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## **Analysis of Achievement of Malaria Elimination Maintenance in Sorong Selatan District**

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### **ABSTRACT**

**Introduction:** . The goal of malaria control in Indonesia is to achieve gradual elimination by 2030, starting from the district/city, provincial, regional, and national levels. The process will begin with elimination assessments for Java and Bali in 2023; Sumatra, Nusa Tenggara Barat (NTB), and Sulawesi in 2025; Kalimantan and Maluku Utara in 2027; Nusa Tenggara Timur (NTT) and Maluku in 2028; Papua Barat and Papua in 2029; with national elimination certification expected by 2030

**Objective:** This study aims to understand the inputs, activities, and outputs conducted by Sorong Selatan District in maintaining malaria elimination

**Method:** The method used is a qualitative approach with interviews conducted with nine informants, including healthcare workers and community members.

**Result:** The results of this study indicate that in Sorong Selatan District, trained healthcare workers and cross-professional collaboration play a crucial role in malaria elimination, despite limited numbers and funding from APBN, APBD, and the Global Fund. The Bela Kampung program raises community awareness, supported by routine monitoring and control activities such as blood surveys and the distribution of insecticide-treated nets. The district has successfully maintained its malaria elimination status despite challenges such as community dishonesty and budget constraints. Optimizing community awareness, cross-sector collaboration, the commitment of the regent, and program innovation help address these challenges.

**Conclusion:** The study recommends increasing the number of healthcare workers and strengthening cross-sector collaboration to maintain malaria elimination in Sorong Selatan District. Additionally, increasing funding and ongoing support from the local government are necessary.

**Keywords:** Malaria; Elimination; Logic Model; Program

## INTRODUCTION

Malaria is an infectious disease that can be life-threatening, caused by the entry of the protozoan parasite *Plasmodium* sp into the human body through the bite of an infected female *Anopheles* mosquito (1). The emergence of malaria is caused by various influencing factors that allow the *Anopheles* mosquito to survive by adapting to the existing environment (2). This condition has attracted the attention of nations, leading to its control becoming part of the Sustainable Development Goals (SDGs) commitment until 2030 (3).

Malaria remains a significant global health issue and continues to be a challenge to this day. According to a report by the World Health Organization (WHO), there were 229 million malaria cases and 409,000 deaths from the disease in 2019. Although the main risk areas are in Africa, Southeast Asia, the Western Pacific, and the Mediterranean, these regions also remain vulnerable. Every country strives to address the malaria problem by adhering to the global commitment made at the 60th World Health Assembly in 2007, which aims to eliminate malaria (4). According to the World Malaria Report, global estimates indicated 227 million malaria cases in 2019, increasing to 241 million cases in 2020 in 85 malaria-endemic countries (5).

Indonesia is one of the malaria-endemic countries. Nationally, according to 2019 case data, malaria cases are still dominant in eastern Indonesia, particularly in Papua (86%) and Nusa Tenggara Timur (NTT) (5%). The Indonesian government issued the Minister of Health Decree Number 293/2019 on Malaria Elimination as part of efforts to support the malaria elimination program. The goal of malaria control in Indonesia is to achieve gradual elimination by 2030, starting from the district/city, provincial, regional, and national levels. The process will begin with elimination assessments for Java and Bali in 2023; Sumatra, Nusa Tenggara Barat (NTB), and Sulawesi in 2025; Kalimantan and Maluku Utara in 2027; Nusa Tenggara Timur (NTT) and Maluku in 2028; Papua Barat and Papua in 2029; with national elimination certification expected by 2030 (4).

The 2020-2024 National Development Priorities aim to coordinate all resources to prepare for Indonesia's golden generation in 2045, focusing on the development of quality human resources. The National Development Planning Agency (BAPPENAS) and the Presidential Staff Office (KSP) have placed the Malaria Elimination Program under their monitoring because delays in achieving malaria-free status could cause new problems (2).

The malaria elimination program targets each district and city to obtain malaria-free certification. Sorong Selatan District is the first district in Papua Island to receive the malaria elimination certificate. Papua Island is a malaria-endemic area in Indonesia. Sorong Selatan District was declared malaria-free on November 5, 2022, by the Ministry of Health and received the malaria elimination certificate on April 24, 2023, in the new capital city. The designation of Sorong Selatan District as a malaria-free area can serve as a model for other districts and cities in Papua Island. There was a decrease in positive malaria cases in Sorong Selatan District from 14 cases in 2020, to 5 cases in 2021, to 22 cases in 2022, and a further decrease to 73 cases in 2023. The Regent of Sorong Selatan District followed up on the malaria elimination certification obtained by signing the South Sorong Regent's Commitment to Maintain Malaria Elimination Areas with four main points: (1) mobilizing all stakeholders to maintain malaria elimination, (2) mobilizing the entire community to prevent the emergence of new malaria cases and prevent malaria deaths, (3) ensuring the availability of trained personnel, facilities, infrastructure, and budget, and (4) coordinating all necessary efforts comprehensively, integrated, simultaneously, and sustainably to support the achievement of national malaria elimination by 2030.

Many challenges are faced in achieving malaria elimination status, especially in Sorong Selatan District, which is in a malaria-endemic area with potential breeding sites for *Anopheles* mosquitoes. This condition highlights the importance of analyzing the achievement of malaria elimination status in Sorong Selatan District as a learning opportunity for other districts/cities in Papua Island. The logic model approach can illustrate the relationship between resources, designed activities, expected outcomes, and long-term impacts. The logic model approach can help design proposed programs, implement, and evaluate programs to maintain malaria elimination status in Sorong Selatan District.

The policy strategy implemented in India to achieve malaria elimination is noteworthy. India applies strategies such as mass screening, active case management, vector control, health education, and behavior change programs. Activities include Indoor Residual Spraying (IRS), eliminating mosquito breeding sites, distributing insecticide-treated nets, logistics of medicines and malaria detection tools, and training health workers, all contributing to India's malaria elimination efforts (5). The strategies and activities implemented in India align with the malaria elimination maintenance guidelines issued by the Ministry of Health.

Previous research conducted in the Thousand Islands, Jakarta, showed that strengthening stakeholder commitment through communication, advocacy, motivation, and socialization was effective. Surveillance strengthening started with early detection, epidemiological investigation, treatment, monitoring, contact surveys, and laboratory examinations (6). Stakeholder understanding of malaria impacts policymaking related to malaria. The commitment to maintaining the elimination certificate is often carried out by UPTD Puskesmas officers (7).

Research conducted on the implementation of malaria elimination policies in Karangasem District, Bali Province, showed that cross-sectoral activities play a role in malaria elimination. The malaria elimination budget still

relies on the regional budget (APBD), making the role of local government crucial in supporting policies, budgeting, and socialization activities. The situation in Karangasem District demonstrates the relationship between input components and activity components to maintain malaria elimination status (8).

Based on the background, existing data, and related research on malaria elimination in other regions, researchers are interested in understanding the achievement of malaria elimination status in Sorong Selatan District. The results of this study will provide input for districts and cities in Papua Island to achieve malaria elimination status. The geographical similarities, tribes, and cultures make the analysis of malaria elimination maintenance in Sorong Selatan District a model and learning opportunity for other districts and cities to obtain malaria elimination status and design activities and programs that can maintain malaria elimination status.

## METHOD

This study on the analysis of malaria elimination achievement in Sorong Selatan District employs a descriptive qualitative research method. Qualitative research aims to explore existing conditions and answer the questions "what," "how," and "why" of a phenomenon being studied (9). This research will present the conditions or descriptions of the malaria elimination maintenance stage in Sorong Selatan District based on the factual findings obtained, providing a depiction of the phenomenon or situation occurring. The study will use the achievement of malaria elimination status in Sorong Selatan District as a case study.

Participants were selected using purposive sampling with a quota sampling strategy, based on criteria such as being health workers who handle malaria at the Health Office or UPTD Puskesmas in Sorong Selatan District, having at least one year of experience in malaria, and having signed informed consent. Exclusion criteria included health workers not involved in the malaria elimination maintenance program planning. To ensure diverse perspectives, participants were chosen from various institutions (Sorong Selatan District Health Office and UPTD Puskesmas), leadership positions (Head of the Health Office, Head of the Division of Disease Control and Eradication (P2P), and Head of UPTD Puskesmas), and roles in malaria activities (Malaria Program staff, Laboratory Analyst, Sanitarian, or Health Promotion Personnel). The minimum sample size was eight main informants and one additional informant, including the Head of the Health Office (1 person), Head of the P2P Division (1 person), two Malaria Program staff members, two Heads of UPTD Puskesmas, two malaria program implementers, and one community member. Data collection included five different instruments to capture various perspectives of the main informants on three variables: input, activities, and output, which are the primary focus of this research.

## RESULTS

The study identified three main themes in the process of malaria elimination: input, activities, and output. These themes were analyzed using NVivo 12 Pro, with detailed thematic mapping presented in Appendix 3. The activities theme covers a wide range of actions taken in the malaria elimination efforts, encompassing 11 categories: *Bela Kampung*, cross-border agreements, mapping, patient management, risk prevention and mitigation, epidemiological surveillance, potential outbreaks, capacity building, monitoring and evaluation, communication, information and education, and data interpretation. These categories are further organized into seven sub-themes, including patient management, which involves case finding, treatment, health service conditions, and guidelines; risk prevention and mitigation, which includes environmental management, Mass Blood Survey activities, survey and vector control, insecticide spraying, and bed net distribution; and epidemiological surveillance, comprising strict case surveillance, information systems, recording and reporting, monitoring migrant cases, new case tracking, and epidemiological investigations. Additional sub-themes in activities include communication, information, and education, with categories such as collaboration, program integration, cross-sector advocacy, and health promotion; capacity building, focusing on reorientation, training health workers, and empowering health cadres; monitoring and evaluation, including follow-up, internal monitoring, data processing, and review; and *Bela Kampung*, which involves sector involvement, program initiation, malaria cadres, and the 1-2-5 Epidemiological Investigation.

The output theme explores the outcomes of the malaria elimination efforts and includes six sub-themes: addressing challenges, service satisfaction, support, challenges, expectations, and conditions for maintaining malaria elimination. Specifically, the support sub-theme is divided into categories such as the commitment of the district head (bupati), cross-sector collaboration, health worker performance, and community awareness. The challenges sub-theme encompasses issues like drug resistance, burdens on pregnant women, cadre incentives, proximity to endemic areas, indigenous community dynamics, environmental changes, staff shortages, mapping needs, communication network issues, increases in imported cases, cross-sector support, leadership changes, staff turnover, community mobilization, focus on stunting, geographical challenges, community dishonesty, and budget constraints. This comprehensive mapping provides a detailed understanding of the activities and outputs involved in the malaria elimination process, highlighting the successes achieved and the obstacles encountered in sustaining a malaria-free status.

## Input Stage

The types of healthcare workers involved in the malaria elimination efforts in Sorong Selatan District include general practitioners, specialists, crosscheckers, entomologists, nurses, midwives, and trained health analysts. These professionals are distributed across various UPTD (Technical Implementation Unit of Public Health Centers) and the District Health Office of Sorong Selatan District, playing crucial roles in implementing and sustaining malaria elimination programs.

*"Yes, it's truly admirable, or rather commendable, that they are striving for malaria elimination on their own. They have trained doctors, including general practitioners and specialists. Typically, we use internal medicine specialists. These doctors are trained in malaria management, and there is also a cross-checker at the district level for second-level examinations and a malaria program manager. In districts that are certified, there are training sessions for the malaria program manager at the district level, particularly for activities involving trained entomologists in receptive mapping and focus mapping, as well as in conducting epidemiological investigations."* (Interview with EM-1)

The availability of healthcare workers in Sorong Selatan District during the process of achieving and maintaining malaria elimination status has been acknowledged as adequate, primarily because these workers have received specialized training related to malaria. There is a strong argument that healthcare workers who have been trained in malaria management are essential for sustaining the malaria elimination status, particularly within their respective areas of responsibility in the region. This underscores the importance of continuous education and training for healthcare personnel to ensure the ongoing effectiveness of malaria control and prevention measures.

*"So, the personnel who have been trained in malaria management must maintain the malaria elimination status."* (Interview with EM-6)

The readiness of healthcare workers in Sorong Selatan District to achieve and maintain malaria elimination status has been supported by enhanced capacity building in malaria management. Healthcare personnel have undergone training to improve their knowledge and skills in malaria treatment and control. Additionally, health analysts in the region have received specialized training, including entomology, with four analysts already equipped with expertise in this area. This capacity building ensures that the healthcare workforce is well-prepared to sustain malaria elimination efforts effectively.

*"The malaria program has conducted outreach and training for both doctors and nurses, including midwives, on malaria management."* (Interview with EM-2)

The shortage of professional personnel in specific fields has led to the development of interdisciplinary collaboration among healthcare workers in Sorong Selatan District to achieve and maintain malaria elimination status. Cross-professional collaboration has become a shared commitment in the fight against malaria in the region. There have been no specific requests for additional healthcare personnel solely for malaria programs, as the available workforce includes civil servant candidates (CPNS), contractual staff, and members of the Nusantara Sehat program. These resources collectively support the efforts to attain and sustain malaria elimination in Sorong Selatan District.

*"Actually, there are no specific requests for personnel. However, there are recruitment efforts for healthcare workers, including contract staff, P3K (Government Employees with a Work Agreement), and civil servants (CPNS). Additionally, there are special locations for the Nusantara Sehat program, which helps address the shortage of healthcare workers in facilities, especially those assisting in maintaining or achieving malaria elimination."* (Interview with EM-1)

The theme related to budgeting and implementation in the pursuit and maintenance of malaria elimination status in Sorong Selatan District reveals several key aspects: budget flow, workload, malaria elimination funding, border area management funding, and funding for potential outbreaks. The distribution of budget for malaria programs is managed through the Papua Barat Province, even though Sorong Selatan District has joined the new South Papua Barat Province, particularly for funds provided by the Global Fund. This arrangement highlights the complexities of financial management and inter-provincial coordination in sustaining malaria elimination efforts.

*"Then the funds are sent directly from the Financial Management of the Global Fund in Papua Barat Province. So, we are still combined with Papua Barat Province, even though we have already separated into South Papua Barat Province."* (Interview with EM-2)

Sorong Selatan District is the only district in Papua to achieve malaria elimination status. A significant challenge is managing cross-border areas. While there is no specific budget allocated for border area management related to malaria in Sorong Selatan District, funds for malaria migration surveillance are available through the Budget for Health Operational Costs (BOK) of Public Health Centers. This arrangement reflects the need for effective surveillance despite the lack of targeted funding for border management.

*"There is no specific budget for high-risk border areas, but the APBN (State Budget) or BOK (Operational Health Budget) for Puskesmas (Community Health Centers) clearly and in detail outlines activities. For*

*malaria elimination areas like Sorong Selatan District, the APBN or BOK budget mandates activities such as surveillance of malaria migration or testing for residents coming from malaria-endemic areas to prevent transmission, as well as other activities funded by the APBN or BOK of Puskesmas." (Interview with EM-3)*

The theme related to infrastructure and facilities necessary for achieving and maintaining malaria elimination status in Sorong Selatan District addresses several aspects, including assistance, the condition of health service facilities, the needs of primary health centers, availability of malaria medications and rapid test kits, the circulation of medicines outside government health facilities, medicine requests, logistics distribution, and referrals. During the pursuit of malaria elimination status, Sorong Selatan District received infrastructure and facility support from the World Health Organization (WHO). This assistance was allocated to the region through the Provincial Health Office, based on directives from the Ministry of Health of the Republic of Indonesia. This support underscores the critical role of adequate infrastructure and resources in sustaining malaria elimination efforts.

*"We receive assistance, such as from the WHO, through the Ministry of Health, which then allocates it to districts and cities via the Provincial Health Department." (Interview with EM-2)*

To maintain and achieve malaria elimination status, primary health centers (Puskesmas) require specific logistics, including malaria test kits such as rapid tests and reagents for microscopic reading. There is also a need for malaria medications to treat both reported and detected cases, whether imported or indigenous, within the health center's operational area. Additionally, insecticide-treated bed nets and larvicides are necessary for effective vector control. These resources are crucial for the continued success of malaria elimination efforts at the primary health care level.

*"What our Puskesmas urgently needs are logistics or facilities, including malaria examination kits, an adequate supply of malaria medication, insecticide-treated nets, and larvicides for vector control. Additionally, competent personnel in their respective fields must always be ready whenever needed for handling malaria cases, including treatment, epidemiological investigation, and malaria control." (Interview with EM-5)*

In Sorong Selatan District, there has never been a shortage of malaria medications. However, information from neighboring districts indicates that their communities face difficulties in obtaining malaria drugs. In Sorong Selatan District, the circulation of malaria medications outside government health facilities is prohibited. There are established regulations and agreements between the Sorong Selatan District Health Office and local pharmacies or drug stores. Pharmacies and drug stores that engage in the sale of anti-malarial drugs are subject to sanctions. This strict control helps ensure the availability and proper distribution of malaria medications within the region.

*"Puskesmas are directly supplied with malaria medication by staff and other doctors, who explain the dosage instructions. Regarding the shortage of medication, I am not aware of it, but there was a family from Sorong City last year." (Interview with EM-9)*

The policy related to malaria status in Sorong Selatan District is marked by the issuance of a decree (SK) by the district head (bupati) concerning malaria elimination. This policy significantly influences the support provided by institutional leaders to healthcare workers implementing malaria programs, thereby contributing to the maintenance of malaria elimination status. The commitment from the district head ensures that the necessary resources and backing are available for sustaining malaria elimination efforts in the region.

*"For the heads of Puskesmas, we consistently support and coordinate with the Malaria Program Manager, including myself, in implementing the malaria program. To achieve indicators, targets, and policy goals for the program, especially for malaria elimination status, there are both routine and periodic activities, as well as integration with other programs." (Interview with EM-7)*

### Activities Stage

The *Bela Kampung* activity is a program replicated from Teluk Bintuni District, involving community participation through health cadres at posyandu (integrated health service posts). The objective of *Bela Kampung* is to enhance public awareness about identifying, preventing, and adhering to malaria treatment processes. This initiative aims to engage the community actively in malaria control efforts and ensure better adherence to treatment protocols.

*"In the beginning, we modeled our efforts after Teluk Bintuni District, which at that time established Village Malaria Workers, known as Juru Malaria Kampung (JMK). In remote areas with limited access to healthcare facilities, JMK are local residents selected to raise community awareness so that they can identify, prevent, and treat malaria. At that time, we were still operating in Papua Barat Province. Learning from what was done by Teluk Bintuni District, we established a program called Belakampung, aimed at freeing villages from malaria within two months and subsequently expanding from village to village gradually. This initiative was comprehensive and sustainable. JMK were trained to conduct blood tests using Rapid Diagnostic Tests (RDT), provide treatment, and use a weight measurement method with strict supervision from healthcare workers.*

*Belakampung in South Sorong involved Posyandu cadres, with cadre training starting in 2018 and continuing through 2019 in several districts." (Interview with EM-2)*

The *Bela Kampung* activity is a program focused on collaborating with healthcare workers to provide information to the community about malaria, utilizing local wisdom. It involves an advocacy team that works in partnership with various sectors to ensure the smooth and effective implementation of the program. This collaborative approach helps integrate traditional knowledge with modern malaria control strategies, enhancing community engagement and effectiveness in malaria prevention and treatment. Health cadres at posyandu play a crucial role in the implementation of the *Bela Kampung* program. The reduction in malaria cases is achieved through increased community knowledge and awareness, facilitated by the information provided by these cadres using local wisdom. Cadres involved in *Bela Kampung* receive training on the 1-2-5 epidemiological investigation concept. This approach supports malaria control efforts at the grassroots level, enabling early warning, case finding, epidemiological linkage, and treatment of malaria cases effectively through the active involvement of health cadres in posyandu.

*"The relationship involves trained healthcare workers conducting PE 125 together with Bela Kampung cadres, enabling them to explain to patients and the community using a familial language and approach during healthcare visits to patients' residences. The cadres monitor the patients' medication intake in accordance with the malaria patient monitoring format. This includes contact surveys, behavioral surveys, and environmental surveys on days 4, 7, 14, and 28, during which healthcare workers collect blood samples with the assistance of the cadres. The cadres consistently accompany the healthcare workers or malaria program officers. On day 5, healthcare workers, in collaboration with the cadres and inter-sectoral units, handle any discovered larvae or Anopheles vectors in the environment." (Interview with EM-6)*

The malaria data held by UPTD Puskesmas serves as a foundation for communication, information, and education efforts. These processes are carried out in an integrated manner, involving collaboration among various professions and sectors, including community leaders, religious figures, village heads, and the general public. The use of malaria data in communication and education activities supports cross-sector advocacy, with the Sorong Selatan District Health Office playing a key role in implementing malaria-related advocacy. This collaborative approach ensures that malaria control messages are effectively disseminated and that all relevant stakeholders are engaged in the fight against malaria.

*"Next, we continued to integrate and advocate with stakeholders, both across sectors and programs within the Health Office, as well as in community health centers (puskesmas) and other healthcare facilities." (Interview with EM-1)*

Monitoring and evaluation are conducted by the malaria program coordinators at the Sorong Selatan District Health Office for the responsible parties and implementers of malaria activities at healthcare facilities, such as puskesmas (community health centers). Evaluation of malaria programs is not only carried out by the Sorong Selatan District Health Office but also includes internal evaluations by UPTD Puskesmas. These internal evaluations are performed periodically, such as monthly, to assess and ensure the effectiveness of malaria control efforts and to support the achievement and maintenance of malaria elimination status.

*"Monitoring and evaluation are conducted by the Malaria Program Manager at the Health Office for the Malaria Managers at healthcare facilities. If any issues arise, immediate assistance is provided from the Health Office to the Program Managers at the healthcare facilities for recording and reporting through the SISMAIL application. If there are network issues, the Program Managers at the healthcare facilities manually collect the data, assist with Excel, and send it to the Malaria Program Manager at the Health Office for further assistance in data compilation." (Interview with EM-2)*

Monitoring and evaluation activities focus on how healthcare workers at health facilities collect and process malaria case data. Document review is a crucial component of the monitoring and evaluation process in Sorong Selatan District. Healthcare workers will receive capacity-building through training, and if any personnel fail to perform their duties effectively, they will be supported by the malaria team from the Sorong Selatan District Health Office. This support ensures that all staff adhere to their roles and responsibilities in maintaining effective malaria control and elimination efforts.

*"Yes, document checks are conducted, and it is mandatory to archive data, both the Format B for each malaria case, case data, and laboratory examination data at every healthcare facility. Additionally, treatment data included in medical records and in the PE format undergo regular malaria data analysis." (Interview with EM-2)*

Prevention and mitigation of risk factors are crucial for achieving and maintaining malaria elimination status in Sorong Selatan District. Key activities include Mass Blood Surveys (MBS), distribution of bed nets, epidemiological investigations, and larval surveys, all aimed at reducing the risk of increasing malaria cases. MBS is conducted alongside the distribution of insecticide-treated bed nets to the community. Health cadres involved in

the *Bela Kampung* program play a vital role in executing these preventive and risk mitigation activities, significantly contributing to the overall effort to control and eliminate malaria.

*"There is MBS, and secondly, the mass distribution of bed nets to the community. Epidemiological investigations are conducted if there is a case, and the formation of Bela Kampung cadres is crucial to assist us in larval surveillance, receptivity mapping, and focus mapping in the Teminabuan community health center area. Routine distribution of bed nets to at-risk groups, such as pregnant women and infants, is conducted. Additionally, there are KIS counseling sessions and socialization, both individually and in groups. We collaborate across programs and sectors, and cross-check malaria sample shipments with the cross-checker at the district level."* (Interview with EM-5)

The distribution of insecticide-treated bed nets, conducted on a large scale and in conjunction with other activities such as Mass Blood Surveys (MBS) and environmental factor surveys, aims to achieve malaria elimination status. A total of 87,480 insecticide-treated bed nets were distributed across 15 sub-districts. There is a notable difference in the distribution approach between the initial achievement of malaria elimination status and the ongoing efforts to maintain this status. The strategy for bed net distribution is adapted to address the changing needs and challenges during both phases.

*"Since 2009, several activities have been carried out. The first was the mass distribution of bed nets from 2009 to 2014. At that time, Sorong Selatan District had 15 districts or sub-districts. About 87,480 bed nets were distributed to all communities, from urban areas to villages."* (Interview with EM-2)

Vector surveys and vector control are key strategies for preventing and mitigating malaria risk factors. Vector surveys are conducted across the areas covered by 16 UPTD Puskesmas, which are spread throughout the 15 sub-districts of Sorong Selatan District. Efforts in vector control include environmental modifications such as filling in stagnant water after vector inspections and planting vegetation such as lemongrass, lavender, and other plants. These activities help reduce mosquito breeding sites and contribute to malaria prevention and control efforts.

*"Yes, that's correct. The implementation of vector surveys and vector control continues in each working area, which includes 16 community health centers (puskesmas) in 15 districts—since one district here has two community health centers. Environmental management and modification activities are consistently carried out in collaboration with cross-sectoral partners in each district and village. This includes tasks such as eliminating water puddles, creating drainage channels in villages to flow standing water, and planting mosquito-repellent plants like lemongrass and lavender flowers. One of the key considerations is the high mobility of people traveling to malaria-endemic areas and then returning to South Sorong, potentially bringing Plasmodium parasites with them. There may be vectors that are not visible or reachable by trained community health centers, posing a risk to elimination efforts. Additionally, weather and climate conditions are highly conducive to the presence of breeding places, such as swamps, temporary water puddles, animal shelters, and other similar environments."* (Interview with EM-4)

Human resources in healthcare are crucial for achieving and maintaining malaria elimination status in Sorong Selatan District. Capacity building for healthcare personnel is carried out through reorientation and training programs focused on the management, prevention, and treatment of malaria cases. Entomology training is particularly emphasized and frequently conducted, especially as part of the malaria program. This ongoing training ensures that healthcare workers are well-equipped with the knowledge and skills needed to effectively address malaria.

*"Thank God, it has been running well and is supported by funds from the national (APBN) and regional (APBD) budgets. Entomologist training and receptivity mapping have been conducted for malaria officers and analysts from 16 healthcare facilities across 15 districts. Monitoring and evaluation of the malaria program can be carried out in 17 healthcare facilities across 15 districts."* (Interview with EM-2)

Epidemiological surveillance is a systematic and ongoing effort to ensure that Sorong Selatan District remains free from indigenous malaria cases. This includes strict case surveillance, tracking new cases, monitoring migration cases, epidemiological investigations, recording and reporting, and maintaining an information system. Epidemiological investigations conducted by UPTD Puskesmas in Sorong Selatan District involve establishing links or epidemiological relationships for each identified case. This approach demonstrates the seriousness with which healthcare workers in Sorong Selatan District address and manage malaria cases.

*"The malaria program establishes epidemiological links or relationships from malaria cases to elucidate the complex determinants of malaria, including disease risk factors and the role of acquired immunity. This approach results in a more targeted and effective malaria control program, which helps reduce both the incidence of malaria cases and mortality rates."* (Interview with EM-8)

The potential for future malaria outbreaks must be prepared for in advance. Should an outbreak occur, the Sorong Selatan District Government will be responsible for managing it through the Sorong Selatan District Health Office, with the assistance of healthcare workers from UPTD Puskesmas in the affected areas. Timely and effective handling of potential malaria outbreaks is a demonstration of the regent's commitment to maintaining malaria

elimination status. Case management at healthcare facilities across Sorong Selatan District is conducted in accordance with guidelines provided by the Ministry of Health. The response to malaria cases in Sorong Selatan District has shown a positive reception from the community, reflecting the effectiveness of the malaria-related health services provided.

*"Certainly, we follow the guidelines from the Ministry of Health for achieving malaria-free status or malaria elimination. This includes case detection through MBS, screening of at-risk groups, and maintaining malaria elimination through migration surveillance. This involves screening and malaria testing for all individuals moving in and out of malaria-endemic areas, whether they are traveling or not. At-risk groups, such as pregnant women and young children, are integrated with maternal and child health programs."* (Interview with EM-2)

### Output Stage

The maintenance of malaria elimination status in Sorong Selatan District remains feasible, with the capacity to identify and track cases being adequately maintained. The District's malaria status has been assessed by the Ministry of Health over the past three years, focusing on the absence of indigenous malaria cases and malaria-related deaths. Despite this, there has been a decline in the number of positive malaria cases, which could be attributed to the impact of the COVID-19 pandemic, resulting in reduced community mobilization.

*"Over the past five years, malaria case distribution has shown a significant decline from 2020 to 2022, likely due to the COVID-19 pandemic, which reduced and restricted community mobilization. However, in 2023, there was a notable increase, and in 2024, the numbers have risen substantially. All malaria cases are imported from endemic areas. The highest number of confirmed malaria cases is found in two districts: Teminabuan and Mosoren. This is attributed to high community mobility to malaria-endemic areas, as the populations in Teminabuan and Mosoren are predominantly transient, meaning they frequently travel to their home villages or for family matters. We conduct case investigations (PE) accordingly."* (Interview with EM-4)

Sorong Selatan District faces a range of challenges in managing malaria cases. Dishonesty among community members during epidemiological investigations, particularly regarding travel history, complicates case tracking. Additionally, securing adequate funding for malaria programs remains a concern, alongside issues such as the replacement or transfer of trained healthcare personnel. Geographical difficulties further hinder access to affected areas, while the local government's focus on other health issues, such as stunting, may divert attention from malaria control efforts. High community mobility and a shortage of qualified professionals add to the complexity of the situation. Changes in local government leadership, lack of support from some cross-sectoral partners, and poor communication networks also pose significant obstacles, affecting case reporting and coordination. Environmental changes, the presence of indigenous communities with unique needs, and proximity to malaria-endemic areas further challenge malaria elimination efforts. Moreover, issues such as inadequate incentives for Bela Kampung health cadres, increased burden of malaria cases among pregnant women, and emerging drug resistance in some malaria cases highlight the multifaceted nature of the problem.

*"The most prominent challenges are high community mobility to malaria-endemic areas and the reluctance of individuals to undergo malaria testing. When malaria is confirmed, there is often dishonesty about travel history to endemic areas, making it difficult to address the issue effectively. Accurate communication from cross-sectoral entities that patients can trust is crucial for patients to honestly disclose their travel history to endemic areas. Another challenge involves regulations from the regent, such as those concerning the elimination of SKKLB (extraordinary events) and the commitment of the regent during changes in leadership. It is uncertain whether the new regent will continue to enforce these regulations, which poses a significant challenge. Additionally, there is a lack of support from cross-sectoral stakeholders in maintaining malaria elimination status. These are the most significant challenges we face."* (Interview with EM-4)

To address the various challenges faced, Sorong Selatan District focuses on optimizing all supporting factors to maintain malaria elimination status. The District frequently implements innovative strategies and activities aimed at achieving and sustaining malaria-free status. Key factors contributing to successful malaria elimination include increased community awareness about malaria issues, effective cross-sector collaboration in addressing these problems, and strong commitment from the District's leadership, particularly the Regent of South Sorong. The performance of healthcare personnel also plays a crucial role; their effective work directly correlates with the level of satisfaction experienced by the community. This satisfaction arises from high-quality service and clear communication about malaria case management, which helps ensure that the community understands and adheres to malaria prevention and treatment protocols.

*"In maintaining malaria elimination status, we hope for continued commitment from the regent. The regent who was present during the malaria elimination certificate presentation must ensure that these commitments*



*are upheld by future regents, rather than ending with the current regent. Regarding funding, we expect continuous financial support to ensure the successful implementation and maintenance of the malaria elimination program. Additionally, timely and mandatory responses, notifications, reporting formats, case management, and investigations need to be enhanced. Migration surveillance and rapid vector control responses, as well as ongoing development in epidemiological and entomological monitoring, are crucial. For increasing community participation, we strongly advocate for more training and capacity building for health personnel, specifically within the malaria program. Involvement from local government, including coordination with security and sectoral leaders, is essential in supporting malaria elimination efforts. Quality diagnostics, including both microscopy and RDTs, must be maintained. Cross-border collaboration should also be sustained to support these efforts."* (Interview with EM-1)

There is a strong hope among all informants that Sorong Selatan District will maintain its malaria elimination status through improved services and innovations emerging from malaria programs. Establishing cross-sector collaboration and maintaining commitment across borders are crucial, as South Sorong remains the only District in Papua to achieve malaria elimination status.

## DISCUSSION

### Input Stage

The input stage underscores the importance of having professional and trained human resources, sufficient budget, and adequate facilities and infrastructure, collectively referred to as resources. Human resources play a crucial role in ensuring the efforts to achieve or maintain malaria elimination status proceed smoothly and sustainably according to established service management guidelines or standards. Budget and facilities are the driving factors enabling existing human resources to implement programs or efforts effectively.

The attainment of malaria elimination is inseparable from the availability of adequate and quality human resources. Technological advancements demand that human resources improve their quality and capabilities. Effective malaria programs require skilled human resources for program management, planning, and vector control carried out by entomology experts. Epidemiological surveys and vector control data are essential for designing optimal prevention and mitigation activities for malaria risk factors (10).

A sufficient number of healthcare workers with knowledge about malaria services significantly influence the maintenance of malaria elimination status. The need for entomology experts in malaria management is vital. The shortage of professional experts has led to training programs to enhance the knowledge and skills of other healthcare workers, enabling them to function as entomology health workers (9).

Adequate funding is a manifestation of the commitment that has been made. A decrease in budget may indicate that the malaria program is functioning well, but it is essential to pay attention to budget allocation to prevent the resurgence of cases. The budget is always present and highly sensitive, affecting various stages of the malaria program (11). Malaria service funding in Sorong Selatan District comes from the state budget, regional budget, and the Global Fund. There has been a decline in the regional budget allocation, indicating that the malaria services in Sorong Selatan District are functioning well. However, field conditions show that the District, still new in maintaining malaria elimination status, has experienced budget cuts due to other governmental focus areas. The budget is central to resources; if human resources face challenges, capacity-building is required, which necessitates proper budget allocation.

Facilities and infrastructure play a vital role in the input stage of malaria elimination status. Essential facilities include rapid diagnostic tests for malaria screening in case detection areas. Every healthcare facility must have microscopes and supporting tools for blood smear examinations. Proper distribution of antimalarial drugs is necessary for treating malaria cases (1).

The input stage of malaria elimination is supported by the strong commitment of the Sorong Selatan District Regent, as reflected in the regent's decree. This shows that the commitment to malaria elimination in Sorong Selatan District is a policy that requires monitoring. Well-implemented policies can be seen from the preparation and evidence that aligns with achieving malaria elimination status (12).

### Activities Stage

The activities stage involves a combination of efforts aimed at achieving malaria elimination status in Sorong Selatan District by optimizing the resources identified in the input stage. These activities include the Bela Kampung program, malaria data interpretation, monitoring and evaluation, risk mapping and prevention, human resource capacity building, cross-border agreements, epidemiological surveillance, and patient management. These interrelated activities contribute to achieving malaria elimination status.

The Bela Kampung program aims to resolve malaria cases in villages within two months and progressively. Initiated by the Papua Barat Health Office in Teluk Bintuni, the Bela Kampung program involves community

participation in addressing malaria cases in their villages. The community assists in case tracking and identifying high-risk individuals, health workers perform examinations and blood sampling, and health volunteers help with case tracking and health promotion using local wisdom. The program emphasizes the 3M approach (covering, draining, and burying) and monitoring distributed bed nets (9).

Malaria surveillance aims to monitor communities for risk factors contributing to increased cases. Strengthening malaria surveillance, including migration surveillance, risk factor surveillance, and case and laboratory surveillance, is essential. Active malaria surveillance is evidenced by well-interpreted malaria data, epidemiological investigations determining imported and indigenous cases, case migration tracking, optimizing cross-border agreements, and more (13).

The 1-2-5 epidemiological investigation is crucial for malaria case control, involving a series of activities like reporting positive malaria cases within 24 hours, completing the epidemiological investigation by day two, and malaria control by day five (13).

Health worker capacity building for malaria management includes training for health analysts, doctors, and malaria program coordinators on malaria management. Entomology training is provided to address the shortage of entomology experts in health departments, similar to the situation in Talaud Islands District (14).

Bela Kampung health volunteers play a critical role in malaria prevention and control, including suspect identification, early malaria detection, and medication supervision. They also assist communities in controlling mosquito breeding sites, ensuring that malaria patients complete their 14-day medication course to prevent relapses and drug resistance (8).

Insecticide-treated bed net distribution targets at-risk populations in endemic malaria areas, not based on socioeconomic status. Distributed bed nets cover a 200 x 200 x 200 cm area, with each family receiving two nets to ensure optimal usage (14).

Before achieving malaria elimination status, Sorong Selatan District distributed bed nets massively to protect the entire community from malaria. The current decline in bed net distribution indicates the region's success in achieving malaria elimination status. Bed net distribution serves as an example to highlight their importance, fostering a sense of necessity among the community.

## Output Stage

Sorong Selatan District successfully achieved malaria elimination status, as assessed by the Ministry of Health over the past three years, with no indigenous malaria cases or malaria-related deaths. The decline in malaria cases during the COVID-19 pandemic, due to reduced mobility, further contributed to this success. However, maintaining malaria elimination status remains a significant challenge requiring ongoing efforts from all stakeholders.

The challenges in maintaining malaria elimination status in Sorong Selatan District include community dishonesty in epidemiological investigations, budget constraints, trained healthcare worker turnover, and difficult-to-reach geographical areas. Additional challenges involve the local government's focus on stunting issues, high community mobility, and the shortage of professional healthcare workers. Other obstacles include government leadership changes, lack of cross-sector support, communication issues, environmental changes, influence of traditional communities, surrounding endemic malaria areas, health volunteer incentives, maternal health cases, and malaria drug resistance.

Regions striving for malaria elimination status face various challenges, including budget limitations, professional workforce shortages, community behavior, and cross-sector roles. Research in Central Bangka District highlights similar challenges, such as suboptimal malaria control strategy implementation, community migration, ineffective cross-border agreements, limited healthcare human resources (especially entomologists and epidemiologists), and budget constraints (15).

Sorong Selatan District has optimized all supporting factors to maintain malaria elimination status. Consistent innovative efforts and activities have been conducted to support this goal. Public awareness of malaria control has increased, and cross-sector roles in addressing malaria issues have become more significant. The commitment of the Sorong Selatan District Regent and the excellent performance of healthcare workers are pivotal in this success, reflecting in the community's satisfaction with malaria services received.

## CONCLUSION

The qualitative analysis of malaria elimination in Sorong Selatan District reveals a multifaceted approach that has led to the successful achievement and maintenance of malaria-free status. The study highlights the crucial role of trained healthcare professionals, cross-professional collaboration, and diversified funding sources, including APBN, APBD, and Global Fund, despite a noted decrease in local budget allocation post-elimination status. Key activities, such as the community-engaging "Bela Kampung" program, routine monitoring and evaluation, and various malaria control measures including vector surveys and insecticide-treated net distribution, were pivotal in

addressing the disease. The strategic use of data for policy-making and community education, along with capacity-building efforts for health workers, underscores the comprehensive approach adopted by the local health authorities. Challenges such as community non-compliance, funding adequacy, turnover of trained health personnel, geographical constraints, and a shortage of professionals with specific competencies were identified as ongoing issues. Nevertheless, the commitment of local leadership, cross-sectoral collaboration, and innovative program initiatives have been crucial in sustaining the elimination status. Overall, the experience of Sorong Selatan District serves as a valuable model for other regions aiming for malaria elimination, demonstrating that a well-coordinated and supported health system, combined with community engagement and adaptive strategies, is essential for long-term success in combating malaria.

## SUGGESTION

Based on the qualitative analysis, to maintain malaria-free status in Sorong Selatan District, several steps are recommended. At the input stage, it is essential to enhance the training of health cadres and strengthen cross-professional collaboration among doctors, nurses, midwives, and entomologists. Additionally, securing additional funding from the local government or through partnerships with the Global Fund will support ongoing malaria programs. At the activities stage, increasing community education and awareness through regular sessions by UPTD Puskesmas is crucial, alongside conducting monthly monitoring and evaluation to ensure program effectiveness and identify areas for improvement. Improving training for healthcare workers and health cadres in line with the latest guidelines from the Ministry of Health or WHO is also advised. Lastly, at the output stage, boosting health cadres' involvement in case management, enhancing cross-sector collaboration, and engaging the community and local government through health campaigns will be key to sustaining the malaria-free status in Sorong Selatan District.

## REFERENCES

1. Afriadi A, Suroyo RB, Harahap J. Evaluasi Pelaksanaan Program Eliminasi Malaria di Kabupaten Aceh Singkil Tahun 2018. *Jurnal Keperawatan Priority*. 2020;3(1):1-12. <https://doi.org/10.34012/jukep.v3i1.757>
2. BAPPENAS. Rencana Pembangunan Jangka Menengah Nasional 2020-2024. 2019.
3. Cowman AF, Healer J, Marapana D, Marsh K. Malaria: Biology and Disease. *Cell*. 2016;167(3):610-624. <https://doi.org/10.1016/j.cell.2016.07.055>
4. Direktorat Jenderal Pencegahan dan Pengendalian Penyakit. Situasi terkini perkembangan program pengendalian malaria di Indonesia tahun 2018. Jakarta: Direktorat Jenderal Pencegahan dan Pengendalian Penyakit Kemenkes RI; 2019. 1-19 p.
5. Ghosh SK, Rahi M. Malaria elimination in India—the way forward. *J Vector Borne Dis*. 2019;56(1):32-40. <https://doi.org/10.4103/0972-9062.257771>
6. Kemenkes. Panduan Pemeliharaan Eliminasi Malaria. Jakarta: Kementerian Kesehatan RI; 2017.
7. Lalandos N, Kepel BJ, Umboh JM. Evaluasi Pelaksanaan Program Eliminasi Malaria Di Kabupaten Kepulauan Talaud. *Graha Medika Nursing Journal*. 2019;2(1):54-62. <https://journal.iktgm.ac.id/index.php/nursing/article/view/67>
8. Lappra KG, Sudharmono U. The Peran Kader Malaria di Wilayah Kerja Puskesmas Bagaisarwar Sarmi Timur. *Promotif: Jurnal Kesehatan Masyarakat*. 2021;11(2):113-121. <https://doi.org/10.56338/pjkm.v11i2.2026>
9. Mobilala FD, Rantetampang AL, Sandjaja B, Pontiku A, Tingginehe R, Makaba S, et al. Studi Keberhasilan Program Pemberantasan Malaria di Kabupaten Teluk Bintuni. *Int J Sci Health Res*. 2019;4:232-243.
10. Pratama GY. Nyamuk Anopheles sp dan faktor yang mempengaruhi di Kecamatan Rajabasa, Lampung Selatan. *J Majority*. 2015;4(1):20-27. <https://journal.uinjkt.ac.id/index.php/kaunyah/article/view/12918/pdf>
11. Roosihermiatie B, Pratiwi NL, Jp W. Analisis Implementasi Kebijakan Eliminasi Malaria di Indonesia. *Bul Penelit Sist Kesehat*. 2015;18(293):277-84. <https://media.neliti.com/media/publications-test/20953-analysis-of-implementation-the-policy-on-e24ac290.pdf>
12. Roosihermiatie B, Rukmini R. Analisis Implementasi Kebijakan Eliminasi Malaria Di Provinsi Bali. *Buletin Penelitian Sistem Kesehatan*. 2013;15(2):21338. [https://doi.org/10.22435/bpsk.v15i2\\_Apr.2988](https://doi.org/10.22435/bpsk.v15i2_Apr.2988)
13. Safrudin WA, Sumanto D, Handoyo W, Sayono S. Edukasi penggunaan kelambu berinsektisida di daerah pre eliminasi malaria dengan pendekatan kunjungan rumah. *J Inovasi Dan Pengabdian Masyarakat Indonesia*. 2022;1(2):41-45. <https://doi.org/10.26714/jipmi.v1i2.22>
14. Suryaningtyas NH, Arisanti M. Situasi Malaria Di Kota Lubuklinggau Provinsi Sumatera Selatan Dalam Mencapai Eliminasi Malaria Tahun 2021. *SPIRAKEL*. 2021;13(2):78-87. <https://doi.org/10.22435/spirakel.v13i2.5545>

15. Utarini A. Tak Kenal Maka Tak Sayang Penelitian Kualitatif Dalam Pelayanan Kesehatan. Yogyakarta: Gajah Mada University Press; 2022.
16. Wahono T, Astuti EP, Ruliansyah A, Ipa M, Riandi MU. Studi Kualitatif Implementasi Kebijakan Eliminasi Malaria di Wilayah Endemis Rendah Kabupaten Pangandaran dan Pandeglang. *ASPIRATOR - J Vector-Borne Dis Stud.* 2021;13(1):55-68. <https://doi.org/10.22435/ASP.V13I1.4683>
17. Wahyudi W, Raharjo M, Sulistiyani S, Nurjazuli N, Suwito S. Penerapan Strategi Pemeliharaan Eliminasi Malaria Di Kabupaten Administrasi Kepulauan Seribu. *J Kesehatan Lingkungan Indonesia.* 2024;23(1):10-18. <https://doi.org/10.14710/jkli.23.1.10-18>.
18. WHO. World Malaria Report 2019. Geneva: World Health Organization.
19. WHO. World Malaria Report 2021. Geneva: World Health Organization; 2021. Licence: CC.
20. Windusari Y, Hasyim H. Analisis Strategi Pengendalian Vektor Malaria di Kabupaten Bangka Barat. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI).* 2021;4(4):545-553. <https://doi.org/10.56338/mppki.v4i4.1827>