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The Prosperity Aspect of Sustainable Agronomy towards Sustainable Development: An Analytical Approach to the Future of Thailand's Population When Deaths Outnumber Births¹

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Abstract

This study aims to present a futuristic analytical approach towards a society of sustainable agronomy in Thailand with a focus on its prosperity along the Buddhist practices of the Noble Path so as to achieve the UN Sustainable Development Goals (SDGs). Based on the Harrison analytical framework, it presents an evaluation of the relationship between sustainable agronomy and SDGs as classified by opportunities, threats, and factors for an increasingly aging population and population shrinkage, followed by corresponding strategies with action plans for the achievement of SDGs via sustainable agronomy over a three-year term for development practices in families, villages, and communities at the provincial and national levels.

Keywords: Sustainable development, Sustainable agronomy, Buddhism, Noble Path, Harrison Model, Aging society, Childless society, Population shrinkage, Thailand, United Nations

To achieve sustainable development goals (SDGs) formulated by the United Nations, Thailand has adopted a localization approach consistent with Thai society, culture, and wisdom. Given His Majesty the Late King Bhumibol Adulyadej's philosophy of Sufficiency Economy as the key means towards those goals, plus His Majesty King Vajiralongkorn's recent initiatives on sustainable agronomy, such achievement can be considered realistic since many Thai people may be familiar with the idea (Sakya, 2022a). Sustainable agronomy serves as a development model for continuing, preserving, and developing the royal

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philosophy to achieve these goals. As such, to localize the universal call in Thailand, whose society and culture are closely connected to Buddhism, the solution to achieving SDGs must recognize Buddhist teaching (Dhamma) as its foundation (Sakya, 2022b) in a process called glocalization. In any case, to identify the most immediate problems in Thailand, one must look at the ongoing changes in its demographic structure due to a sharp decline in the total fertility rate (TFR) and a trend toward an aging population with increasing life expectancy. Advancements in modern medicine and technologies are partly responsible for these changes. As a result, 2023 was the second year in which Thailand saw more deaths than births, a clear example of unsustainability in its economy and society. This article aims to present an analysis of approaches toward an advanced society with sustainable development to support the increase in the proportion of the elderly and the problem of population shrinking whereby Thailand has more deaths than births.

Sustainable Agronomy, or Development towards a Sustainable State and SDGs

In progressing toward sustainable agronomy, five levels of *Aryan* state must be attained: People, Planet, Prosperity, Partnership, and Peace (Figure 1). The first and foremost in the transition toward sustainable agronomy is for the people to be civilized. For this to happen, their environment or the planet they live on must be developed and acquire Prosperity along an approach that does not destroy the economy, society, or environment. More importantly, all parties within the community must cooperate to initiate development, thus leading to true peacefulness. When this is achieved, sustainable agronomy can be attained, whereby a society is developed in complete peace in all its social, economic, and environmental aspects. As stated earlier, for Thailand to achieve the SDGs in line with the United Nations' resolution, its version must be implemented, that is, to localize international SDGs to be in harmony with Thai society, culture, and wisdom. Moreover, with His Majesty the Late King Bhumibol Adulyadej's philosophy of Sufficiency Economy and His Majesty King Vajiralongkorn's initiatives on sustainable agriculture, localizing SDGs to fit Thailand's situation will likely meet little opposition since Thai people may already feel comfortable with the idea (Sakya, 2022a).

Figure 1: Dimensions of Sustainable Development and Sustainable Agronomy



Source: Sakya, 2022a.

In fact, His Majesty King Bhumibol Adulyadej's use of the phrase "sufficiency economy" may have been due to a change in his royal mindset to implement the Buddhist teachings of *Santutthi param dhanam*, which means "sufficiency is the noblest wealth." Here, the Buddha uses the term *dhanam*, or wealth, which is nothing near the modern uses of wealth as we understand them, but more about noble wealth, well-being, or virtue (not money or possessions). When looking at sustainable agronomy using the knowledge of the Aryan Eightfold Path, it can be understood that they are closely related (Sakya, 2022c).

The *Aryan* Eightfold Path comprises eight practices, all closely intertwined with the five principles of the civilized state (Figure 2). The proper knowledge (Right View), creativity mindset (Right Thought), and awareness or intention of being mindful (Right Mindfulness) form the basis of what is clearly manifested in sustainable agronomy. For a **Person** to be civilized, he or she must possess meritorious communication (Right Speech). For the **Planet** to be civilized, everyone must persevere and not give up (Right Effort). To bring **Prosperity** to society, the jobs available must not be harmful to the economy, society,

or environment (Right Livelihood). To acquire civilized **Partnership** among people, everyone must be mindful of each other when being together (Right Mindfulness). Lastly, to attain **Peace**, everyone must possess strong determination (Right Concentration).

Figure 2: Principles of Sustainable Agronomy Practices



Source: Sakya, 2022c.

Following the Aryan Eightfold Path will lead to the formation of sustainable agronomy, the development goal based on the Dhamma that coincides with what United Nations wants to achieve by 2030. Therefore, sustainable agronomy can be achieved through the implementation of His Majesty the King's Royal Decree on continuing, preserving, and developing sustainable development as glocalization, i.e., to create a development model to achieve SDGs based on Thai society and culture with Buddhism as the basis of thought (Sakya, 2022c).

For easier understanding of the SDGs, the United Nations has presented a formula based on sustainable agronomy's five principles, all of which cover the 17 SDGs (United

Nations (Figure 3).⁷ The UN urges all governments to make policies for achieving SDGs as part of their national agenda. Intending each country to develop its own national method based on different societies and cultures and ultimately achieve universal goals, the UN gives no explicit instructions on how to solve a country's specific problems (Sakya, 2022a).

Figure 3: Principles of SDG Practices



Source: SDG Services. The pillars and frameworks of the SDGs. Accessed <https://www.sdg.services/principles.html>. The SDGs are

Aging Society and Shrinking Population in Thailand

In Thailand, many sectors have begun to realize and see the significance of the shift toward an aging society due to fears that a rapidly decreasing total fertility rate (TFR) will not

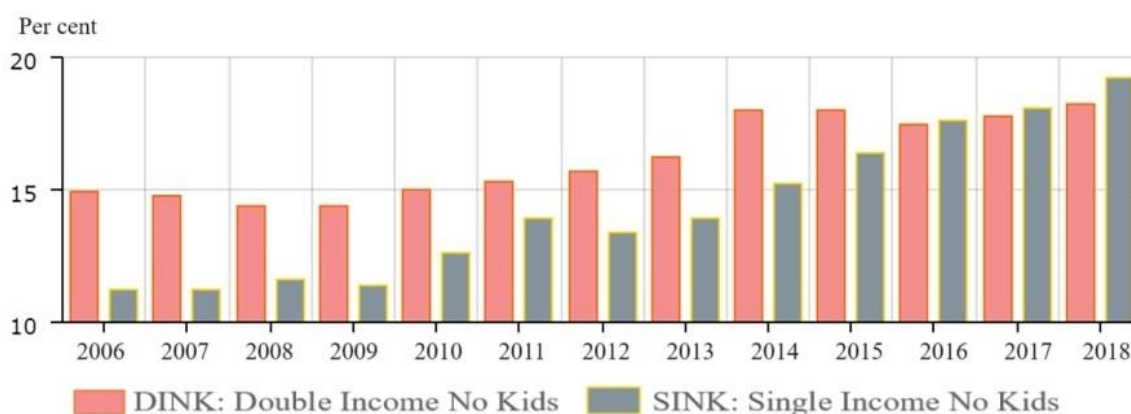
⁷ Under the United Nations 5P Principals, People covers SDGs 1, 2, 3, 4, and 5; Planet covers SDGs 6, 12, 13, 14, and 15; Prosperity covers SDGs 7, 8, 9, 10, and 11; Partnership covers SDGs 17; and Peace covers SDGs Article 16.

be conducive to Thailand's economic and social development. The overall birth rate has continued to decline, with 2021 being the first year in modern history that Thailand had more deaths than births, according to the Bureau of Registration Administration, Department of Provincial Administration. In that year, deaths outnumbered births by 19,080, an alarming figure compared with 2020, when the number of births surpassed deaths by 85,930. In contrast, between the 1st National Economic and Social Development Plan (1961-1966) and the 2nd Plan (1967-1971), the fertility rate stood at 6%, which meant six children were born in an average household. At the time, such a high rate was considered a hindrance to the country's development opportunities. To address this problem, the government formulated a policy to reduce the population growth rate that began with the 3rd National Development Plan (1972-1976) and lasted through the 7th National Development Plan (1992-1996). In the 8th Development Plan (2002-2006), Thailand began to shift towards an emphasis on population distribution and urban-rural redistribution to achieve balanced economic growth. The 9th National Development Plan (2007-2011) aimed at maintaining a fertility rate no lower than 1.8, but the rate kept declining in subsequent development plans to reach 1.6, below the replacement level. In 2019, according to a survey conducted by the National Statistical Office (NSO) in collaboration with UNICEF Thailand, the fertility rate dropped further to 1.44, while public health statistics for 2019 found it at 1.29. The population policy was flipped from rate reduction to halting its decline any further, a change that could be found in many nations to address their declining populations. An example is China, which had implemented a one-child policy to lower population growth before changing to a two-children policy in 2015 in an effort to raise the fertility rate. In 2021, China shifted to a three-children policy to create quality human resources to pass on to the society at large. Such an approach contributes to a sustainable society.

The research cited above also considers the threat of a "Childless Society" (Edu-radio-center กรมประชาสัมพันธ์, 2565) -- another aspect of aging society -- that will greatly impact the future but has yet been given attention due to a lack of proper understanding among the public. According to the Labor Force Survey of the National Statistical Office from 2006 to 2018, the proportion of childless households nationwide rose to a high of 37.4% in 2018 from

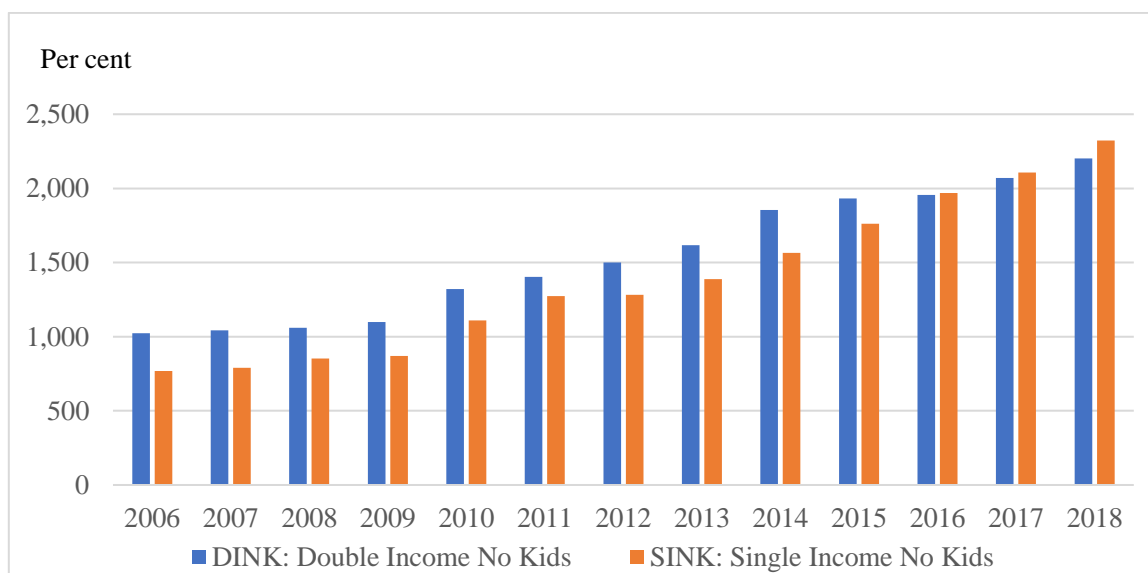
26.1% in 2006, representing a high growth rate of 43.3% (Figures 4 & 5). The structure of such households without children consists of DINK (Double Income No Kids) families in which the husband and wife have no children and SINK (Single Income No Kids) households of a man or a woman who lives alone and has no children. When comparing the two structures, it was found that during the past 10 years, the rise in SINK households was more discernable. The research cited above reveals that more than 21 million Thai households are currently childless (Eduradio-center กรมประชาสัมพันธ์, 2565), an alarming figure and even more worrisome in that it will likely increase. The leading cause of this childless society is changes in economic and social values, such as higher employment rates among women, the increasing age at first marriage of spouses, the fact that Thai women have their first child at an older age than in the past, and the rising trend of being single and divorced. These trends result from values and ways of life that have changed, with people currently focusing on their own economic and social readiness to achieve their goals. This point is reflected in their lifestyles, which focus on working and making money before getting married. They prioritize having a house, car, and household facilities over having children. Many choose to be single to achieve life's goals by themselves and not have the burden of having to take responsibility for another life.

Figure 4: Percentage of Childless Households in Thailand



Source: Thai National Statistical Office. (2018) Labor Force Survey 2006 to 2018

Figure 5: Number of households without descendants

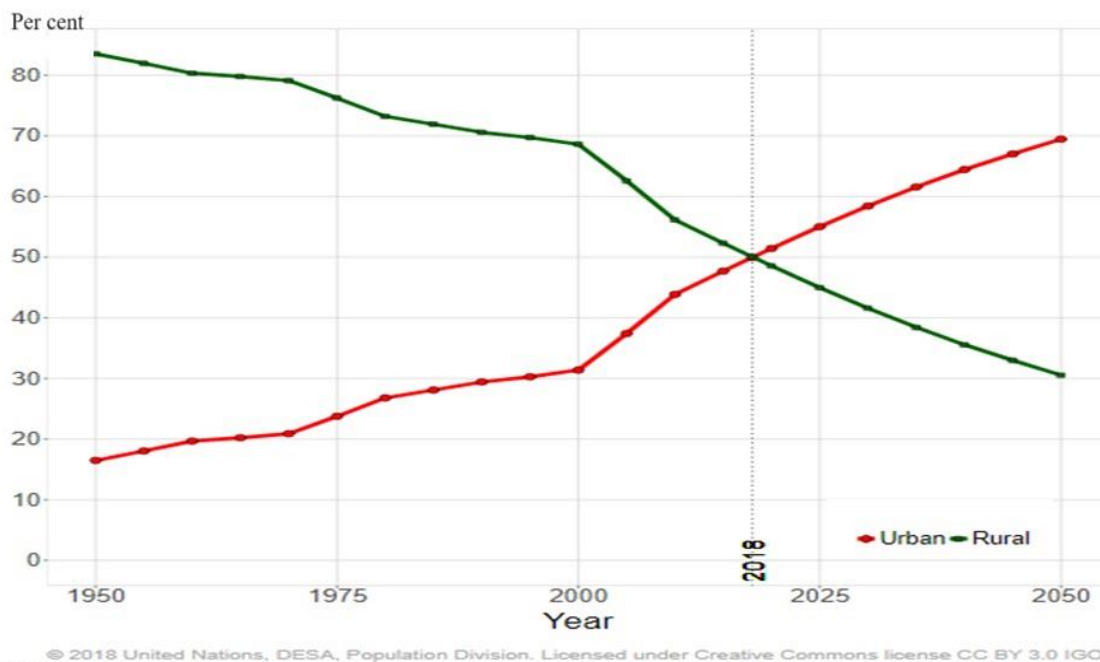


Source: Thai National Statistical Office. (2018) Labor Force Survey 2006 to 2018

Based on a study (Guo, 2014) in China, the above-cited research (Eduradio-center กรมประชาสัมพันธ์, 2565) opines that older people without children are more likely to suffer from depression. Among the childless elderly with low incomes, the leading cause of suffering stems from the unmet cultural expectation of filial piety. The childless elderly also

encounter relatively poor health and low life expectancy, compared with those with children. For Thailand, despite research in this area being relatively small, a recent study (Quashie & Pothisiri, 2018) found that childless elderly have worse mental health and are more likely to develop depression than those with children.

Figure 6: Percentage of Population in Urban and Rural Areas in Thailand



Source: United Nations, Department of Economic and Social Affairs, Population Division. 2018. World Urbanization Prospects: The 2018 Revision; custom data acquired via website.

Note: Urban and rural population in the current country or area as a percentage of the total population 1950 to 2050

As Figure 6 shows, the percentage of the Thai population in urban areas has been steadily increasing. Together with the increasing proportion of the elderly population, these results are consistent with a study by Jarzebski et al. (2021) in terms of the challenges of an increase in the aging population and a decline of other ages against sustainability objectives and development opportunities. However, we argue that an increase in the aging population amid a shrinking population may have both positive and negative effects on sustainability regarding economic growth, government development, consumption patterns, land-use

changes, greenhouse gas emissions, and other aspects. Thus, the relationships mentioned above will have significant implications for implementing the SDGs.

This study will apply the concepts of a Prosperity-based approach in sustainable agronomy (corresponding to Targets 8.1, 8.2, 9.1, 9.2, 11.1, 11.2, 11.6, and 11.7 of the SDGs) towards sustainable development as well as ideas from the work of Jarzebski, Elmqvist, Gasparatos et al. and Harrison's analytical framework (Harrison, 1990) as analytical tools to look at the future of the Thai population at times when the number of deaths far exceed births. (Sakya, 2022a). The current population structure of Thailand, with an increasing elderly population and a shrinking overall population, can render both opportunities and challenges to the eighth, ninth, and eleventh SDGs. Taking SDG11 (Sustainable Cities and Communities) as an example, the study team finds these elements contain both challenges and opportunities to achieve Target 11.1 of the SDGs (Access for all to adequate, safe, and affordable housing and basic services and upgrade slums), as well as Target 11.2 (Access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport). In addition, they also threaten the achievement of SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure).

While focusing on the Prosperity aspect in sustainable agronomy as mentioned above, its linkage with People-based and Planet-based approaches is also analyzed in this study. On the aspects of People and Prosperity, it considers the linkages related to healthcare in an aging society, especially on the heightened cost of healthcare and medicine. It argues that the availability of funds tends to decrease due to population shrinkage, resulting in a declining proportion of the working-age population, which is an essential part of economic growth. The notions suggest that a growing proportion of the aging population compared with other age groups poses a challenge to Target 3.4 of the SDGs (Reduce premature deaths from non-communicable diseases) and Target 3.8 (Achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all). On top of those, they also pose a threat to achieving the First SDG (No Poverty), in particular, the poverty-

related targets (Targets 1.1–1.2) and social protection (Targets 1.3–1.4), because the elderly are often among the unemployed, relying solely on pensions.

Furthermore, concerning the linkage between the Planet and Prosperity aspects, the above-mentioned population decline will significantly threaten many other SDG targets such as 8.1, 8.2, 9.1, and 9.2. At the same time, such a decline together with the increasing proportion of the elderly can bring an opportunity to achieve SDG 12 (Sustainable Production and Consumption), namely, Target 12.2 (sustainable management and efficient use of natural resources), Target 12.3 (Halve global per capita food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses), and Target 12.5 (Substantially reduce waste generation through prevention, reduction, recycling and reuse). They are also contributing to Target 15.1 (Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services), Target 6.1 (Universal and equitable access to safe and affordable drinking water for all), and Target 14.4 (Regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices). However, the growing proportion of the elderly will limit the achievement of SDG13, especially Target 13.1 (Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries), because older people are often more vulnerable and less adaptable to natural disasters (Jarzebski et al., 2021). The detail of the aforementioned relationship will be explained further in the following analysis.

The analytical tool used in this analysis here is based on the Harrison analytical framework ($I = PAT$ or $I = PCT$) (Harrison, 1990), representing:

1. Interaction between measures of environmental impact (I) or unsustainable development (Authors) and population factors (P), which here refer to the elderly population and the changing demographic structure due the increasing proportion of the elderly; A = Consumption pattern (Affluence or C: Consumption) or *Samudaya*, desires that “can never end, never be enough, and never be fulfilled,” also known as 108 cravings. (Krom Luang Vajirayanasangworn, 2021) In addition to the P and A factors, a technology factor (T) accelerates *Samudaya*, resulting in unsustainability;

2. Population factors (P). As mentioned earlier, many sectors have begun to see the importance of Thailand stepping into an aging society as its total fertility rate (TFR) rapidly declines, especially as occurred in 2021, which saw more deaths than births. Such changes will not be conducive to the country's socio-economic development as the proportion of the working-age population has decreased significantly when looking at the 2010-2040 trend, while the proportion of the elderly population steadily increases (Figure 7). A result of such changes in the population age structure is that the total population started to decline in 2023. The Thai experience -- in terms of the increasing proportion of the elderly, the population decline, and the increasing percentage of urban residents -- complement an argument by Jarzebski et al. (2021) that an increasing proportion of the elderly and a population decline could pose both opportunities and challenges to SDGs 8, 9, and 11. All three SDGs align with the creation of a society with Prosperity to cope with the trend of an increasing elderly and shrinking population. This prosperous society will bring good awareness, generous minds, peace, volunteers, and development to society to fulfill SDGs 8, 9, and 11. To cover the targets of other SDGs to enhance sustainability further, a link to SDGs 1, 2, 3, 6, and 12-15 can be forged by designing a society of sustainable agronomy that is connected to societies of sustainable people, a sustainable planet, and sustainable peace. This integrative approach of linkages will result in a holistic approach in health management focusing on preventive healthcare and access to clean water for sustainable consumption and production.

Based on the study by Jarzebski et al. (2021), both the increase in the elderly population and declining population threaten Target 8.1 (Ta 8.1.a & Tps 8.1.b⁸), Target 8.2 (Ta 8.2.c & Tps 8.2.d), Target 9.1 (Ta 9.1.e & Tps 9.1.f), and Target 9.2 (Ta 9.2.g & Tps 9.2.h) of the SDGs. Yet for SDG 11 (Sustainable Cities and Communities), they are both a challenge and an opportunity for achieving Target 11.1 (Safe and Affordable Housing and Basic Services and Upgrade Slums). Given that many homes in Europe will need to be renovated to ensure that people can continue to live in them safely as they age, an increase in the proportion of the elderly (Ta 11.1.i) threatens sustainable development. Meanwhile, the population decline offers an opportunity (Ops 11.1.j) for Target 11.1 in that a decline results

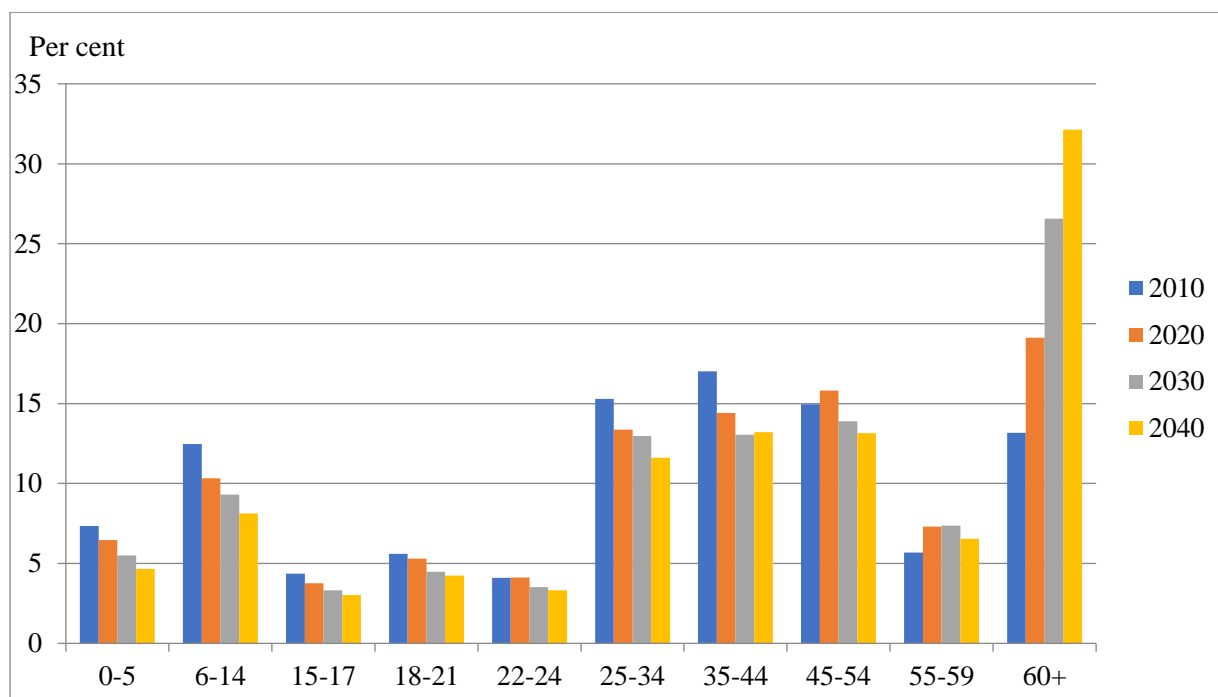
⁸ Oa: Opportunities-Ageing, Ops: Opportunities-Pop-Shrinking, Ta: Threats-Ageing, Tps: Threats-Pop-Shrinking

in less state spending because a smaller number of people will need access to adequate, safe, affordable housing and fewer essential services. However, the increasing proportion of the elderly and the population shrinkage can negatively affect (Threats: Ta 11.2.k & Tps 11.2.l) Target 11.2 (Affordable and Sustainable Transport Systems, Notably by Expanding Public Transport).

An aging population tends to increase demand for city administrators to design safe and accessible public spaces (Ta 11.7.m), which poses a significant challenge to Target 11.7 (Provide access to safe and inclusive green and public spaces). At the same time, declining urban populations may reduce financial resources (i.e., fewer taxpayers) required for the development and maintenance of public spaces friendly to the general population as well as to the aging population, leading to additional challenges to achieving goals (Tps 11.7.n).

In any case, the increasing proportion of the elderly and population shrinkage are often associated with reduced greenhouse gas emissions due to the lower use of materials that contribute to these emissions. Such reductions are crucial to achieving Target 11.6 (Reducing environmental impacts that are significant issues affecting the urban environmental concerns, therefore considered Oa 11.6o & Ops 11.6p). However, the elderly are found to have a higher carbon footprint than other age groups (Ta 11.6q) because they are prone to activities with high emissions, including the use of private cars to access medical care and treatment.

Figure 7: Thai population by age group, 2010-2040



Source: Patcharawalai Wongboonsin, et al. (2015)

3. A = Consumption pattern (Affluence or C: Consumption) or *Samudaya*, desires that “can never end, never enough, and never be fulfilled,” also known as the 108 desires. This number come from assigning three kinds of desires, namely *Kama Tanha* (desire for sensual pleasure), *Bhava Tanha* (the desire to become something), and *Vibhava Tanha* (the desire not to be something) to each of the six human communication systems (eye, ear, nose, tongue, body, and mind). The numbers total 18 desires, and since the past, present, and future are all counted, they sum to 54. Including these 54 desires for oneself and another results in 108 desires (Digital Twin also uses this concept) (Krom Luang Vajirayanasangworn, 2021).

As previously mentioned, due to population shrinkage, the proportion of the working-age population -- a key contributor to economic growth -- is reduced. The increase in the elderly population is also of a higher proportion than that of other age groups. Such an effect would threaten Target 3.4, Target 3.8, Target 1.1–1.2, and Target 1.3–1.4, which are part of the People aspects of the SDGs. Therefore, to achieve sustainability, we must find ways to

reduce consumption or overcome the *Samudaya* (Desires) factors that “can never end, never enough, and never be fulfilled” to achieve the goals of SDGs 1 and 3 above. Maintaining health by reducing excess consumption is very important for an aging population because non-communicable diseases (NCDs), such as obesity, diabetes, and high blood pressure, are caused by consumption and lifestyle behaviors. Achieving this can reduce the threat to Target 3.4 (Ta 3.4.r & Tps 3.4.s: Reduce mortality from non-communicable diseases and promote mental health) and to Target 3.8 (Ta 3.8.t & Tps 3.8.u: Achieve universal health coverage, including financial risk protection, access to quality essential healthcare services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all). In addition, the increase in the elderly population may pose a threat to SDG 1 (poverty); in particular, the poverty targets 1.1–1.2 (Ta 1.1.v & Tps 1.1.w and Ta 1.2.x & Tps 1.2.y), and social protection targets 1.3–1.4 (Ta 1.3.z & Tps 1.3.aa and Ta 1.4.ab & Tps 1.4.ac). This is partly because the elderly tend to be among the unemployed or have a lower employment participation rate than other labor populations. Most of them rely solely on pensions or government grants.

On the other hand, the rising of an aging population while the total population declines presents an opportunity to sustain the goals in the Planet category, namely the SDGs 12.2 goals: Oa 12.2.ad & Ops 12.2.ae (Sustainable management and efficient use of natural resources) SDGs 12.3: Oa 12.3.af & Ops 12.3.ag (Halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses) and SDGs 12.5: Oa 12.5.ah & Ops 12.5.ai (Reduce waste generation through prevention, reduction, recycling, and reuse). In addition, the study by Jarzebski, Elmqvist, Gasparatos et al. also found that the population decline in Japan has created opportunities for land recovery for agriculture, forestry, and other sectors that were once used intensively (Jarzebski et al., 2021). Such a situation is an opportunity to achieve Target 15.1: Oa 15.1.aj & Ops 15.1.ak (Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services), Target 6.1: Oa 6.1.al & Ops 6.1.am (Universal and equitable access to safe and affordable drinking water for all) and Target 14.4: Oa 14.4.an & Ops 14.4. ao (Regulate harvesting and end overfishing, illegal,

unreported, and unregulated fishing, and destructive fishing practices). At the same time, it may create limitations to Target 13.1, especially 13.1: Ta 13.1. ap (Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters).

4. Technology factor (T) refers to innovations to promote healthcare and facilitate elderly mobility. Many countries/cities with aging and decreasing populations have piloted and relied upon such new inventions, ranging from innovative technologies, social innovation and institutions of technological innovations to care for the health of the elderly. Among others, social assistance robots and virtual entertainment can take care of the mental health of patients, and AI health check services can monitor and care for the health of people in a village or other community (Jarzebski et al., 2021). This includes care facilities for both children and the elderly, with young and elderly volunteers coordinating and helping each other in caring for patients during the day.

Urban mobility services plays an essential role in the participation in social activities of the elderly. The concept, Mobility as a Service (MaaS), through the ubiquitous use of smartphones and internet connectivity, including a mix of transport services from public and private providers and discounted fares, helps increase the quality of life for an aging population. This helps seniors travel for medical check-ups or treatment and meet with friends and family quickly and easily. All of the above use technology for healthcare and increase the quality of life for a rapidly aging population.

5. Strategies based on the evaluation of the relationship between sustainable agronomy and SDGs classified by opportunities, threats, and factors of the increasingly aging population and population shrinkage (Table 1) can be formulated into threefold as follows:

Strategy 1: Develop a society of sustainable agronomy with sustainable Prosperity to support the increasing trend of the elderly with a population decline to become a prosperous society that awakens its citizens to become a caring and peaceful community filled with hospitality and to foster development to reduce threats against sustainable development, particularly those negatively affecting SDGs Targets 8.1, 8.2, 9.1, 9.2, 11.1, 11.2 and 11.7. This will also increase the likelihood of achieving Target 11.6 of the sustainable development goals. In addition to a plan with Prosperity as its priority, this strategy can also focus on

People and Planet to create a society with holistic health management emphasizing preventive healthcare, access to clean water for consumption, sustainable production and consumption, including an emphasis on urban management in the design of public spaces to increase green area that is safe and accessible.

Strategy 2: Create inventions aligning with royal initiatives that drive a sustainable-Prosperity society to overcome *Samudaya* (desires) factors by forming a Prosperity-based society focusing on people and their holistic health (Krom Luang Vajirayanasangworn²⁰²¹). This strategy aims to mitigate the effects of population shrinkage, which has led to a decrease in the working-age population who play an essential role in economic growth, posing a threat to Targets 3.4, 3.8, 1.1, 1.2, 1.3, and 1.4. This strategy's priority is to conquer *Samudaya* factors that “can never end, never enough, and never be fulfilled,” leading to unnecessary consumption attributable to non-communicable diseases (NCDs), such as obesity, diabetes, and high blood pressure. In addition, the increasing proportion of the elderly may pose a threat to SDG1 targets, in particular, the poverty targets and social protection. (This is partly because the elderly tend to be among the unemployed or less engaged in employment than other working populations, primarily relying solely on pensions or state aid.) Making differences in society, such as establishing a new social institution to ensure paid employment, would allow senior citizens to contribute to future generations' opportunities. It is one way to continuously create more social capital from one generation to the next, as well as promote the well-being of the aging population to enable them to play this new role successfully.

Strategy 3: Promote inventions to elevate healthcare and body movement of the elderly. This includes innovative technologies (such as social assistance robots, virtual entertainment for mental healthcare of patients, health check-up services, and AI for monitoring health in communities) and social innovations (through establishing a prosperous society with the focus on the Planet aspect) that creates cooperation by the community to take care of senior citizens' health. Such examples include care facilities for children and the elderly, with young people and elderly volunteers providing care during the day. In such care

facilities, social innovation can be said to sustain SDGs Targets 12.2, 12.3, 12.5, 6.1, 13.1, 14.4, and 15.1 in the Planet category.

Table 2: The relationship between sustainable agronomy and SDGs goals, classified by factors of increasing aging population and population shrinkage and corresponding strategies.




Sustainable Agronomy	SDGs	Ageing	Population Shrinking	Strategies
Prosperity	8.1	Ta 8.1.a	Tps 8.1.b	Strategy 1: Develop a society of sustainable agronomy with sustainable Prosperity to support the tendency of the increasingly aging population and population decline to become a prosperous society that awakens its citizens to become a caring and peaceful community filled with hospitality and bring development to reduce threats to sustainable development that affect SDGs Targets 8.1, 8.2, 9.1, 9.2, 11.1, 11.2 and 11.7. This will also increase the likelihood of achieving Target 11.6 of the sustainable development goals. In addition to the plan with Prosperity as a priority, this strategy can focus on People and Planet to create a society with holistic health management emphasizing preventive healthcare, access to clean water for consumption, sustainable production and consumption, including an emphasis on urban management in the design of public spaces to increase green area that is safe and accessible.
	8.2	Ta 8.2.c	Tps 8.2.d	
	9.1	Ta 9.1.e	Tps 9.1.f	
	9.2	Ta 9.2.g	Tps 9.2.h	
	11.1	Ta 11.1.i	Ops 11.1.j	
	11.2	Ta 11.2.k	Tps 11.2.l	
	11.7	Ta 11.7.m	Tps 11.7.n	
11.6	Oa 11.6o & Ta 11.6q	Ops 11.6p		
People	3.4	Ta 3.4.r	Tps 3.4.s	Strategy 2: Create new inventions and development to overcome <i>Samudaya</i> (desires) factors by forming a Prosperity-based society focusing on People and their holistic health. (Krom Luang Vajirayanasangworn ²⁰²¹) This strategy aims to mitigate the effects of population shrinkage, which has led to a decrease in the working-age population who play
	3.8	Ta 3.8.t	Tps 3.8.u	
	1.1	Ta 1.1.v	Tps 1.1.w	
	1.2	Ta 1.2.x	Tps 1.2.y	
	1.3	Ta 1.3.z	Tps 1.3.aa	






	1.4	Ta 1.4.ab	Tps 1.4.ac	<p>an essential role in economic growth, posing a threat to Targets 3.4, 3.8, 1.1, 1.2, 1.3, and 1.4. This strategy's priority is to curb <i>Samudaya</i> factors that “can never end, never enough, and never be fulfilled” that lead to unnecessary consumption since they may lead to non-communicable diseases, such as obesity, diabetes, and high blood pressure that are related to behavior. Create prestige innovations for society to achieve the SDG1 goals by creating new social institutions that play a role in securing jobs for the aging population by being paid with dignity in a manner that facilitates the aging population able to benefit the opportunities of future generations even more.</p> <p>Promote innovations aligned with the royal initiatives of H.M. King Vajiralongkorn that drive Thai society towards SDG1. This includes promotion of a new social institution to ensure paid employment of the elderly to ensure the contribution of senior citizens to future generations' opportunities. It is one way to continuously create more social capital from one generation to the next, as well as promote the well-being of the aging population to enable them to play this new role successfully.</p>
Planet	12.2	Oa 12.2.ad	Ops 12.2.ae	<p>Strategy 3: Promote inventions to elevate healthcare and body movement of the elderly, including innovative technologies (such as social assistance robots, virtual entertainment for mental health care of patients, health check-up services, and AI for monitoring health in communities) and social innovations (through establishing a prosperous society with the focus on the Planet aspect) that creates cooperation of the community to take care of senior citizens' health. Among others is to promote child & eldercare facilities, with young and elderly volunteers to provide care during the day. In such facilities, social innovation can be said to sustain SDGs Targets 12.2, 12.3, 12.5, 6.1, 13.1, 14.4, and 15.1 in the Planet category.</p>
	12.3	Oa 12.3.af	Ops 12.3.ag	
	12.5	Oa 12.5.ah	Ops 12.5.ai	
	15.1	Oa 15.1.aj	Ops 15.1.ak	
	6.1	Oa 6.1.al	Ops 6.1.am	
	14.4	Oa 14.4.an	Ops 14.4.ao	
	13.1	Ta 13.1.ap	---	


Oa: Opportunities-Ageing, Ops: Opportunities-Pop-Shrinking, Ta: Threats-Ageing, Tps: Threats-Pop-Shrinking

Action Plan: Takes the strategy into separate key actions and determining the duration of the main activities to be carried out in the first, second, and third years.

Table 3. Strategies and key actions along a three-year plan

Strategies	Key Actions	Year 1	Year 2	Year 3
<p>Strategy 1: Develop a society of sustainable agronomy with sustainable Prosperity to support the tendency of the increasingly aging population and population decline to become a prosperous society that awakens its citizens to become a caring and peaceful community filled with hospitality and bring development to reduce threats to sustainable development that affect SDGs Targets 8.1, 8.2, 9.1, 9.2, 11.1, 11.2, 11.6, and 11.7 of the sustainable development goals. In addition to the plan with Prosperity as the priority, this strategy can also focus on People and Planet to create a society with holistic health management emphasizing preventive healthcare, access to clean water for consumption, sustainable production and consumption, including an emphasis on urban management in the design of public spaces to increase green area that is safe and accessible.</p>	<p>Survey and observe how to develop and improve a sustainable agronomic society in terms of Prosperity to support the tendency of the increasingly aging population and population decline to become a prosperous society that awakens its citizens to become a caring and peaceful community filled with hospitality and bring development to reduce threats to sustainable development that affect SDGs Targets 8.1, 8.2, 9.1, 9.2, 11.1, 11.2, 11.6, and 11.7.</p>			
	<p>Survey and observe how to develop and improve the method to include People and Planet aspects to the Prosperity approach to create a society with holistic health management emphasizing preventive healthcare, access to clean water for consumption, sustainable production and consumption, including a focus on urban management in the design of public spaces to increase green area that is safe and accessible.</p>			
	<p>Analyze the results of the above two actions and write a report to develop a plan detailing the design of the sustainable agronomic society with Prosperity approach to better cope with the trend of an aging population and population shrinkage.</p>			

Strategies	Key Actions	Year 1	Year 2	Year 3	
<p>Strategy 2: Create inventions aligning with royal initiatives that drive a sustainable-Prosperity society to overcome <i>Samudaya</i> (desires) factors by forming a Prosperity-based society focusing on people and their holistic health (Krom Luang Vajirayanasangworn, 2021). This strategy aims to mitigate the effects of population shrinkage, which has led to a decrease in the working-age population who play an essential role in economic growth, posing a threat to Targets 3.4, 3.8, 1.1, 1.2, 1.3, and 1.4. This strategy's priority is to curb <i>Samudaya</i> factors that "can never end, never enough, and never be fulfilled" that lead to unnecessary consumption since they may lead to non-communicable diseases such as obesity, diabetes, and high blood pressure, which are diseases related to behavior. Create prestige innovations for society to achieve the SDG1 goals by creating social institutions that play a role in securing jobs for the aging population by being paid with dignity in a manner that facilitates the aging population's ability to provide greater opportunities to future generations. Making differences in society, such as establishing a social institution to ensure paid employment, would allow senior citizens to contribute to future generations' opportunities. It is one way to continuously create more social capital from one generation to the next, as well as promote the well-being of the aging population to enable them to play this new role successfully.</p>	<p>Create inventions aligning with royal initiatives that drive a sustainable-Prosperity society to overcome <i>Samudaya</i> (desires) factors by forming a Prosperity-based society focusing on People and their holistic health. This strategy aims to mitigate the effects of population shrinkage, which has led to a decrease in the working-age population who play an essential role in economic growth, posing a threat to Target 3.4 (Reduce mortality from non-communicable diseases through prevention and treatment) and 3.8 (Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all).</p>				
	<p>Create inventions aligning with royal initiatives that drive establishment of a new social institution to ensure paid employment to allow senior citizens to play their roles in contributing to future generations' opportunities. It is one way to continuously create more social capital from one generation to the next and promote their well-being to enable them to play this new role successfully.</p>				
	<p>Analyze the results of the above two actions, write a report, organize a meeting to present the findings, and listen to suggestions and criticisms to adjust and improve the inventions and development details.</p>				
<p>Strategy 3: Promote inventions to elevate healthcare and body movement of the elderly with innovative technologies such as social assistance robots, virtual entertainment for mental health care of patients, health check-up services, and AI for monitoring health in communities, and social innovations through establishing a prosperous society with the focus on the Planet aspect that creates cooperation of the community to take care of senior citizens' health. This includes care facilities for children and the elderly, with young people and elderly volunteers corresponding to provide care during the day. In such facilities, social innovation can be said</p>	<p>Promote inventions to elevate healthcare and body movement of the elderly, such as social assistance robots, virtual entertainment for mental health care of patients, health check-up services, and AI for monitoring health in communities.</p>				
	<p>Promote social innovations (through establishing a society of sustainable Prosperity with a focus on sustainable Planet) that create cooperation of the community to take care of senior citizens' health. These include care facilities for children and the elderly, with young people and elderly volunteers providing care during the day. In such facilities, social innovation can be said to sustain SDGs Targets 12.2, 12.3, 12.5, 6.1, 13.1, 14.4, and 15.1 in the Planet category.</p>				

to sustain SDGs Targets 12.2, 12.3, 12.5, 6.1, 13.1, 14.4, and 15.1 in the Planet category.	Analyze the results of the above two actions and write a report to develop further.			
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Conclusion

Thailand is encountering a rapid change in the age structure of its population, due to a declining total fertility rate (TFR), a growing proportion of the elderly population, and increasing life expectancy, which is partly attributable to medical advances and innovations in science and related technologies. As a result, 2023 was the second year Thailand experienced more deaths than births, representing a demographic phenomenon of far-reaching implications -- both for & against -- sustainable development.

This study aims to present a futuristic analytical approach towards a society of sustainable agronomy in Thailand with a focus on its Prosperity aspect along the Buddhist practices of the Noble Path so as to achieve the UN Sustainable Development Goals. It relies upon the Harrison analytical framework ($I = PAT$) to analyze the interaction between unsustainable development (I), population factors (P), consumption patterns (Affluence or Consumption) or *Samudaya* factors, i.e., desires that “can never end, never enough, and never be fulfilled,” and technology factors (T).

For the population factors (P), 2021 represented the first year in modern history that Thailand experienced more deaths than births amid its rapidly declining TFR. Such changes have been deemed unfavorable to the country’s economic and social development. These trends align with a previous study on the implications of aging and population decline for urban sustainability across the globe. This current study argues that the continuing trend of an increasing percentage of the Thai population in urban areas can pose both opportunities and threats to SDGs 8, 9, and 11. These three goals align with the creation of a Prosperity-based society of sustainable agronomy to cope with the trends of the elderly and the shrinking population whereby a Prosperity-based society will generate good awareness, generous and giving mindsets, peace, and development to help achieve SDGs 8, 9, and 11. A society of sustainable agronomy will further contribute to SDGs 1, 3, 6, 12, 13, 14, and 15 when there is

a linkage of its Prosperity-based approach with the People-based and Planet-based approaches. Among others, such a linkage contributes to holistic health management for preventive healthcare and access to clean water for sustainable consumption and production.

For variable A, consumption pattern (Affluence or C: Consumption) or the *Samudaya* factors, this study argues that the population shrinkage will result in a decreasing proportion of the working-age population, which is the main contributor to economic growth. Given a higher proportion of the elderly than that of other age groups, this demographic phenomenon is considered a threat to SDGs 1 and 3 from the sustainable People perspective. The solution to this is a reduction in unnecessary consumption, or the *Samudaya* factors that “can never end, never enough, and never be fulfilled.” This is especially the case for the elderly who tend to suffer non-communicable diseases such as obesity, diabetes, and high blood pressure due mainly to their consumption behavior and ways of life. Reducing these factors can help lessen premature deaths from non-communicable diseases and reduce the threats to the 3.8 targets of SDGs (Ta 3.8.t & Tps 3.8.u: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all). In addition to this, the issue of an increasingly aging population may also threaten SDG1. This study suggests the creation of inventions aligned with royal initiatives that drive towards the SDG1. It includes the creation of social institutions that play a role in securing decent paying jobs for the elderly in a manner that facilitates them to contribute to future generations. It is one way to continuously create more social capital from one generation to the next, as well as promote the well-being of the aging population to play this new role successfully.

Considering the technology factor (T), this study suggests the promotion of innovations to elevate healthcare and body movement of the elderly. They include innovative technologies such as social assistance robots, virtual entertainment for mental health care of patients, health check-up services, and AI for monitoring health in communities, and social innovations through establishing a society of Prosperity with a focus on the Planet that creates partnerships for cooperation in a community to take care of senior citizens' health. This includes child & eldercare facilities with young and elderly volunteers during the day. In

such care facilities, social innovation can be said to sustain the SDG targets in the Planet category.

The analysis of opportunities and threats leads to these three strategies with action plans for the achievement of SDGs via sustainable agronomy in a three-year term.

Strategy 1: Develop a society of sustainable agronomy with sustainable Prosperity to achieve SDGs 8, 9, and 11, particularly Target 11.6, while turning the demographic challenges into opportunities for the said goals.

Strategy 2: Create inventions aligned with royal initiatives that drive a society of sustainable Prosperity, while also stimulating a society of sustainable People to overcome *Samudaya* (desires) factors and to come up with holistic health management in communities. This would contribute to Targets 1.1 – 1.4, 3.4, and 3.8.

Strategy 3: Promote inventions -- in both technological and social terms -- to elevate healthcare and body movement of the elderly to achieve SDGs 12, 6, 13, 14, and 15 in the Planet category.

This analytical approach is considered applicable for development practices in both the public and private sectors, regardless of differences in types of institutions and territorial scales, namely the family, villages & communities in rural and urban areas, both provincial and national.

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