Current Situation and Progress toward the 2030 Health-related Sustainable Development Goals (SDG 3): A Scoping Review in Thailand

Anunya Pradidthaprecha, Orawan Noiwat and Kultida Bunjongsiri*

School of Health Science, Sukhothai Thammathirat Open University, Nonthaburi, Thailand

Corresponding author: Kultida73@gmail.com

Received: 28 March 2023 / Revised:: 17 July 2023 / Accepted: 5 August 2023

Abstract By adopting the Sustainable Development Goals (SDGs) in 2015, all of the goals are interconnected, even if only SDG 3 focuses on ensuring healthy lives and promoting wellbeing for all people at all ages. The United Nation member set a number of audacious and ambitious health-related goals that must be accomplished by 2030. While one of the SDGs is "health", several other "health-related" goals also included. Health-related objectives can serve to direct efforts to promote health, direct health policy, and evaluate progress. A goals-setting process almost always results in a higher focus on illness prevention and health promotion. For Agenda 2030 to be realized, integrated implementation across Goals is required. A multistakeholder, multi-actor response is necessary to implement the 2030 Agenda. In addition to discussion between governments, the commercial sector, civil society organizations, and nongovernmental organizations, innovations and advancement in policy, technology, and research are required. Most significantly, a committed community is required. It is essential to comprehend Thailand's development toward these goals if population health for 70 million citizens is to be improved. While the body of literature already in existence is replete with normative suggestions for potentially helpful measures, there is less evidence of national implementation plans.

Keywords: Sustainable Development Goals, SDG 3, Health-related, Health and Well-Being, Thailand 4.0

1. Introduction

A series of audacious and ambitious health-related goals were defined by the Sustainable Development Goals (SDGs), which were adopted by all UN member states in 2015. The SDGs of the United Nations (UN), which took their place after the Millennium Development Goals (MDGs), which were already completed in 2015, represent the new development agenda through 2030. Only target 3, "guarantee healthy lives and promote well-being for all at all ages," specifically mentions health among the 17 SDGs, however 10 other goals make use of health-related indicators [1]. The Inter-Agency and Expert Group on SDGs Indicators released a total of 232 monitoring indicators, 50 of which are connected to health, to track and assess the advancement of member nations

[2]. Monitoring Health for the SDGs [3], Atlas of the SDGs [4] , Index and Dashboards [5] , and Global Burden of Disease (GBD). Study are just a few of the projects that have been created to monitor worldwide progress toward the health-related Goals [6].

According to the Department of Mental Health' s research from 2019, Thailand has the 32nd-highest suicide rate in the world, with an average rate of 14.4 per 100,000 persons [7]. Additionally, it was shown that only 28% of the 1.5 million Thai people aged 15 and older who suffered from depression had access to treatment. In Thailand, there have been almost six attempts at suicide every hour over the previous few years. Depression is regarded as a major cause of death and is responsible for more than 70% of suicides. Thai people who should have had longer lives as a result of this circumstance pass away too soon. Additionally, empirical data suggests that the COVID-19 situation has resulted in a rise in suicide rates since 2020. According to reports, stress levels were higher among Thai people, which increased the prevalence of depression. Additionally, the long- lasting effects of the COVID- 19 epidemic have left the general public in a condition of constant exhaustion, mental fatigue, and emotional vulnerability, which has diminished their capacity for resilience in the face of adversity [8]. Additionally, research has shown that older people with a history of COVID-19 infection had lower quality of life and a higher prevalence of depression than those without a history of infection. Therefore, the elderly's mental health should be given priority in effective planning and health policy actions aimed at lowering health-related concerns [9,10].

Thailand' s 20- year sustainable development plans will be in line with the SDGs. The SDGs' 15- year plan will be covered by the strategies, which will also protect the nation' s sustainable development from political upheaval. According to the new constitution, the nation must have national policies and budgets that support those policies. The "Thailand 4.0" paradigm is another step along the Thai path to the SDGs. The nation must progress through its agricultural, industrial, and technical stages in order to build a creative, "smart" economy with a diverse culture that strives for sustainability. It must now move into its phase of development known as 4.0, which is characterized by a digital economy, increased quality of life for all people, and sustainable use of natural resources. The 12th National Economic and Social Development Plan, which covers the years 2017 through 2021, promotes conformity with the Paris Agreement and 20- year national strategies. To improve population health for Thailand' s 70 million citizens [11] , it is essential to comprehend the progress toward these goals. According to the most recent report from 2022, Thailand has an overall SDGs Index score of 74.1 and is ranked 44th out of 163 countries [12]. This indicates that Thailand has covered 75 percent of the distance. Nonetheless, a comparison of the SDGs Index for 2021 and 2022 would show a decline in Thailand's ranking. Thailand's score increased in 2022 as a result of the approach that saw new indicators added and the calculation methods modified. Since its beginning in 2002, Thailand's policy on universal health coverage (UHC) has advanced significantly. At all phases of life, every Thai citizen is now entitled to necessary preventive, curative, and palliative healthcare treatments. But the policy has issues, just like its counterparts abroad. In a country where a sizable segment of the population lives in poverty, a system that is primarily tax- financed will always try to keep expenses from rising. There are differences between the various health insurance plans that cover Thai citizens.

Government funding for national health care is significant, primarily to lower access costs for the underprivileged. Along with the development of Thai people's lifestyles, the population is aging, and the illness profiles of the population are changing [13].

In this article, we provide an overview of Thailand' s current condition and development efforts in relation to the 2030 Sustainable Development Goals for Health. The main research questions of the study are: What is the present SDGs scenario in Thailand with regard to health issues? What are the drivers and inhibitors of the current SDGs environment in Thailand? What specific factors might need to be taken into account in future guidance?

2. Methodology

Using databases from PubMed, ISI Web of Science, Embase, Scopus, and ProQuest, a comprehensive examination of papers was conducted without regard to time constraints. A scoping examination of the grey literature was conducted in addition to the search using the official report depositories of the World Bank, United Nations, World Health Organization (WHO) , and SDG Progress. After that, factors affecting the development of the SDGs and their pertinent indicators were discovered by an inductive content analysis. Finally, an evaluation instrument was created from a thorough set of indicators.

3. Determinants of health, and the global context

A paradigm shift in global health strategy is necessary to implement the SDGs, especially SDG 3, which aims to ensure healthy lives and promote wellbeing for all people, regardless of age. In order to accomplish the SDGs, there have been no noteworthy institutional, structural, or financial reforms to the governance of global health, and donors have not changed the way they finance projects. The Global Finance Fund, which addresses the continuum of maternal, child, and adolescent health, was the only major effort established at the time of the SDGs in July 2015, although it still does not address the underlying social, political, and economic determinants of health [14]. To achieve this, it would be necessary to look at SDG 3 as a whole rather than as a collection of specific conditions, targets, or programs, and to go well beyond the constrained MDG health agenda. Significant reforms must be made to current financial institutions and tools, as well as possible repurposing [15]. For the SDGs to be implemented nationally, three major governance difficulties must be overcome, and they are particularly important for the health and health- related SDGs. Making difficult trade- offs while concentrating on equity, justice, and fairness; (1) cooperation between actors across scales, in multiple contexts, and throughout time is essential for implementing the SDGs. This can be done by creating inclusive decision spaces for stakeholder interaction across various sectors and scales; (2) ensuring that accountability systems are in place to hold societal actors responsible for decisions, investments, actions, and results that are responsible for commitments made by countries, communities, organizations, and other parties to SDG- related agreements; and (3) there will unavoidably be many tensions between equity, justice, and fairness, thus it's important to make sure that difficult trade- offs are made while concentrating on these concepts. This raises the urgent need to identify these trade- offs and solutions to them. When two things cannot be fully accomplished at the same time, a trade-off is giving up one component of the goal in exchange for gains in the other [16] . Climate change and the part that unchecked urbanization and shifting habitats play in raising the danger of infectious illnesses are undoubtedly two

topics of global significance that have emerged given their influence on populations and health. All health professionals should be involved in this problem since it is well acknowledged that there is a connection between climate change and environmental health on a global scale and how it impacts health outcomes. A threat to sustainable development is the negative impact of climate change on human potential and economic production [17]. Risks associated with climate change, such as droughts, extreme weather events, shifting disease patterns, water scarcity, and air pollution, require active mitigation and adaptation, as well as the necessary skills, resources, and funding. In the articles found, a variety of projects and suggestions regarding potential responsibilities for healthcare professionals were provided [18]. There are a number of suggested measures and modifications targeted at enhancing healthcare professionals' pre- , post- , and ongoing education regarding climate and environmental change, its effects, and its present and potential future effects on human health. Healthcare workers' awareness and readiness are meant to be increased by these efforts. Better evidence should be provided about how changing one's lifestyle can also improve one's health and the environment. Reduced meat consumption and, when possible, walking or bicycling instead of using a vehicle that contributes to climate change and environmental pollution are two examples of individual and group behaviors that healthcare professionals should actively encourage. However, healthcare professionals have a professional public health obligation to support the evaluation and application of effective interventions, to raise the level of knowledge among their peers, and to continue to inform and alert various audiences through potentially effective communication interventions [19]. In actuality, the link between health problems and environmental and climatic change may serve as a powerful change agent.

Sustainable development is at risk due to climate change's negative effects on human capacity and economic production. Droughts, extreme weather events, shifting disease patterns, water scarcity, and air pollution are just a few examples of dangers associated to climate change that require active mitigation and adaptation, as well as the necessary skills, resources, and funding. A sustainable food systems approach, which promotes locally available, inexpensive, diversified nutritious foods as a method supporting environmental sustainability as well as the prevention of overweight and obesity, can also be used to effectively address the global nutrition issue [20]. SDG 3's primary global health target areas can be summed up as follows [2], [5], [21]: end the global epidemics of HIV/ AIDS, TB, Malaria, and other communicable diseases; reduce premature non- communicable disease mortality by one- third; lower infant and under- five mortality rates; lower maternal mortality rates; and promote universal access to life-saving medicines and vaccines that are high-quality, affordable, safe, and effective for everyone.

4. Overview of the current Situation of the health-related SDG indicators

The Sustainable Development Goals were released in 2015 and will have been in effect for seven years by 2023, when all 193 United Nations member nations will have ratified them. The "Sustainable Development Report" (SDR), a study report and assessment of progress in advancing the SDGs of each country. The Sustainable Development Solutions Network (SDSN) , which is an assessment of SDGs performance that is recognized globally, is regarded as the most

up- to- date report on the SDGs and is accompanied by the yearly SDGs Index rankings [22] . Thailand's SDGs Index dropped from 43rd to 44th in the year 2022 SDR report. The score has been dropping since the COVID-19 crisis, and it is currently heading in the same negative direction as the global SDGs Index as a whole. Thailand is first among ASEAN members for the fifth consecutive year and is third overall in Asia on the SDGs Index, behind only Japan (19th) and South Korea (27th), and first in East and South Asia (2019 - 2022). While Thailand has the highest SDG Index ranking among its neighbors, it has only ever maintained one Goal in an achievable state (green), namely SDG 1 (Eradicate Poverty). The five targets, which include social (SDG 2 and SDG 3), environmental (SDG 14 and SDG 15), and peace (SDG 16) challenges, are still in the most challenging situation (red) and have not changed from the previous year.

The main focus of SDG 3 is mortality from noncommunicable diseases (NCDs) , with heart disease being one of the NCDs issue (SDG 3. 4) . It has continued to be Thailand' s leading cause of death in recent years, along with diabetes, asthma, and high blood pressure [3] . Furthermore, greater numbers frequently occur. This is caused by a variety of factors, including deteriorating urban environmental problems, shifting lifestyles, and health- related activities. The death rate from suicide has also increased over the previous five years. The greatest rate of 48.9 cases per 100,000 people in 2019 was caused by cerebrovascular illness. In addition, the suicide death rate has grown during the past five years [23].

Road traffic accidents are the second largest cause of death among non-communicable diseases (SDG 3.6). Thailand has the ninth- worst global road fatality rate and the highest rate in Southeast Asia, according to the World Health Organization's 2018 Global Status Report on Road Safety [24] . According to the 2018 WHO report, Thailand has the highest road death rate in Southeast Asia at 32. 7 deaths per 100,000 population. 2020 will be significant due to the halt in a number of activities brought on by the epidemic condition. Yet, the death toll was still quite high [24] . When compared to the World Health Organization's (WHO) standard of 2.8 doctors per 1,000 people, there is a dearth of medical workers per unit of population in several parts of Thailand [25] . As a result, there exist disparities in access to public health services between urban and rural communities due to the concentration of available, qualified medical staff in major metropolitan centers. Patients in rural and isolated places may therefore find it challenging to frequently receive necessary medical care, particularly those with chronic illnesses or who are bedridden, elderly, those with disabilities, and low- income patients. Table 1 displays the SDG Dashboards and Trends for Thailand as determined by the 2022 report.

Table. 1 SDG Dashboards and Trends: Thailand (report 2022) [12]

No	Indicators	Dash boards	Trends
3.1.1	Maternal mortality ratio	●	↑
3.2.1	Mortality rate, under-5	●	↑
3.2.2	Neonatal mortality rate	●	↑
3.2.2	Life expectancy at birth	◘	→
3.3.1	New HIV infections	●	↑
3.3.2	Incidence of tuberculosis	○	→
3.4.1	Age-standardized death rate due to cardiovascular disease, cancer, diabetes, or chronic respiratory disease in adults aged 30-70 years	●	↑
3.6.1	Traffic deaths	○	→
3.7.2	Adolescent fertility rate	●	↑

3.8.1	Universal health coverage (UHC) index of service coverage	●	↑
3.9.1	Age-standardized death rate attributable to household air pollution and ambient air pollution	◐	••
3.b.1	Surviving infants who received 2 WHO-recommended vaccines	●	↑
3.c	Births attended by skilled health personnel	●	••
-	Subjective well-being	◐	↓

Note: Dashboards: ● SDG achieved, ◐ Challenges remain, ○ Major challenges remain
Trends: ↑ On track or maintaining SDG achievement, → Stagnating, ↓ Decreasing, •• Trend information unavailable

Thailand has achieved respectable progress on its objectives in the first five years (2016–2020). Yet, it should be recognized that some issues still need for quicker solutions. The Sustainable Development Goals Assessment found that nine subgoals, including three indicators of SDG 3, are not moving forward at a rate that is 50% of the target value: SDG 3.4 by 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being, SDG 3.6 by 2020, halve the number of global deaths and injuries from road traffic accidents, and SDG 3.9 by 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

5. Future attainment of the health-related SDG indicators

By preventing and treating chronic diseases, fostering mental health, and boosting overall wellbeing, it is possible to reduce the number of premature deaths from non-communicable diseases (SDG 3.4). Currently, nurses at all levels of healthcare facilities play a vital role in providing care for healthy individuals, at-risk populations, and patients with chronic non-communicable diseases [26]. They also promote disease prevention by helping people change unhealthy habits that put them at risk for developing a number of chronic diseases. It is significant that the SDGs can be connected to primary care nurses' case management responsibilities for chronic noncommunicable disease groups at the individual, family, community, and national levels. The existing circumstances must be taken into account while determining the best way to provide individuals with as much access to reliable health information as feasible. So that individuals are equipped with the information to take care of themselves in order to prevent disease or to recognize signs in order to start receiving treatment. One of the key tools that the Ministry of Public Health uses in collaboration with universities and other organizations to carry out practical work at the national level is health literacy. In order to organize for accuracy and dependability, the Ministry of Digital has enforced the rule on online sharing of health information.

Enforcement of rules that control significant behavioral risk factors from road traffic accidents (SDG 3.6), such as speed limits, prohibitions against drunk driving, requirements for the usage of seat belts, helmets, and harnesses, or child safety seats. It is essential to preventing fatalities in car accidents. Thailand's traffic restrictions, according to this WHO assessment, are at a "good" level, complying with WHO requirements. Laws requiring the use of seat belts and helmets for motorcyclists both exist. It is the only country in Southeast Asia with "excellent" levels of drunk driving legislation, albeit, according to WHO standards for usage of traffic regulations that are not at a good level. The population of the world is

growing yearly. Also, the number of drivers is rising quickly. While current initiatives to increase road safety from all sectors may assist to ameliorate the problem, progress toward the SDG 3 - Health and Well-Being Sustainable Development Goals - should be taken into account. Current efforts might not be sufficient to meet Target 3.6, which asks for a 50% decrease in traffic fatalities by 2030 [24].

According to the situation with hazardous compounds (SDG 3.9) in both the industrial and agricultural sectors, toxic chemicals may not necessarily reflect each other and result in pollution issues. Knowing which chemicals are initially utilized in high quantities in Thailand is merely knowledge, though. This suggests a higher danger of hazardous and chemical hazards if they are not appropriately managed [27]. At the moment, lead poisoning can be diagnosed by determining the general lead levels in the blood. The Ministry of Public Health data system is used to collect the data. Lead poisoning can be identified by occupational medicine departments at hospitals, who can also record data in the HDC system. There is no verification, which is a drawback of this approach. For this reason, it is crucial to provide environmental medicine services by the public health service unit in order to provide surveillance and health screening from environmental contamination.

As data for some metrics differs from the indicators and techniques used by the UN, it is still challenging to monitor and evaluate Thailand's progress toward achieving the SDGs. Due to Thailand's continued prohibitions on the storage of private information and environmental statistics, which necessitate expertise and access to a variety of data sources, including satellite data. However, not all of the aforementioned indicators can totally and accurately represent the context of the country's success, including geospatial and ecological data [28].

6. Conclusions

In Thailand, sustainable development is feasible across the board. People in society must adopt a new consciousness in order to focus on the demands of the general public and alter their thinking. At the same time, the functions of the public sector must be harmonized. Members of the neighborhood and community ought to participate in and work together to build a learning process. However, the government should take specific action right away, in particular, to address indicators like traffic deaths (3.6.1) and tuberculosis incidence (3.3.2) that have not yet been reached. In order to achieve the 17 Sustainable Development Goals by 2030, Thailand is boosting up efforts across the board. The Ministry of Public Health has created Roadmap Target 3 in accordance with the 20-Year National Strategy (Public Health) to guarantee that people live healthy lives and that health promotion is made accessible to all people of all ages. Thailand's public, private, and subordinate government entities should work together to achieve the Sustainable Development Goals in order to define the direction of the Ministry of Public Health, which is largely accountable for attaining SDG 3.

References

[1] International Council for Science, International Social Science Council, (2023, Mar. 9). "Review of targets for the sustainable development goals: the science perspective. Paris, France: International Council for Science; 2015" [Online]. Available: http://staging.icsu.org/publications/review-of-targets-for-the-sustainable-

development- goals- the- science-perspective-2015.

[2] United Nations Economic and Social Council, (2023, Mar. 9). "Report of the inter-agency and expert group on sustainable development goal indicators. New York: United Nations; 2020" [Online]. Available: https://tcg.uis.unesco.org/wp-content/uploads/sites/4/2020/10/TCG-7-REF-1.pdf.

[3] World Health Organization, (2023, Mar. 9). "World health statistics 2022: monitoring health for the SDGs, sustainable development goals" [Online]. Available: https://www.who.int/publications/i/item/9789240051157.

[4] The World Bank Group, (2023, Mar. 9). "Atlas of sustainable development goals 2020: From world development indicators. Washington, DC: World Bank; 2020" [Online]. Available: https://datatopics.worldbank.org/sdgatlas/.

[5] The Sustainable Development Report, (2023, Mar. 9). "Sustainable Development Report 2022 From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond" [Online]. Available: https://dashboards.sdgindex.org/.

[6] Lozano, R., Fullman, N., Abate, D., Abay, S. M., Abbafati, C., Abbasi, N., … & Beghi, E., "Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017", *The lancet*, vol. 392, no. 10159, pp. 2091-2138, 2018.

[7] Department of Mental Health, Ministry of Public Health, (2023, July 15). "Report of suicide rate per 100,000 population divided by province for the year 2019" [Online]. Available: https://dmh.go.th/report/suicide/statprovince.asp.

[8] Department of Mental Health, Ministry of Public Health, (2023, July 15). "Revealing the Statistics of Depression in Thai Society: The Silent Epidemic of Emotional Distress Among New Generation." [Online]. Available: https://dmh.go.th/news-dmh/view.asp?id=31459.

[9] Tipayatikumporn, U. U., "Mental Health Service Access For The Individuals With Depression: Evidence In Thailand." *Journal of Namibian Studies: History Politics Culture*, vol.33, pp.839-851, 2023.

[10] Boustani, A., Torabizadeh, C., & Najafi Kalyani, M., "Comparison of the Quality of Life and Depression in the Elderly with and without a History of COVID-19 Infection in Shiraz, Iran." *Depression Research and Treatment*, 2023.

[11] Worldometer, (2023, Mar. 9). "Thailand Population (LIVE)" [Online]. Available: https://www.Worldometers.info/world-population/thailand-population/.

[12] The Sustainable Development Report, (2023, Mar. 9). "Thailand East and South Asia" [Online]. Available: https://dashboards.Sdgindex.org/profiles/thailand.

[13] Sumriddetchkajorn, K., Shimazaki, K., Ono, T., Kusaba, T., Sato, K., & Kobayashi, N., "Universal health coverage and primary care, Thailand." *Bulletin of the World Health Organization*, vol.97, no.6, pp.415, 2019.

[14] Claeson, M., "The Global Financing Facility— towards a new way of financing for development.", *The Lancet*, vol. 389, no. 10079, pp. 1588-1592, 2017.

[15] Marten, R., Kadandale, S., Nordström, A., & Smith, R. D., "Shifting global health governance towards the sustainable development goals." , *Bulletin of the World Health Organization*, vol. 96, no. 12, pp. 798-798A, 2018.

[16] Bowen, K. J., Cradock-Henry, N. A., Koch, F., Patterson, J., Häyhä, T., Vogt, J., & Barbi, F., "Implementing the Sustainable Development Goals: towards addressing three key governance challenges— collective action, trade-offs, and accountability.", *Current opinion in environmental sustainability*, vol.26, pp.90-96, 2017.

[17] Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... & Murray, C. J., "Food in the Anthropocene: the EAT– Lancet Commission on healthy diets from sustainable food systems.", *The lancet*, vol.393, no.10170, pp.447-492, 2019.

[18] Dupraz J, Burnand B., "Role of Health Professionals Regarding the Impact of Climate Change on Health- An Exploratory Review." *Int J Environ Res Public Health.*, vol. 18, no. 6, pp. 3222, 2021.

[19] Barteit, S., Sié, A., Yé, M., Depoux, A., Louis, V. R., & Sauerborn, R., "Lessons learned on teaching a global audience with massive open online courses (MOOCs) on health impacts of climate change: a commentary." , *Globalization and Health*, vol. 15, no. 1, pp.1-5, 2019.

[20] Abarca-Gómez, L., Abdeen, Z. A., Hamid, Z. A., Abu-Rmeileh, N. M., Acosta-Cazares, B., Acuin, C., ... & Cho, Y., "Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population- based measurement studies in 128· 9 million children, adolescents, and adults.", *The lancet*, vol. 390, no. 10113, pp. 2627-2642, 2017.

[21] United Nations, (2023, Mar. 9). "Sustainable development goals: about the sustainable development goals" [Online]. Available: https://www.un.org/sustainabledevelopment/sustainable-development-goals/.

[22] GLOBAL COMPACT NETWORK THAILAND, (2023, Mar. 10). "SDSN Thailand Update Releases Sustainable Development Report 2022 and SDG Index 2022 " [Online]. Available: https: / / globalcompact- th. com/ news/ detail/918 (in Thai).

[23] Natetida Bunnag, (2023, Mar 10), "SDG Updates | Summary of 9 critical sub-goals (summary) from the 5-year report on the status of Thailand SDGs by NESDB. " [Online]. Available: https://www.sdgmove.com/2021/10/21/ sdg- updates- 9- sdg- targets- major-challenges- in- nesdc- thailand- sdg-report-2016-2020/ (in Thai).

[24] World Health Organization, (2023, Mar. 9). "Global Status Report on Road Safety 2018. " [Online]. Available: https: / / apps. who. int/ iris/ bits tream/ handle/ 10665/ 277370/ WHO-NMH-NVI-18.20-eng.pdf?ua=1.

[25] United Nations Development Programme in Thailand, (2023, Mar. 14). " SDG Investor Map Thailand 2022. " [Online]. Available: https: / / www.sec.or.th/TH/Documents/Seminars/seminar-060765-08-en.pdf.

[26] Pannee Pantaewan, "Nursing Role and Sustainable Development Goal (SDGs)", *Journal of The Royal Thai Army Nurses*, vol. 20, no. 2, pp. 33-43, 2019 (in Thai).

[27] Ministry of Public Health. (2023, Mar. 16), " Roadmap to drive Sustainable Development Goal 3. " [Online]. Available: http://www.nbhospital.go.th/ 10704nbh/ images/ download/ SDGs_Moph.pdf (in Thai).

[28] Thailand's SDG Progress Report 2016-2020: Executive Summary (2023, Mar. 16). [Online]. Available: https://www.doe.go.th/prd/assets/upload/files/lmi_ratchaburi_th/ 27d5601d1c88fb7bf56 c58c9f291409e.pdf (in Thai).

Authors' biography:

Dr. Anunya Pradidthaprecha: In 2009, 2011, and 2021, respectively, she earned her bachelor's, master's, and doctorate in public health from Khon Kean University in Thailand. Her main areas of expertise are in parasitology, nutrition, epidemiology, and community health. She has received the UK Professional Associated fellowship recognition from the Higher Education Academy in 2022 (UKPSF).

Assist. Prof. Orawan Noiwat: In 2001, she graduated with a B. Sc. in Health Education from Burapha University in Thailand. In 2004, she graduated with an M. Sc. in Preventive and Social Medicine from Chulalongkorn University in Thailand. She is currently pursuing her D. Sc. in Health research and Management at the Chulalongkorn University School of Medicine's Department of Preventive and Social Medicine. Her primary contribution is on how elderly people's health behaviors are affected by health promotion programs.

Assist. Prof. Dr. Kultida Bunjongsiri: She earned a B. Eng. and an M. Eng. in environmental engineering from Chulalongkorn University in Thailand in 1992 and 1997, respectively. From Griffith University in Australia, she received a Ph. D. in environmental engineering in 2017. Her primary area of competence is environmental engineering in compliance with occupational health and safety, particularly with regard to the SDGs and the expansion of the eco-industrial sector. She was named a fellow by the Higher Education Academy in accordance with the UK Professional Standards Framework as of 2019 (UKPSF).