CATRA RESEARCH INSTITUTE
ISSN 2720 - 9644 (print)
ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA, Google, doi Crossref, ROAD, Index Copernicus, Indonesia OneSearch, ISJD, sinta 4, EBSCO, Clarivate Analytics

THE PERFORMANCE OF THE SIKKA REGENCY HEALTH SERVICE TO BE CALLED THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN REDUCING MATERNAL AND CHILD MORTALITY RATES

Volume: 6
Number: 6
Page: 1478 - 1485

Sia WILFRIDA[1], Hendrik TODA[2], Maria Magdalena LINO[3]
[1,2,3]Faculty of Social and Political Sciences, Nusa Cendana University, Indonesia
Corresponding author: Sia Wilfrida
Email: siawilfrida1997@gmail.com

Article History:
Received: 2025-09-09
Revised: 2025-10-15
Accepted: 2025-11-15

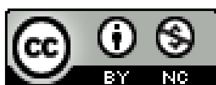
Abstract:
This study aims to determine the extent to which the performance of the Sikka District Health Office is achieving the Sustainable Development Goals of Reducing Maternal and Child Mortality Rates, and what are the supporting and inhibiting factors in providing maternal and child health services. The method used is qualitative, where the research is descriptive. The collection technique used is interviews with informants who have the potential to provide information related to the research, as well as observation and documentation methods. The results show an increase in the performance of the health office in several indicators, although some are not yet optimal. There are several main obstacles faced, such as the distribution of health workers, access to remote areas, and limited public understanding of the importance of maternal and child health services. The infrastructure for complaint services is still not optimal. Meanwhile, the form of internal and external accountability at the Sikka District Health Office has been running well, such as the services provided, especially in each Community Health Center covered by the Sikka District Health Office, are in accordance with the applicable Standard Operating Procedures (SOPs) and monthly monitoring and evaluation of performance achievements. Then, the preparation of activity reports is carried out monthly and annually.

Keywords: Maternal Mortality Rate, Child Mortality Rate

INTRODUCTION

The maternal mortality rate (MMR) is an indicator of health development and the fulfillment of basic human needs. The MMR is a measure of women's health and is a component of both the development index and the quality of life index. Meanwhile, the child mortality rate (AKA) is often used as an index of economic development, quality of life, and a determinant of life expectancy (Ensor, 2010). One of the targets is SDG 3, which aims to ensure a healthy life and improve the well-being of all people of all ages. The first indicator aims to reduce the maternal mortality ratio to less than 70 per 100,000 live births, and the second indicator aims to end all preventable deaths of children under 5 years of age, with an estimated reduction in neonatal mortality to less than 12 per 1,000 live births and under-five mortality to 25 per 1,000 live births by 2030 (Bappenas, 2020). Health affairs are delegated to the local government.

The Sikka Regency Health Office, as the regional agency responsible for implementing regional government affairs in the health sector, is obligated to ensure the success of these health development goals. In Sikka Regency, maternal and infant mortality remain a major challenge in improving public health. Various initiatives have been implemented to reduce maternal and infant mortality rates in Sikka Regency. Although the rates have decreased over the past five years, they remain fluctuating and have not yet reached national and regional development targets. Undeniably, various obstacles in maternal and child health care contribute to the persistence of



This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By :

maternal and child mortality. The following is a summary of maternal and child mortality rates in Sikka Regency.

Table 1. Maternal mortality in Sikka Regency

No	Target	Year				
		2020	2021	2022	2023	2024
1.	Maternal Mortality Rate	7	9	8	3	2
2.	Infant Mortality Rate	45	51	66	39	47
3.	Infant Mortality Rate	15	3	11	11	8

Source: Researcher's Analysis, 2025

From the table above, the maternal mortality rate in Sikka Regency has tended to decline over the past five years. However, for infant and toddler mortality, this decline tends to fluctuate.

Therefore, it is important to understand the performance of the Sikka Regency Health Office in achieving the Sustainable Development Goals of reducing maternal and child mortality in Sikka Regency, as well as the supporting and inhibiting factors in implementing maternal and child health programs in Sikka Regency.

METHODS

Research Approach: The researcher employed a qualitative approach, employing descriptive research. This approach was chosen to explore social phenomena related to the performance of the Sikka Regency Health Office in achieving the SDGs of reducing maternal and child mortality.

Research Location: The research was conducted at the Sikka Regency Health Office, the primary institution responsible for health care, specifically maternal and child health.

Research Focus and Sub-Focus: This study employed Agus Dwiyanto's Performance Indicator theory, with the following focus and sub-focus:

1. Productivity: Work Plans and Results
2. Service Quality: Reliability, Empathy, Responsiveness, and Communication
3. Responsiveness: Response time, service availability, and ease of access
4. Responsibility: Transparency, regulatory compliance, and complaint handling
5. Accountability: Policy consistency and accountability

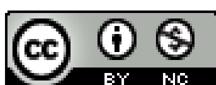
Research Informants: The informants selected for this study included the Head of the Sikka Regency Health Office, the Coordinator of the Maternal and Child Health Program (2), health workers (3), and the community (4 pregnant and breastfeeding women). A total of 10 informants were involved.

Data Sources: Data sources were obtained from primary and secondary data. Primary data were obtained from interviews and direct observations by the researcher. Secondary data were obtained through official documents, activity reports, policies, and related literature sources.

Data Collection Techniques: The data collection technique used structured interviews with all informants, direct field observations of maternal and child health service activities, and documentation in the form of photographs, documents, and field notes.

Data Analysis Techniques: The analysis used the Miles and Huberman model (as cited in Sugiyono 2012), including:

1. Data Reduction: Data obtained from interviews, observations, and documentation during the research period.
2. Data Presentation: Data presented in narrative text, matrices, networks, and charts.



This open-access article is distributed under a Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA, Google, doi, ROAD, INDEX COPERNICUS, oneSearch, ISJD, sinta 4, EBSCO, Clarivate Analytics

3. Conclusion Drawing: Based on patterns and relationships among the data obtained.

Data Validation Techniques: Data validity was tested using a triangulation approach. Triangulation is the act of comparing or contrasting findings with other findings as long as they are not contradictory or comparable (Siswantoro, 2005).

1. Source Triangulation: comparing data from various informants.
2. Technical Triangulation: using interviews, observation, and documentation.
3. Temporal Triangulation: data collection is conducted at different times to ensure consistency.

RESULT AND DISCUSSION

Health development aims to improve the quality of human life. The efforts of the Sikka Regency Health Office have shown progress in implementing maternal and child health programs, both in terms of productivity, service quality, and accountability. The Health Office (Dinkes) is an implementing element of regional autonomy in the health sector, which is accountable to the regional head (Regent/Mayor) through the Regional Secretary. The Dinkes has the primary task and function of administering regional government affairs in the health sector, including health services, health facility development, public health programs, and disease prevention and control. Maternal and child health in Sikka Regency, East Nusa Tenggara, is a focus of attention for the local government and various related parties. Efforts continue to improve the quality of health services, particularly in efforts to reduce maternal and infant mortality rates, and improve the overall health status of mothers and children. With Sikka's geographical conditions dominated by mountains and many remote villages, the challenges of health services are certainly not small. However, the Sikka Health Office remains committed to providing quality and equitable health services, both through a network of community health centers (Puskesmas), regional hospitals, integrated health posts (Posyandu), and mobile health services that reach remote areas. This spirit of hard work is a concrete manifestation of the Sikka Health Office's vision.

Productivity. The productivity of the Sikka District Health Office's performance in supporting the achievement of sustainable development goals, particularly in reducing maternal and child mortality, can be analyzed through its work plan and results, which serve as benchmarks for the efficiency and effectiveness of the public bureaucracy. From the work plan perspective, health program development is structured and systematic, and refers to the regulatory framework for development planning at both the national and regional levels. The Work Plan (Renja) prepared by the Sikka District Health Office is derived from the National Medium-Term Development Plan (RPJMN), the provincial and district RPJMDs, and the more technical Regional Apparatus Organization (OPD) Strategic Plan (Renstra). This ensures that the resulting policy direction remains within the national development framework and aligned with the Sustainable Development Goals (SDGs). The work plan development process is not merely administrative but also strategic, involving a participatory regional development deliberation forum (Musrenbang) that brings together various stakeholders. Therefore, this planning document is not merely an annual program guide but also an instrument that guides health development priorities, resource allocation, and the establishment of measurable performance indicators. In addition, the use of an indicator-based budgeting system through SIPD (Regional Government Information System) is a mechanism that strengthens efficiency, because only programs that are in accordance with national indicators can be allocated a budget. Evaluation of the implementation of the previous year's program is also used as a corrective basis in the current year's planning, so that productivity in terms of work plans can be assessed as having run in accordance with the principles of effectiveness and efficiency as emphasized by Agus Dwiyanto (2006), where the productivity of public

This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA Google doi Crossref ROAD INDEX COPERNICUS oneSearch ISJD sinta 4 EBSCO Clarivate Analytics

organizations does not only include output but also the quality of the process and the achievement of goals.

In terms of work results, the Sikka Regency Health Office's achievements show gradual improvement, although it has not yet fully met the set targets. The maternal mortality rate (MMR) has decreased significantly, from a high of 9 cases in 2021 to 2 cases in 2024, indicating the success of interventions through the Childbirth Planning and Complication Prevention (P4K) program, improving the quality of antenatal care services, and optimizing referrals for high-risk pregnant women. The infant mortality rate also showed a downward trend, from 15 cases in 2020 to 8 cases in 2024, indicating that nutritional interventions, improved sanitation, and infectious disease management are beginning to have a positive impact. However, the infant mortality rate (IMR) remains volatile, with a peak of 66 deaths in 2022, a decline to 39 in 2023, and a rebound to 47 in 2024. This situation highlights vulnerabilities in neonatal services, particularly in the management of low birth weight (LBW), birth complications, asphyxia, and uncontrolled infectious diseases. Therefore, it can be concluded that the Sikka Regency Health Office's work has shown signs of increased productivity, but it still faces challenges in achieving the ideal mortality reduction targets set by the SDGs (MMR <70/100,000 live births and IMR <12/1,000 live births).

Obstacles to improving productivity encompass several key aspects. First, limited human resources and healthcare infrastructure remain a challenge, particularly the uneven distribution of medical personnel and transportation, particularly in geographically difficult-to-reach areas. Second, family involvement in supporting maternal and child health programs, particularly husbands' participation in prenatal classes and birth planning, remains relatively low, impacting the success of interventions. Third, budget limitations stemming from the SIPD mechanism mean that not all programs can be accommodated, requiring some activities to rely on alternative funding from the non-DAK Regional Budget (APBD). Fourth, persistent technical obstacles in the field, such as delays in emergency referrals and suboptimal neonatal care, contribute to delays in achieving expected results.

Thus, overall, the productivity of the Sikka Regency Health Office has shown positive progress through planning aligned with national policy directions and program implementation that has significantly contributed to reducing maternal and infant mortality rates. However, the still-unstable results, particularly in the infant mortality indicator, demonstrate the need to strengthen the health service system, improve cross-sectoral coordination, and provide more adequate resource support. This confirms that achieving health bureaucratic productivity is determined not only by the quality of planning, but also by the ability to overcome structural, technical, and social barriers still encountered at the regional level.

Service Quality. The Sikka Regency Health Office's service quality in reducing maternal and child mortality is quite good, particularly in terms of reliability and empathy. Although communication still faces several challenges. In terms of reliability, the Primary Service Integration (ILP) program implemented in 25 community health centers (Puskesmas) and more than 400 integrated health posts (Posyandu) demonstrates consistent service standards, although it is still limited by low compliance among patient families and geographical barriers that hinder equitable access. In terms of empathy, health workers, especially village midwives, demonstrate high levels of concern by providing personal service to the community despite limited facilities, difficult terrain, and cultural resistance. Structurally, empathy is also demonstrated through the policy of changing the status of community health centers to UPTD BLUD (Service Units for Public Services) to expedite services. However, this empathy is not yet optimal due to limited medical personnel, high workloads, and low welfare.

This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By :

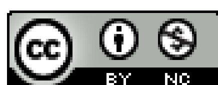
Meanwhile, communication efforts have been made through outreach, prenatal classes, and cross-sector collaboration with religious leaders, teachers, and indigenous communities. However, effectiveness remains limited due to telecommunications signal problems, low health literacy, and geographical barriers. Thus, although the quality of maternal and child health services in Sikka Regency has shown positive progress, particularly in terms of reliability and empathy, structural, geographic, and social barriers still need to be addressed to ensure more equitable communication and optimize public health services.

Responsiveness. The Sikka Regency Health Office's responsiveness in reducing maternal and child mortality is quite good. This is evident in the ability of community health centers and health workers to provide rapid response times through the Rapid Response Team and the maternal-neonatal referral system, which has resulted in a decrease in maternal and infant mortality rates (MMR) over the past three years. The availability of basic health services is also relatively adequate, although the distribution of medical personnel is uneven, particularly in remote areas. Health workers, especially village midwives, demonstrate high responsiveness by continuing to serve the community despite limited facilities and difficult terrain. However, ease of access remains a major obstacle due to geographical conditions, limited transportation, and low public health literacy. Thus, the Health Office's responsiveness has shown positive progress, but sustaining the target of reducing maternal and infant mortality requires innovative strategies to overcome structural and geographic constraints.

Responsibility. The Sikka Regency Health Office's responsibility in accelerating the reduction of the Maternal Mortality Rate (MMR) and Child Mortality Rate (AKA) is reflected in three main aspects: transparency, regulatory compliance, and complaint handling. From a transparency perspective, the office has managed its budget openly through planning documents (Renstra and RKPD) and the use of the SIPD application, accompanied by oversight from the Supreme Audit Agency (BPK), the Attorney General's Office, and local media. This demonstrates a commitment to public accountability, despite ongoing human resource constraints and delays in disbursement due to digital bureaucratic procedures. In terms of regulatory compliance, the Sikka Health Office consistently implements maternal and child health programs in accordance with the mandate of the Minimum Service Standards (SPM), the Minister of Health Regulation, and the annually updated Standard Operating Procedures (SOPs), ensuring that services remain within the legal framework and national policy. This compliance also reinforces the principles of good governance, although referral refusals are still encountered in the field due to customary law and financial constraints. Meanwhile, from a complaint handling perspective, the establishment of Rapid Response Teams (TGC) in each community health center (Puskesmas) and cross-sectoral collaboration with religious and traditional leaders, village governments, and educational institutions demonstrate social responsibility in responding to community needs, even though cultural and economic challenges often delay the receipt of medical services by patients' families.

Overall, the Sikka Regency Health Office's accountability in accelerating the reduction of maternal mortality (MMR) and infant mortality (AKA) is supported by transparent budget management, regulatory compliance, and a rapid response mechanism to public complaints. However, inhibiting factors still faced include limited health personnel, delays in fund disbursement, difficult geographic conditions, and cultural resistance from the community. Therefore, the agency's success is determined not only by administrative aspects but also by its ability to overcome social and technical obstacles collaboratively and sustainably.

Accountability. The Sikka Regency Health Office's accountability in accelerating the reduction of maternal mortality (MMR) and infant mortality (AKA) is demonstrated through


This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA Google doi Crossref ROAD INDEX COPERNICUS OneSearch ISJD sinta 4 EBSCO Clarivate Analytics

consistent program implementation, achievement reporting mechanisms, and data-based policy accountability. Consistency is reflected in the involvement of multiple actors, from community health centers (Puskesmas), regional hospitals (RSUD), schools, local organizations, and community leaders in supporting maternal and child health services. Program achievement reporting is conducted transparently through the Strategic Plan (Renstra), the Child Health Information System (LAKIP), and the Child Health Information System (SIPD), with measurable indicators such as K1–K4 coverage, deliveries in health facilities, immunizations, and the distribution of iron tablets, although reporting standards across units are still not uniform. Policy accountability is realized through evidence-based planning, implementation of priority programs such as P4K (Pregnancy and Childhood Education), and quarterly evaluations that serve as a means of continuous improvement. Supporting factors for this accountability include information transparency, cross-sectoral coordination, community involvement, and routine evaluation mechanisms. Inhibiting factors include limited health workers, budget fluctuations, difficult geographic access, and cultural resistance among some communities to modern health services. Thus, the Sikka Health Office's accountability in handling maternal and child mortality (MMR) has been quite good, but still requires strengthening the reporting system, equitable distribution of resources, and innovative strategies to overcome structural and social barriers.

Inhibiting and Supporting Factors in the Performance of the Sikka Regency Health Office in Achieving the Sustainable Development Goals of Reducing Maternal and Child Mortality Rates.

Supporting Factors. In reducing the Maternal Mortality Rate (MMR) and Child Mortality Rate (AKA), the Sikka Regency Health Office has demonstrated strategic steps in line with Sustainable Development Goal (SDG) 3. Successful implementation is supported by the local government's commitment to integrating SDG targets into development planning, the sustainability of priority programs such as the Community-Based Child Health Program (P4K), and cross-sectoral support through health education and nutrition interventions. Campaigns for zero stunting and zero maternal and infant mortality have strengthened collective public awareness. Furthermore, the use of Minimum Service Standards (MSH) indicators is a crucial instrument in ensuring the quality of basic maternal and child health services.

Inhibiting Factors. The implementation of programs to reduce the Maternal Mortality Rate (MMR) and Child Mortality Rate (AKA) still faces various serious obstacles. Geographic accessibility is a major obstacle, with hilly conditions, remote areas, and limited transportation hindering access to health facilities, particularly in emergencies. The shortage and unequal distribution of healthcare workers at the primary care level contribute to the decline in service quality, exacerbated by the double workload faced by staff. From a social perspective, low health literacy and persistent reliance on traditional birth attendants (TBAs) lead some communities to delay prenatal checkups until they are in critical condition. Other obstacles include inconsistent implementation of standard operating procedures (SOPs), limited infrastructure and medical equipment, the lack of accreditation of all community health centers (Puskesmas), budget constraints, and minimal community participation in program oversight. Furthermore, the organization's responsiveness and the effectiveness of the referral system are also considered suboptimal, as evidenced by the continued high number of cases of pregnant women arriving at health facilities in critical condition.

This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA, Google Scholar, doi Crossref, ROAD, Index Copernicus International, Indonesia OneSearch, ISJD, sinta 4, EBSCO, Clarivate Analytics Web of Science

CONCLUSION

Based on the results of the research entitled "The Performance of the Sikka District Health Office in Achieving Sustainable Development Goals in Reducing Maternal and Child Mortality," the following conclusions can be drawn:

1) Productivity: The Sikka District Health Office's productivity has increased, indicated by a decline in maternal and infant mortality rates. However, fluctuations in infant mortality emphasize the need for improved neonatal services, child growth and development monitoring, and cross-sectoral support to achieve more optimal results.
2) Service Quality: The Sikka District Health Office has improved service quality—including reliability, empathy, responsiveness, and communication—through structured, community-oriented efforts. Although technical and social challenges still need to be addressed to achieve equitable, effective, and affordable services.
3) Responsiveness: The Sikka District Health Office's performance in reducing maternal and infant mortality rates has shown improvement thanks to progressive policies. However, obstacles in human resource distribution, infrastructure, and public awareness have hampered its responsiveness, necessitating strengthening technical capacity, human resource management, and community empowerment to ensure equitable and sustainable achievement of the SDGs. 4) Responsibility: The Sikka District Health Office's performance in terms of responsibility reflects the principles of good governance through transparency, legal compliance, and social sensitivity to ensure sustainable, equitable, and quality maternal and child health services, despite structural and cultural challenges that still need to be addressed, while strengthening the institution's accountability and moral legitimacy.
4) Accountability: The Sikka District Health Office's performance accountability is reflected in consistent planning, reporting, and transparency in program implementation—including antenatal care, safe delivery, iron supplement distribution, and health education—supported by community participation, local data-driven policies, quarterly evaluations, routine supervision, and training of health workers to ensure the effectiveness and quality of services.

REFERENCES

Dwiyanto, A. (2006). *Mewujudkan good governance melalui pelayanan publik*. Yogyakarta: Gadjah Mada University Press.

Ensor, T. (2010). The impact of economic recession on maternal and infant mortality: Lessons from history. *BMC Public Health.*

Kementerian Perencanaan Pembangunan Nasional/Bappenas. (2020). *Pelaksanaan pencapaian SDGs Indonesia tahun 2020.*

Kombertonggo, V. (2008). *Evaluasi program kesehatan ibu dan anak puskesmas di Kabupaten Mimika tahun 2007 yang dilakukan pada tahun 2008.*

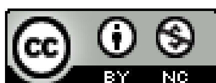
Rajagukguk, J., Manalu, D., & Damanik, G. (2023). *Kinerja Dinas Kesehatan dalam menanggulangi kematian ibu hamil dan bayi di Kota Medan.*

Rosyidatuzzahro, A., & Supit, P. W. E. (2023). Evaluasi pembangunan kesehatan dalam upaya penurunan angka kematian ibu dan bayi di Kabupaten Malang. *Journal Publico, 6*(1), 257–266.*

Sugiyono. (2007). *Metode penelitian kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.

Sugiyono. (2008). *Metode penelitian pendidikan.* Bandung: Alfabeta.

Sugiyono. (2013). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.



This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA, Google, doi Crossref, ROAD, INDEX COPERNICUS, onesearch, ISJD, sinta 4, EBSCO, Clarivate Analytics

Sugiyono. (2016). *Metode penelitian kuantitatif, kualitatif, dan R&D.* Bandung: PT Alfabeta.

Sugiyono. (2020). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.

Toda, H., Lino, M., & Tae, M. (2023). Peningkatan kapasitas pencapaian tujuan pembangunan berkelanjutan (SDGs) dalam menurunkan angka kematian ibu dan bayi (Studi pada lingkup organisasi pembangunan daerah Kabupaten Timor Tengah Selatan). *Jurnal Internasional Lingkungan, Keberlanjutan, dan Ilmu Sosial,* 4(1), Januari–Februari 2023.

This open-access article is distributed under a
Creative Commons Attribution (CC-BY-NC) 4.0 licence