting P3KE Data Recapitulation Results of Verification of Needs (Family and Individual) per Sub-district for 13 types of KE needs.

Table 8. Draft Recapitulation of P3KE Data for Family and Individual Needs per Sub-district (Year x)

No	KECAMATAN	Fasilitasi Bantuan Permakanan (Sembako)	Rehab Rumah Tidak Layak Huni	Fasilitasi Sanitasi Permukiman	Fasilitasi Sumber Air Bersih	Fasilitasi Administrasi Kependudukan	Fasilitasi Jaminan Kesehatan	Penanganan Stunting dan Gizi Buruk	Fasilitas Alat Bantu Penyandang Disabilitas	Fasilitas Layanan Pendidikan	Fasilitas Layanan Ketenaga kerjaan	Pemberdayaan Ekonomi/UMKM	Pelayanan Keluarga Berencana	Pengembangan Pertanian/Perikanan/Peternakan
1	BANYUMANIK													
2	CANDISARI													
3	GAJAHMUNGKUR													
4	GAYAMSARI													
5	GENUK													
6	GUNUNGPATI													
7	MIJEN													
8	NGALIYAN													
9	PEDURUNGAN													
10	SEMARANG BARAT													
11	SEMARANG SELATAN													
12	SEMARANG TENGAH													
13	SEMARANG TIMUR													
14	SEMARANG UTARA													
15	TEMBALANG													
16	TUGU													
	Total													

Step Two: Recapitulate the facilities that will be supported by various activities / sub-activities / activity details, and determine the regional apparatus that supports the intervention (according to its duties and functions). Source of funds: from the government (central, provincial, and city), in the form of: money or physical, form: capital goods, services and infrastructure, allocation: family, individual and environment.

Table 9. Draft Recapitulation of P3KE Data Proposed Needs per Sub-district (Year x)

NO.	PROGRAM/KEGIATAN PENGHAPUSAN KEMISKINAN EKSTREM	BENTUK INTERVENSI	PERANGKAT DAERAH PENGAMPU	ANGGARAN
1.	**Administrasi Kependudukan**	Kartu Keluarga, E-KTP, Akta Kelahiran, Kartu Identitas Anak, Akta Kematian		
2.	**Bantuan Sembako**	Bantuan Sembako Jumat Berkah Semarang Berbagi KITA		
3.	**Jaminan Kesehatan**	Jaminan Kesehatan Nasional - Penerima Bantuan Iur (JKN-PBI) dari APBD Kota Semarang, yaitu *Universal Health Coverage* (UHC)		
4.	**Penanganan Stunting & Gizi Buruk**	Pemberian Makanan Tambahan (PMT)		
5.	**Alat Bantu Penyandang Disabilitas**	Berupa kursi roda standar, kursi roda adaptif, kursi elektrik, kruk, alat bantu dengar, walker, tripot, tongkat netra		
6.	**Pelayanan Pendidikan**	Beasiswa Siswa Miskin (BSM), fasilitasi Sekolah Swasta Gratis, dan fasilitasi PKBM (Kejar Paket A, B dan C)		
7.	**Rehab Rumah Tidak Layak Huni**	Rehab Rumah Tidak Layak Huni		
8.	**Sanitasi Permukiman**	Akses pembuangan toilet/WC/KM → tangki septic		
9.	**Sumber Air Bersih**	Akses air bersih (sumur, jaringan pipa)		
10.	**Pelayanan Ketenagakerjaan**	Akses pekerjaan, pelatihan (desain grafis / tata kecantikan / boga, membuat kue / operator komputer / barista / menjahit / *food and beverage*)		
11.	**Pemberdayaan UMKM**	Akses permodalan; pelatihan-pelatihan: kemasan, pemasaran, pengelolaan keuangan, peningkatan SDM; dan fasilitasi PIRT/Halal/HAKI/NIB		
12.	**Pelayanan Keluarga Berencana**	Fasilitasi KB gratis (IUD, pil KB, kondom, MOP, MOW, suntik, implant)		
13.	**Pengembangan Pertanian / Perikanan / Peternakan**	Peningkatan kapasitas petani, nelayan, peternak		
			TOTAL	

Step Three: Create a report on intervention data carried out by filling in the start column and end column, as well as the KE status. To strengthen the intervention report, it is mandatory to attach photos of the intervention. Complete with data: time, place, recipient, type of facility and implementing regional apparatus.

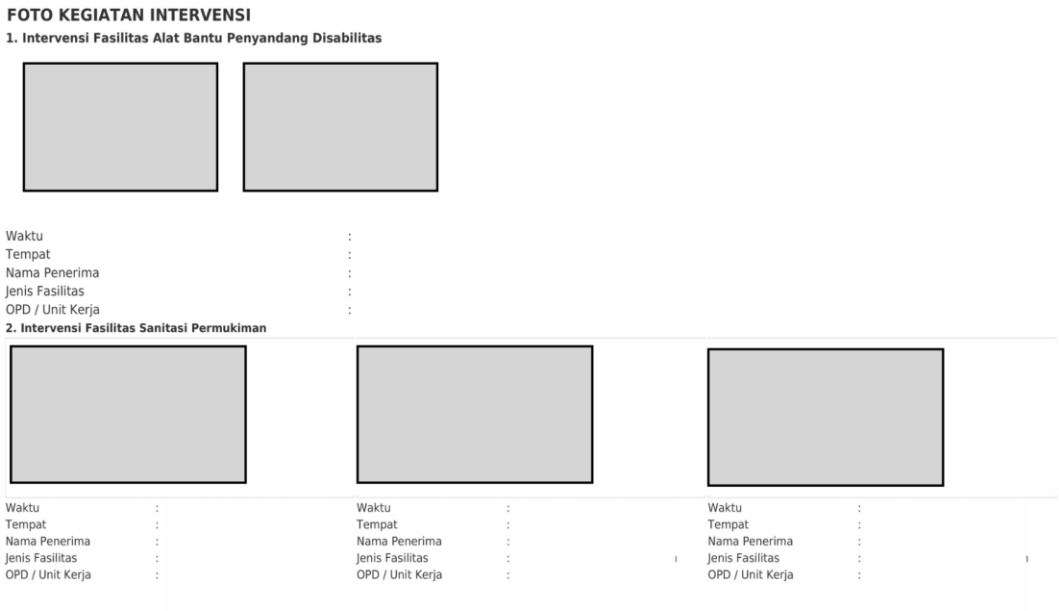


Figure 3. Design of the Profile Report Data Attachment in the form of photographs.

Digitization of Extreme Poverty Data Collection

In order to collect data on Extreme Poverty, Digital Technology support is needed. The implementation of Digitalization of Extreme Poverty Data Collection aims to improve the accuracy, effectiveness, and speed of data collection, so that extreme poverty alleviation programs are more targeted. So that data collection to reporting can be done without time limits and can be done anywhere.To improve the quality of extreme poverty data collection in Semarang City, better digital technology integration is needed. The implementation of extreme poverty data digitalization can be supported by:

Utilization of Big Data and AI Technology, digitization of data collection allows the use of big data technology and artificial intelligence (AI) to process large-scale data more quickly and accurately. With a big data system, local governments can analyze data on extremely poor people from various sources, such as population administration, economic data, health, education, and social assistance. AI is used to map pockets of poverty, detect patterns that are difficult to identify manually, and predict the risk of poverty in the future.Fahle et al, 2020; Fang & Fang, 2021).

Development of Integrated Information System, useful for integrating various data from ministries, non-governmental institutions, and local governments. This system allows real-time data updates, where information received from the field (for example via mobile devices / hand phones) is directly processed and synchronized with the database at the Government data center. This approach reduces the risk of outdated data or data duplication. The Integrated Information System can also be the basis for determining recipients of social assistance and other assistance. So that the management information system (SIM) is integrated with other data, such as population, health, education, social, and financial data, and others to ensure comprehensive and consistent data..

Utilization of Geospatial Technology, Currently, Poverty mapping in the central government is in the form of a geographic map where KE data is divided into sub-districts. The use of Geospatial Information System (GIS) technology is also applied to map the distribution of the extreme poor population in more detail. This technology helps in visualizing geographic data, mapping the location of poor households, and helping to design more precise area-based intervention programs.

Mobile-Based Application Development for Surveys and Location Searches, Local Governments need to implement the use of mobile-based applications for village officers. This application allows population surveys to be conducted digitally, so that survey results can be sent directly to the local government data center. This increases time efficiency and reduces human error compared to manual methods. Augmented Reality (AR) can also be developed to detect each point of the location of extreme poor households and their data.

Executive Management Dashboard Development, is a data visualization tool used by top management (Mayor, Deputy Mayor and Regional Secretariat) to monitor P3KE performance in real-time and the performance of regional apparatuses that support extreme poverty. This dashboard is designed to provide a comprehensive overview of key performance indicators (KPIs) to help make strategic decisions quickly and efficiently. Data

visualization is presented in the form of graphs, charts, maps, or tables for easy understanding. In addition, it provides real-time or periodic data updates (daily, weekly, monthly) depending on needs. This allows top management to take proactive action based on the latest information. Executive dashboards also often integrate data from multiple sources. This integration makes all important information available in one place.

CONCLUSION

The Development Design of Extreme Poverty Data Collection in Semarang City is very important to support the implementation of the Extreme Poverty Eradication Acceleration Program (P3KE) effectively. Accurate, fast, and integrated data collection is the key to formulating targeted policies. The challenges faced, such as data inaccuracy, lack of technological infrastructure, and limited digital literacy, require holistic technology-based solutions. By utilizing digital technology, such as Big Data, integrated information systems, and mobile applications for field data collection, the quality of extreme poverty data collection can be improved. This approach must also be accompanied by increasing human resource capacity, collaboration with various parties, and regular data updates. This will ensure that data collection is not only accurate, but also continues to be relevant to face social and economic dynamics. In the implementation of monitoring and evaluation of P3KE data collection by Top Management, a Management Dashboard needs to be created so that it can be monitored in real time and policy making is easy.

There are several recommendations that can be conveyed in this study, namely Implementing data integration policies in all regional devices, with the use of the Single Identity Number (NIK) system to unify P3KKE, socio-economic, population and other data. Issuing regulations that require monthly data updates so that poverty data is always up to date and ready to be used in policy planning. Conducting HR competency development through routine training and certification for data collection officers and social volunteers. Strengthening strict personal data protection to maintain the privacy of the extreme poor, so that they feel safe in providing their data. Expanding the scope of the Social Safety Net program and launching adaptive social protection policies, which are flexible in responding to changes in the economic conditions of the community, such as rising prices of basic necessities or disasters. Providing incentives for companies or institutions that are actively involved in extreme poverty alleviation programs, such as tax breaks that contribute in the form of social investment.

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