



THE TWELFTH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN

(2017-2021)

Office of the National Economic and Social Development Board

Office of the Prime Minister

Bangkok, Thailand

Foreword

The Twelfth National Economic and Social Development Plan (2017-2021) was formulated during a period when the world was experiencing rapid change and becoming even more integrated, whilst Thailand itself was undergoing reforms. Since the Ninth Plan, the principles of the “Sufficiency Economy Philosophy” have been and continue to be a vital element of development strategy as they underpin the promotion of moderation, reasonableness, and resilience. These principles have significantly contributed to balanced and sustainable development in Thailand.

In formulating the Twelfth Plan, the Office of the National Economic and Social Development Board (NESDB) adhered to the 20-year National Strategy framework (2017-2036), the country’s Sustainable Development Goals (SDGs), the Thailand 4.0 Policy, as well as other reform agendas. In order to set out development directions and strategies to achieve the objectives of “Security, Prosperity, and Sustainability”, the NESDB regards participation by a broad cross-section of society to be a crucial principle in the drafting of this Plan.

The National Strategy is to be translated into action through the five-year National Economic and Social Development Plans, commencing with the Twelfth Plan. Each strategy within the Twelfth Plan lays out development agendas as well as flagship projects which need to be accomplished in order to prepare human capital, society and the economy for future challenges. Clear implementation mechanisms as well as monitoring and evaluation procedures are also identified to bring about genuine development that is effective, beneficial, and sustainable for all.

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Contents

	Page	
Part 1	Overview of the Twelfth Plan	1
Part 2	Assessment of the Development Situation	
	◆ External Situation and Trends	29
	◆ Internal Situation and Trends	37
Part 3	Objectives and Development Targets of the Twelfth Plan (2017-2021)	77
Part 4	Development Strategies	
	<i>Strategy 1</i> : Strategy for Strengthening and Realizing the Potential of Human Capital	80
	<i>Strategy 2</i> : Strategy for Creating a Just Society and Reducing Inequality	94
	<i>Strategy 3</i> : Strategy for Strengthening the Economy, and Underpinning Sustainable Competitiveness	102
	<i>Strategy 4</i> : Strategy for Environmentally-Friendly Growth for Sustainable Development	132
	<i>Strategy 5</i> : Strategy for Reinforcing National Security for the Country’s Progress towards Prosperity and Sustainability	149
	<i>Strategy 6</i> : Strategy for Public Administration, Corruption Prevention, and Good Governance in Thai Society	160
	<i>Strategy 7</i> : Strategy for Advancing Infrastructure and Logistics	177
	<i>Strategy 8</i> : Strategy for the Development of Science, Technology, Research, and Innovation	198
	<i>Strategy 9</i> : Strategy for Regional, Urban, and Economic Zone Development	206
	<i>Strategy 10</i> : Strategy for International Cooperation for Development	230
Part 5	Implementation, Monitoring and Evaluation of the Twelfth Plan	245

Part **1**

Overview of the Twelfth Plan

Part 1

Overview of the Twelfth Plan

1. Overview of the Twelfth Plan

During the period of the Twelfth National Economic and Social Development Plan (2017-2021), Thailand will undertake a range of reforms aimed at solving various long-term accumulated fundamental problems. These reforms will take place within a global situation of rapid change and closer connectivity. Competition within the global economy will be more intense, while the global society will be drawn closer together in an increasingly borderless world. In addition, the rapid pace of technological change will significantly affect either people's daily lives or their economic activities. Meanwhile, Thailand will face an array of fundamental strategic development factor limitations which will provide an obvious obstacle to the country's future development.

The period of the Twelfth Plan will be an extremely challenging time for Thailand to undertake substantial reforms by accelerating the development of science, technology, research and development, and innovation as key factors in empowering the development of all aspects needed to increase the country's competitiveness with an exceedingly competitive global economy. Furthermore, in addition to persistent levels of income inequality, Thai citizens still lack the knowledge, skills, qualities and attitudes needed to realize the country's development potential. The demographic structure has turned to be an aging society, resulting in labor shortages. The size of the Thai population of working age started to decline in 2015, and the population structure will reach a definitional 'aged society' by the end of the Twelfth Plan. Meanwhile, natural resources and the environment have rapidly deteriorated in both quantity and quality, resulting in higher economic costs and devastating negative impacts on people's quality of life. In addition, public administration has been inefficient, lacking in transparency, and highly corrupted. All of these factors will be constraints to national development and will leave some parts of society behind.

With such a variety of challenges which are major obstacles to the country's development in the long run, it is commonly recognized that, in order to elevate Thailand to be a developed country with security, prosperity and sustainability, Thailand must accelerate the improvement of fundamental strategic development factors in all respects, such as: increasing investment in research and development; developing science, technology, and innovation; this has to be accomplished together with accelerating the enhancement of labor skills, both of new entrants to the labor market and existing workers, in order to be compatible

with the targeted improvements in the production and service sectors, and with technological changes. Furthermore, human society should be developed in such a way as to achieve well-being in all age groups and to have the capacity to cope adequately with daily life changes through the leverage provided by quality education, learning and skills enhancement, and through quality public health services in all areas, and by promoting the role of social institutions to imbue good, disciplined people with strong values and social responsibility. Moreover, henceforth the spatial development and enhanced economic potential of cities must be emphasized. This will be accomplished through improved environmental standards, rationalization of land use, organized city planning, and strengthened urban security which is consistent with Livable Cities benchmarks. The spatial development of cities and the realization of their economic potential has the purpose of spreading economic and social opportunities and creating new economic and income-generating bases, thereby decreasing social inequality in Thailand and increasing competitiveness by promoting livable cities as the new economic bases in both the interior up-country areas and the major border areas.

In addition, the next five years is a crucial time for Thailand to push forward international trade and investment growth as well as domestic investment and economy enhancement as the main engines of development. Thailand needs to make agreements on international trade and investment, and cooperate with allied nations to expand development through bilateral and multilateral arrangements, together with strengthening regional and sub-regional linkages and pursuing a proactive investment strategy boost for the regions. International cooperation frameworks at all levels will provide opportunities for Thailand to maximize the advantages derived from its geographical location to develop itself into a major regional economic and trading hub. Therefore, the Twelfth Plan focuses on enhancing international regulatory and institutional linkages at the implementation level and at each border check-point, side-by-side with developing domestic physical infrastructure networks to link with those of neighboring countries. Meanwhile, Thailand must be prepared to function as a gateway to West and East Asia. The Twelfth Plan emphasizes using physical infrastructure linkages as a basis for the development of areas, economies and communities along transborder economic corridors, upgrading their competitiveness and distributing wealth to the communities, provinces, and cities along these economic corridors as well as other domestic linkage areas. Additionally, Thailand must execute a proactive strategy for creating an entrepreneurial society and intensively supporting Thai entrepreneurs to invest abroad in order to gain capital revenues and potential business opportunities. The aim is also to promote value chain linkages within the region, especially with Cambodia, Lao PDR, Myanmar, Vietnam (CLMV) and ASEAN.

The major forms of international cooperation for Thailand's development from now on will be economic cooperation on trade and investment, social development cooperation,

environmental cooperation, and security cooperation in various frameworks including at sub-regional, regional, and global level. Not only must existing bilateral and multilateral agreements be efficiently utilized, but also new agreements will be constructed based on the concept of free trade and competitiveness improvement, in particular promoting the use of the cooperation frameworks of ASEAN and with development partners outside ASEAN. To achieve this, Thailand should play a constructive role in supporting development cooperation in every aspect, and in strengthening poverty and inequality reduction in the sub-region and region. Additionally, Thailand should adopt the Sustainable Development Goals (SDGs) and international regulations and standards concerning the quality of goods and services, labor rights, environmental suitability, security, transparency, etc. to guide its practices and enforcement.

Therefore, under the limitations imposed by the fundamental factors for all aspects of the country's development, and within a global trend where technology is developing rapidly and many countries are swiftly developing innovations to elevate their productivity and the value of their goods and services in order to compete in the global market and improve the quality of life of their citizens, Thailand faces a severe challenge to accelerate the development of various strategic fundamental factors, including: investing in research and development; developing science, technology and innovation; developing basic infrastructure and logistics to form a complete network; efficient human resources development; and reforming public administration to be efficient, transparent, and accountable, in particular revising public administration laws and regulations. Accordingly, the Twelfth Plan focuses on incorporating creativity and innovation to generate a new value-added economy, including manufacturing processes and forms, new products and services, technology changes, and business patterns. Likewise, creativity and innovation will either radically change people's way of life or further their development, as well as develop both local and high-tech goods and services that affect the quality of life and well-being of the public. Therefore, development in the next five years will focus on knowledge-based development which results from the use of wisdom, skills, science, technology, research and development, and innovation in all aspects of development. This development will be environmental-friendly, comply with SDGs, create and expand new and more inclusive income bases, as well as extend the existing income bases. Thailand will be a just and quality society which leaves no one behind, based on the collaboration of all Thai stakeholders (Thailand 4.0).

In order to propel development following the concepts and directions previously mentioned, the Twelfth Plan highlights the need for the public administration system at every level to pursue good governance, be free from corruption, and adjust laws and regulations accordingly. Likewise, Thai people's attitudes must be changed to be virtuous, disciplined, accountable, and ready to adapt to changes in accordance with the principle of protecting the

common interest. In order to address complex and persistent problems while fluctuating external factors increasingly affect Thailand's development, there must be significant development changes which will act to enhance the country's strengths and reduce its weaknesses. Thus, representatives of various sectors in Thailand have formed a consensus that the country needs to prepare and follow a national strategic master plan that specifies long-term targets over the coming 20 years (2017-2036). The National Strategy will establish the main development directions that must be followed under any government in order to achieve the country's future development targets. The long-term development master plan will constitute a framework that regulates any and all aspects of development implementation, as well as linking overall and specific development plans at all levels to be properly integrated under the National Strategy. The clear and specific long-term targets require a continuous process of getting to the root of problems and strengthening the foundations for development. Additionally, monitoring and evaluation processes need to be adjusted in order to regulate the linkages between strategies, budget allocation, and implementation that conforms to targeted outputs, outcomes, and impacts.

Development under the Twelfth Plan constitutes the first five years of the implementation of the 20-year National Strategy (2017-2036), which is Thailand's development master plan for steering the country towards security, prosperity, and sustainability. It identifies the targets for Thailand's development over the next 20 years, as well as strategic issues and the main directions to be followed to achieve these targets. The Twelfth Plan in turn will be a major tool to energize the implementation of the National Strategy, alongside with other mechanisms and supporting instruments. So, the Twelfth Plan sets clear economic, social and environmental targets that have to be achieved within the next 5 years. However, in order to set the targets for the five years of the Twelfth Plan, the accumulated objectives of the next 3 Plans (the Thirteenth Plan, the Fourteenth Plan, and the Fifteenth Plan) have also to be considered, particularly the Fifteenth Plan (2032-2036), which will cover the last five-year period of the 20-year National Strategy (2017-2036). A core objective of the National Strategy is for Thailand to be a developed country by the end of its implementation period. Thus, both the overall targets and the sectorial targets of the Twelfth Plan are consistent with the targets of the 20-year National Strategy. Similarly, the subsequent National Economic and Social Development Plans will continue to pursue the objectives and targets of the 20-year National Strategy after the Twelfth Plan period had been completed.

1.1 Principles of the Twelfth National Economic and Social Development Plan (2017-2021)

The development objectives of the Twelfth Plan over the next five years, linked cumulatively with subsequent plans to those of the 20-year National Strategy, adopt the following core principles:

1. The Twelfth Plan is based upon the principles of the “Sufficiency Economy Philosophy”, which has been a vital foundation since the Ninth Plan. The Philosophy promotes balanced development by embracing the following concepts: moderation, reasonableness, and resilience or risk management. The Sufficiency Economy Philosophy provides the necessary basis for sustainable development, which focuses on developing quality human resources and nurturing the qualities of Thai society, enhancing chances for everyone to live happily and harmoniously, while the growth of the Thai economy increases continuously, appropriately, stably, fairly, inclusively, and friendly to the environment, while bio-diversity, communities’ ways of life, values, traditions, and cultures are preserved.

2. “People-Centered Development” seeks to create quality of life and healthy conditions for Thais. It aims to develop quality citizens who are disciplined, receptive to learning, knowledgeable, skillful, and creative. They should also have good attitudes, social responsibility, morality, and ethics. People of all ages are developed and are well prepared for an aging society. People can live with and make use of their environment harmoniously, as well as preserve and rehabilitate natural resources.

3. “The Vision of the 20-Year National Strategy”, which is “Thailand as a developed country with security, prosperity, and sustainability in accordance with the principles of the Sufficiency Economy Philosophy” with the national slogan “Security, Prosperity, and Sustainability”, is used as a framework for the vision of Thailand in the Twelfth Plan. The vision represents the interests of the nation, including: independence, sovereignty, completeness of jurisdiction, security of major national institutions, absent of threats to the people and the nation, people able to live together in peace, solidarity and with social security within a pluralist society and with human dignity, national economic growth, social fairness, well-being of the people, sustainability of natural resource and environment, energy/food/water security, ability to maintain national interests within a changing international environment, security coordination among ASEAN members and the international community, respecting others’ honor and dignity, Thailand not being a burden to the world and able to help countries of lower economic status.

4. “The Targets of Thailand in 2036”, which are the targets of the 20-year National Strategy, are used as a framework in setting major and minor targets for the first five

years. Each target and indicator will also have to abide by the internationally accepted 2030 SDGs. The targets for Thailand in 2036 are derived from major development issues, patterns of development, the character of the main production and service bases, and conformity of Thais, Thai society and target groups in Thai society to desirable norms. Therefore, the target of the Twelfth Plan is as follows: “Thailand’s economy and society to develop stably and sustainably consistent with sustainable development. Thai society to have low inequality. Thai citizens to be high quality, disciplined, alert to learning, active in lifetime self-learning, knowledgeable, skillful, having good attitudes and values, physically, mentally and spiritually healthy, having public mindedness, and be good Thai, ASEAN, and global citizens. Thailand to have an important role in international fora. Thai economy to be innovation-led, digitally-based and forming an entrepreneurial society. Thai business to be competitive in production and good at doing business. The Thai production and service base will have high quality and distinguished designs which serve the demands of the global market. Thailand will be the major production and service base in many fields, such as finance, logistics, health, and tourism. Thailand will be the world’s kitchen of quality and hygienic food, as well as smart industries and services bases which will be the industries of the future. Industry will use innovation, highly-skilled human capital, and smart technology to further the potential of the existing production and service bases and develop new ones to drive Thailand to be a country of smart economy, society, and citizens.”

5. Encourage “a form of economic growth that contributes to inequality reduction and promotes greater levels of productivity that is based on local wisdom and innovation.” The Twelfth Plan focuses on inclusive growth in order to expand the middle class population group. The Plan sets the goal of increasing economic opportunity, social opportunity, and incomes of the 40 percent of the population with the lowest income (the bottom 40 percent). In addition, increasing productivity based on knowledge and innovation development is a crucial factor in driving the development of every sector to the next level. In moving towards the goal of being a developed country, the targets of increasing income, creating a just society, reducing inequality, expanding the middle class population group, and creating a quality society with good governance and environmental friendliness are set.

6. “Bringing the Twelfth Plan into action in order to achieve the long-term development goals.” The National Economic and Social Development Plan is the mechanism that connects, oversees, and takes the development directions and goals of the 20-year National Strategy through to implementation at all levels and involving all aspects, harmoniously. Consequently, the Twelfth Plan emphasizes the “Pra-Cha-Rat” mechanism, which is the platform for combining the power of the public sector, private sector, and citizens.

The Plan also determines the high-priority development issues that require integrated implementation, sets programs/projects that will effectively correspond to the development targets, and sets the targets and indicators that cover a wider range than was the case with the previous National Economic and Social Development Plans. Target-setting brings many factors into consideration, which are: congruence with the targets of the long-term 20-year National Strategy, which provides the structure for setting the minor targets and indicators which are to be exercised within the budgeting framework; and the monitoring and evaluation of the public sector in terms of its spending, performance and development which are to be consistent with and reinforce one another. Hence, the Twelfth Plan sets the integrated development issues which provide the directions for the budget allocation, compiles and sets the key programs/projects at the implementation level, and sets the focal points for spatial development in the manufacturing and service sectors, as well as identifying the main provinces facing each development issue.

1.2 The Turning Points in the Twelfth National Economic and Social Development Plan. The Twelfth Plan contains many turning points including: (1) the 20-year National Strategy provides the framework for the targets and direction of long-term development, while the Twelfth Plan provides the development implementation mechanism by setting the development goals and directions that must be implemented in the first five years of the National Strategy; (2) the implementation framework and direction of the Twelfth Plan are more specific in that they identify the flagship programs/projects which will be undertaken in the first five years of the 20-year National Strategy's implementation through sectoral plans, ministries' strategies, regional development plans, provinces' and provincial clusters' plans, and annual implementation plans of public organizations in driving forward the strategies of the Twelfth Plan. The budget should be allocated by integrating development issues and spatial development, and setting indicators to monitor and evaluate systematically development outcomes and achievements. In the next five years, the budget allocation system, public budget management, the public administration plans, rules and regulations on financial and fiscal discipline, the monitoring and evaluation system of development strategy, and the monitoring and evaluation system of public performance will be changed radically to meet the challenge of driving towards effective implementation. Additionally, the development directions, which are found in the details of the 10 strategies of the Twelfth Plan, cover various issues and sectoral development directions, which the responsible organizations have indicated in their sectoral plans, or are in the process of implementation. These all aim to integrate all development issues and maintain continuity of implementation in order to pursue the desired outcomes and achievements; (3) the Twelfth Plan sets the provincial, regional and urban

development directions, which identify the specific target areas and the specific target production and service sectors, to lead spatial, provincial, regional and urban development implementation in order to achieve their targets consistent with the overall targets for the country; (4) the Twelfth Plan identifies issues and directions which support the implementation of National Reform agendas as proposed by the National Reform Assembly and the National Reform Steering Assembly. The issues identified are clear and need to be tackled within the next five years, which is the specified period for reforming the country and laying the long-term development foundation to achieve security, prosperity, and sustainability.

In addition, the Twelfth Plan continues to strengthen the development mechanisms to be more efficient and consistent with the current situation. The mechanisms are laws and regulations, as well as the committees and organizations that are responsible for strategy implementation at all levels, making it appropriate and able to cope with the changing situation, and reducing redundancy in the system at either the national or spatial levels. The roles of knowledge, technology and innovation are increased to become the main development mechanisms in every sector.

2. Development Circumstances and Development Issues in the Twelfth Plan

2.1 Development conditions and circumstances

The progress of Thailand under the National Economic and Social Development Plans, from the First Plan (1961-1966) until the Eleventh Plan, has resulted in a higher level of development, respectively, in both economic and social aspects, such as: the size of Thai economy, manufacturing base, and services base are all larger, citizens' incomes are higher, poverty has decreased, people's quality of life has improved since the coverage of social services has been increased, basic infrastructure has been more comprehensively developed, and the results of free trade and investment policies and the enlargement of cooperation with allied countries, at both bilateral and multilateral levels, as well as cooperation within the sub-region and ASEAN which have been more intensive since 2015, have expanded Thai's trade and investment opportunities, bringing strength and prominence to many Thai production and service bases.

In the previous 6 decades, the Thai economy has expanded at an average rate of 6.0 percent per year. Since 1987, the Thai economic base has shifted from one concentrated on agriculture to one concentrated on industrial production, and has started to become more modern services-based in the last 10 years. As a result of the expansion of the Thai economy and increasing per-capita income, Thailand shifted its status in the World Bank classification

from a low-income economy to a lower-middle income economy in 1988. Thailand's per-capita income in 1988 was 29,307 THB per year, and surpassed the threshold for classification as an upper-middle income country in 2010, before reaching a GNI per capita of 4,121 USD per year in 2014.¹ The production and service bases have become more diversified, the industrial goods export base has impressively enlarged, many production and service sectors - such as the automotive industry, electronics and electric appliances, food industry, agricultural products, tourism and health services - have been internationally competitive, increased global market share, and gained higher foreign currency earnings. Meanwhile, liberal economic policies have made Thailand more internationalized in terms of standards of products, service, rules and regulations. Bilateral and multilateral cooperation between Thailand and the international community have also progressed, and have provided the mechanisms and means that have pushed forward the Thai economy, society, and politics meaningfully, while cooperation frameworks have elevated Thai standards to be of international standing. The value of international trade and investment has increased continuously. By the year 2015, the value of trade in both goods and services was 17.2 trillion THB, or 126.9 percent of the size of Thai economy, measured as the value of the country's total production (Gross Domestic Product: GDP). Additionally, Thai society and Thais have become more international, Thai and people have higher English language skill, knowledge about international standards, rules and regulations, as well as the changing global situation. The integration of cultures has been adopted into daily life.

The enlarged economic base has resulted in increasing employment, absorbing up to 38 million out of the 38.5 million workforce. The average unemployment rate was less than 0.9 percent, and poverty has decreased accordingly, both in terms of the number of people under the poverty line and the proportion of people under the poverty line as a proportion of total population. This proportion dropped from 20 percent in 2007 to 10.5 percent in 2014, while the population below the poverty line fell from 12.7 million in 2007 to 7.1 million in 2014. The quality of life of the average Thai has improved in all regards. Access to education, public health services, public services, basic infrastructure, social protection and other resources has improved in coverage and quality. For instance, in 2015 universal health care covered 99.9 percent of Thai people, while there was income security for disadvantage people, the coverage of which improved. Life expectancy has continuously increased: a male's life expectancy at birth was 71.6, whereas a female's was 78.4. The average number of years education of Thais aged between 15-59 years has increased to 10.1 years.

¹ GNI per capita (GDP per capita was 6,034 USD per year), Office of the National Economic and Social Development Board (NESDB).

Nevertheless, Thailand still faces problems of quality in almost all aspects, for example in terms of knowledge, skills, attitudes, virtues and ethics. Many citizens respect neither others' rights nor the public interest. There are also shortages of labor in the situation where the population structure has rapidly changed to become an aging society. Moreover, Thailand still has problems regarding the quality of public services, education, health services, basic infrastructure, and logistics, while water resource management has not yet formed a complete network, and development in this regard is slow. Many problems remain in the basic infrastructure, such as the modes of transport have not been modified to be more efficient and meet performance targets, there is a lack of unity in management, services are insufficient, are of limited quality, have been concentrated in the urban areas, and are too costly. In addition, there are many laws and regulations that hinder the development of infrastructure and logistics. The development of science, technology and innovation are still slow. Investment in research and development is insufficient. Research has not been used effectively to create economic or social gain, while innovation developments are still scant.

The above problems are partly attributable to the low efficiency of public administration, lack of transparency and accountability, while development implementation has lacked continuity and law enforcement has been ineffective. Additionally, many laws and regulations are too obsolete to cope with changes while the targets of good governance and administration of the country have not been achieved. Although public services, which have been provided to both the public and private sectors, have expanded, they are still slow and don't meet international standards when compared to other countries. Additionally, the structure of the public sector has grown very large and complicated, while personnel costs have risen continuously. The budget allocation process takes a long time, and this restricts its ability to meet the needs of the people. Besides, budget spending has not been effective and efficient, and lacks transparency and good governance, while the quality of public sector employees has fallen due to jobs in the public sector not being the first choice for people with high education and capability, unlike in the past. Many capable officials have resigned because they have better professional options. The main reasons are: the public sector does not have obvious career paths; there is a lack of human resource development programs that comply with contextual changes; and corruption has spread widely in both the public and private sectors.

These development circumstances have resulted in low productivity within the Thai economy, and thus quantitative growth is needed as the main economic driver. Meanwhile the structure of the Thai economy is unbalanced: international trade as a proportion of the total economy is much larger than the proportion contributed by the domestic economy. Thus,

the Thai economy is very sensitive and volatile to external factors. The agricultural and service bases have low productivity. The use of knowledge, technology, and innovation to add value in these bases is still low. The income of farmers is much less than the people in the manufacturing and service sectors, and this has generated income inequality. Furthermore, Thailand still has high inequality and a lack of fairness in many other aspects, which has fomented disharmony in society. The income disparity between the rich and the poor has only slightly reduced: the coefficient of income inequality (Gini Coefficient) decreased from 0.493 in 2014 to 0.465 in 2013. Besides, natural resources and the environment have been wastefully utilized, have sharply declined and deteriorated, while waste-generation is overwhelming, and the environment has degenerated in all aspects. Lastly, the issue of the security of the state is complicated by long-term accumulated problems, which have increased unceasingly and shown significant signs of disaster, such as: the abuse of the major national institutions; conflicts between Thais arising from fundamental differences of opinions and ideologies relating to economy, society, culture and politics; and the southern Thailand insurgency.

On the economic front : considering economic growth since the First Plan, the Thai economy showed high growth rates between the First Plan and the Sixth Plan (1961-1991). After this period, growth softened during the Seventh Plan as a result of slowdowns in exports and investment prior to the worst economic and financial crisis in Thailand's development history, in 1997. Subsequently, after experiencing this crisis, the country's development planning adopted the Philosophy of Sufficiency Economy as the key implementation guideline from the Ninth Plan to the Eleventh Plan in order that all sectors in society should become resilient and adopt proper risk management. Lessons learned from the crisis in 1997-1998 encouraged both the public and private sectors to be more resilient based on the good governance approach which includes: (i) operating with more effectiveness, transparency, accountability, together with better systematic checks and balance mechanisms; (ii) having monetary and fiscal discipline in order to achieve fiscal sustainability, more secure fiscal foundations, as well as higher international reserves; (iii) revising laws and regulations to function more systematically and compliant with the economic and social structure; (iv) providing fairness across all sectors by protecting consumers and people from being exploited, creating a competitive environment in the market as well as implementing supporting policies to facilitate Thailand's ease of doing business; and (v) achieving more effective macroeconomic management. Since the Ninth Plan, Thailand has given greater emphasis to investment in infrastructure network extension as a key development strategy. There has also been a target set for increasing Research and Development (R&D) investment and the budget allocation for science, technology and innovation. In addition, the adoption of the Sufficiency Economy

Philosophy as the key development guiding principle at every level of Thai society has helped the country to survive every subsequent crisis.

However, Thailand's competitiveness ranking is improving quite sluggishly, and has even decreased when faced with economic fluctuations. The International Institute for Management Development (IMD) has ranked Thailand around 30th position out of 59 countries from 2012 onwards. In 2016, it ranked Thailand 28th out of 61 economies, which showed a relatively small improvement during the five year period under the Eleventh National Economic and Social Development Plan (2012-2016). At the same time, the Doing Business Report by the World Bank ranked Thailand 49th out of 189 economies worldwide. Thailand's constraints include limitations of human capital, the small volume of science, technology and innovation research investment, low infrastructure quality, inefficient logistics systems, government inefficiency, outdated regulations and ineffective law enforcement, and corruption. Thailand's economy fluctuates easily when confronted with global economic crisis and natural disasters such as the major flood of 2011. The Thai economy has grown at a lower rate than its potential for several years. During the Ninth, Tenth and Eleventh National Economic and Social Development Plans, the Thai economy grew in the range of 5.8, 3.0 and 3.4 percent respectively, averaging at 3.1 percent² from the Eighth to the Eleventh Plans. In the Eleventh Plan, Thailand has evidently lost its competitive advantage due to high labor costs. The country also needs to improve its creativity and innovation capacity that will allow Thailand to compete with more advanced economies and to overcome the middle-income trap.

Thailand's economy has shifted from an agricultural-based to an industrial and service-based economy. Industry has continuously accumulated knowledge and production technology. It has transformed from primary production industry with foreign investment dependency to sophisticated production industry with a wider portion of domestic investment. Thailand has become a significant exporter of advanced-technology-based products. At the same time, its service sector has diversified from the traditional tourism-based services to services with more specialization such as finance, health and others. However, the agricultural sector has developed at a slower pace than the other sectors because of low productivity, which is the result of the lack of use of technology, poor soil quality, inappropriate land use, poor water management, insufficient resiliency to climate change, and the absence of a suitable price insurance system. Government subsidies to the agricultural sector are very high, but do not contribute to the sector's productivity improvement and represent a high budget burden for the country.

² NESDB's projection of Thai economic growth is 3.0-3.5 percent in 2016.

In social aspects : the human capacity and standard of living of the Thai people are below the target and are inconsistent with a knowledge-based economic and social development direction. This matter occurs as a result of some major problems, such as: low quality in education and learning; delayed development in pre-school children due to lack of knowledge and time of their families; a shortfall of school age children's intellect because of the low quality of education; and a lack of skill and ability to adapt theoretical knowledge into practice, eventually resulting in low labor productivity. Another problematic issue regarding human capital development in Thailand is environmental and behavioral risk. Thai people are deemed to be more likely to be affected by non-communicable diseases and premature death as a result of inappropriate consumption behavior and a lack of adequate physical activity. Determinants of health are also considered to other environmental health risks: for example, those who have low levels of education are subject to lesser awareness about health and the alternatives for a healthy lifestyle, such as: food safety risks, air pollution exposure, and road accidents.

Additionally, Thailand is expected to encounter some challenges, brought about by its currently changing demographic structure, which will have impacts on living standards, economic potential, and various social aspects. Given the current demographic profile, Thailand is expected to become an aged society in 2021, the final year of implementation of the Twelfth Plan, with 19.8 percent of elderly people to total population. The nation's working age population reached its peak in 2014 and will be on a path of steady decline thereafter, possibly leading to severe labor shortage problems, which can be further intensified if the existing seemingly low labor productivity problem is not adequately tackled, due to a number of factors, including low quality workforce, delayed technological development, and administrative problems. Such challenges can pose some limitations to the nation's competitiveness, development, economic growth as well as income generation and well-being improvement of the Thai people. Furthermore, besides quantitative challenges, the qualitative aspect of the Thai people is also considered to be a challenge that needs to be tackled. Problems, despite varying depending on the age groups concerned, are nonetheless interconnected, starting from early childhood. Inadequate early childhood development can very likely lead to poorly performing school age children and a mismatch of skills development for the labor market. The number of elderly people living alone who have health-related problems is expected to be on the rise. Additionally, the influences of foreign cultures, being absorbed into the Thai society more easily in the digital era, can negatively impact social norms, attitudes and the behavior of some Thai people, especially those who are unable to screen out inadequate cultures.

Resolving poverty and inequality is also an urgent issue to be tackled during this Plan. Currently, poverty continues to be concentrated in the Northeast and the North of Thailand. At the same time, income disparities between the richest income decile and the poorest stood at 34.9 times in 2013. The fundamental cause lies in geographical disparities in the quality of social services, an imbalanced economic structure, uneven distribution of development opportunity and unequal access to justice. Moreover, there are relatively fewer opportunities for the population in remote areas to access relevant information, knowledge, financial sources and quality social services. This will tend to bring more risks in the future where rapid technological advancement takes place in every aspect of life, consequently creating wider inequality. Nonetheless, forming networks to resolve community issues through economic, social and environmental activities has improved. Examples include disaster-management communities and the preparation of community plans formulated by every community before being integrated into sub-district plans, local administration plans, district development plans and provincial development plans, respectively. Community enterprises and occupational groups account for 32.51 percent while financial organizations account for 26.77 percent of all organizations.

Natural resources and the environment continue to be the critical issues of Thailand. Over several decades, natural resources have been utilized tremendously for development. Consequently, natural resources have been constantly depleted whilst the natural environment has deteriorated in quality. As a result, conflicts over the utilization of natural resource between the government and different groups of people have tended to increase. In addition, the management of natural resources and the environment remains centralized, which has no linkage with the local level. All these factors have contributed to the existing state of natural resources. Forest areas are decreasing. Soil becomes unfertile. Biodiversity is threatened. Coastal ecosystems are destroyed. Water resources cannot meet consumption demand. Environmental problems escalate simultaneously with the growth of the economy and urbanization. The management of Municipal Solid Waste (MSW) is still inefficient, leaving unmanaged solid waste accumulated over the years up to 30.8 million tons in 2014. Similarly, the MSW generation rate has risen from 1.04 kilograms per person per day in 2010 to 1.11 kilograms per person per day in 2014. While Waste from Electrical and Electronic Equipment (WEEE) is likely to increase by 10 percent each year, only 70 percent of industrial waste is collected and treated properly. Moreover, in many places, air pollution concentration has been higher than the air quality standards. In 2014, these air pollutants were Particulate Matter (PM), ozone, and Volatile Organic Compounds (VOC). Meanwhile, water quality has been

degraded due to erosion of soil contaminated with chemical fertilizers, livestock waste, and untreated household wastewater. Currently, the number of waste water treatment systems is inadequate.

The trend of greenhouse gas emissions has increased constantly, although the annual growth rate of 3.3 percent in 2014 was actually lower than in the previous year due to the effects of several greenhouse gas reduction measures and sequestration by forests and land use. In addition, highly unstable weather will result in more frequent natural disasters, particularly severe floods and droughts. This will harshly affect the economic sector and the supply chain of production both inside and outside the country to a greater extent than in the past. Illegal fishing has continued. Moreover, the haze from forest fires has become more appalling and affected the health of people and the tourism business in some seasons. The causes of forest fires come from burning for clearing farming lands and post-harvesting, both in Thailand and in adjacent neighboring countries.

With the aforementioned limitations and challenges, Thailand's current economic and social structure remains weak, whereas its overall management still lacks efficiency and transparency. As a result, Thailand is facing greater pressure and risk under intensified globalization, moving towards a world with no boundaries – free mobility of manpower, goods and services, investment, knowledge, as well as data and information. Consequently, global competition has become more severe; economic bloc formation has been prevalent; R&D in ST&I effort has been stimulated to increase productivity in many countries. Many new economies have become more competitive, such as Latin America, China, India, and Vietnam. These countries still have lower costs of labor and have used many measures to attract foreign investment. Hence, they can compete well in the marketplace, particularly their primary and secondary industries. Meanwhile, the global economic and political conditions have been unstable. Global economic crises in many regions have occurred more frequently. Moreover, changes in the global landscape, new technological pushes, and closely connected global communities have generated more complex threats and risks, including terrorism, epidemics, international networks of narcotics, and other forms of international crime. These illegal activities – for example, international narcotics trade, illegal foreign labor, human trafficking, illegal immigration, child workers, sex trade, and money laundering - have become more complicated due to regional connectivity and novel communications technology. At the same time, climate change has become more unpredictable, causing risks to livelihood, business management, and public administration. Accordingly, international agreements have

become more stringent in several aspects in terms of pollution emissions, human rights and financial regulation.

Many aspects of conditions and environments, both inside and outside the country, will provide unavoidable pressures that Thailand will have to adjust to and manage risk in a more sophisticated manner. The required adjustment needs to be rooted in structural change which will eliminate the country's weaknesses while building proactive mechanisms to support the country's strengths, resulting in optimum benefits for the majority of people in the country. If these reforms fail to be achieved during the next 4-5 years, Thailand will lose its competitiveness. The average income per capita will not rise. The overall quality of life, on average, will continue to be low. Inequality will be higher. Natural resources will further deteriorate. In the end, development will not be sustainable in the long term. The country will not be able to become developed by 2030, as is targeted in the 20-year National Strategy.

Therefore, the 5-year duration of the Twelfth National Economic and Social Development Plan represents a critical period of reform and transformation for the country in order that its future economic and social structure will be aligned with the new global landscape. Moreover, this new structure must be resilient and responsive to the new risks and threats. Thailand can also take advantage of the changing global context and reap benefits for the people. Critical issues are therefore economic and social structural adjustment, infrastructural investment, human development, and the transformation of values and living culture in work, learning, discipline and responsibility. All in all, collaborative action in creating unity, setting priorities, and sharing responsibilities among all stakeholders is the key to addressing these issues. It is therefore important to consider the following: the seamless linkages of development strategies at all levels; an integrated and results-based budget system; continuous area-based development; investment in R&D and human development; and sets of indicators for regular monitoring and assessment of development strategies.

2.2 Main Emphases and Development Issues

During the next five years, Thailand needs to be transformed extensively due to prevailing conditions and the development environment. Fundamental problems, persistent weaknesses and restrictions can be overcome by reform and change. In the meantime, a proactive strategy of risk management and building resilience is needed in order to utilize the strengths of the country for long term development. However, the main emphases and development issues of the Twelfth Plan focus on interconnected and integrated issues which will provide the basis for budget allocation, plan implementation, and monitoring and evaluation. The development issues are as follows:

2.2.1 Innovation Development and Commercialization to Enhance Thailand's Competitiveness

The focus will be on using creativity and innovation development to create economic value-added in the production process, in product design and in services. Technological alteration, new business models, radical changes in people's lifestyle, and innovation development will improve performance and enhance the capacity of human beings, resulting in higher productivity, income base expansion from new products and services, and cost reduction. In the face of increasing global competition, and competition from lower wage countries, the Twelfth Plan will focus on innovation in products and processes to create value-added goods and services. In order to achieve this, high-tech products, and/or innovative products and services – both local and high-end - which affect the quality of life and people's well-being should be prioritized. For example: relocating personnel from the production line to other positions which yield higher value-added contributions to the value chain, such as in the process of product development and product design, R&D, creativity and innovation, and other activities including marketing, logistics, and branding.

Moreover, in order to drive the development and adoption of innovation, the focus of the National Research Agenda must be clear, specific and in line with the development targets of different sectors, and innovation strategies should be fully integrated. This should be performed along with promoting cooperation and partnerships involving all stakeholders, including government, the academic sector, the private sector in all areas of manufacturing and services, and communities in order to create an environment and system that supports research and strengthens innovation development. Furthermore, R&D should be integrated with innovation development and commercialization by defining the National Research Agenda in parallel with the country's goals and key social development issues according to the demands of the market and society. The private sector should participate in every stage of development, including the R&D process, the innovation development process, and the commercialization process by providing necessary funds, resources, knowledge, ideas and expertise in specific areas. Meanwhile, the private sector should use innovation to create green growth, to support communities to generate ideas, and to build a quality society.

2.2.2 Promotion of Science, Technology and Innovation Development

In the five-year period of the Twelfth Plan, the issues are as follows:

- 1) Supporting R&D as well as modifying and developing strategic technology. Existing production and services will be strengthened. Production and services will

be developed to become “Smart Production & Services” by using advanced and integrated technologies, such as: (1) food, agricultural, and biotechnological industry; (2) health and medical technology industry; (3) smart tools, robotics, and mechanical systems using electronic control systems; (4) digital, internet of things (IoT), artificial intelligence (AI), and embedded technology; and (5) creative, cultural, and high-value service industry.

2) Developing entrepreneurs to become “Technopreneurs”. Production sectors such as farming, community enterprises, and Small and Medium Enterprises (SMEs) will be linked to research institutes and education institutes in order to allow the production sector to access and use available research for commercialization, along with nurturing competent entrepreneurs.

3) Developing and leveraging existing infrastructure. The objective is to prepare for rapid technological change, especially to accelerate the development of researchers in the fields of STEM (Science, Technology, Engineering, and Mathematics), and to promote private sector research laboratories particularly in new science and in technological fields which are important for the country’s future innovation development, such as cognitive science, synthetic biology, stem cells, and so on.

4) Supporting the implementation of networks among research institutes, education institutes, the public sector, the private sector, and civil society/communities. Social innovation will be used as a mechanism to promote inclusive growth and to improve the quality of life, especially for the elderly and disabled.

5) Adjusting the mechanisms of the national R&D system. This will include research funding, research networking, the research system, research adoption, and project evaluation. The focus will be on integrating the capabilities of researchers in different fields in order to serve the demand of the private sector for leveraging technological potential and efficiency.

2.2.3 Preparation of the Workforce and Capacity Enhancement of People of All Ages

This aims to create high potential human capital by means of human resource development in all aspects within the context of transitional changes, such as demographic change towards an aged society by the end of the Twelfth Plan. The nation’s working age population has been declining since 2014, resulting in a shortfall and low productivity of labor. There are still problems regarding the quality of human resources which have a sequential impact on human resource development at all stages. Young children are not

properly developed in their early childhood stage. School age children perform poorly. The workforce lacks theoretical knowledge and skills, and encounters a problem of skills mismatch. The elderly are living with poor health conditions and are becoming more dependent. Hence, human resource development in the Twelfth Plan emphasizes the following:

1) Promoting physical and mental health among young children to allow them to have sound neural and cognitive development, as well as enhancing their life skills in order to become a valuable asset for the country.

2) Socializing the people to have better moral standards which are consistent with social values and norms. The Thai population of all ages are expected to be healthy, moral-minded, ethical, and have public consciousness.

3) Developing necessary skills and knowledge in each age span in order to lay a firm foundation for creating well-rounded citizens. Human resource development should be consistent with labor market demand and the skills needed to function in the 21st century among all age groups. School age children and adolescents must be imbued with systematic and creative analytical knowledge and skills, and preparedness for building on all kinds of skills, including working and life skills, that are vital for labor market participation. Working age people will be equipped with knowledge and skills that are responsive to the demands of the labor market, namely basic skills, specialized skills, emerging entrepreneurial skills, and self-employment skills. The elderly will be encouraged to develop working skills that are suited to their age and individual experience.

4) Preparing the workforce in the field of science and technology which will significantly shape the future of the country.

5) Educational excellence should be promoted at all levels by improving the management of primary education quality in small schools, reforming teaching and learning methods, and developing the quality of teachers within the whole system. The improvement in educational quality also requires excellence in the specialized fields, such as through Dual Vocational Education³ and Cooperative Education,⁴ in order to prepare the workforce to have the requisite skills before entering the labor market. Furthermore, there is a need to create an environment for lifelong learning which features diverse learning materials and centers.

³ Dual Vocational Education combines apprenticeships in a company and vocational education at a vocational school, all in one course.

⁴ Cooperative Education is a structured method of combining classroom-based education with practical work experience, providing academic credit for structured job experience.

6) Promoting a healthy population. This will be implemented by changing health-related behavior and reducing risk factors that have impacts on health through prioritizing health education promotion, promoting physical activity and nutrition that is suitable for each age group, adopting legal mechanisms and incentives in regulating food and products that impact health, and establishing a public policy-making process that takes health impacts and the creation of a healthy environment into account.

2.2.4 Creating a Just Society and Reducing Inequality.

In the next 5 years, emphasis will be on improving the quality of social services throughout the country, particularly those that concern education and public health. Also, gaps in social protection will continue to be closed, along with enhancement of labor skills and the implementation of labor policy, to improve labor productivity and income. Key development agendas are as follows:

1) Enhance opportunity for the targeted 40 percent of the population with the lowest income. Measures include: provision of quality public services - both in education and health - to disadvantaged persons and population in remote areas; allocation of land to poor landless farmers, with conditions that prevent subsequent change of ownership; and skills training for target population groups to enable them to have decent jobs and income. Establishment of a land bank and development of a crop insurance system and microfinance organizations will also be emphasized during the Plan.

2) Create economic and social opportunity, by promoting job- and income-creation and increasing productivity, for the 40 percent of population with the lowest income, disadvantaged persons, women and elderly persons. Measures include: support for SMEs, community enterprises and social enterprises; development of microfinance organizations, along with improvement in financial access; and enhanced access to high-quality inputs at fair prices. Meanwhile, area-based budgeting and integrated budgets need to be promoted.

3) Enhance the more equal distribution of quality public services including education, public health, infrastructure and social welfare. Also, the fair distribution of resources needs to be emphasized along with the creation of a complementary business environment, particularly by improving laws and regulations to support fair competition.

4) Strengthen communities to be a social partner for, as well as a beneficiary of, development. This will be done by promoting community-level entrepreneurship, supporting community skill-training centers to upgrade the skills of members,

and promoting the provision of social welfare and services by the community. The land distribution and management system at the community level will also be fostered in order to resolve the landlessness issue and establish rights in local resource management.

2.2.5 Restructuring of Production and Creating Economic Opportunities at Each Stage of the Value Chain

The focus is on strengthening fundamental factors of production and economic capital in order to promote the capability of the present production and income bases as well as create new ones. Also, there is a need to improve the value chain by utilizing technology in R&D as a means of creating environmentally friendly and innovative production which responds to the needs of the market, as well as boosting product and service standards. Building conditions where entrepreneurs can possess the business skills needed to keep pace with technological change should be encouraged. The development of new economic zones and potential economic border gateways should drive Thailand to become a high-income country in the future.

2.2.6 Adjustment of the Agricultural Production System to Comply with Climate Change Commitments and Realize the Potential of Land Use

In order to add value to agricultural products that are safe for health and have no negative implications for the quality of life as well as the environment, it is important to support knowledge creation in agriculture, science and technology, and the co-creation of innovations that link with bio-based natural resources. This focuses on developing the system of sustainable agriculture while expanding opportunities for farmers to access arable land. Individual farmers are encouraged to collaborate with each other in the form of cooperatives, partnerships and companies in order to achieve economies of scale, decrease underemployment, apply appropriate technology, and use market mechanisms to manage risk.

2.2.7 Potential Enhancement in the Existing Production and Service Base, and Creation of New Production and Service Bases with the Use of Intensive Technology and Innovation

This aims to lay the foundation for future industrial development both in terms of personnel and infrastructure, as well as establishing mechanisms and networks in the form of clusters.

2.2.8 “New Economies” Reinforcement

This includes the Digital Economy, Bio-Based Economy, and Creative and Cultural Economy. Furthermore, an entrepreneurship society where start-ups and social enterprises can flourish shall be promoted to advance the production base of goods and services, expand the present income base, as well as create new income bases.

2.2.9 Competitiveness Enhancement in the High-Potential Service Sectors and Tourism, and in Support of the Manufacturing Sector

The focus is on amending laws to achieve a balanced and sustainable development in the tourism industry by giving more careful consideration to the carrying capacity of ecosystems in evaluating an area’s potential for tourism development. The strategy will also prioritize the creation of economic added value in all dimensions of the sports industry.

2.2.10 Production Sectors Connectivity Creation

Forming production network and utilizing R&D to create a variety of products that respond to the demands of the market should lead to an increase in economic value, a strong production chain as well as an expansion of the economic base. In order to enhance the logistics system and lower its costs, connectivity in transportation, logistics and telecommunications within the following cooperation frameworks must be promoted: Greater Mekong Subregion (GMS), Ayeyawady - Chao Phraya - Mekong Economic Cooperation Strategy (ACMECS), Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), Joint Development Strategy for Border Areas (JDS), as well as cooperation within the Association of Southeast Asian Nations (ASEAN). Development according to the ASEAN connectivity master plan should have continuity and aim at delivering a complete network. Transportation and logistics should be efficient and meet international standards. Laws and regulations concerning the transportation of people and goods should be revised. Manpower in the fields of transportation and logistics should be developed. Economic development along the border lines and within border economic zones should be connected with the production sector in the inner parts of the country.

2.2.11 Small and Medium Enterprises (SMEs), Community Enterprises and Social Enterprises Development

It is hoped to expand grassroots economic development to cover a larger number of communities across the country. It is essential to create economic opportunities for various groups in society together with promoting an environment within which entrepreneurs can succeed.

2.2.12 Natural Resource Stock Security and Environmental Quality Enhancement

This aims to preserve and restore the natural resource base. Therefore, it is important to increase efficiency in water resource management, foster green growth, and clean up pollution. Simultaneously, it is critical to build a transparent and fair management system as well as promote sustainable consumption and production. In terms of climate change, it is necessary to be prepared for greenhouse gas mitigation, raise adaptive capacity, whilst reducing natural disaster risks.

2.2.13 Restoration of the Security Foundation Which is the Key Factor for the Country's Economic and Social Development

The focus is on a society of peaceful coexistence of different opinions and ideologies on the basis of a democratic regime with the King as Head of State, and with preparedness to deal with transnational crimes, which will have a significant impact on the economic and social development of the country in the next 20 years.

2.2.14 Public Sector Management Improvement, Corruption Prevention and Good Governance Encouragement

This emphasizes the promotion of good governance aimed at tackling public administration and personnel challenges in a concrete manner. Transparent, effective and accountable public administration is encouraged. The decentralization of power, coupled with public participation and the fair distribution of responsibilities among national, regional and local actors, should also be promoted.

2.2.15 Infrastructure and Logistics Development to Extend the Country's Competitiveness, Improve its Services Quality, to Support the Expansion of Cities and Core Economic Areas, and Raise Living Standards in All Walks of Life

To achieve this, the government plans systematically to increase connectivity within sub-regional and ASEAN framework through domestic networks that connect economic corridors. There is also a need to improve administrative and monitoring systems to become more in line with international standard, to ensure fair access to public services, and to guarantee consumer protection. Additional strategy guidelines include development in downstream industries to bring about new economic opportunities, and promotion of entrepreneurs in the logistics sector to invest abroad.

2.2.16 Development of Regional, Urban and Economic Areas

Key activities to be undertaken in a timely manner are strengthening the existing production and service bases, expanding new production and service bases to generate more income for people in each region, and supporting the quality growth of urban areas. Other activities are developing and reviving the Eastern Seaboard areas to accommodate future industrial expansion, enabling the sound management of border economic areas to attain sustainable growth and competitiveness, and enhancing the efficiency of urban and regional development implementation mechanisms to obtain concrete outcomes.

2.2.17 International Cooperation Enhancement to Ensure Full Development Benefits

In the next 5 years, the focus will be on defining and streamlining institutional linkages and regulations at the implementation level and in border areas, reducing non-tariff barriers on trade and investment, advancing physical infrastructure development within the country and with neighboring countries. Thailand is prepared to be the gateway to the east and the west of Asia, and to enhance physical linkages between economic zones and communities along economic corridors to increase competitiveness and distribute wealth to communities, towns, and provinces along the core economic corridors and along other key transit corridors. Thailand will use strategic approaches that support Thai entrepreneurs to invest overseas, which will help to expand the value chain in ASEAN, boost competitiveness,

and create more trade and investment opportunities, particularly in CLMV and ASEAN. Thailand will utilize the benefits to be derived from cooperation frameworks with the ASEAN community as well as with non-ASEAN countries, and will highlight its creative role in global fora by supporting the country's efforts to achieve the Sustainable Development Goals (SDGs).

2.2.18 Enhancement of Thai Outward Investment

This stresses: enhancing Thai entrepreneurs' business skills, especially within SMEs, to increase business cooperation with neighboring countries; investing in human resources, technology, and innovation; improving the business environment and supporting the work of business councils under various cooperation frameworks; and providing Thai entrepreneurs with financial capital and in-depth knowledge regarding foreign production bases.

2.2.19 Improvement of the Thai Financial Sector to Become More Efficient and Competitive

There is necessity for the government to amend rules and regulations for the financial sector in order to enhance competitiveness, improve efficiency and fairness in service provision for consumers and private sector. Furthermore, it is necessary to have monitoring mechanisms to avoid potential risks emanating from the changing patterns and greater volume of financial connectivity and dynamic capital movements. Financial technology utilization, the development of financial tools for funding mega project investments, as well as an expansion of accessibility to financial services at reasonable cost are also emphasized in order to facilitate the business sector's and every other sector's access to finance services. Grassroots financial institutions should also be developed.

2.2.20 Fiscal and Budgetary Reform

Major reforms include: a broadening of the tax base; an adjustment of the budget proposal system; budget allocation; integrated budgeting, both development issue-based and area-based; monitoring and evaluation of budget spending; decentralization of tax and fees collection to Local Administrative Organizations (LAOs); and a reduction of redundancy in social welfare benefits. There is also a need to establish sustainable public finance for the social protection system, including an improvement of the retirement savings system as well as of the health insurance system, in order to minimize financial dependency on the government.

3. Targets and Development Guidelines

3.1 Development Targets

Development targets set in the Twelfth Plan will continue through the Thirteenth, Fourteenth and Fifteenth Plans in order to accomplish the objectives of the 20-year National Strategy. Therefore, this plan has more detail on development targets and key indicators than previous plans in order to guide and link to development target-setting in secondary plans and action plans. Budget allocation and action plans must be closely linked to achievement of the main goals and the outputs of the work plans/projects, as well as government's key performance indicators. Significant development targets in the Plan as follows: **(1) Thai people have the characteristics of good citizens.** A good citizen is a person who is disciplined and has decent attitudes and behavior. He/she should also be an active citizen, enhance resilience in their life and adapt himself/herself to global changes (resilience to deal with changes), be responsible, and volunteer for community services. He/she should have physical and mental well-being as well as spiritual well-being. He/she should apply the Philosophy of the Sufficiency Economy into his/her daily life. Moreover, he/she should manifest Thainess; **(2) Income and poverty inequality are reduced.** All Thai people should be able to access quality social services equally. The 40 percent with the lowest income (the lowest 40 percent) should have at least 15 percent higher income; **(3) The economic system is strong and competitive.** The Thai economic system should be restructured toward a service and digital economy by supporting new entrepreneurs and becoming an entrepreneurial society. The Thai economy should have strong SMEs that utilize innovation and digital technology in order to create quality goods and services. Technology should also be deployed in order to increase value-added in the production of goods and the provision of services. Thus, the Thai economy should be stabilized. GDP growth would be increased by at least 5 percent annually in order for Thailand to be a high income country by 2036; **(4) Natural capital and environmental quality can support green growth as well as food, power, and water security** by: increasing the country's forest area to cover up to 40 percent of the country's total area in order to maintain a balanced ecosystem; reducing greenhouse gas emissions in the energy and transport sectors by at least 7 percent by the year 2020, compared to a business as usual scenario; increasing efficiency in solid waste disposal; conserving and restoring the quality of water and air in severely affected areas so they should also be able to stabilize the ecosystem up to a healthy standard; **(5) National security, independence and sovereignty, social security, social cohesion, positive image, and country confidence are increased.** In consequence, ideological conflicts in society and criminal activity should be decreased. Thailand should become a more active participant in international fora and in the formulation

of international protocols; **(6) The public management system is efficient, up-to-date, transparent, and accountable, and also decentralized and involving popular participation.**

The government should reduce its duties in some service areas which the private sector could operate more efficiently. Digital services should be widely utilized. Corruption should be decreased. Decentralization should be pursued more effectively in order to strengthen local administration. Accordingly, the six significant development target of the Twelfth Plan are in line with the target of the Sustainable Development Goals (SDGs) and the long term targets of the 20-year National Strategy.

3.2 Strategies and Development Guidelines

Strategies and Development Guidelines under the Twelfth Plan are based upon the six primary strategies of the 20-year National Strategy. These strategies and guidelines provide a framework to ensure consistency throughout the development process and to assure the achievement of development targets within the next five years. They are the development foundation that supports national development towards Security, Prosperity and Sustainability by adopting the Philosophy of the Sufficiency Economy as the guiding principle. The ten primary strategies of the Twelfth Plan cover the main emphases of national development in the next five years, the successful outputs of which will continuously be built upon in future plans. This provides continuity of long-term development over the next 20 years in terms of reform agendas, integrated development issues, implementation approaches and solutions.

There are ten strategies under the Twelfth Plan, and these have more development details than the 20-year National Strategy because it is difficult to determine longer-term strategies and guidelines due to the dynamic nature of global and national development. Setting the national strategy and development guidelines must consider the issues and factors of the time in order for the national development plan to be successfully implemented. For that reason, the National Strategy provides only the major guidelines for all kinds of development issues. The National Strategy reflects the development of the manufacturing and services base, target groups, protocols and regulations, and human capital. Hence, the strategies under the Twelfth Plan include the six primary strategies of the 20-year National Strategy: (1) Strengthening and Developing the Potential of Human Capital; (2) Creating a Just Society and Reducing Inequality; (3) Strengthening Sustainable Economic Development and Competitiveness; (4) Green Growth for Sustainable Development; (5) National Security for the Country's Development towards Prosperity and Sustainability; and (6) Public Administration, Corruption Prevention, and Good Governance in Thai Society. In addition, four other strategies are set for the efficient mobilization of the aforementioned six strategies: (7) Advancing

Infrastructure and Logistics; (8) Science, Technology, Research, and Innovation Development; (9) Regional, Urban, and Economic Zone Development; and (10) International Cooperation for Development.

Part 2

Assessment of the Development Situation

Part 2

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1. Global Situation and Trends

1.1 Global Economic Situation, Outlook and Impact on Thailand

The pace of growth in the global economy over the next five years will tend to slow down, and it is likely to face many downside risks associated with the high volatility of the global economic and the financial systems. Key risk factors include uncertainty over monetary policy adjustment from major advanced economies, namely the United States of America (USA), European Union (EU) and Japan, which will affect the Thai financial and business sectors. Moreover, there will be more intense competition from trade liberalization as well as in the service and tourism sectors, and this will require Thailand to adapt by becoming more competitive. On the other hand, trade liberalization will provide opportunities for Thailand to utilize increased connectivity at the sub-regional and regional levels to support value chain development.

External factors that are expected significantly to affect the Thai economy include:

1.1.1 The increasing role of emerging markets has led to shift in economic geography. Emerging markets, including Brazil, Russia, India, China and South Africa, are sources of raw materials and labor as well as a market associated with high purchasing power. The Asian market will also become the center of global economic power which will experience capital inflow into the production sector, particularly the electronics and automobiles and parts industries. This region will become a major location for the world's supply chain, or "Asia's production factory" for exporting to the world market. In addition, the Asian economies will attract integration with the advanced countries and thus help to develop additional economic power within the region, particularly through the new patterns of economic integration with stronger negotiating power, namely the Trans-Pacific Partnership (TPP) and the Regional Comprehensive Economic Partnership (RCEP). As a result of this, the pattern of trade in the coming period will become more open and also more competitive. In addition, a growing middle class population will enhance purchasing power within the world market, which will offer greater opportunities for trade, investment, services, and the movement of capital and labor. However, liberalization can lead to additional non-tariff measures such as the issuance of rules and regulations as well as the application of standards to products and services, the environment, and human rights. Therefore, Thailand's economic and social development must be grounded on a sound knowledge base of science, technology and innovation. It is also needs to revise rules and

regulations to be in line with international agreements as well as create a business environment that can accommodate fair competition.

1.1.2 The global financial market has become interconnected as a result of drastic advancements in financial technology and innovation. This has brought about new financial instruments including financial applications, crowd funding, and financial platforms. Together with financial liberalization in the ASEAN countries, competition has become more intense, and this requires Thailand's financial sector to speed up the development of financial technology and innovations to both catch up with its competitors and to prepare for several major changes, such as the revision of rules and regulations in the financial sector, the restoration of users' confidence regarding the security of their personal details within information technology systems, risk protection from financial connectivity, capital movement, and increasing transaction volumes.

1.1.3 Increased liberalization in ASEAN countries after 2015. Liberalization of both goods and services, particularly in the financial sector, will provide many opportunities, including: the free flow of production factors, capital and labor; the easing of restrictions on domestic demand which will allow the production sector to expand markets and become stronger; as well as the comparative advantages derived from the country's location, infrastructure and logistics which can drive the economy to be a center of trade, investment, finance, services and manufacturing production. Meanwhile, competition among ASEAN countries will become more intense, especially in terms of standards of goods and services. It will also be challenging for agricultural products to remain competitive due to decline in tariffs in Cambodia, Laos, Myanmar, and Vietnam. The free flow of skilled labor can be both an opportunity and a threat. In addition, as many countries share similar goals for their manufacturing and service sectors, including Indonesia, Malaysia, Vietnam, and Thailand, the development of each country thus needs to consider specific advantages in situating its own trade strategies in goods and services, and it will also be necessary for Thailand to intensify outward investment to other ASEAN countries.

1.1.4 Trade patterns are likely to shift towards greater liberalization and more prolific economic integration, which may create wider opportunities for both trade and investment. However, competition among economic cooperation groups and between countries will be high and intense. During the 5 years of the Twelfth Plan, it is quite certain that global economic, trade and investment expansion overall is likely to be low. Thailand must therefore set more precise competitive strategies as well as cooperation strategies between countries, including the marketing bases in both trade and investment in the sub-region, region and within the global economy, especially in those areas of production and services in which Thailand has the capacity to compete. All this would take advantage of: (1) the country's strategic location, using policy to attract foreign investment and to promote Thailand as an International Trading

Center and an International Headquarters; (2) Investment in large-scale infrastructure and logistics systems, as defined in the investment plan; and (3) the promotion of industrial and service excellence, namely in automotives, electronics, food, and travel services. However, there may simultaneously be increased international competition from advanced innovation and productivity gains, and it is likely that each country will adopt non-tariff barriers as an indirect tool to discourage trade, such as human rights standards, food safety standards and environmental standards.

1.2 Research and Development (R&D) in science and technology will be a key factor in developing the economy, social, and environment, and changing people's lifestyles.

In the past, the development of science and technology, such as communications technology and biotechnology, has rapidly changed patterns of production, business operations, and people's lifestyles. People can communicate boundlessly through pictures and sound across vast distances. Moreover, business operations and financial transactions can easily be performed via digital networks. Countries using technology as an economic development platform have drastically improved their economic performance. For example, South Korea's high investment in R&D helped drive the growth of its GDP from 67,000 million USD in 1980 to 561,000 million USD in 2000, or approximately an 8.3-fold increase within 20 years. The other case is China. The GDP of China increased from 1.2 trillion USD in 2000 to 6.6 trillion USD in 2010. Moreover, four years later, it had reached 10.4 trillion USD in 2014.

In the future, the accumulation of knowledge in science and technology along with progress in new basic sciences such as cognitive science - the operations between brain and mind, or the relationship between thought, emotion, and action - will be important to generate new technology and innovation, which can lead to the development of disruptive technology. This new technology will cause a critical transformation of economic and social development, and people's lifestyles. Four basic technology groups consisting of (1) biotechnology, (2) nanotechnology, (3) material, energy, and environmental technology, and (4) ICT and digital technology will lead to twelve new technological developments, viz. (1) the mobile internet, (2) artificial intelligence (AI), (3) the Internet of Things (IoT), (4) cloud technology, (5) advanced robotics, (6) autonomous and near-autonomous vehicles, (7) next-generation genomics, (8) energy storage, (9) 3D printing, (10) advanced materials technology, (11) advanced oil and gas drilling technology, and (12) renewable energy technology.

These new technological trends will affect the country's economic and social development in the following ways:

1.2.1 Creation of new industries and services using multidisciplinary technologies in response to changes in demand in manufacturing, services, and in consumer behavior. The anticipated new industries are divided into 5 groups, viz: (1) food, agricultural and biotechnological industries, (2) health and medical industries, (3) smart device, robotics, and electronic mechanical system industries, (4) digital, Internet of Things (IoT), Artificial Intelligence (AI), and embedded system industries, and (5) creative, cultural, and high value-added industries. In addition, the pattern and processes of the service industries will rapidly and variously change. Product and service cycles will shorten. Market competition will be based on innovation across the value chain, including the production process, product design, servicing, marketing, and business management. Unless the business sector, especially SMEs, adjusts to this fast-moving technological change, it will lose its competitiveness. Meanwhile, these changes will create opportunities for entrepreneurs who can adapt and adopt new technology in production in order to manage the production chain efficiently.

1.2.2 Humans can boundlessly access information and knowledge. Technological development will enhance the quality of life. The internet will be an integral part of people's lifestyles due to its highly efficient communication technology which can contain, receive, process, and display enormous amounts of information. In 2025, 2-3 billion people worldwide will be able to access the internet. It will change consumer behavior to seek both convenience and privacy. It will create conglomerated online groups of people who share the same interests. This phenomenon may also bring about more individualism and less personal interaction.

1.2.3 High demand for labor specialising on or with multiple-skills in advanced technology in many countries is driven by the needs resulting from technological change and technological development. Unskilled labor will be disadvantaged in the labor market because it can be replaced by automation and robotics. Therefore, the labor force must adapt and improve their skills in advanced technology. However, an aging society will see the size of the workforce shrink. Labor shortages will lead to labor mobility, as countries seeking to benefit from economic integration try to recruit skilled labor into their own countries.

1.2.4 Creation of new dimensions of inequality, for example: inequality in access to technology due to disparities in income, knowledge and skills; inequality in access to technological infrastructure; inequality between high-technology skilled labor and unskilled labor; and inequality in technological-upgrading investment capacity between large and small enterprises.

Thailand has to increase its capability in high technology, focusing on five fields: (1) food, agriculture and biotechnology industries; (2) health and medical industries;

(3) smart devices, robotics and electronic mechanical systems industries; (4) digital, Internet of Things (IoT), Artificial Intelligence (AI), and embedded systems industries; and (5) creative, cultural, and high-value-added industries. The groups most capable of self-development in order to create more value-added and to be ready for providing the platform for the new economy of the future are: agriculture, medical technology, environment, creative and cultural industries. For other groups with less capability, reverse engineering could be applied in order to accelerate technology development in order to cope with change in the world. Meanwhile, investment in research and development in basic science, which is the platform for technology development, must be increased. Human development must be emphasized by motivating foreign researchers to partake in the country's technology advancement in the short term, while developing domestic researchers and personnel in the basic and interdisciplinary sciences in the long term, in order to leverage science and technology knowledge for economic development and to enhance the quality of life in the longer term.

1.3 The Global Social Situation and Trends

1.3.1 The global transition into an aging society will certainly have an impact on the economy and the people's way of life. In 2015, the world population was 7,349 million and will reach 7,758 million by 2020, half of this number living in Asia. Additionally, according to the UN, 2001-2100 will be an 'aging century' with a continuous increase in the number of elderly worldwide. The proportion of the elderly will increase from 12.3 percent of the total population in 2015 to 13.8 in 2020, while people of working age (between 25-59 years), will slightly increase from 45.5 percent to 45.7 percent over the same period, but soon after 2020 the proportion of working age will decrease constantly. Children, aged between 0-24 years, will also decrease in proportion from 42.3 percent to 40.8 percent by 2020. The developed countries will become aged societies, but most will have had a longer preparatory period when compared to the developing countries. For example, France took 115 years to become an aged society, 85 years for Sweden, and 69 years for the United States. In comparison, the developing countries have less time to prepare for change: for example, Jamaica has only 25 years to be prepared, and Sri Lanka only 23 years. Thailand is no exception: it will become an aged society at the end of the Twelfth Plan (2021), 16 years before it will become a developed nation at the end of the National Strategy (2037). This will have significant implications for savings, investment, and the public finances.

The trend in the distribution of the world's population suggests that more than 50 percent of the world's population will be living in cities, which will contribute over 80 percent of total consumption. The elderly in the developed countries will be the

group that will spend more on goods and services, particularly those related to health. This therefore provides an excellent opportunity for Thailand to conduct research and to develop new innovations and consumer goods, including medical and care-giving services to supply the needs of the elderly in the developed countries, such as nursing homes and hospitality for the elderly. As the world is experiencing a global aging society, Thailand will encounter long-term labor shortages which will give rise to intensified competition for high-potential workers who will be the key to national development.

1.3.2 The amalgamation of cosmopolitanism and local culture will influence people's way of life and consumption patterns. Thai culture has been changing dynamically as a result of globalization, which drives the flow of cosmopolitanism. Such change has brought about cultural assimilation and has involved changes in individuals' lifestyles, attitudes, beliefs, interpersonal relationships, learning behavior and consumption patterns, for example, acquisition and transaction via digital media, and ease of interaction between strangers in cyber space. Simultaneous media consumption has expanded the opportunity for Thai people endlessly to access various types of information, leading to an emergence of contemporary culture, but also the opportunity to develop the country's consumer goods and services all along the value chain. However, this situation can lead the country towards a cultural crisis scenario, such as a rise in consumerism, a hectic lifestyle, a lack of respect for other people's rights, a loss of consideration and generosity, as people tend to lack cultural literacy and neglect their own cultural identity. Finally, the scenario could lead to the loss of traditional cultural values and the growth of undesirable behavior in Thai society.

1.4 The Global Environmental Situation and Trends

The global Sustainable Development Agenda 2030 has determined the direction of integrated conservation and management of natural resources and the environment. At the same time, the intensification of climate change and Thailand's related commitments have given the country more responsibilities in greenhouse gas reduction within a context of intensified trade competition.

1.4.1 The Sustainable Development Agenda 2030 provides the crucial directions for global development post-2015. In this context, the Sustainable Development Goals (SDGs), including 17 goals and 169 targets, will be influential in setting Thailand's future development direction. The main issues include the following: (1) ensuring water availability and sanitation for all people; (2) improving water quality; (3) increasing the efficiency of water use in all sectors; (4) sustainable production and consumption; (5) using natural resources efficiently while minimizing waste generation; (6) conserving and utilizing the seas and oceans; (7) protecting and restoring sustainable forest ecosystems; (8) ending biodiversity loss; (9) managing cities sustainably and reducing urban environmental impacts;

(10) urgently responding to climate change and related impacts. As a result, Thailand needs to set targets and development guidelines to conserve, restore and use the natural resource base sustainably. For this reason, it is a good opportunity for Thailand to establish implementation mechanisms to ensure the integration and harmony of actions for achieving both global and domestic sustainable development.

1.4.2 Intensified international agreements relating to climate change have caused all countries, including Thailand, intensify the mitigation of greenhouse gas emissions. Thailand has submitted an Intended Nationally Determined Contribution (INDC) which determines the targets for greenhouse gas emissions reduction between 7-20 percent of the business as usual (BAU) scenario by 2020. In addition, the Paris Agreement that countries ratified on December 12, 2015, aims at controlling the average global temperature increase to be lower than 2 degree Celsius above pre-industrial levels. Thailand signed this agreement on April 22, 2016, resulting in a commitment to reduce greenhouse gas emissions continuously. The INDC emissions reduction target has been set at 20-25 percent by 2030 from the BAU scenario. Moreover, every 5 years, a review of INDC is required in order to increase the level of greenhouse gas emissions reduction. There are consequent implications for the country's development. Thailand is required to speed up greenhouse gas emissions reduction in all sectors, industries, services, electricity generation, and households. This will create pressure for the country to transform towards more sustainable forms of consumption and production, and to use more renewable energy and bio-fuels.

Additionally, there is a tendency to use the issue of greenhouse gas emissions to underpin stricter product standards in international trade. If this happens, Thailand's export sector will be affected. Although the United Nations Framework Convention on Climate Change (UNFCCC) allows countries to assist each other in terms of environmentally sound technology transfer, practices in reality are limited due to conflicts with the intellectual property rights regime under the World Trade Organization (WTO). As a result, Thailand cannot reap the benefits as specified by the UNFCCC.

1.4.3 Climate change and natural disasters are more frequent and extreme, affecting agricultural and food production as well as water security. Climate change has caused water shortage, floods and severe natural disasters. The consequential losses and damage in the agricultural sector will result in the decline of global agricultural production, causing food insecurity. For Thailand, climate change has a direct effect on the export of food and agricultural products, which is one of the main revenue sources of the country. Furthermore, agriculture is the main income basis of poor farmers. Thus, climate change has a tremendous impact on poor individual farmers and has aggravated the poverty issue.

1.5 Global Security Situation

1.5.1 The superpowers will have a tendency to expand their influence and have an increasing role in other regions. This includes the use of economic and military power to intervene in the internal affairs of other countries, such as: (1) America's Asia Pacific strategy to leverage national resources of allied countries, and influence Asia-Pacific shipping routes which are strategically important to world trade; (2) the Trans-Pacific Partnership Agreement may affect the ASEAN Community; (3) the rapid expansion of China's influence in the ASEAN region in economic, social, military and diplomatic terms has given China an influential role in the formulation and implementation of policies in many countries, including Thailand, which is an ally of both China and America. Accordingly, Thailand has to resort to balancing its diplomatic positioning and seeking to remain neutral in its relations with the superpowers.

1.5.2 International conflicts between states in terms of land territory, overlapping maritime claims and geopolitical gains from natural resources protection will have a tendency to increase the power of the military, such as: (1) the development of nuclear weapons in North Korea; (2) the declaration of an Air Defense Identification Zone over the East China Sea by China, covering disputed territory between China and Japan, the Senkaku Islands, and South Korea's research station; (3) conflicting claims to the Spratly Islands by several countries are also significant for Thailand, in the event that the use of armed force will affect geopolitical, economic and political stability and may lead to conflict and the negotiating of military power and national security. These conditions have direct significance for economic and international relations stability.

1.5.3 Transnational crime will have a tendency to expand and be difficult to control, requiring more sophisticated methods. Crime syndicates may create networks in the region and develop high-tech communications systems. Thailand, therefore, is still at risk from transnational criminality which may affect economic, social and national security, such as: (1) the smuggling of drugs, substrate and chemicals across the country's borders and airports. This affects the drug cycle from production, through distribution to consumption; (2) the problem of transnational labor migration, especially from neighboring countries, affects crime, hygiene and public health as well as the rights and obligations of legal persons. Moreover, criminals use loopholes in the legal system to infiltrate markets, which may impact on local businesses; (3) human trafficking linked to illegal immigration, child labor and prostitution, for which Thailand is both a destination and transit country. This affects Thailand in term of failing to comply with international human rights law. During the years 2010 to 2013, Thailand was ranked in the Tier 2 Watch List of the Trafficking in Persons Report (TIP Report), and was ranked in the Tier 3 Watch List during 2014 to 2015, which is the lowest level. Indeed, the USA has placed a priority on issues such as the illegal

use of labor in the fisheries sector, ineffectiveness of law enforcement, the involvement of government officials in human trafficking, and the lack of care and protection of victims of trafficking; (4) money laundering is a problem related to other crimes, such as rebellion, drugs, human trafficking, economic crimes and corruption, a problem which Thailand is in the process of solving in order to meet international standards.

1.5.4 Terrorism is impacting the world, and has intensified over the last several years, spreading to new parts of the world. Extremist ideologies and terrorism advocate violence, and terrorist groups seek to form a united front which will expand violence to weak states in other regions. These precipitate the migration to safer countries in order to escape war and conflict. Thailand is at risk of being used as a shelter for terrorist groups which enter as immigrants and tourists, and which may use Thailand as a base in planning terrorism in the country and in the region.

The world trends in the next 5 years, such as the slowing down of economic growth, the concentration of financial innovations, trade and investment, the growing economic power of emerging countries especially in Asia, rapid technological developments, aging society, multiculturalism and disparity in society, will tend to become more widespread. Therefore, Thailand must be prepared to encounter the associated challenges and grasp related opportunities in order to support the country's development. The situation and trends affecting the country must be analyzed in order to manage risks associated with weaknesses and also find advantages linked to the country's strengths for future development.

2. Internal Situation and Trends

The country's development during the Eleventh Plan emphasized economic development, social equality, and environmental preservation. This section reviews and analyses: the macroeconomic situation; development of the production sector; the development and use of science, technology, and innovation; society; environment; urbanization; and security. The details of each section are as follows:

2.1 Situation and Trends of the Thai Economy

2.1.1 In the past, Thailand's overall economic development has been successful at a satisfactory level, in terms of economic growth, production sector restructuring, accumulated knowledge on production technology, sectoral economic development, competitiveness enhancement and economic stability. All of which has equipped the Thai economy with sound economic fundamentals and a readiness to develop further and drive Thailand to be a developed country by 2036, as set in the national reform agenda.

1) Economic growth: the Thai economy during 1961-2015 expanded by 6.1 percent on average, the 22nd highest growth rate in the world (out of 205 countries). Income per capita increased from 3,476 Baht (170 USD) per head per year in 1967 to 23,666 in 1987, and 185,858 Baht per head per year in 2015, which meant that Thailand could step forward from being lower middle-income country to become an upper middle-income country in 2010, the fourth year of the Tenth Plan.

2) The economic structure has increasingly been transformed from the dominance of the agricultural sector to the prominence of the manufacturing and service sectors. The share of the agricultural and service sectors declined from 9.9 and 64.7 percent in 1990 to 9.1 and 60.9 percent respectively in 2015, while the share of the manufacturing sector increased from 25.4 percent in 1990 to 30.0 in 2015. The economic transformation of the production sector has induced the continual movement of labor and production resources from the low productivity sector to the high productivity sector. The share of labor in the agricultural sector declined from 64.0 percent in 1990 to 31.6 percent in 2015, while the share of labor in the manufacturing and service sectors to total labor rose from 10.3 and 25.7 percent in 1990 to 16.9 and 51.3 percent respectively in 2015. As a result of the movement of production factors together with capital accumulation and accumulated production technology, Total Factor Productivity increased at a satisfactory level.

3) The production sector has accumulated knowledge and also adjusted technology continually. The structure of the manufacturing sector has been transformed from the primary manufacturing production of a “lower middle income country” which was mainly reliant on foreign capital, to supporting the industries of a “middle middle income country”. There has been a steady accumulation of technology, development of manufacturing components through the production subsidiaries of multinational companies, as well as a higher share of Thai-owned capital during the period of moving towards becoming an “upper middle-income country”. Similarly, in the service sector there has been a diversification of expertise, technological adoption and creativity, a higher share of Thai-owned capital as well as an increasing role in the foreign market. The activities include, for example, petroleum drilling, entertainment and movies, wholesale and retail services, construction and equipment. Both the manufacturing and service sectors have become well prepared for being further developed into forms of production and services based on more advanced technology and innovation. There is a need for more production and services to be Thai-owned as the economy moves forward to attaining the status of a “high-income country” in the next period.

4) Thailand has key strengths in a diversified and world-class production base. In 2014, when Thailand’s share of export value of goods and services in

the world market was 1.2 percent, the export value of agricultural products reached as high as eighth ranking in the world, while the export value of manufacturing and services was ranked thirteenth and fifth largest in the world respectively. For agricultural products, Thailand's rice and rubber exports were ranked second and first in the world market, respectively. For manufacturing products, Thailand was the largest automotive production base in Southeast Asia and was ranked fourth largest in Asia and eighth largest in the world. In addition, Thailand was also known as a major exporter of electrical and electronics products, with the eleventh highest export value in the world.

5) Overall competitiveness rankings have improved. In 2015, the World Economic Forum (WEF)'s World Competitiveness Index ranked Thailand thirty-second out of 140 countries, while the World Bank's East of Doing Business survey placed Thailand twenty-sixth out of 189 countries around the world. As for the competitiveness index ranking by the International Institute for Management Development (IMD), Thailand's ranking improved from thirtieth in 2015 to twenty-eighth in 2016, out of 61 countries. On economic performance, IMD ranked Thailand thirteenth. This suggests that Thailand has strong economic fundamentals which will enable the country to be further developed, raising the country's income and providing sufficient resources for investing in human development to realize its fullest potential. Nevertheless, on the infrastructure front, Thailand was ranked forty-ninth, particularly on basic public utilities and education which were ranked lower than the previous year. This is due to the fact that Thailand's transportation and logistics infrastructure have remained inefficient and lack systematic connectivity, leading to higher costs than in other countries. In addition, infrastructure for information systems and communications to serve the digital economy has not yet become distributed adequately and widely. Meanwhile, infrastructure for science, technology and innovation remains limited, and there is a shortage of researchers both in terms of quantity and quality.

6) Maintaining economic stability: Although Thailand faced two tough periods which challenged economic stability, in 1981 and 1997, the problem-solving measures adopted as well as the emphasis on monetary and fiscal discipline, helped stabilize the country and allowed it to remain in a strong position, especially when compared with countries with a similar level of development. In 2015, Thailand had a ratio of public debt and external debt to GDP of 44.4 and 38.2 percent respectively, which were ranked ninety-second (out of 173 countries) and sixtieth (out of 111 countries) in the world, respectively. Meanwhile, foreign reserves stood at 156.5 billion USD. The current account continued to register a surplus after the 1997 economic crisis, while the Baht remained stable and appreciated in value, which demonstrated strong economic fundamentals and underpinned foreign investors' confidence in the Thai economy.

2.1.2 The outcomes of economic development during the Tenth Plan and the first four years of the Eleventh Plan had begun to reveal the limitations to economic growth. In addition, the decline in competitiveness of the real sector could also become a key constraint to growth over the coming period, and may restrict the capacity of the Thai economy to make the transition to a middle income country quickly enough. Key developments during the Tenth Plan and the first four years of the Eleventh Plan which suggest the limitations facing Thailand's economic growth include:

1) The economy slowed down rapidly and became more volatile.

In the past nine years, the Thai economy expanded by only 3.1 percent, decelerating from 5.7 percent during the Ninth Plan. This was lower than the potential output growth, and was lower than the level necessary for driving the economy forward to middle income status within an appropriate time-frame.

2) Thailand's agricultural and manufacturing product exports.

Export volumes during the post-financial crisis period expanded at a slower rate, falling from 9.7 percent per annum during the Ninth Plan (2002-2006) to 5.2 percent during the Tenth Plan, and only 2.0 percent during the first four years of the Eleventh Plan (2012-2016). There were slowdowns and a decline in export volumes of agricultural, agro-industry and manufacturing products, as well as services receipts. Despite the fact that the causes of export decline during these periods mainly came from the global financial crisis in 2008-2009, slowdowns in the economies of major trading partners, and the impacts of flooding, performance also partly reflected a decline in the competitiveness of the production sector, particularly the segments producing labor- and resource-intensive products and electrical and electronics products.

3) Investment as a factor supporting growth in the short run and enhancing potential growth in the long run showed a slowdown in both private and public investment. During the Tenth Plan, total gross investment grew by only 1.9 percent, lower than the capital depreciation rate, and this can become a key constraint for economic growth, both at present and in the future. Private investment increased by 3.2 percent, while public investment expanded by just 0.8 percent. However, total investment during the first four years of the Eleventh Plan started to accelerate, with a 3.0 percent growth rate owing primarily to the speeding up of public investment in 2015.

4) Measures to promote economic stability have shown some signs of becoming a limitation for long-run economic growth. Specifically, public debts increased from 37.9 percent of GDP in the Tenth Plan to 42.1 percent during the first four years of the Eleventh Plan. This suggested that, despite remaining within the fiscal sustainability framework, the ratio of public debts to GDP had increased as a result of the

short-term economic stimulus package, and this has started to limit fiscal stimulation to the economy as well as potential growth over the coming period.

2.1.3 Key weaknesses of the Thai economy: slow and volatile economic growth, together with the decline in export competitiveness and economic stability during the Tenth Plan period and the first four years of the Eleventh Plan revealed key weaknesses of the Thai economy, including structural problems, global economic conditions as well as policy implementation and macroeconomic management.

1) Domestic demand has been limited compared to production capacity. Economic growth thus needed to rely heavily on external demand which was driven by competitiveness and global economic expansion. Over the coming period, the domestic demand-driven economy is likely to face problems due to persistent income and purchasing power inequality. In addition, the economy will depend largely on the export sector for strengthening household income, ahead of using domestic demand to lend further support to economic growth.

2) Government measures to boost the domestic economy in the past nine years have focused mainly on short-term measures, particularly those that created public debts in order to stimulate domestic spending through private demand and other spending apart from investment. Although some short-term measures were needed to alleviate the problems of low-income people, limitations in applying these measures to support the grassroots economy have remained due to the fact that the export sector and agriculture as major sources of income were affected by a global economic slowdown. In addition, implementing some short-term measures impacted export competitiveness and constrained potential growth in the long run. Domestic demand has been volatile, however, in line with debt creation in both the public and private sectors in order to support short-term spending.

3) There was a lack of necessary and sufficient investment for uplifting potential growth in order to move out of the middle income trap within an appropriate time-frame. In particular, public investment slowed down significantly as it entered contraction during the Tenth Plan and expanded only slowly during the first four years of the Eleventh Plan. The Thai economy thus lacked a sufficient level of investment, including investment in infrastructure, investment to enhance the efficiency of the economic system, investment in research and development, and investment for economic zone development in order to build up the production base in such a way as is required for driving the economy forward in the future. Meanwhile, private investment also softened in tandem with the global economy, reduced competitiveness, and a decline in the driving force provided by public investment.

4) The role of labor inputs as a driver of economic growth has reduced due to: (1) a shrinking of the labor force coupled with a slow increase in labor productivity; (2) a slow pace of labor movement from the low-productivity, low-income agricultural sector to segments of the production sector with higher productivity and income, which limits labor productivity enhancement; (3) a lack of appropriate technology and capital to boost labor productivity; (4) inconsistency between labor market demand and supply; (5) an absence of agricultural cooperatives which would benefit from economies of scale; and (6) a slow improvement in the quality of education. Such a reduced role of labor inputs will consequently lower Thailand's competitiveness both in labor-intensive and semi-capital-intensive production.

5) Total Factor Productivity (TFP) has not been sufficient to allow the country to escape the middle-income trap. In order to achieve this there is a need for production that incorporates more domestically-driven innovation and technology advancement. Despite reaching satisfactory levels of TFP growth before the Tenth Plan, the growth remained slow when compared to other countries which started their economic take-off at the same time but could achieve the status of high-income countries before Thailand. Slow progress in increasing TFP determines that Thailand must rely on productivity improvement coupled with using other production factors in order to accelerate economic growth during the transition to a high-income country.

6) There have been delays in economic structural reform in areas such as: (1) enhancing efficiency and value-added in the agricultural sector in order to raise productivity and per capita income continuously and sustainably. This has resulted in agricultural production, which is the key income base of the country, facing major problems including low output per Rai as a result of water resource problems, and also delays in improving production technology and management. Rice production remained at 459 kilograms per Rai, lower than that of Vietnam, Myanmar, and the Lao PDR, which are able to produce 836, 654 and 576 kilograms per Rai, respectively. In addition, agricultural products have not yet attained appropriate safety standards; (2) improving agricultural products that have low value-added and are likely to lose competitiveness, to become agricultural products with high value-added and also with linkages to other production sectors; (3) developing current industries to become the industries of the future, applying higher levels of technology, innovation, and creativity including, particularly, the target industries, namely automatic robots, aerospace components, and medical appliances and equipment; (4) upgrading the competitiveness of SMEs from producing parts to producing final products with their own brands, and also seeking additional market channels. Moreover, it is necessary to increase the percentage of Thai shareholders in current high potential industries, such as electricity and electronics, and automobiles and parts; and (5) building up the production

base of the service sector to become an income base of the future, such as in transportation and logistics, regional headquarters, international schools, medical services, digital services, and trade and financial services.

7) The financial and fiscal sectors have so far been unable to support fully the economic strategic plan for the coming period, in particular the plans relating to growth potential enhancement, reducing inequality and environmentally friendly production. A concurrent rise in public debt is leading to higher future fiscal contingent liability. Fiscal pressure is likely to increase due to: (1) an trend of increasing fiscal expenditure on medium-term infrastructure development plans; and (2) insufficient liquidity of some public enterprises. In the meantime, the strength and efficiency of the financial sector continue to be low, as can be seen from the following details: (1) Thai competitiveness in financial development, as reported by the World Economic Forum (WEF), was lower relative to Singapore and Malaysia in terms of the availability and affordability of financial services, as well as ease of access to them; (2) based on a report from the Bank of Thailand, the National Statistical Office and the Fiscal Policy Office, the proportion of individuals who were unable to access necessary financial services increased from 3.50 percent in 2010 to 4.22 percent in 2013. The level of financial literacy, meanwhile, was lower than the world average; (3) while the commercial banks recorded a solid operating performance and profitability, however, their operating costs to average assets ratio remained high. Moreover, transfer and payment charges remained high. The usage of electronic payments and the number of card terminals were low relative to Malaysia and Singapore; (4) competition from foreign commercial banks remains low, while competition among local banks is concentrated mainly on services for large-scale businesses. Meanwhile, financial services for small and medium enterprises (SMEs) remain insufficient or too costly; (5) the development of financial services innovation and FinTech will improve the efficiency of financial services, at lower cost, compared to existing services. In addition, virtual currencies, which are playing a more important role, will cause drastic change in the financial environment. They are likely to put pressure on the existing financial sector, and may undermine the competitiveness of current financial intermediaries. From the viewpoint of policy makers, virtual currencies would pose significant challenges to the conduct of monetary policy, foreign exchange rate management and oversight of transactions that are becoming more complicated; (6) so far, some specialized financial institutions (SFIs) have not been able to fill the gap in the provision of financial services to the intended target groups, particularly SMEs, startups and those on a low incomes. There have also been limitations in organisational management, which is not yet efficient, including in terms of good governance and the adaptation capability to keep pace with changes in technology. Besides, the monitoring and supervision of government projects has not been stringent enough, which could potentially pose risks to fiscal stability.

8) Macroeconomic management still has key constraints, including:

(1) genuine coordination between monetary and fiscal policies, as well as real sector development policies, has not yet materialized. Also, the public sector, private sector, and local government have not collaborated effectively in order to drive key development projects; (2) measures were mainly focused on short-term demand stimulus rather than long-term potential growth expansion. This also included the fact that there were some short-term measures that posed obstacles to potential growth enhancement in the future; (3) further efficiency improvements in public revenue collection and budget spending are required. This also includes the screening of budget frameworks to make them adequate for short-term management measures aimed at reducing economic volatility, as well as measures for long-term growth potential enhancement; (4) the implementation of key development projects has been delayed and has encountered further difficulties; (5) economic development under the economic and social development plans have lacked explicit targets. Therefore, the processes of plan and project formation, as well as the integration of detailed plans and projects, have not been clear and concrete enough to drive the economy and generate income for the country.

2.1.4 Threats/risks influencing the success of economic development during the Twelfth Plan include:

1) Demographic transition towards an aging society will hinder economic development, both directly and indirectly. Many changes comprise such a transition, namely: (1) change in the demographic structure, with the size of the labor force starting to decline by 0.4 percent and 0.8 percent during the Twelfth and Thirteenth Plans, respectively. If labor productivity does not increase at a rate that compensates for the effects of a shrinking labor force, it will adversely affect economic growth by 0.15 percent and 0.25 percent, respectively. The shrinking labor force provides a different scenario to that during the period between the Fifth and Tenth Plans, where growth in the size of the labor force contributed 0.74, 0.86, 0.37, 0.26, 0.71 and 0.49 percent to economic growth, respectively, during these six plan periods; (2) slower population growth rates - by 0.23 percent during the Twelfth Plan and by 0.08 percent during the Thirteenth Plan - will cause domestic demand to grow at a slower rate. This will mean that economic growth will have to rely more on external demand, particularly if the increase in income per capita does not compensate for a fall in the size of the population; (3) an increase in the proportion of elderly population, while that of the working age population decreases, is likely to limit competencies in technological and innovation development - an important factor for upgrading the economy; (4) an increase in the number of elderly population will tend to bring a larger fiscal burden while reducing revenue collection capacity in the public sector;

2) The global economy continues to fluctuate, constraining its capacity to support Thailand's economic growth. Overall global economic growth will tend to remain at a low level, while the financial market, capital market and the world economy are likely to fluctuate throughout the period of the Twelfth Plan;

3) High competition in the world market will continue to put pressure on exports from Thailand. This is due to the fact that (1) the world economy will tend to grow at a lower rate than between 2004-2007, while the production capacity of several countries will continue to rise, and (2) several countries will attempt to maintain their market share in order to sustain economic growth, both in the short term and long term. Accordingly, measures to gain trade advantages, both at the micro and macro levels, are being widely implemented;

4) Changes in the competitive landscape in many aspects, including: (1) increased competitiveness in primary agricultural, processed agricultural and primary manufacturing production in Cambodia, Lao PDR, Myanmar, and Vietnam (CLMV countries), causing Thailand to lose its advantages from input abundance along with reduced preferential trade and disadvantages from stricter environmental standards; (2) China's expansion of agricultural production capacity in neighboring countries through the use of new technology and management systems, whilst domestic agricultural productivity remains low; (3) rapid expansion in semi-capital-intensive and technology-intensive production in Vietnam, allied with comparative advantages from labor inputs. The country also pursues an exchange rate policy which attracts foreign investment and enhances competitiveness in prices and production costs; (4) the decline of the competitiveness of Japan, which has been a major source of funding and production technology in some products, and their diversion to some other countries that do not have a production base in Thailand, but do have in CLMV countries;

2.1.5 Supporting factors and opportunities for economic development.

During the Twelfth Plan, Thailand is likely to encounter some weaknesses and threats which might slow down the economy over the next five years. The future growth rate will probably be lower than the potential growth rate and the rate required to escape the middle-income trap in the next 15 years. However, Thailand still has a chance to become a high-income country within the next 15 years if the country considers the following factors:

1) Thailand's manufacturing sector has been developed over many decades and is now ready to step up to knowledge-based and innovative production processes, which is necessary to drive the economy and enhance national development. It needs: (1) to leverage existing strengths, i.e. the diversity of the production base, the stability of the economy, and the accumulated production technology, which are adequate for enhancing the manufacturing and service sectors through advanced technology

and innovation; (2) in the eyes of foreign investors, Thailand has an advantage due to the capital and technology intensity of the manufacturing industry, although the competitiveness of labor-intensive industry and production of semi-capital-intensive products has been decreasing; and (3) the readiness of basic infrastructure, logistics, and the physical setting are other important supporting factors which are essential to develop the manufacturing and services sectors in such a way that advanced technology, research and innovation can be applied.

2) As a result of the creation of the ASEAN Economic Community in 2015, Thailand could enjoy various opportunities to enhance economic growth:

(1) the industry and service sectors, which are major production components of the Thai economy, are going to be stronger because of a reduction in domestic obstacles. In addition, enterprises in these sectors will become high-technology and innovative businesses, and the entrepreneurs can have their own brands and become more professional throughout both upstream and downstream production; (2) the opportunity to use resources and labor for agricultural and primary industries development will lead to an increase in competitiveness and self-development towards higher levels, especially through the transformation of general agricultural production into agro-processing industry, and also the opportunity of to use neighboring countries as production bases to produce labor-intensive goods; and (3) the opportunity to make use of Thailand's advantages from location, infrastructure and logistic systems, and establish Thailand as the future industry and service center of sub-regional and regional areas, and use this opportunity to accumulate funds, technology and knowledge of business administration in order to progress from being a middle-income country.

3) In the long run, there will be some occurrences that might stimulate the Thai economy, such as: (1) an increasing trend in international trades after the rebalancing of the global economy; (2) an increasing trend of middle-class expansion, urbanization, and the economic power of Asian countries, within a trend towards a multi-polar world economy; (3) scarcity of resources, which will certainly bring about a greater demand for food and energy; and (4) growing economic linkages and improved access to technology.

2.2 The Development of Science, Technology, Research and Innovation

The country's development of science, technology, research, and innovation is ranked low in the world classifications. The lack of integrated research management at all stages of the process, ie. at policy level, funding level, and research level, leads to an unclear direction of development in these areas. Furthermore, it creates overlapping operations among concerned organizations. Not only has it restricted the prerequisites for the country's development, it has also **delayed the technology and innovation development process, which now lag behind other parts of the world.**

Furthermore, **research has insufficiently been applied to commercialization** by the manufacturing sector, which constitutes a large group of people, including small farmers, community enterprises, and SMEs. There are limitations to access and exploit research, technology, and innovation, such as a lack of research and innovation managers who act as a link between manufacturers and research users, and the low investment rate in the private sector aimed at transforming research into commercialization, due to the high-risk of this investment. These restrictions are reflected in the competitiveness indicators of science, technology, research, and innovation that are summarized as follows:

2.2.1 The efficiency of the country's transformation of innovative resources into innovative products is reflected in the indicators of the "Global Innovation Index (GII)", published jointly by Cornell University, Institut Européen d'Administration des Affaires (INSEAD) and the World Intellectual Property Organization (WIPO). Thailand ranked 55th in the 2015 Global Innovation Index among 141 economies listed, while the United States, Singapore, Korea, China, and Malaysia ranked 5th, 7th, 14th, 29th, and 32nd, respectively. In the sub-index, institutional factors were the weakest area of Thailand's innovation index (ranked 92nd) due to the regulatory environment and the political environment making only a limited contribution to innovation creation and development.

2.2.2 Thailand's Competitiveness in Science and Technology ranking by the International Institute for Management Development (IMD):

1) In 2016, Thailand's ranking for scientific and technological infrastructure was 47th and 42th respectively, out of 61 economies, which is a very low ranking and has been weakness of the country for a long time. If Thailand is not competent in adopting R&D with the aim to add value to the kingdom's products and services, the competitiveness of the country will weaken in the long term. This, in turn, will affect national development towards Thailand becoming a high-income country in the future.

2) Thailand's R&D expenditure as a percentage of GDP increased slightly from 0.47 percent in 2013 to 0.48 percent in 2014, with government spending accounting for 46 percent of total R&D expenditure, with the remaining 54 percent derived from private spending. From 2000-2014 it averaged 0.27 percent of GDP. However, developed countries such as South Korea, Japan, the USA, and Australia spent 4.15, 3.47, 2.81, and 2.18 percent of GDP respectively on R&D, with more than 60 percent of R&D investment coming from the private sector.

3) The education system and science and technology personnel development are still Thailand's weaknesses. The number of R&D personnel in Thailand is not sufficient to promote the development of science, technology, and innovation to an advanced level. In 2013, there were only 11 persons per 10,000 population, increasing to

12.9 per 10,000 population in 2014, while the ratio of R&D personnel in mostly developed countries is 60-80 persons per 10,000 population (Japan and Singapore are 68 and 77 persons per 10,000 population respectively). Accordingly, Thailand has lost opportunities for many aspects of economic and social development.

4) The number of design and innovation patent applications being filed and granted is quite small. Most of the patent applications are filed by foreigners. In 2014, the total number of new patent applications filed in Thailand was 12,007. There were 3,763 patents granted, among these, 1,522 or 40.4 percent were granted to Thais (1,455 design patents and 67 invention patents) and 2,241 or 59.6 percent were granted to foreigners. However, the number of patent applications being filed in the developed countries and the emerging economies such as China, United States, Japan, and South Korea were 734,081, 501,128, 473,317 and 223,517 respectively. Therefore, Thailand needs to keep developing the patent registration system to increase the number of patent applications being filed by Thais, especially invention patents. Moreover, the problem of delays in the filing of patent applications spoils the opportunity to increase the volume of research that could be introduced into the system of intellectual property (IP) protection. To prevent this, the government should consistently develop human resource potential in intellectual property management, develop an effective system for intellectual property registration according to international standards, and support IP commercialization.

5) Thailand's scientific and technological publications, which are an indicator of R&D competency and collaboration among domestic and international institutions, is quite low in comparison with other countries. There were only 6,974 scientific and technological publications in domestic academic journals in 2014. Nonetheless, the number of citations per publication increased from 0.65 times per article in 2008 to 0.78 times per article in 2014. In addition, the volume of scientific and technological articles published in international academic journals was 6,333 in 2014, an increase of 0.5 percent from the previous year. Chemistry was the subject that obtained the highest number of publications, with 688 articles. However, the number of scientific and technological articles published in international academic journals by other countries, including Singapore, South Korea, Japan, and Malaysia, was 10,814, 51,221, 73,442 and 9,831 articles respectively. The low level of publication reveals that Thailand should be further pursuing efforts to develop more and better R&D researchers, and also be a reliable source of knowledge that can be referenced and extended.

Although currently Thailand has focused mostly on the transition to a knowledge-based economy and society, based on science, technology, research, and innovation, the potential and capability of the country in these regards is still insufficient to develop the technology and innovations which target higher levels of production and

service in order to propel the economy to high-income country status in the coming phase. This is demonstrated by Thailand's investment in research and development in proportion to GDP being 6-10 times less than the high-income countries transitioning from middle-high-income status, such as South Korea and Singapore, which have consistently increased their R&D investment, with a large proportion of the R&D investment coming from the private sector. Moreover, the number of R&D personnel in the private sector of the other countries is 7-11 times higher than in Thailand. Meanwhile, Thai entrepreneurs, especially in the SMEs, do not give priority to the adoption of science, technology, research, and innovation in order to add value to existing products.

Therefore, if Thailand continues to develop science and technology in the existing way, the technological development of the country will lag behind other parts of the world and, accordingly, the economy of the country will not be developed into a high-income country as targeted in the next 20 years.

2.3 Thai Social Situations and Trends

2.3.1 Given the current demographic profile, Thailand is expected to become an aged society in 2021, which is the final year of implementation of the Twelfth Plan. The nation's working age population already reached its peak in 2014 and will be on a steady decline thereafter, thereby possibly impacting the country's long-term economic growth potential. The total population in 2016 was recorded at 65.3 million people, comprising 17.82 percent children, 65.67 percent working-age population and 16.90 percent elderly people. The Total Fertility Rate (TFR) in 2017 is about 1.59, a figure which is below the replacement rate of 2.1, and is expected to continue a declining trend throughout the implementation of the Twelfth to Fifteenth Plans, and will be down to only 1.35 in 2036. Thus, if no concrete actions aimed at increasing the TFR are put in place, Thailand will become an aged society by the end of the Twelfth Plan, with the proportion of elderly people accounting to about 19.8 percent in 2021, up from 17.1 percent in 2017, while that of children will decline from 17.5 percent to 16.6 percent, and working-age population from 65.3 percent to 64.1 percent over the same period. Such a decline in the working age population will be one of the key factors impacting the country's future economic growth potential. The shrinkage of the country's labor force by 0.4 percent during the Twelfth Plan and 0.8 percent during the 13th Plan will result in the slowing of economic growth by 0.15 percent and 0.25 percent during the same periods. Additionally, the working age population is the only population group with income surplus, and thus the declining size of this group will inevitably impact the government's tax revenues, which are needed for the country's development and welfare allocation. At the same time, the majority of working age population will be people of Generation Y, people who were born between 1982-2005, who

will constitute 32.5 percent of the total working age population. These working age people will play quite a crucially important role in both the labor market and population reproduction during the 5 years of the Twelfth Plan. There are a number of unique traits and characteristics of Generation Y people, including: being constantly plugged into technology, which becomes an essential aspect of their lives; a love for being creative; a distaste for strict rules in the workplace; frequently changing jobs and more likely to be self-employed; having lifestyles that involve high spending, and thus having low savings; as well as placing less importance of having families and children. Consequently, the attitudes and behavior of Generation Y people will, to a great extent, influence the direction of the country's development and future TFR.

2.3.2 The Thai population of all age groups tends to demonstrate age-specific problems. Thai people in each age group highlight key problems that may negatively affect the nation's competitiveness enhancement, including insufficient age-specific and intellectual/cognitive development from early childhood, lack of sufficient skills required by the Thai labor market, and health problems among elderly people that can pose a financial burden to the government.

Early childhood age group (0-5 years old): this population group shows some developmental problems: 27.5 percent of young children demonstrate delayed development, the most significant delay of which is language development. The lack of knowledge and insufficient time spent with children by parents are the two main contributing factors to such delay. The most critical time for brain development of any child is between 0-3 years old, thus, setting the foundation of the lifelong development of the child's intellect, personality and emotional quotient. Breastfeeding supports better nutrition and contributes about 20-30 percent to brain development; however, only about 27.6 percent of mothers breastfeed their child for at least 6 months. Furthermore, 76.3 percent of children aged 3-5 years old, the age period when social skills development needs to be started, attend early childhood development institutions - namely childcare centres, child development centres, preschool child development centres of religious institutions, initial care centres for disabled children or those with special needs, or early childhood development centres under other names - the quality standards of which are not up to par. Currently, various standards are set by different official bodies in charge of supervision, be it the Ministry of Public Health, Ministry of Social Development and Human Security, or Sub-district Administrative Organizations, and this inevitably has an impact on teaching formats as well as teachers, thereby influencing the adequacy of age-specific development of each early childhood age group.

School age children have low IQ and EQ scores, while unintended pregnancy is a major problem found among Thai adolescences. In 2014, school age children had an average IQ score of 93.1, which was below the global average of 100, while the average EQ score recorded in 2011 was only 45.12, which was well below the normal range of 50-100. The main factors believed to contribute to such low scores are poor nutrition of mothers and children, socio-economic status, as well as child rearing practices and parenting skills, which can pose some negative impacts on the attitudes and behavior of growing up children, resulting in unwanted behavior transiting into the teenage years, especially unprotected sex and lack of contraception knowledge. The adolescent birth rate (aged 15-19 years) in 2014 was 47.9 births per 1,000 women in the same age group. Furthermore, it was also reported that 12.8 percent of women aged 15-19 years old had repeated pregnancies before they reached 20 years of age. These problems can, later, lead to these young women becoming single mothers, marriage at a young age, and insufficient knowledge about adequate child rearing.

The working age population has relatively low labor productivity. Labor productivity of the Thai workforce during 2001-2014 increased by an average of 2.9 percent per year, a rate which is considerably lower than that of neighboring countries, including Malaysia, which has double the productivity of Thailand, and Singapore, which is 5 times higher. The main reasons behind such low productivity of Thai labors stem from skills and competency mismatches between labor demand and supply, as currently most industries are still very labor intensive, whilst the workforce increasingly has higher educational attainment. Additionally, as many as 60 percent of all Bachelor degree holders are unemployed, while a sample survey by the Ministry of Labor showed that 64 percent of the labor demanded by employers are those with an educational attainment of less than secondary school degree level (M6 and below). Furthermore, Thai labor shows skills and knowledge mismatches in relation to what is demanded by the labor market. According to the employer survey conducted by the Ministry of Labor in 2015, a large proportion of both semi-skilled and skilled Thai workers demonstrated lower-than-expected performance in terms of various skills, including English language, computing, mathematics, communication, management and occupational competency.

Elderly people have health-related problems and an increasing tendency to live alone. It is expected that there will be about 4.6 million elderly people aged 70 years and above by the end of 2016, equivalent to 42.9 percent of the total number of elderly people, and this is forecast to increase to 5.6 million by 2021. This elderly people population group has a high prospect of becoming dependent on economic, social and health assistance from others. Statistically, 2.6 percent of elderly people aged 75 years and over are bedridden, compared to 0.9 percent of the 60-64 year age group. This will

inescapably lead to an increase in healthcare expenditure, which are expected to increase from 63,565.13 million Baht in 2010 to 228,482.21 million Baht in 2022. Additionally, the number of elderly people living alone has also been on the increase, rising from 3.6 percent of the total elderly population in 1994 to 8.7 percent in 2014. The majority of the elderly population (60+) who live alone have health-related problems, both physical and mental, and do not have appropriate caretakers. As for the ‘young-old’ population (aged 60-69 years old), an age group still capable of obtaining work, a high proportion (59.9 percent) have relatively good health, but only a small proportion is still in the workforce. In 2014, only 59.2 percent of elderly people aged 60-64 years were in the workforce, compared to 45.6 percent of those aged 65-69 years. This will have some impacts on the incomes and savings of these elderly people as they reach the ‘old-old’ elderly phase. Additionally, the existing design of public services does not have features corresponding to the needs of elderly people, as only 7.2 percent of the elderly feel satisfied with all public services.¹ Also, the majority of public places and spaces do not yet have elderly-friendly design facilities, such as ramps, stair railing and toilets.

2.3.3 Single-parent families and skipped-generation families are highly fragile, thus possibly impacting the quality of child rearing. Recent demographic, economic, and social changes have resulted in, firstly, a smaller average household size, from 3.6 people in 2000 to just 2.7 people in 2014, and, secondly, more variety of family types, such as nuclear family, same-sex couple family, one-person household, single-parent family and skipped generation family, of which the latter two family types are considered to be the most vulnerable when compared to other types. In 2013, there were 1.4 million single-parent households, accounting for about 7.1 percent of the total number of households nationwide. The majority of these single-parent households are single mother families that often have problems regarding poverty and accommodation arrangements. Additionally, these single mothers have to deal with negative attitudes and perceptions from society of being single parents, especially young single mothers. As for the skipped-generation family type, currently there are over 400,000 skipped-generation families, or 2 percent of all households in Thailand, and the trend is expected to increase over time. This translates into 1.24 million children in Thailand currently living in a skipped-generation household. More than half of skipped-generation household heads are older than 60 years, and almost 90 percent are women. Furthermore, approximately 20 percent of elderly people living in skipped-generation families have below-poverty-line earnings, which unescapably impacts the development and educational opportunities of children living in such households. Related research reveals that children under the care of their grandparents

¹ John Knodel, Vipap Prachuabmoh, and Napaporn Chayovan, 2013, “The Changing Well-being of Thai Elderly: An Update from the 2011 Survey of Older Persons in Thailand”, University of Michigan, Institute for Social Research, Population Studies Center Research Report 13-793, June 2013.

tend to have poorer educational performance compared to those under the care of their own parents.

2.3.4 The quality of the Thai education system is still a major concern, with low levels of learning achievement among Thais. Despite a constant increases in the mean number of years of schooling of the working age population aged 15-59 years old, from 8.8 years in 2008 to 9.3 years in 2015, learning achievement among Thais is, however, a concern, as reflected in the average scores of the O-NET and PISA exams. In 2015, the average scores for the five O-NET subjects were below 50 percent, while the PISA scores were lower than those of other countries with the a comparable level of development. There are a number of key reasons behind such poor academic performance of Thai students, including the design of both curricula and the teaching system, which mainly focuses on testing students' memory of what they have been taught rather than their understanding of the content, causing a lack of creativity among students. Furthermore, there is inadequate distribution and allocation of teaching resources and teachers to remote areas. Moreover, the proportion of students interested in pursuing further studies in the vocational stream is relative small. In the school year of 2015, the ratio of students enrolling in the vocational stream to the general stream was 36:64. For tertiary and higher education, it is found that many educational institutions have opened enrollment in fields/subjects without taking into account labor market demand, while many graduates have skills and knowledge below the expectations of the market. According to the recent competitiveness ranking undertaken by IMD in 2016, the quality of the country's schooling is ranked 47th out of 61 nations worldwide. These challenges make it really important for the government to tackle seriously the qualitative problems of the nation's education system at all levels. Furthermore, the majority of Thais do not seem to place a great emphasis on learning, as only 31.7 percent of the total number of 26 million internet users use it for reading to gain knowledge, and only 81.8 percent of all Thais are active readers, with an average reading time of just 37 minutes daily. Additionally, many learning resources do not promote knowledge exchange activities, such as museums, historical parks, local/provincial libraries and science parks. However, as communication technology is rapidly developing, this brings about challenges to teaching principles as well as the lifelong learning process, both of which need to be adjusted in order adequately to respond to such technological and innovative changes, and to provide everyone with easy access to the acquisition of knowledge and information, anywhere and anytime.

2.3.5 The number of Thai citizens diagnosed with non-communicable diseases (NCDs), the nation's leading cause of death, has been on the rise. More Thai people are being diagnosed with the 5 NCDs, namely heart disease, diabetes, stroke, hypertension and cancer, with an average of a 12 percent increase per year. Health-risk

behavior, such as smoking, alcohol consumption, consumption of unhealthy foods high in sodium, fat and sugar content, high sugar content beverage consumption, and insufficient physical activity are the key contributors to such an increase. Additionally, external environmental factors can also contribute to an increase in the chances of people having NCDs, including poverty, living and working conditions and pollution that can impact health and educational attainment. These can also lead to the further development of mental disorders in some people. Statistics show that the number of Thai people diagnosed with certain mental disorders to the point that they can no longer function normally on a daily basis increased from 48.79 persons per 100,000 persons in 2007 to as high as 78.63 persons per 100,000 persons in 2014. Thailand also has the second-highest road-fatality rate in the world, with 36.2 deaths per 100,000 persons. These NCDs, as well as road traffic accidents, are among the leading causes of death in Thailand, resulting in possible long-term increases in health-related expenditure. Despite the government's numerous attempts aimed at promoting health, which could reduce the chances of Thai people developing NCDs, the number of Thais diagnosed with such diseases has not yet successfully been lowered. This highlights the necessity of adjusting health-related policies, with more emphasis on targeting health-risk behavior and improving surrounding environments. However, such policies will need all related parties to work in an integrated manner.

2.3.6 Health-related government expenditure has a clear tendency to consistently be on the rise, especially the government-funded health insurance schemes which require the government's contribution. According to the recent National Health Expenditure Accounts, the government's health care expenditure increased from 127,534 million Baht (63 percent of total health expenditure) in 2002 to 388,939 million Baht (76 percent of total health expenditure) in 2012, equivalent to an average increase of 11.98 percent per year. The highest contribution to expenditure is provided by the 3 main government funded schemes, namely the Civil Servant Medical Benefit Scheme (CSMBS), the Universal Health Care Scheme (UHC) and the Social Security Scheme (SSS), which collectively increased from 57,820.56 million Baht in 2002 to 201,319.40 million Baht in 2012, equivalent to an average increase of 15 percent per year. Total health expenditure to GDP increased from 1.06 percent to 1.77 during the same period, reflecting a faster growth of the government's health expenditure on government-funded health insurance schemes than the rate of growth of the economy. Additionally, based on the expenditure forecast for the government-funded health insurance scheme, it is expected that such expenditure will increase further to about 433,664 million Baht in 2021, equivalent to an average increase of 8.94 percent per year, resulting in the total government expenditure increasing to 684,275 million Baht, equivalent to a 6.64 percent increase per year. By and large, one point of concern of the 3 government-funded health schemes is the fact that the majority of their financing sources come from the government's budget, thus this may have an impact on the

country's fiscal sustainability in the future. Furthermore, the management and administrative system of the 3 government funded health schemes still lack effectiveness, including their databases on benefits, disbursement and service quality, which urgently need to be thoroughly analyzed and integrated in order to deliver health care services effectively for all Thais. Therefore, it is a considerable challenge for the government to balance quality service administration and management and fiscal sustainability.

2.3.7 A majority of Thais still have some issues regarding ethical and moral values and a lack awareness of the importance of discipline, honesty and public mindedness. External changes in many aspects have been transferring into Thai society more easily through the digital era, as a result causing rapid changes in social norms and values among Thais. As some Thais may lack the ability to differentiate between positive and negative changes, they may not be able to assimilate such changes suitably into their daily lives. This may therefore result in some Thai traditions and culture becoming assimilated with foreign cultures, with some Thais valuing their own personal beliefs and values over social norms, being too playful and cherishing a desire for comfort, being easily persuaded by fake news, lacking discipline, being materialistic, and valuing social status over morals and ethics. According to a survey conducted by the Moral Center and NIDA Poll in 2014, more than 50 percent of Thai people agree that a lack of honesty and corruption are the key moral and ethical problems facing Thai society that need urgently to be tackled, and more than 90 percent of people agree that all relevant bodies need hastily to promote the importance of ethics and morals among the people. Moreover, a 2014 survey on the acceptability of social behavior of Thai people aged 13 years and over revealed, in relation to discipline behavior, that more than 45 percent of the surveyed people never or seldom use a road crossing or walking bridge when crossing to the other side of the road, while 64.1 percent feel indifferent to and have accepted the behavior of some people who mix Thai with English words in sentences, and 38.7 percent feel impassive about people wearing revealing or strapless tops, and shorts. Such figures implicitly reflect the fact that some Thai people lack the ability adequately to screen and adapt appropriate foreign cultures into their daily lives without putting Thai culture in jeopardy. Therefore, it is crucially important for Thai people to have values and attitudes that accord with Thai social norms.

2.3.8 Thailand continues to face various manifestations of inequality. Overall income inequality in the past 10 years, as measured by the Income Gini Coefficient, has come down from 0.514 in 2006 to 0.445 in 2015. Despite that, the situation continues to be a concern when looking at the income difference between income groups. Ten percent of the population with the highest income (Decile 10) accounted for 35.0 percent of total income in 2015, while 40 percent of the population with lowest income (Deciles 1-4) only received a 14.3 percent share of total income. The difference becomes even more

pronounced when compared with the 1.58 percent share of total income held by the poorest 10 percent of the population (Decile 1). There is also inequality in assets and land-holdings. Ten percent of the population with the highest land holdings held more than 60 percent of total land, while 40 percent of the population with the smallest land holdings only accounted for 1.2 percent of all land. In terms of public services inequality, although services have been expanded to full national coverage, differences in quality of services persist. For education, only 69.9 percent of 12,230 basic-education institutions passed the quality assessment. There are also differences in assessment standards between urban and rural schools, schools across regions, schools under different authorities, and schools across different sizes. For public health, health personnel and advanced equipment continued to be concentrated in Bangkok, which has a doctor-to-population ratio of 1:722, while the national average stood at 1 : 2,131 in 2014.

Such inequalities arise mainly from an imbalance in the economic structure, which has relied heavily on exports and emphasized economic growth rather than the fair distribution of the benefits of growth. Other major causes include inefficient public administration that favors interest groups and lacks transparency. Delays in decentralization has limited the scope for communities and poor people to benefit fully from resource allocation. Similarly, lack of opportunity in accessing quality public services, land, water and financial resources has also consequently hindered capacity-development toward decent occupations and incomes.

Issue of inequality tend to have been more severe due to intensive globalization, technological advancement, climate change and rapid demographic transition toward an ageing society. Technological advancement and financial capital will allow those with access - most of whom are high-skilled workers - to benefit from economic development. Meanwhile, the transition to an ageing society will cause labor shortages. As the majority of the labor force is still made up of low-skilled workers, they are unable to move up to the high-tech manufacturing and service sectors. They are also more likely to be replaced by robots and advanced technology. This will consequently widen the labor income gap between different types of labor. In addition, global warming and climate change may adversely affect agricultural production and the security of vulnerable households. Inequality is therefore a key challenging factor for economic development, particularly in escaping the middle-income trap.

2.4 Situation and Trends of Thai Natural Resources and Environment

Recently, the natural resources and environmental outlook has been challenging and become a weakening basis for production, service provision, and livelihood both inside and outside the cities.

2.4.1 Natural resources have declined and degenerated. Because of over-exploitation beyond the carrying capacity of ecosystems, Thailand's forest areas had continually declined by around 2 million Rai per year during 2008–2013. The main causes were deforestation, which threatened biodiversity. Marine resources have deteriorated due to illegal and intensive fishing beyond the sustainable yield limits, breaking the recovery cycle of nature. On the one hand, economic activities such as infrastructure construction, aquaculture, and tourism expansion have made the major ecosystems vulnerable, such as mangroves, coral reefs and sea grass. On the other hand, climate change has become a crucial risk factor aggravating the deterioration of natural resources.

2.4.2 Access to and allocation of natural resource utilization remains unfair and contributes to inequality. Natural resources, namely land, forest, water, coastal and mineral resources, being the fundamental element of local livelihoods and employment, have not been equally distributed or fairly allocated to different groups of people. The main reason lies in inequality of rights and authority to manage resources, resulting in conflicts and disputes between the government, private sector and communities in these areas. Often this has led to violence that seems to occur more frequently and severely.

A number of sizable development projects, both public and private, have not been welcomed by local communities, which focus on the negative impacts of the projects. In particular, communities are likely to believe that the projects may destroy the potential of local stocks of natural resources. Their livelihoods, health and quality of life are affected, especially those who rely on natural resources as the foundation for their living. Thus, to reduce inequality the government needs to set up conflict-resolution mechanisms and build good governance and equality of access, allocation and sharing of benefits from the use of natural resources in a fair manner.

2.4.3 There is a risk of water shortages in the future, whilst water resources management is still inefficient. In 2014, the water demand of the country was around 151,750 million cubic meters, while the actual met demand for water by all sectors was only around 102,140 million cubic meters. In the future, water demand will increase even more due to widespread urbanization, expansion of economic activities without consideration to the watershed potential, and inefficient water use in production and consumption, especially in the agricultural sector. At the same time, the construction of large water storage facilities will be quite difficult due to popular protests. Moreover, during droughts and floods, water resources management, in terms both of quantity and quality, still lacks integrated mechanisms to solve and alleviate the problems rapidly and efficiently. This results in extensive losses and damage, with serious effects on production, people, and ecosystems. In addition, the development and management of water resources at the

policy, program and large-scale project levels still lacks systematic public participation and Strategic Environmental Assessments (SEA) prior to operation. All in all, this results in the unsustainability of water resources management.

2.4.4 Pollution problems affect people's quality of life and increase economic costs. Unsustainable production and consumption remains the core environmental problem. Resource utilization has brought about waste generation and pollution emissions to the extent that they have exceeded the carrying capacity of ecosystems. In the past, agricultural production has been export-oriented, and hence focused on a mono-crop approach. Consequently, many forest areas were encroached and turned into farm land, particularly in the upper reaches of watersheds. Moreover, the misuse of chemical pesticides and fertilizers had contaminated the environment. Similarly, the practice of burning after crop harvesting has caused forest fires and appalling haze. The inefficient use of land and water without proper care has resulted in soil infertility. In other words, commercially-oriented agriculture, especially crop monoculture, has given rise to the encroachment of forest areas and impacts on ecosystems. Likewise, industrial production has placed an emphasis on cost reduction to enhance competition and exports, with much less effort afforded to waste treatment. Unsustainable consumption patterns and urbanization have exceeded the capacity of existing utility systems. As a result, an increasing volume of solid waste, wastewater and air pollution is left untreated due to inadequate facilities. During 2010-2014, the average amount of solid waste generated per person increased from 1.04 kilograms/person-day in 2010 to 1.11 kilogram/person-day in 2014. On average, 26.19 million tons of solid waste was generated each year. Of this total amount, only 7.88 million tons were treated by sanitary methods. Thus, in 2015, the accumulated solid waste left untreated was around 30.49 million tons. Similarly, a large volume of wastewater was not treated properly because of inadequate wastewater treatment facilities. In addition, air pollution remains a challenge, particularly particulate matter and Volatile Organic Compounds (VOC) in critical areas such as the industrial areas and high-density communities. Therefore, to achieve a good quality of life as well as sustainable and balanced development, all types of pollution, namely solid waste, wastewater and air pollution, need to be treated appropriately.

2.5 Situation and Trends of Regional, Urban, and Economic Zones Growth

2.5.1 The primary concentration of economic activities in Bangkok and the Central Region have caused disparities among regions. In 2013, the Central Region's Gross Regional Product (GRP) was 40.9 percent of Thailand's GDP, while the Northeastern, the Northern and the Southern Regions accounted for 10.9, 8.8 and 8.6 percent of GDP respectively. Furthermore, GRP per capita among regions has varied widely. The average GRP per capita of the Central Region was 280,734 Baht, while that of the Northeastern

Region was only 74,532 Baht. Regional development therefore needs to focus on decentralization, with the gradual extension of economic activities from Bangkok and its vicinity to the other regions.

2.5.2 The provincial and provincial cluster development mechanism has been unable to unify the activities of relevant agencies in order effectively to achieve the intended development goals. While the current mechanism is unable to associate spatial development with national development, the expansion of international economic cooperation among sub-regional and regional member nations provides opportunities for Thailand to (1) develop connectivity between urban and border economic zones, and (2) become the hub for sub-regional logistics, manufacturing, commerce and tourism. Therefore, it is necessary to overcome the limitations of the existing development mechanism, as well as national infrastructure, in respect to quantity, quality, service and management in order to capitalize on the full potential of spatial economic linkages development.

2.5.3 The hasty pace of urbanization has surpassed the development of necessary infrastructure. The national population and housing census data reveal an increasing proportion of the population living in urban areas, rising from 26.4 percent in 1980 to 44.1 percent in 2010. The growing urban population is expected to expand to 60 percent in the next decade. In order to bring about benefits from rapid urbanization to improve income levels and the standard of living, various aspects of urban planning and management need to be improved, namely (1) public transport services, (2) traffic management, (3) urban planning, (4) public facilities and utilities extension, (5) solid waste and waste water management, (6) universal facilities to support an aging society, and (7) public safety and reduction of risk from natural disasters, crime and insurgency. This is for the improved well-being of the people and a strengthened ability to cope with urban expansion in the future.

2.5.4 A high level of economic expansion in key economic areas may unfavorably affect the sustainability and stability of spatial development. Rapid economic expansion leads to rising concerns about environmental problems and infrastructure deficiency, for example in transportation, energy, water supply, electricity and the communications system. Being key economic areas, they attract investment and generate significant revenue for the country. Provisions to support economic growth while improving people's livelihoods shall include planning for the development of economic, social, and environmental infrastructure to be standardized, sufficient, and responsive to economic expansion.

2.5.5 Infrastructure-related spatial and industrial development has not been fully actualized. Thailand has yet to benefit fully from the connectivity of the

infrastructure it has been continuously developing throughout the years. With the persisting limitations of the regional and local agencies, in addition to ineffectual urban planning and management such as city planning, and incentive creation for regional investment by the private sector, Thailand has failed to boost infrastructure-related industry to its full potential due to the absence of key investors with advanced technology setting up their production base in the country.

2.6 The Security of Thailand

Internal security problems in Thailand are complicated and have accumulated over a long period. These problems have expanded widely and warn of significant damage, such as the following:

2.6.1 Major national institutions will be affected by internal conflicts which stem from differences of opinion in culture and politics, and from social and economic inequality. These include the use of the internet to distort information to achieve cleavage and disunity in society, especially the new generations who lack appreciation of the importance of major national institutions.

2.6.2 The situation in the Southern border provinces of Thailand will continue to create circumstances which may lead to attempts to take the lives of government officials, and to target the economic zones and urban areas. In addition, there are many other problems including conflicts of interests, drugs, illegal commodities and environmental destruction which emanate from highly unequal development. These in turn contribute to lower benefits from economic development, insufficient income, and an inability to support development distribution. Moreover, there are larger gaps within the social structure concerning knowledge, information and social services which cause differences in thoughts, attitudes and beliefs among social groups and regions which affect economic and social opportunity and lead to conflicts in society.

2.6.3 Thailand has a high risk of cyber-crime with a tendency to attack the systems of large corporations which may have a higher impact and cause a high cost of damage. The Global Risks Index 2015 of the World Economic Forum ranks information security attacks in 10th place of the attacks most likely to occur in 2016, and this has the potential to cause critical information infrastructure breakdown. Cybercrime has altered its target to the systems of large organizations which can cause wide impacts and high damage value. It is also connected to other forms of economic crime, such as threats to financial institution databases. Furthermore, while the Internet of Things brings more convenience, it also bring risk to data safety at both the personal and institutional level. Cyber-attacks are now increasing rapidly all over the world, particularly in public service systems in large cities. Thailand has also become one of the cyber threat targets and is

attacked more frequently. The Security Threat Report 2013 of Sophos indicates that Thailand is ranked the 3rd in the most cyber at-risk ranking, and is ranked 48th out of 60 countries in the Threat Exposure Rate (TER), lower than Malaysia (9th), Singapore (13th), and Indonesia (46th). One out of five computers in Thailand is attacked by harmful programs. Therefore, the public sector, private sector and the people of Thailand face higher risk of security threats and cybercrime which are allied to the advance of digital technology.

2.6.4 Problems of national security and national interest in maritime areas. Economic growth, trade and investment within ASEAN have induced more maritime activities, but have also challenged maritime security in areas such as accidents, drugs and illegal goods trafficking, illegal immigration, human trafficking, maritime fishery encroachment, terrorist equipment and high-power weapons smuggling, piracy and ship robbery, all of which have tended to expand rapidly. Moreover, law and law enforcement are other major problems which are linked to illegal fishing. According to the United Nations Convention on the Law of the Sea (UNCLOS), which Thailand has become a signatory to in 1982, Thailand has not complied with the Illegal Unreported and Unregulated (IUU) fishing regulations, and lacks good governance, promotion of public awareness, and efficient law enforcement. Therefore, Thailand's image and accountability are damaged and there is a risk that it will create a barrier to trade and other concerned industries. It also directly affects natural resource and environment security as well as maritime national interests in the long term.

2.6.5 Outbreak and public health emergencies. Thailand is located at the major linking point in South East Asia. Lots of people travel through the country for various purposes. The ASEAN Community also promotes labor mobility. Therefore, the risk of epidemics - both emerging infectious diseases and re-emerging infectious diseases - may lead to public health emergencies. Diseases might spread and there may be a need to quarantine people, animals or goods in order to control the situation. Thailand has faces epidemics and health emergencies on several occasions, such as SARS in 2002, and Avian Influenza in 2006. Each time, lives were lost and the economy was damaged. Thailand still lacks necessary basic vaccines, so the diseases which cause major public health problems and emerging infectious diseases might not be controlled. Currently, Thailand can self-produce only 2 vaccines, BCG and AG. Thus, many vaccines have to be imported, which costs between 2-4 billion Baht per year. Moreover, there is a risk of vaccine shortage, both in a normal situation and during an emergency, due to a scarcity of vaccine producers and their motivation to make profit.

2.7 International Cooperation and Connectivity for Development

2.7.1 Thailand plays an increasingly crucial role on the international and regional stage, and in neighboring countries. The inter-connection between Thailand and other countries has become closer, particularly in the sub-region and Asia. The stronger impact of globalization, the shift in economic power to multi-polarity, and the greater economic power that Asia has gained are key challenges for Thailand. These have prompted the country to expand cooperation on economy, trade, transport, human resources development, and information technology with other countries at the bilateral and multilateral levels, especially in South Asia and East Asia.

Thailand has strengthened its development partnership with neighboring countries and ASEAN with policies to promote international trade and investment, and to prepare the country to benefit fully from global connectivity. Development schemes include transport corridors, telecommunications, energy networks, production and services infrastructure, regional and urban development, economic zones along economic corridors connecting with neighboring countries, joint production and investment promotion, and border development with neighboring countries. Notable progress include the cooperation between Thailand and Cambodia to develop border economic zones, cooperation between Thailand and Myanmar to develop the Mae Sot-Myawaddy border economic zone, and development of the Dawei Deep Seaport and Special Economic Zone in Myanmar to serve as a regional economic hub. Kanchanaburi has high potential to become a key economic city after the establishment of the ASEAN Economic Community, especially with the development of the Phu Nam Ron economic zone.

Thailand intends to play a leading role in economic and social development in the sub-region, acting as a development partner offering technical and financial assistance in education, public health, and the environment. Moreover, Thailand promotes social cooperation and cultural exchange, provides assistance on major infrastructure development, such as roads, rails, energy, and deep seaports, and supports potential state enterprises and the private sector to invest in specialized businesses. The goals are to generate income, upgrade the level of economic development in neighboring countries, strengthen sub-regional and regional integration, and increase negotiating power with non-member trading nations.

2.7.2 Progress under Key Cooperation Frameworks:

1) Greater Mekong Sub-region Economic Cooperation Program (GMS)

The six countries of the Greater Mekong Sub-region are high potential markets, with Thailand being the most important trading partner, and a gateway to

China/India with the largest number of consumers in the world. The program focuses on economic and social development to promote sub-regional growth, narrow the economic development gap, and raise the standard of living and the well-being of peoples through economic zone development, competitiveness enhancement, and community relations, or altogether the 3Cs Strategy (Connectivity, Competitiveness, and Community). Key development progress in Thailand includes: (1) providing assistance to neighboring countries on infrastructure development such as Highway 11 in the Lao PDR, the Tha Na Lang-Vientiane railway in the Lao PDR, the Tin Ka Ying Nong-Kawkareik road link in Myanmar with assistance from the Thai government, renovation of the First Thailand-Myanmar Friendship Bridge over the Moei River, commencement of the Second Thailand-Myanmar Friendship Bridge, opening of the Fourth Thailand-Lao Friendship Bridge over the Mekong River at Chiang Khong-Huayxai, the Thailand-Lao PDR-China railway and high-speed train development; (2) environmental impact assessment of the Bang Yai-Kanchanaburi highway intercity motorway project; (3) implementation of the Cross-Border Trade Agreements (CBTA) at Mukdahan-Savannakhet between Thailand and the Lao PDR, Aranyaprathet-Poipet between Thailand and Cambodia, and Chiang Khong-Huayxai-Boten-Bohan between Thailand, the Lao PDR and China; (4) providing assistance to other GMS countries on human resources development, and experience-sharing in agriculture, public health, energy, and others; and (5) becoming a center for the GMS Mekong Tourism Coordinating Office (MTCO), the Regional Power Coordination Center (RPCC), and a focal point for cooperation on environment, agriculture, and railways in the future.

At the moment, the GMS has successfully laid out the Regional Investment Framework (RIF), comprising 91 high-priority projects to be implemented in 2014-2018, with a total investment value of 23.1 billion USD. The largest number and value of projects are in the transport sector, followed by energy, tourism, and agriculture, respectively. Investment in urban development, information and communications technology (ICT), and special economic zones (SEZs) development has tended to increase significantly. The Twelfth Plan is crucial in helping to move forward investment projects under the RIF. Gradual progress in cooperation and connectivity plays an important role in promoting trade and investment flows in the sub-region. For instance, the value of trade within the GMS increased from 89,115 million USD in 2012 to 96,811 million USD in 2015, while the value of cross-border trade between Cambodia, Lao PDR, Myanmar, and Thailand increased from 10,884 million USD in 2011 to 14,873 million USD in 2014. The construction of the physical linkage network has reduced journey time between Bangkok-Kunming through R3W and R3E from 77-78 hours in 2000 to only 30 hours in 2015. For investment, the value of Thailand's direct investment in the CLMV countries totalled 6.7 billion USD in 2015, and Thailand continues to be one of the top investors in the Lao PDR and Myanmar. Most of the investment is in the energy sector. This reflects the agreements under various

cooperation frameworks that promote outward investment expansion in the sub-region, joint production chains, a future possibility to connect with South Asia through the Dawei deep seaport and Dawei Special Economic Zone, and with the Eastern Seaboard through the Southern Economic Corridor. Sub-regional trade and investment are expected to increase. Nonetheless, operations under the Cross-border Transport Agreement have not been fully implemented due to domestic rules and regulations in neighboring countries that do not yet support such agreements. Also, the closing of border crossing points and the scarcity of financial resources have impeded operations under the RIF.

2) Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) with a primary focus on economic zone development. Remarkable progress in Thailand includes upgrading the airport to enhance direct aviation linkages in the sub-region, improving Highway 4 in Thailand to link with E1 in Malaysia, improving the Hat Yai-Sadao Special Highway, constructing new border post facilities in Sadao, constructing Tummalong port in Satun and Na Klua port in Trang, improving the Thailand-Malaysia border post, developing special border economic zones (Songkhla-Kedah, Narathiwat-Kelantan), improving the bridge over the Kolok River in Tak Bai and Sungai Kolok in Narathiwat and Kelantan, and improving the maritime transport network linking the three countries, the air transport network, the logistics network for trade and investment, and the Thung Song distribution center in Nakhon Si Thammarat. The IMT-GT is attempting to implement priority connectivity projects to expand sub-regional linkages for the IMT-GT to accomplish connectivity according to the Master Plan on ASEAN Connectivity. The three countries have expedited key physical infrastructure construction projects in economic zones to promote transport and logistics connectivity between the three countries and the rest of the sub-region. The purpose is to prepare for more sub-regional trade, investment, and tourism. The IMT-GT Implementation Blueprint 2012-2016 consists of 11 projects, totaling 3,728.6 million USD.

With the abovementioned Implementation Blueprint, the IMT-GT also focuses on six areas of cooperation: (1) transport and infrastructure development to promote sub-regional connectivity in economic zones along corridors and inner areas; (2) trade and investment to create high value within the sub-region and between sub-regions through cross-border production linkages, such as border economic zones; (3) tourism that promotes unique touristic products to accommodate domestic and international markets; (4) Halal products and services that support Halal certification, Halal brand development, and joint markets; (5) human resources development to strengthen human skills in all sectors; and (6) agriculture, agro industry, and the environment that support value-added products while promoting sustainable development. The overall goal of the IMT-GT is to provide mutual economic opportunities among development partners, reduce inequality, and narrow the development gap following the ASEAN goals.

Moreover, strengthening such connectivity increases the potential to link with countries outside ASEAN, such as the Bay of Bengal Initiative on Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), which reflects India's Look East Policy and its pivotal role. Nonetheless, Thailand still has to develop border towns and border economic zones along the economic corridors to link with neighboring countries, by conducting feasibility studies, integrating development plans on joint border economic zones with neighboring countries, and formulating investment strategies, human resources and skilled labor development schemes to prepare for economic zone and border economic zone development.

3) Association of Southeast Asian Nations (ASEAN)

The ASEAN Economic Community was established in 2015. The three pillars of ASEAN are: (1) the ASEAN Economic Community (AEC); (2) the ASEAN Socio-Cultural Community (ASCC); and (3) the ASEAN Political-Security Community (APSC). The ASEAN Economic Community (AEC) is engaged in four pillars: (1) a single market and production base through free flow of goods, services, investment, skilled labor, and freer flow of capital; (2) a competitive economic region with fair competition policy, consumer protection, intellectual property rights promotion, infrastructure development, appropriate tax measures, and e-commerce policy; (3) equitable economic development by strengthening SMEs and boosting competitiveness through various programs, such as the Initiative for ASEAN Integration (IAI) to narrow the development gap; and (4) integration into the global economy through a coherent approach towards external relations. Remarkable progress includes eliminating import tariffs to zero percent for 8,287 items, reducing import tariffs to five percent for sensitive items (coffee, potatoes, dried coconuts, and cut flowers), liberalizing trade in services in 12 main sectors comprising 128 sub-sectors, removing obstacles in all forms of services, and permitting ASEAN investors to hold at least 70 percent of the shares in priority sectors, namely telecommunication and computers, health, tourism, air transport, and logistics. Furthermore, the ASEAN countries have harmonized product standards, and implemented the Mutual Recognition Agreement (MRA) in facilitating ASEAN trade to reduce non-tariff barriers. Now it is harmonizing standards for the 20 product groups, with the majority being electronic equipment, such as air conditioners, refrigerators, radios, and televisions. At the moment, ASEAN is expediting the Mutual Recognition Agreement (MRA) on electrical and electronic equipment, and the ASEAN Mutual Recognition Agreement (MRA) of Product Registration Approvals for cosmetics, food and drugs.

ASEAN promotes skilled labor mobility through the Mutual Recognition Agreement (MRA) on professionals to facilitate the mobility of professionals and skilled labor. Member countries have thus far signed agreements in eight areas: architectural services, engineering services, medical practitioners, dental practitioners, nursing services,

accountancy services, surveying qualifications, and tourism professionals. ASEAN has specified the guiding principles for quality recognition to facilitate the work permit application process, but has not reached joint work permit recognition. Foreign professionals working in another country must apply local rules and regulations. As for progress, engineering services shows the biggest progress, since it is already up to international standards, and preparations have been made to promote engineering in another 17 areas (from 7 previously), totalling 24 areas. However, no ASEAN-registered engineers have yet shown an interest in working in another ASEAN country. For architectural services, the quality specifications are relatively high. For instance, at least ten years experience is required, and within those ten years, large scale projects must have been produced, and continuous learning in engineering conducted. The quality level of architects varies among countries. Moreover, Thailand has listed architects as a reserved career, causing the law amendments to be prolonged. In 2015, only six architects were able to work in ASEAN (as of September 17, 2015). For the health area (medical practitioners, dental practitioners, and nursing services), there has not been much progress in implementation due to the lack of joint curriculum recognition, some moral issues, work permit examination that is conducted in local languages so that health personnel can communicate with patients, and various definitions that have to be accepted both ways. For accountancy services, challenges lie in setting the accounting education standards, specifying the number of hours to provide accounting services under the CPC 826 which varies among countries, and passing a law on fees and registration. Lastly, tourism professionals is the most readily mobilized area as there is no domestic law in place. However, the process to obtain certification for tourism professionals, educational recognition in 32 positions, and guidelines for work permit issuance, are still unclear.

In terms of investment liberalization in ASEAN, the ASEAN Comprehensive Investment Agreement has not been put into effect since some countries have not ratified it, including Indonesia, Lao PDR, Myanmar, and Thailand. The ASEAN Comprehensive Investment Agreement has been expanded to cover more aspects, from investment promotion and protection, to facilitation for FDI and portfolio investors to ensure an open and free investment system in ASEAN, whereas the previous investment agreement only intended to increase investment from ASEAN and outside, and to promote an environment for free and transparent investment. For liberalization of the stock exchange, which is the most open area, Thailand allows ASEAN investors to hold up to 100 percent of shares in securities companies and asset management companies. This covers forward contracts, security borrowing and lending, joint capital management, joint asset management, private fund management, fund management for forward contracts, and portfolio investment consultancy. Nonetheless, Thailand still has not ratified international services, and new permit issuance. For commercial banks, Thailand allows ASEAN countries

to hold shares in Thai commercial banks according to the Thai law, which is not more than 25 percent. Thailand also lifted the restriction on the number of banking personnel from ASEAN working in Thai commercial banks. Commercial banks have to submit an employment scheme of foreign nationals to the Bank of Thailand for consideration. This, nonetheless, does not affect cross-border services, except financial consultancy and information exchange, and does not affect new permit issuance. The targets to be achieved post-2015 are more liberalization to promote financial integration in ASEAN, increased financial stability and financial inclusion, and insurance sector integration.

After the ASEAN Economic Community was established in 2015, ASEAN member countries have laid out a joint operational framework post-2015, the Kuala Lumpur Declaration for ASEAN 2025, to identify ASEAN visions – a future direction for a politically cohesive, economically integrated, socially responsible, and a rules-based, people-oriented, people-centered ASEAN. ASEAN has to expedite the measures to facilitate trade, such as transport and customs measures, the ASEAN single window, ASEAN Rules of Origins, trade database, and the product mutual recognition agreement. The post-2015 Agenda for ASEAN Connectivity is formulated to carry on operations under the Master Plan on ASEAN Connectivity (MPAC), with five new cooperation areas: (1) sustainable infrastructure; (2) digital innovation; (3) seamless logistics; (4) regulatory excellence; and (5) people mobility. Fifty-five projects from the previous MPAC are also included in the new Agenda.

Nonetheless, Thailand's trade value in ASEAN has tended to shrink, with a lower trade growth rate that dropped from 30.59 percent in 2010 to -6.82 percent in 2015. Competition in ASEAN has tended to increase, as most ASEAN countries produce common goods and offer common services, contributing to competition for market share both within ASEAN and with other regions. Competition for jobs in certain areas, such as nursing services, exists as there is more mobility in labor and production capital. Other areas, by contrast, experience less mobility due to regulations and quality assurance procedures. In the next stage, Thailand has to revise regulations that oppose liberalization, such as for free labor movement, financial liberalization, and capital flow. Joint agreements have to be implemented. Preparations for liberalization in the services and the financial sectors should be completed. The production sector has to advance research and development to produce unique and quality products with added value, promote ASEAN products, and address market needs to increase the income of the country.

For the ASEAN Political-Security Community (APSC), although most of the targets have been achieved, challenges remain in the efforts to prepare for new threats, border management, maritime security, transnational crime, building mutual trust, preventive diplomacy, and joint military defense. For the ASEAN Socio-Cultural Community

(ASCC), the focus is placed on implementing international measures, managing transnational labor, and improving skills in English and the languages of the neighboring countries.

4) The Regional Comprehensive Economic Partnership (RCEP) is an economic agreement between the ten ASEAN member states and its Free Trade Agreement partners: China, Japan, South Korea, India, Australia, and New Zealand. RCEP started detailed negotiations in 2013 to advance the five existing free trade agreement ASEAN has with six countries (ASEAN-China, ASEAN-Japan, ASEAN-South Korea, ASEAN-India, and ASEAN-Australia-New Zealand). The goal is to promote regional trade and investment to generate mutual benefits, and boost economic growth and development. RCEP employs common free trade rules in all 16 countries, and aims to link the ASEAN economy to the world economy in all aspects of trade, including products, services, investment, trade measures, and economic cooperation. This will enhance production, trade, and investment connectivity, and facilitate trade and investment. Key players in RCEP are China and India, new emerging economies that comprise over 3,000 million people, with a combined GDP of 21.2 trillion USD, or over 30 percent of the world's GDP, with high purchasing power of the middle class, and serving as the number one export base of the world.

The principles of RCEP are: (1) an economic partnership that covers a wider range and is more in-depth, comprising trade in goods, services, investment, facilitation among member countries and in regional and global supply chains, economic and technical cooperation, intellectual property, competition, dispute settlement, and other relevant issues; (2) Rules of Origin have to integrate member countries into the global supply chain; (3) reduce regulations in trade and services as much as possible; (4) encourage liberalized and facilitated investment, create an environment that promotes investment, build capacity to promote and protect free trade, and push forward FTAs to reach the same level; and (5) RCEP should have a higher impact than ASEAN+1, thus the accomplishments should benefit all countries including the developing countries.

RCEP encompasses all issues that Thailand recognizes in other regional and bilateral frameworks, such as trade liberalization, import tax reduction, sustainable development, and non-tariff barriers including sanitary and phytosanitary measures (SPS), technical barriers to trade (TBT), anti-dumping measures, Rules of Origin, market and investment liberalization with more relaxed regulations, and tax reduction/exemption to reduce inequality. Nonetheless, agreement was not reached at the previous meetings regarding measures for liberalization of trade, trade in services, and investment. Member states still hold differing opinions, and some have never entered into any bilateral agreements, thus they are more reserved in moving forward with RCEP. Furthermore, attempts to remove overlapping operations, streamline rules and regulations of current FTAs and ASEAN+1, and eliminate non-tariff measures are still challenging. In the

near future when all the import tariffs are reduced to zero, non-tariff barriers could act as obstacles to trade, intellectual property, and competition. Intellectual property law or systems, and competition policy in all 16 countries still differ. Ways to further support SMEs under RCEP are being discussed, which is the topic of much interest for ASEAN and India.

Since RCEP is a new free trade agreement that overlaps previous agreements Thailand is already involved in, the benefits the country will receive depend on several factors. These include products that were not liberalized in previous agreements, the readiness of RCEP member countries, problems and obstacles in implementation, Rules of Origin, and investment liberalization. These could have both a positive and negative impact on Thailand. For instance, Thailand could benefit from more investment and technology overflowing into the country, while it may lose income from import-export duty on certain products. Thus, Thailand should prepare both tariff and non-tariff measures, such as trade facilitation to support products with comparative advantage – machine and electric appliances, rubber and plastic, air conditioners, ribbed smoked sheets, and polymer ethylene.

5) Asia-Pacific Economic Cooperation (APEC) comprises around 2,800 million people, or around 45 percent of the world’s population, accounting for 49 percent of the world’s trade, and 57 percent of the world’s GDP. APEC conducts 70 percent of its trade internally, and 30 percent with countries outside the region. APEC has adopted a set of targeted goals, the “Bogor Goals”, to promote trade and investment, economic expansion, and social participation. The developed economies were to achieve the goals by 2010, and the developing economies by 2020.

In the previous years, the APEC Economic Committee placed importance on five main issues in economic structural reform to enhance market competitiveness: (1) more open, well-functioning, transparent, and competitive market; (2) effective financial market monitoring mechanisms; (3) educational and job opportunities; (4) sustainable development of SMEs, and opportunities for women and people with disabilities; and (5) an effective social safety net. APEC endorsed the Renewed APEC Agenda for Structural Reform (RAASR) for 2016-2020, aiming for a structural reform agenda to combat corruption and enhance good governance, accountability, and integration in the public sector in order to provide more efficient, integrated, and transparent services to the people. A structural reform agenda to enhance public sector governance and efficiency involves several sectors, and is a primary condition to boost the country’s productivity and uplift the standard of living. Thailand prioritizes: (1) public sector reform to utilize systemized digital services and enhance data linkages; (2) regulatory reform to support market competition, consumer protection, and ease of doing business; (3) development of Regulatory Impact Assessment (RIA); (4) target market for services to refine the services sector, increase

competitiveness, and enhance opportunities for Micro, Small and Medium Enterprises (MSMEs); and (5) labor force development in accordance with APEC standards and Green Jobs.

At the policy level, Thai agencies benefit from participating in APEC in four channels: (1) programs that promote technical cooperation, mutual learning, and sharing of experiences and best practices, particularly those regarding rules and regulations, international standards, enforcement, efficiency and transparency in the public sector, and environmental regulations and standards; (2) programs that strengthen MSMEs and the vulnerable populations, especially competitiveness and opportunity enhancement for MSMEs, and women's and the elderly's empowerment; (3) programs for sectoral development, including the food industry, science and technology cooperation, growth and sustainable development in the tourism industry, human resources development, natural disaster warning and response, clean energy consumption, corruption of all forms in public and private sector, and infectious disease prevention; and (4) programs that support trade and investment liberalization, reduce barriers, and facilitate trade, with a particular focus on multilateral trade, achievement of the Bogor Goals (trade and investment liberalization by 2020), the establishment of the Free Trade Area of the Asia-Pacific (FTAAP), and global value chain cooperation. The Committee on Trade and Investment is the main focal point.

APEC stresses the importance of the services sector in boosting productivity in a number of other sectors, and the potential to create jobs, generate export revenue, and increase overall productivity. APEC endorsed the APEC Services Cooperation Framework (ASCF) with the objectives to raise the competitiveness of the services sector, remove unnecessary measures/regulations on trade and investment in services, further participate in the global value chain, especially MSMEs, and identify the long-term future direction of services, based on transparency/fairness, good practices in regulatory and competition policy, and mobility of services providers. APEC foresees the following potential areas: liberalization and facilitation in environmental services, and services in the manufacturing industry. To prepare for more liberalization in the future, Thailand should determine the future direction of the services sector by identifying strategies to link the manufacturing industry and the services industry, with respect to the FTAs Thailand is involved in. At the outset, the Ministry of Industry studied and found out that the types of services that correspond to Thailand's target industries are business services, distribution services, environmental services, financial services, and transport services. Thus, these types of services should be improved to be able to compete at the regional level in the long run. Furthermore, APEC plays a crucial role in Thailand's trade and investment. A more liberalized APEC market is an opportunity for Thailand's trade and investment expansion, and more negotiating power with other economies. Also, the commitment to carry out the

action plans among the member countries will lead to setting up common standards in the region, such as customs procedures, and industrial product standards and certification.

6) The Trans-Pacific Partnership (TPP)

The Trans-Pacific Partnership (TPP) is the largest trade agreement that covers 40 percent of the world's GDP, and is led by the USA. As a high-level multilateral trade agreement, TPP calls for comprehensive economic integration to liberalize goods, services, and investment, structural reforms, and economic policy coordination to set common standards, such as for competition policy, public procurement, intellectual property, labor standards, and environmental standards. Early member countries were Chile, New Zealand, Singapore, and Brunei, and it was known as The Pacific-4 (P4). The original agreement, the Trans-Pacific Strategic Economic Partnership Agreement (Trans-Pacific SEP), was signed on June 3, 2015, and entered into force on May 28, 2016. Later, the USA, Australia, Peru, Vietnam, and Malaysia, all of which are APEC member states, joined the TPP. No additional member will be accepted until negotiations are complete.

Main issues for negotiation in the TPP are different from other FTAs. TPP aims to remove import tariff and non-tariff barriers to products and services, promote supply chain development and production that includes all TPP members and relevant issues (Full Regional Agreement), and enhance competition policy coordination and business promotion. Thus, TPP emphasizes Rules of Origin and common business rules as standards to assure fairness. However, in previous discussions, member countries could not reach agreement or conclusions regarding: (1) procedures towards market liberalization, as the USA demands bilateral agreements with the countries which the USA has not established any FTAs with, while Australia, New Zealand, and Singapore call for a sole agreement for single market access; (2) investment, as the USA supports public-private dispute settlement while Australia and New Zealand do not agree; and (3) intellectual property, as the USA seeks to advance strong intellectual property rights protection over Trade-Related Aspects of Intellectual Property Rights (TRIPs) under the WTO while New Zealand does not agree. Along with other pending issues, TPP negotiation has been unable to reach a conclusion.

At this time, Thailand has not appealed to join TPP, as it is contemplating the future direction of negotiations among TPP members. Thailand has already entered into free trade agreements with almost all of the TPP members, except the USA, Canada, Mexico, and Chile. If Thailand and other ASEAN countries join TPP, the influence and the role ASEAN has maintained may diminish, and the Asia-Pacific Community that will be established will bring about international political implications, balance of power issues, and further relations with countries outside TPP. Besides, TPP is a new form of high-level trade agreement to prepare for economic revolutions in the 21st Century,

comprising liberalization in services and investment, economic regulatory reform and coordination, public procurement, intellectual property, and labor and environmental standards. However, Thailand is not completely set to comply with rules and regulations in the above fields, particularly liberalization in services and investment, which may cause the country to lose advantages over other TPP members, such as the US, Australia, and Singapore. Therefore, Thailand has to conduct a study to review threats and opportunities under RCEP, examine the benefits and ramifications the country will experience, and at the same time raising the country's capacity to review regulations and ensure coordination among them to better prepare for more market opening. The USA calls for more liberalization in agricultural products, garments and textiles, and manufacturing industry, all of which make up Thailand's export share. Thus, Thailand should review rules and regulations to ensure their practicality, especially drug patents, and plant and animal patents. The country should also remove barriers to competition and enhance the competitiveness of the private sector, improve the labor force to meet international standards, strengthen SMEs in clusters, and advance the services and investment sector.

7) Sustainable Development Goals (SDGs) and Other Cooperation

Frameworks

Thailand adopted the Sustainable Development Goals (SDGs) 2016-2030 in September 2015, led by the United Nations. SDGs serves as a new global development agenda that promotes economic, social, and environmental interconnectedness in the future production chain. The five key elements, 5Ps, consist of People, Planet, Prosperity, Peace, and Partnership. The 17 goals² and the 169 targets all call for changes among stakeholders, acting as a factor and accelerator for sustainable development, and ensure that all economic, social, environmental, and business activities in the public and private sectors are administered with sustainability as a principle. Thailand plans country development in accordance with the SDGs.³

² The 17 Sustainable Development Goals (SDGs) are: (1) to end poverty, (2) to end hunger, (3) to ensure healthy lives and promote well-being, (4) to ensure quality education, (5) to achieve gender equality, (6) to ensure access to water and sanitation, (7) to ensure access to clean and reliable energy, (8) to promote economic growth and decent work, (9) to build infrastructure, promote sustainable industrialization, and foster innovation, (10) to reduce inequality, (11) to make cities sustainable, (12) to ensure sustainable consumption and production patterns, (13) to combat climate change, (14) to conserve the oceans, seas, and marine resources, (15) to manage forests, halt and reverse land degradation, and halt biodiversity loss, (16) to promote just, peaceful, and inclusive societies, and (17) to revitalize the global partnership for sustainable development.

³ Thailand established the National Committee for Sustainable Development on June 9, 2015, chaired by the Prime Minister and led by the Secretary-General of the National Economic and Social Development Board as secretariat and committee. The purpose of the National Committee is to design and formulate national sustainable development policies and strategies to comply with relevant international agreements or frameworks, support and promote public-private operations towards sustainable development, and ensure coordination in implementing the policies in government agencies. The National Committee agreed to the establishment of three sub-committees: (1) Sub-Committee for SDGs Mobilization, (2) Sub-Committee for Promotion of Understanding and Evaluation on the Implementations of Sufficiency Economy, and (3) Sub-Committee for the Database. The three sub-committees are assigned to publish a roadmap on Sustainable Development Goals (SDGs) that is in alignment with government policies, the 20-Year National Strategy, the Twelfth National Economic and Social Development Plan, the structural reform agenda, and the Thai Government Roadmap Phase II-III.

Apart from the aforementioned cooperation frameworks, Thailand takes part in a number of others; for instance, the Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS), Mekong-Japan, Mekong-ROK Cooperation, Bay of Bengal Initiative on Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), and Asia Cooperation Dialogue (ACD). These frameworks share mutual objectives of strengthening Asia, promoting understanding and trust, and fostering cooperation that leads to more peace, stability, and prosperity. Member countries can benefit from their strengths and potential in various aspects to bring about balanced development, and a narrowed economic and development gap. Thailand should promote the role it plays in diverse cooperation frameworks to boost connectivity in all forms to further expand opportunities in trade and investment in the region, and integrate the regional production chain to the global level.

2.8 Public Administration

2.8.1 The public sector is large and characterized by rising current expenditure as well as a high proportion of expenditure on personnel. In addition, in terms of infrastructure, there is a lack of a platform to enable the formation of an integrated network where agencies within the public sector collaborate with stakeholders in other sectors, such as business, civil society and citizens (the Pra-Cha-Rat System). Moreover, information technology and databases have not met appropriate standards. Human resources in the public sector, state enterprises and most entrepreneur networks still lack social responsibility, knowledge and the drive to perform one's duty and enhance their own capacity as well as that of their networks, which makes it very difficult for organizations to cultivate continuous learning. In particular, there is a lack of integration, common goals and collaborative direction in the forms and approaches being adopted in finance, production technology, marketing as well as rules and regulations for promoting investment as the services and industries targeted for development in the Twelfth Plan pursue value-added creation.

2.8.2 Members of the younger generations with high potential do not apply to work in the public sector, so there are workforce shortages, such as in the replacement of retired officers. Due to the diverse types of work available, such as freelancing and the gig economy (short-term contracts and taking many temporary jobs at the same time), the new generations are not interested in working in the public sector. Moreover, since public administration systems do not match the working styles of the new generations, public recruitment and development systems, as well as public administration itself, will have to adjust accordingly. Opportunity and fairness in public employment, coupled with capacity development of public human resources towards leadership and the digital economy, should also be encouraged and delivered.

2.8.3 The efficiency of public administration is low, and the public services have not met international standards comparable to those in other countries.

The International Institute for Management Development (IMD) reported that, in 2015, the efficiency of Thailand's public sector ranked 27th in the world, and 3rd among ASEAN countries, behind Singapore and Malaysia. Furthermore, the World Bank has reported that, in 2015, Thailand ranked 49th in the world for the ease of doing business, and 3rd in ASEAN, again behind Singapore and Malaysia. The causes of the problems are: a top-down public administration with concentric patterns of management, a proliferation of procedures and regulations, red-tape, inflexibility, cumbersome, expensive, and incoherent management. Integration with proactive strategic plans should be adjusted, as well as congruence with lifestyles and business practices, using information technology and communication tools that encourage more rapidity and efficiency. Moreover, advances in communications technology help facilitate people's more immediate and diverse access to information, giving them high expectations to receive public services through various and more effective channels, such as one-stop or online services.

2.8.4 The budget allocation processes has low efficiency and effectiveness. This is because of limitations associated with the awkward timing of the budget request procedure, which is unable to keep up with rapidly changing and complicated problems. The budget analysis and project prioritization processes among ministries are independent. Ministries, departments and units are not integrated in national problem-solving, especially concerning anti-corruption measures that link public, private and non-governmental organizations, both at the national and international levels. Furthermore, the lack of comprehensive budget planning and allocation has led to the fragmentation of funding to the local areas, making it very difficult to bring about fundamental change and tackle effectively all local problems. Also, the provincial development plan, which underpins efficient budget allocation to local areas, is still not of an acceptable standard in several provinces. There is also a lack of mechanisms and channels to encourage public participation in the evaluation and monitoring of the public budget, while work procedures in policy formulation, projects and plans do not truly serve the people's needs.

2.8.5 Corruption and misconduct is widespread in public, private and non-governmental organizations, resulting in inefficiency in public administration, a slowdown of national economic and social development, and a lack of international trust in relations, security rapport, trade, investment, and politics. In its Corruption Perceptions Index 2015, Transparency International ranked Thailand 76th among 168 countries, with a score of 38 out of 100. In ASEAN, Thailand came third, after Singapore and Malaysia. The main causes are a lack of continuity and too much red-tape in the corruption prevention and repression interventions of related organizations. In addressing misbehavior among some public officers,

particularly cronyism, there is a lack of integration among public, private and civil society actors. Furthermore, anti-corruption measures focus only on corruption in the public sector, with little emphasis on solving the problem of corruption in other sectors even though the level, scale and severity of corruption in the private sector, state enterprises and private agencies, respectively, is high, at both the national and international level.

2.8.6 Supervision of state enterprises is incomplete, lacks effective strategic plans, and has complicated management procedures, resulting in ineffective performance. Many state enterprises suffer high losses, a lack of liquidity, and are severely indebted. Supervision structures lack of unity, are inflexible, and are interfered with or controlled by other organizations, leading to corruption risks. Moreover, as SOEs assume both the role of regulator and operator, this has resulted in unfair competition with segments of the private sector which compete in the same industries, and has deprived consumers of a guarantee of high quality services at reasonable cost. Meanwhile, consumers are not guaranteed to receive standardized and qualified services, suited to their needs, at fair prices.

2.8.7 The Management and Services of Local Administration Organizations (LAOs) are inefficient, non-transparent and are not able to respond perfectly to people's needs. The reason is disparity in the structures of central, regional and provincial public administration. Public administration is more centralized than decentralized, lacks linkages between and integration of networks, and lacks a people-centric collaboration system. There are still problems with public administration organizations which lack clarity in task distribution among central, provincial and regional governments. The transfer of personnel from central to provincial administrations, or vice versa, is not smooth. The central administration transfers the responsibility to perform certain tasks to local administrations that still lack the capacity to accomplish them. Also LAOs, which have the responsibility to provide basic public services, do not emphasize people-participation. Power acquisition in some LAOs is not transparent enough, and evaluations of budget spending in some provincial administrations are not effective and systematic enough.

2.8.8 Many laws do not meet international standards due to their obsolescence and deficiencies in legislation processes, including law lag, a lack of stakeholder participation in the processes, the unpreparedness of implementation teams, a lack of multi-aspect assessments, more focus on controlling than promoting long-term development, as well as the centralization of high-level organizations, and inefficiency in law enforcement. Moreover, enforcement officers often lack knowledge and understanding of laws and judicial administration, so they may be taken advantage of and treated unfairly. Also, as Thailand has entered into several international agreements, such as cooperation for the Sustainable

Development Goals (SDGs), the United Nations Framework Convention on Climate Change (UNFCCC) to reduce emissions of greenhouse gases, and the UN Convention Against Corruption 2003 (UNCAC), the country is therefore obliged to improve rules, regulations, and relevant guidelines to meet the pre-determined international standards and agreements that Thailand has signed.

2.8.9 Some judicial processes and systems are inefficient and do not facilitate equity, fairness and justice, as well as being insufficiently internationalized, because of their centralized structures and interference from politics. Law enforcement and the judicial processes of related organizations are not transparent, are corrupt, and employ double-standards in inquiry, investigation, and prosecution. There is a lack of an assessment system to evaluate the quality and efficiency of the justice system in order for the system to reflect the entity's top priorities. Furthermore, power is abused to benefit some groups, and there is red-tape in lawsuit prosecution processes.

Part 3

Objectives and Development Targets of the Twelfth Plan (2017-2021)

Part 3

Objectives and Development Targets of the Twelfth Plan (2017-2021)

The Twelfth National Economic and Social Development Plan (2017-2021) is the five-year country development plan that translates the long-term 20-year National Strategy (2017-2036) into action. Therefore, the direction of the Twelfth Plan, which is set within the principles of the “Sufficiency Economy Philosophy”, aims to prepare and lay the foundation for Thailand to be a developed country and to achieve “Stability, Prosperity, and Sustainability”. The objectives and development targets of the Twelfth Plan are set within the framework of the vision and targets for Thailand’s future, in 2036, which are incorporated in the long-term 20-year National Strategy. The objectives and development targets of the Twelfth Plan are also drawn from an assessment of external and internal factors that reveals the country’s strengths, weaknesses, opportunities and threats in striving to achieve the development targets of the first five years of the long-term 20-year National Strategy. These are set to underpin the continuous effectiveness of the subsequent National Economic and Social Development Plans’ outcomes. The Twelfth Plan determines its objectives and overall targets as follows:

1. Objectives

1.1 To lay a foundation for a good value-system by encouraging Thais to be ethical, disciplined, happy, healthy and smart. They should have good social values, public mindedness, close family ties, and be capable of continuous self-development through every stage of their lives.

1.2 To provide economic and social security as well as fair access to resources and quality social services. To enhance the capabilities of the disadvantaged. To encourage communities to be strong and self-reliant.

1.3 To promote an economy that is strong, competitive, stable, and sustainable. To strengthen existing production and service bases as well as develop new ones by using intensive innovation. To strengthen the grassroots economy, and foster energy, food, and water security.

1.4 To preserve and restore natural resources and environmental quality in order to support green growth and enhance the quality of life of Thai citizens.

1.5 To improve public administration by enabling it to become more efficient, transparent, modern, and able to work in an integrated manner with various development partners.

1.6 To distribute prosperity across different regions through urban and regional development by supporting existing production and service bases and developing new ones.

1.7 To strengthen the connectivity between Thailand and other countries at the sub-regional, regional, and international levels. To promote Thailand as a leading actor in trade, services, and investment within sub-regional, regional, and international collaboration frameworks.

2. Overall Targets

To pursue these objectives, the main targets of the Twelfth Plan are determined as follows:

2.1 The Thai people should have a good value-system. Thai people should possess discipline, attitudes and manners according to the norms of society. They should also be receptive to learning, practical, well-informed, responsible, physically and mentally healthy, spiritually refined, self-sufficient and able to represent Thainess.

2.2 Income inequality and the level of poverty should be reduced. The foundations of the economy should be strengthened. Every Thai should have fair access to resources, job opportunities and social services. The 40 percent of the population with the lowest incomes should see their income levels rise by at least 15%.

2.3 The Thai economy should be strong and competitive. The structure of the economy should be transformed to one that is based on services and digital technologies. Thailand should foster a new generation of entrepreneurs and social entrepreneurship. Small and medium enterprises (SMEs) with high potential should improve their products and services through innovation and technology. Existing production and service bases should generate higher value-added. There should also be investment in knowledge-based production and services, which is both localized and environmentally friendly. Production and service bases should be distributed to different regions across the country in order to reduce inequality. The Thai economy should grow at an average annual rate of 5%. The driving factors for this growth should include logistics, energy and investment in research and development programs which support the expansion of the manufacturing and service sectors.

2.4 Natural capital and environmental quality should be able to support green growth. Thailand should have food, energy, and water security. The proportion land under forest should cover 40% of the country in order to underpin a balanced ecological system. Greenhouse gas emissions in both the energy and transportation sectors should be reduced by at least 7% by 2020, compared to current emission levels. The proportion of solid waste that is disposed within the sanitation system should be increased.

Water and air quality in critical areas should be improved to reach acceptable health standards.

2.5 National sovereignty, security, safety, reconciliation and the country's confidence should be improved. Social ideological conflicts, crimes, and losses from piracy and the smuggling of goods and human trafficking should be reduced. Preparedness to protect citizens from terrorism and natural disasters should be strengthened. Thailand, alongside other countries, should collaboratively determine and set international norms, and become a vital partner in sub-regional, regional, and international cooperation. Transportation, logistics, and value chains should be interconnected. The rate of investment and exports from Thailand to sub-regional, regional, and ASEAN countries should increase.

2.6 Public administration should be efficient, modern, transparent, accountable, decentralized, and welcome public participation. The public sector should reduce its role in providing services in areas where the private sector can do better. The use of digital services should be increased. The level of corruption should be reduced. The Local Administrative Organizations should be more flexible. The ranking of public administration efficiency, according to the International Institute for Management Development (IMD) and the Ease of Doing Business ranking, should be raised. Public spending and the budgetary system should become highly efficient. The tax base should become broader and Thailand's ranking on the Corruption Perception Index should be improved. Public sector officers should become proficient in and highly adaptable to the technologies of the digital age.

Part 4

Development Strategies

Part 4

Development Strategies

Strategy **1** Strategy for Strengthening and Realizing the Potential of Human Capital

Recent demographic changes are expected to result in Thailand becoming an aged society by the end of the Twelfth Plan, with the proportion of elderly people increasing to about 19.8 percent of the total population. In contrast, the proportion of people of working age has been declining since 2015, resulting in labor shortages in a wide range of sectors. The challenges brought about by these changes are further amplified because the productivity of the current Thai workforce is relatively low due to a number of factors, including an unskilled workforce, delayed technological development, and problems with administration. Such challenges can pose limitations to the nation's competitiveness, development and economic growth, as well as income generation and improvement to the well-being of the Thai people. In addition to such quantitative challenges, certain qualitative aspects of the Thai population need also to be considered as challenges that need to be tackled. Such problems vary according to age group but are nonetheless interconnected, starting from early childhood. Inadequate early child development can very likely lead to poor performance among school age children, and later a mismatch of skills development for the labor market.

The number of elderly people living alone who have health-related problems is expected to be on the rise. A wide variety of family structures is expected to emerge, with some types presenting greater risks of becoming fragile families with impaired ability to bring up and nurture their children adequately. Additionally, the influence of foreign cultures, which are being more easily absorbed into Thai society in the digital era, can negatively impact the social norms, attitudes, and behavior of some Thai people, especially those who are unable to screen out inappropriate cultural influences. Thus, the next step of human capital development will have to emphasize development of some of the fundamentals, starting from early childhood, promoting adequate physical and mental development, cognitive development, life skills and learning skills, so that children have the basis for making an adequate transition into adulthood. However, this will have to be accomplished together with attention to the soft side of human capital development, aiming for Thai people of all ages to develop satisfactorily as good citizens with strong well-being, ethics, self-discipline, collective consciousness, skills and knowledge, and the ability to adapt to a rapidly changing environment. Furthermore, social institutions, namely the family, education institutions, religious institutions, local communities and the private sector, will need to be

strengthened in order collectively to be able to participate in the development of the nation's human capital, which in turn can help drive the country forward more successfully.

1. Objectives

1.1 To transform people in Thai society to enhance the acquisition of values that are deemed acceptable by social norms.

1.2 To prepare Thai people of all ages to acquire the skills needed for a quality life in the 21st Century world.

1.3 To promote the lifelong well-being of the Thai people

1.4 To promote and strengthen social institutions to become a foundation of both the country and of human capital development.

2. Targets and Indicators

2.1 Development Targets

2.1.1 The majority of Thai people will have attitudes and behavior that are more in accordance with social norms.

2.1.2 Thai people of all ages will have higher levels of essential skills, knowledge, and capabilities.

2.1.3 Thai people will receive an education that matches international standards and develop their capacity for continuous self-learning.

2.1.4 Thai people will have better health and well-being.

2.1.5 Social institutions will be strengthened and will have more involvement in the country's development, especially the family, education institutions, religious institutions, local communities, the media and the private sector.

2.2 Indicators

Target 1 The majority of Thai people will have attitudes and behavior that are more in accordance with social norms:

Indicator 1.1 Thai people who are aged 13 years and over have more moral and ethical behavior.

Indicator 1.2 There is a proportional decrease in criminal cases.

Target 2 Thai people of all ages have higher levels of essential skills, knowledge, and capabilities:

2.1 Appropriate early childhood development to enable children to realize their fullest potential:

Indicator 1 At least 85 percent of children aged 0-5 years old develop appropriately according to their age.

2.2 Increases in IQ and EQ levels of school age children and adolescents:

Indicator 2 Above international average IQ scores.

Indicator 3 At least 70 percent of school age children and adolescents have above average EQ scores.

2.3 Working age people will have the knowledge and skills required to perform adequately in the labor market, as well as adequate financial skills deemed suitable for the economic environments:

Indicator 4 The number of students enrolling in Dual Vocational Training (DVT) increases at an average of 30 percent per year.

Indicator 5 There is an increase in the number of people certified by the Thailand Professional Qualification Institution (TPQI) and the number of people passing the National Skill Standard tests.

Indicator 6 There is an increase in individuals' savings of disposable income.

2.4 Young-old elderly people will have adequate employment and income suitable to their capacity:

Indicator 7 There is an increase in the employment of elderly people (aged between 60-69 years old).

Target 3 Thai people will receive an education that matches international standards and develop their capacity for continuous self-learning:

Indicator 3.1 PISA scores that are not less than 500 for each subject.

Indicator 3.2 There is an increase in the use of the Internet for learning purposes.

Indicator 3.3 The literacy rate of Thai people increases to 85 percent.

Indicator 3.4 The number of working people requesting the transfer of their experience and knowledge as academic credits towards vocational qualifications increases by an average of 20 percent per year.

Target 4 Thai people will have better health and well-being:

Indicator 4.1 There is a decrease in the number of Thai people aged 15-79 years old who are overweight.

Indicator 4.2 The motor vehicle death rate is below 18 deaths per 100,000 people.

Indicator 4.3 Thai people participate in more sports events and activities.

Indicator 4.4 The successful suicide attempt rate per 100,000 people declines.

Indicator 4.5 The number of births among women aged 15-19 years old declines.

Indicator 4.6 Health-related expenditure is below 5 percent of GDP.

Indicator 4.7 20 percent of the total elderly population resides in homes with suitable environments.

Target 5 Social institutions will be strengthened and will have more involvement in the country's development, especially the family, education institutions, religious institutions, local communities, the media and the private sector:

Indicator 5.1 An improved Warm and Loving Family Index score.

Indicator 5.2 Thai people who are aged 13 years and over practice religious teachings more regularly.

Indicator 5.3 There is an increase in the number of social enterprises.

3. Development Guidelines

3.1 Transforming the values of the Thai people to have more virtues and moral ethics, discipline, public-mindedness and behavior desired by society, by:

3.1.1 Promoting a style of child-rearing that emphasizes self-reliance, honesty, discipline, morals, ethics, and responsibility, through the use of daily activities that help parents engage with their children in order that the children can observe first-hand and learn from their parents as role models.

3.1.2 Promoting learning activities, both outside and inside the classroom, that are embedded with morals, ethics, discipline and public-consciousness, as well as urgently creating safe school environments for all students.

3.1.3 Adjusting the way of disseminating information on religious teachings and practices, making it more comprehensive and practical, so that it can be used as one of the tools for instilling good values in Thai people.

3.1.4 Strengthening local communities to have a greater role and engagement in organizing activities concerning the public interest and social organization, as well as determining appropriate social sanctions for those not behaving in accordance with certain social norms.

3.1.5 Allocating air time and venues for creative media aimed at helping to promote morally ethical behavior, especially during peak airtime, as well as promoting the use of social networking services as a platform to educate Thai people about good citizenship.

3.1.6 Encouraging the practice of good work ethics and positive work behavior, such as punctuality, responsibility, discipline, teamwork, enthusiasm, and being accepting of other people's different opinions.

3.2 Developing Thai people of all ages to acquire the skills, knowledge and capability needed for sustaining meaningful lives:

3.2.1 Promoting adequate early childhood development so that young children can have proper cognitive and social skills development.

1) Educating parents or guardians on adequate nutrition, child-rearing practices that can help stimulate development in children aged 0-3 years old, as well as promoting among mothers the breastfeeding of their children for at least 6 months after birth.

2) Setting up measures designed to create a work-life balance for parents with young children, so that they can bring up their children themselves, such as incentive measures for workplaces to have more flexible working hours, and promoting men to participate more in household responsibilities, including looking after their children.

3) Developing research-based curricula and improving childcare centers nationwide in order to deliver quality that is up to par with predefined standards, with more emphasis placed on skills development, including brain development, cognitive skills, emotional skills, planning and systematic thinking skills, and self-evaluation skills. Furthermore, such developments need to be accompanied by professional skills and

knowledge development that is essential for effective teaching by early childhood age group teachers.

4) Promoting creative media production in various forms to be embedded with child-rearing skills and knowledge for young children (aged 0-5 years old), such as family studies, health for mothers and children, and brain and social skills development.

5) Pushing forward related early childhood development legislation to have more coverage on skills development, formal education system entrance preparation, health and sanitation development adequate for each age group, and all-round social skills development.

3.2.2 Developing systematic thinking skills, creativity, and essential working skills required by the labor market among school-age children and adolescents:

1) Adjusting learning processes, aiming at encouraging and promoting active learning among children, so that they can learn by doing and experiencing things themselves, with more emphasis placed on the sciences, technology, engineering, mathematics, the arts and foreign language subjects.

2) Encouraging children to take part in life skills and continuous learning skills development, both inside and outside the classroom, including reading, community service, taking care of health, team working, and life planning.

3) Creating more incentives designed to attract more children to take part in either Dual Vocational Education or Co-operative Education programs in order to equip them with the essential skills required by the labor market.

3.2.3 Promoting the working age population to acquire skills and knowledge demanded by the labor market to enable them to perform their jobs effectively.

1) Developing labor training centers to have standards that are up to par with those of the Professional Qualifications Framework and the National Skills Standard, as well as creating occupational standards guidelines for occupations required by targeted high-potential industries and promoting the use of competency-based skills evaluation.

2) Accelerating the development of an integrated labor demand and supply database that can be further used for labor projections in accordance with anticipated labor market trends.

3) Establishing one-stop labor information and data services centers in order to provide relevant information and consultation on suitable financing and marketing for new entrepreneurs and freelancers, as well as encouraging education institutions to provide short-term courses on essential skills development for this target group.

4) Encouraging financial institutions to cooperate with workplaces in creating attractive savings measures for workers which can help inspire them continuously to save part of their income for their own financial security after retirement.

3.2.4 Developing and improving young-old elderly people's capability to increase their opportunities to gain employment:

1) Developing working skills development courses that are suitable for young-old elderly people according to their age, competencies, physical abilities, and job characteristics as well as promoting team-working skills among people from different generations.

2) Promoting the use of more monetary and fiscal incentives to encourage more employers to consider providing adequate employment opportunities for elderly people.

3) Promoting more marketing channels and financial sources as well as information services for elderly people to enable them to access employment opportunities in local communities.

3.3 Improving the quality of the education system and lifelong learning:

3.3.1 Adjusting the management and administrative systems of small-scale schools where the number of students and the size of the schools falls below benchmarks, in order to pool their resources and adjust their size and number of students to be appropriate to the area and to a population structure with a diminishing number of children.

3.3.2 Adjusting teacher training programs, with more emphasis placed on competency-based programs, professionalism, coaching skills, and the ability to stimulate learning. Furthermore, some other measures will also need to be initiated, including creating incentive mechanisms designed to attract high-potential individuals to become teachers, adjusting the teachers' academic standing evaluation method to reflect students' performance, as well as building teaching knowledge exchange networks for teachers as a platform for continuous competency development among teachers.

3.3.3 Developing a quality assessment system that can truly reflect learners' improvement of skills, knowledge, capability, and competency in accordance with the learning standards of each educational level.

3.3.4 Promoting more incentive mechanisms aimed at attracting medium-scale workplaces to expand their potential to take part in either the Dual Vocational Education or Co-operative Education programs, as well as educating entrepreneurs/employers and coaches/mentors collaboratively to plan teaching materials and programs, and collectively evaluate learners.

3.3.5 Expanding cooperation between vocational institutions, tertiary institutions, the private sector, and Thai and international experts in developing curricula for certain subject fields that Thailand is specialized in, turning research into innovation, as well as developing competency-based curricula to cover more subjects and educational levels nationwide.

3.3.6 Creating e-learning materials that can be used or communicated through various easy-to-access and convenient communicative platforms, anytime and anywhere, and creating tax incentives to attract more private entities to produce high quality but inexpensive books and other learning materials.

3.3.7 Transforming local learning centers - such as libraries, museums, historical parks, and schools for the elderly - into more creative and living learning resources, as well as pushing forward better local wisdom management in local communities.

3.4 Minimizing health risks and raising awareness among all related parties regarding health complications and impacts, and related causal factors:

3.4.1 Improving health literacy among Thai people and providing easier-to-access mental health consultations, as well as regulating health-related information publication, which should have an academic or scientific grounding.

3.4.2 Encouraging adequate age-specific health activities and nutrition, and assisting local communities in allocating and managing public areas and facilities designed for physical activities and sports.

3.4.3 Improving relevant legal measures and tax incentives aimed at promoting entrepreneurs to start using technology and innovation in healthy food and beverage production as alternatives for consumers, promoting easy-to-understand food labels on product packaging, as well as regulating the advertisement of unhealthy products that may have harmful impacts on human health.

3.4.4 Pushing forward the conducting of Health Impact Assessments (HIA) when designing and implementing public policies at all levels: national, spatial and local community. The potential impacts of major development proposals on the health and wellbeing of the people should be considered, thereby leading to healthy built environments for all.

3.4.5 Promoting a traffic safety culture through available means of public communication that are suitable for each target groups, in order to reduce traffic accident-prone behavior, as well as setting up a systematic road traffic accident management service.

3.5 Enhancing the efficiency of public health service system management and improving the health financing system:

3.5.1 Adjusting the resource management system among all scales of sanatoriums under all jurisdictions located in all health areas in terms of human resources, medical equipment and related infrastructure, to be seamlessly connected in order to provide quality health care services at all community, general and regional hospitals nationwide, as well as developing fast and effective referral and emergency medical systems.

3.5.2 Setting up measures designed to oversee health-related expenditures between the public sector and patients, taking into account socioeconomic status, accessibility of low-income earners to essential treatments, and the nation's public finance discipline.

3.5.3 Developing a health insurance system for foreign workers and tourists to provide more quality coverage of healthcare services, with adequate regulations, that will not have any negative impacts on national security, in terms of both financial and public health aspects.

3.5.4 Integrating related data and information from all health insurance systems into one database, comprising of data and information on entitled benefits, usage of service, budget disbursement and performance evaluation.

3.6 Improving the elderly care system and creating adequate environments suitable for an aging society:

3.6.1 Pushing forward long-term care legislation to cover quality accessible services provided by the public sector, private sector, and civil society, as well as a sustainable financing system.

3.6.2 Developing a medium-term aftercare system, designed to provide essential support to recovering patients, that is seamlessly connected with the long-term care system, and promoting long-term care service businesses whose standards are up to par to what is required, for dependent elderly people in urban areas, as well as studying suitable financing models for long-term care insurance.

3.6.3 Conducting research and development on the necessary facilities required by elderly people to sustain quality living on a daily basis, and developing medical

technology and innovations to be used in improving the health and well-being of elderly people, as well as injury prevention technology and a treatment monitoring system.

3.6.4 Promoting elderly-friendly urbanization with universal designs, including public transportation, buildings, public areas, and accommodation that is suitable for the quality living of elderly people and everyone in society.

3.7 Encouraging social institutions collaboratively to take part in strengthening the nation's development:

3.7.1 Creating enabling social environments that can help strengthen family cohesion, with the use of appropriate communication means aimed at promoting the importance of families in human development, developing innovations designed to help facilitate communication between family members, creating more opportunities for family members to spend time together, and establishing networks between homes and schools through relation-strengthening activities between parents, teachers, and children.

3.7.2 Setting up measures designed to protect and care for vulnerable families so that they can look after their family members more effectively, including adequate income earned from appropriate jobs, accessibility to healthcare services, developing monitoring systems for assistance to elderly people, as well as encouraging elderly people to partake in looking after vulnerable family members in their own communities.

3.7.3 Promoting educational institutions also to become academic knowledge centers to which the public can easily gain access, providing free public access to academic research, as well as promoting educational institutions to conduct more research with interested local communities on spatial development.

3.7.4 Promoting those who disseminate religious teachings to behave as great role models by strictly following their own religious teachings and principles, as well as urgently regaining the people's trust of religious organizations.

3.7.5 Promoting media producers of all types to present truthful news and information which is based on media ethics, as well as emphasizing positive phenomena and trends aimed at reducing conflicts in society.

3.7.6 Designing incentive measures aimed at attracting the private sector to take part in new social project developments that are considered social innovations, such as local products development, social stock exchange, social bonds, social enterprise, and media for learning.

4. Complementary Plans

- 4.1 (Draft) National Strategic Plan for Early Childhood Development ร่างแผน (2017-2021)
- 4.2 (Draft) 2nd National Policy and Strategy on Reproductive Health Development (2017-2026)
- 4.3 National Manpower Production and Development during the Second Decade of Education Reform (2009-2018)
- 4.4 (Draft) National Education Plan (2017-2031)
- 4.5 (Draft) Reading Culture for Thai Learning Society Master Plan (2017-2021)
- 4.6 Nation Labor Master Plan for the Ministry of Labor (2017-2021)
- 4.7 The 2nd National Plan on The Elderly (2002-2021)
- 4.8 (Draft) 1st National Ethics Promotion Master Plan (2016-2021)
- 4.9 Thailand Healthy Lifestyle Strategic Plan (2011-2020)
- 4.10 (Draft) Action Plan for Integrated Non-Communicable Disease Protection and Control in Thailand Strategy which Respond to the Nine Targets (2017-2025)
- 4.11 (Draft) The National Strategic Plan for Family Promotion and Development (2015-2021)
- 4.12 (Draft) Safe and Creative Media Development Strategy (2017-2021)

5. Flagship projects

5.1 Early Childhood Development

5.1.1 Main Content: to develop the young children of the nation to become well-rounded citizens with adequate cognitive and social skills development, through integrative collaboration between related agencies in the following matters:

- 1) **setting up policy/measures aimed to facilitate families in taking care of their children at their utmost capacity** by designing appropriate measures to attract both the public and private sectors to have more flexible working patterns and to have a designated area for breastfeeding and a sanitized storage room for equipment;
- 2) **enhancing the quality of early childhood personnel and early childcare centers** by requiring all early childhood education institutes to have teachers and babysitters that have qualifications in early childhood or other related fields, by setting up an early childhood curriculum that emphasizes child development in connection with the promotion of morals and ethics, and by creating a standardized evaluation system for all early childhood development centers;
- 3) **arranging adequate environments that encourage learning** by allocating areas for (i) creative activities designed to encourage the learning of sciences, arts, cultures, music and

sports, (ii) cultural learning centers, and (iii) green areas or playgrounds in safe environments, as well as organizing the necessary public utilities for local communities in order to facilitate and encourage families and their children to take part in activities held within their communities; and 4) **promulgating laws on early childhood development**, emphasizing integrated collaboration between related agencies.

5.1.2 Key Implementing Agencies: Ministry of Public Health, Ministry of Social Development and Human Security, Ministry of Education, and Local Administrative Offices.

5.1.3 Operational Timeframe: 5 years (2017 – 2021)

5.2 Family Well-being Enhancement and Family Strengthening Program:

5.2.1 Main Content: emphasizes working collaboration and integration at all spatial levels, through collaboration between related agencies and family development centers in local communities, such as the Provincial Social Development and Human Security Office, the Local Administrative Offices, educational institutions and local healthcare service providers. Key operations are as follows: 1) development of a family information database which can be used for further analysis and planning suited to the characteristics and nature of families in each area; 2) organization of activities and creation of opportunities in local communities for family members to get to spend time together, thereby strengthening relationships, as well as provision of opportunities for children to show their artistic and cultural talents in order to create among them a pride of being Thai; 3) insertion of knowledge concerning family education in the learning process of school-age children, with more participation and contribution from families in formal curriculum design and planning, as well as in the organization of activities that encourage learning, management and problem-solving regarding children-related issues.

5.2.2 Key Implementing Agencies: Ministry of Education, Ministry of Social Development and Human Security, Local Administrative Offices, and the family development centers network.

5.2.3 Operational Timeframe: 5 years (2017 – 2021)

5.3 Holistic Health Risk Behavior Reduction Campaign:

5.3.1 Main Content: emphasizes collaborative integration of all related parties' operations aimed at increasing awareness of health risk behavior among all Thais, thereby adjusting and improving such behavior through the following measures: **1) building positive attitudes towards good health and promoting learning of adequate nutrient intake** by including knowledge on adequate nutrient intake in official curricula and promoting public-friendly and enthusiasm-triggering public communication means to educate the general public on healthy and unhealthy products, as well as self-assessment

of health risks; **2) promoting health-friendly environments** by developing health-friendly infrastructure and public services systems, and encouraging companies and organizations to allocate spaces/areas for physical activities; **3) promoting health-friendly food products and beverages and other products** by promoting tax incentive measures designed to encourage business producers, distributors and restaurants to produce and use organic products as alternative food products for consumers to choose from, and financially subsidizing agriculturalists cultivating organic fruits and vegetables.

5.3.2 Key Implementing Agencies: Ministry of Public Health, Ministry of Commerce, Ministry of Education, Ministry of Tourism and Sports, Local Administrative Offices, and private organizations.

5.3.3 Operational Timeframe: 5 years (2017 – 2021)

5.4 Labor Training Center Improvement for Lifelong Learning Promotion Program:

5.4.1 Main Content: improving labor training centers all around the nation in order to enhance and develop the competencies required by both the national professional qualification framework and national labor standards, among workers whose skills and competencies do not match with what is required in the labor market, as well as among workers who wish to develop their skills further and those who wish to switch their professions. This needs to involve integrated collaboration between the Thailand Professional Qualifications Institute (Public Organization), Department of Skills Development, labor training centers, skill testing centers, educational institutions and potential training institutes so that workers are able adequately to develop their skills in accordance with their capacity and needs, and also to have their progress recorded as accumulative credits which can, thereby, help promote lifelong learning among Thai workers.

5.4.2 Key Implementing Agencies: Thailand Professional Qualifications Institute (Public Organization), Department of Skills Development, training institutes.

5.4.3 Operational Timeframe: 5 years (2017 – 2021)

5.5 Environments Building Conducive to Lifelong Learning Program:

5.5.1 Main Content: emphasizing the development of resource centers to become living, modern, quality and standardized learning centers in order to motivate people of all ages to have an interest in learning and taking part in educational activities, and the development of new forms of resource centers that can help enhance Thai people's capacity to embrace any possible changes in the future, such as the Virtual Library and the Edutainment Center. Furthermore, more emphasis should also be placed on the

promotion of reading through modern local library services, provision of opportunities to children and youths to gain easy access to quality, fast, and convenient learning services, establishment of learning parks at both the provincial and regional levels, as well as collaboration between all related parties in local communities to develop local museums as great culture and history learning centers.

5.5.2 Key Implementing Agencies: Ministry of Culture, Ministry of Social Development and Human Security, Local Administrative Offices, educational institutions and Office of Knowledge Management and Development (Public Organization).

5.5.3 Operational Timeframe: 5 years (2017 – 2021)

Section 4 Development Strategies

Strategy **2** Strategy for Creating a Just Society and Reducing Inequality

The development of Thailand to date has advanced the country in many aspects, creating occupational and income security that has led to considerable poverty reduction. Public services in education and health have also expanded significantly. Despite such achievements, however, progress in resolving inequality and creating social fairness has been rather slow. Many dimensions of inequality have persisted as challenging issues. These include income inequality across population groups, and inequality in the quality of public services, particularly among the disadvantaged groups and the population in remote areas. These groups of people also face relatively limited access to justice. Additionally, there are many current conditions and risk factors that are likely to widen inequality in the future. Transitioning into an ageing society with a shrinking working-age population means that the dependency ratio will increase. The burden from a higher number of dependents will impose limitations on people's ability to save. At the same time, some groups of population still lack financial literacy, which may lead to them becoming elderly poor in the future. Technological advancements tends to benefit those with access, most of whom are people with high skills, who are able to gain higher returns. This will consequently leave a wider gap to the incomes of the low-skilled population without access to such technology. On the other hand, technology can also enable people in remote areas to gain access to education, knowledge and health services. Accordingly, the issue of inequality needs to be tackled urgently in the Twelfth Plan such that it does not become an impediment to the country's economic and social development towards high-income status. To achieve this, all development dimensions - including economic, social, environmental, regional and urban, as well as public administration - have to be integrated. Therefore, creating a just society and reducing inequality will require the incorporation of other development strategies of the Twelfth Plan as enabling measures. For instance, the strategy for strengthening sustainable economic development and competitiveness will enhance the opportunity for communities and labor to acquire the benefits of development; the strategy on green growth for sustainable development emphasizes fair distribution of land; the strategy for public administration, corruption prevention and good governance aims at raising social fairness; and the strategy on regional, urban and economic area development will complement the dispersion of growth and income.

As for the strategy for creating a just society and reducing inequality, the next five years will focus on upgrading the quality of social services, particularly education and public

health. In addition, closing the social protection gaps should continue from the Eleventh Plan, with an emphasis on raising labor skills and pursuing labor policy that enhance labor productivity and income. Assistance should also be linked to increasing the productivity of the 40 percent of population with the lowest income, the disadvantaged, women and elderly persons. Examples of assistance include support for SMEs, community- and social enterprises, development of microfinance and of financial access for job-creation, and promotion of access to high-quality inputs at fair prices. At the same time, efficiency in area-based budgeting and integrated budgeting should be enhanced to reduce inequality effectively.

1. Objectives

- 1.1 To enhance income-generating opportunities for the 40 percent of the population with the lowest income (the bottom 40 percent).
- 1.2 To ensure universal access to quality public services.
- 1.3 To strengthen communities.

2. Targets and Indicators

Target 1: Reduce Income Inequality across Socio-economic Groups and Tackle Poverty:

Indicator 1.1 The growth rate of per capita income of the bottom 40 percent of the population is no less than 15 percent per annum.

Indicator 1.2 The income Gini coefficient is reduced to 0.41 by the end of the Plan.

Indicator 1.3 The share of financial assets held by the bottom 40 percent of the population increases.

Indicator 1.4 The share of the population under the national poverty line is lower than 6.5 percent by the end of the Plan.

Indicator 1.5 The ratio of debts to household income of the poor households decreases.

Target 2: Enhance Accessibility to Basic Social Services:

Indicator 2.1 The adjusted net enrollment rate for basic education reaches 90 percent, with no disparities across population groups and geographical areas.

Indicator 2.2 The share of students who pass the 50 percent benchmark on the national test score increases, and educational outcome disparities across areas and regions narrow.

Indicator 2.3 The share of insured persons under Social Security Article 40 and the share of national savings fund members relative to the total labor force increases.

Indicator 2.4 Disparities in the ratio of population per health personnel across geographical areas narrow.

Indicator 2.5 Access to justice by the poor population increases.

Target 3: Foster Communities' Capacity and Strengthen the Grassroots Economy toward Self-reliance and Inclusiveness:

Indicator 3.1 The share of households with access to sources of finance increases.

Indicator 3.2 The community empowerment index increases in all regions.

Indicator 3.3 The value-added of community products increases.

3. Development Guidelines

3.1 Enhance opportunities for the 40 percent of population with the lowest income (bottom 40 percent) to access quality public services and to have decent jobs.

This group of population should have the opportunity for a higher level of education, receive fair and full coverage of social protection and welfare, and have access to skills-training to enhance their income. Measures to achieve this include:

3.1.1 Enhance the access of disadvantaged children and youths to uninterrupted quality education without being limited by family conditions, location and personal physical conditions. Holistic measures should be implemented for poor students in remote areas, covering income-creation for their families and support with school-related transportation expenses. Also, the selection process for the scholarships for poor students given by the Office of the Basic Education Commission (OBEC) should be improved. At the same time, scholarships for higher education should be put in place to prevent drop-outs.

3.1.2 Provide additional mechanisms to ensure accessibility of the bottom 40 percent to public health services, particularly those in remote areas. Mechanisms to assist and support community welfare that cover transportation expenses to the closest public health facilities should be promoted. Also, proactive health services e.g. counseling, control and prevention of non-communicable diseases (NCDs), and sanitation promotion should be fostered at the community level.

3.1.3 Enhance land-ownership opportunities along with provision of income-generating measures by promoting sustainable and holistic land access rights. Measures include land allocation to landless poor farmers, with conditions preventing the transfer of land to investors; skills-training; financial provision for job-creation; and expansion of opportunities to access professionally-relevant information, news and knowledge. Moreover, support with marketing and financial management should also be promoted. Finally, a land

bank should be established as a mechanism for distributing land-holdings to farmers and poor households such that they would have land to earn a living as well as for shelter.

3.1.4 Impose a more-redistributive fiscal policy that effectively favors the low-income population by imposing more wealth-based taxation and enhancing the efficiency of tax collection. Also, budget allocation should be restructured by giving priority to integrated budgeting and area-based budgeting that targets poverty- and inequality-reduction.

3.1.5 Provide additional social welfare for the 40 percent of population with the lowest income in a sufficient and appropriate manner. For instance, provide additional disability allowances and old-age allowances for the poor group to a level sufficient for a living, support with the shelter and utility system to resolve bad conditions in urban slums, and encourage communities to provide services needed by the elderly.

It is important that relevant databases be linked with public service management such that all agencies can benefit from the shared information. This is in order to reach successfully the targeted 40 percent of the public with the lowest income, the poor and the near-poor population.

3.2 Distribute high-quality public services in education, health and social welfare more evenly as well as improve the business environment. Rules and regulations should also be improved to create fair business competition. This way, everyone would have an equal chance to access the public services and resources which would enable them to develop to their fullest potential and improve their quality of life. Measures to achieve this include the following:

3.2.1 Promote the more equal distribution of quality education across geographical areas. This can be done by: (1) providing incentives for teachers such that they are dispersed more efficiently. Incentives can be both financial and non-financial, e.g. accommodation, career path and skills-development programs; (2) setting up an educational accountability system by incorporating educational outcomes into the evaluations of teachers and institutions; and (3) expanding distant learning education by using information technology networks as a tool. This would help resolve the shortage of teachers in remote areas.

3.2.2 Ensure full coverage of quality public health services through enhancing the efficiency of the patient transfer system from the community level through to the national level. At the same time, a system of management for disease control should be fostered, along with the use of technology, particularly information and communications technology, in providing distance health assistance to resolve personnel shortages in remote areas.

3.2.3 Raise awareness among informal workers of the benefits of the social security system and income security after retirement. Expand the provision of housing for low-income earners such that it can be accessible throughout the country.

3.2.4 Foster universal and tailor-designed infrastructure which emphasizes appropriateness for children, women, disabled persons, the elderly and disadvantage groups. This aims to enable these groups of population to have equal access to public services and equal opportunity to develop themselves to their fullest potential. In addition, participation of these groups in local and national management and decision-making should also be promoted.

3.2.5 Improve the business environment including rules and regulations toward a fair competitive environment. Antitrust laws and tax benefits for SMEs should be improved, corporate social responsibility activities should be promoted, and consumer protection laws should be updated to accommodate new types of goods and services, as well as be enforced effectively.

3.3 Foster communities' capacity in economic development and strengthen microfinance based on the Sufficiency Economy Philosophy (SEP), such that communities are self-reliant and capable of managing their own land and human capital. This can be achieved through the following:

3.3.1 Build and empower transformational leaders at community level to inspire members in community development, have good governance, and promote cooperation and self-reliance within the community.

3.3.2 Promote learning communities through a research and knowledge transfer system in order to resolve local issues as well as to transform knowledge for commercial use. Moreover, the use of information technology should be promoted as a tool for community knowledge management.

3.3.3 Strengthen community economies by promoting community-level entrepreneurship, supporting community training centers and connecting industrial clusters with community economies. Tripartite cooperation (private sector, educational institutions and community) should be fostered such that theoretical knowledge will be practically applied to community entrepreneurial uses. Community-based tourism and conservation tourism should also be promoted in communities with touristic sites.

3.3.4 Provide financial management knowledge to communities, restructure communities' financial organizations toward fully-functioning local-level financial institutions, and set up microfinance networks with the Government Savings Bank (GSB) and the Bank of Agriculture and Agricultural Cooperatives (BAAC) as network hosts.

3.3.5 Foster community participation in providing welfare, social services and resource management through partnerships with government agencies and local administrative organizations. The quality of life for the people in communities should be cared for by accepting all members of the community without discrimination. The Community Land Title Act should be pushed forward so that communities can collectively manage land and natural resources efficiently.

4. Complementary Plans

Currently, related agencies have provided supporting plans which cover the period of Eleventh- and Twelfth Plans as follows:

4.1 Ministry of Social Development and Human Security Strategic Plan (2017-2021).

4.2 Draft of the Women's Development Plan under the Twelfth National Economic and Social Development Plan (2017-2021).

4.3 Draft of the Fifth National Development Plan for Life Quality of Persons with Disabilities (2017-2021).

4.4 Draft of the Third Social Welfare Provision Strategic Plan (2017-2021).

4.5 Housing Development Strategy (2016 – 2025).

5. Flagship Projects

5.1 Plan for Assisting Low-Income Earners:

5.1.1 Main Content: This plan aims at motivating the population functioning outside the formal income database (i.e. tax system) to enter the system, such that low-income earners can be identified for effective assistance. This is consistent with the Committee for Implementing Central Public Database Integration, where the Revenue Department, Ministry of Finance, has been assigned the objective to oblige all citizens to file personal income tax forms. It is also consistent with the *National e-Payment Master Plan*, in which registered persons with an income lower than the threshold will receive government benefits, e.g. financial assistance, free public transportation and food coupons. The main objective of the Master Plan is to establish a personal income database which facilitates more effective targeting toward low-income earners. In doing so, it is necessary that the system be easily accessible by the entire population, including those in remote areas and those without access to technology.

5.1.2 Key Implementing Agencies: Ministry of Finance.

5.1.3 Operational Timeframe: 5 years (2017-2021).

5.2 Plan for Promoting the Use of Technology for Remote-Area Development:

5.2.1 Nationwide Free Wifi for Education:

1) Main Content: Nowadays, technological advancement can be used to support educational development in terms of learning materials, knowledge searching, etc. Despite this, access to the internet in remote areas usually comes at higher cost, causing access limitations for students in those areas. Having free wifi services at all educational institutions nationwide will enable students of all ages to access information that is useful for their learning and research. It will also serve as a modern learning channel.

2) Key Implementing Agencies: Ministry of Digital Economy and Society and Ministry of Education.

3) Operational Timeframe: 2 years (2017-2018)

5.2.2 Development of a Child-Tracking Information System:

1) Main Content: A comprehensive data collection and monitoring system that efficiently incorporates information for every child from birth should be established and linked with civil registration. All educational institutions and related agencies should also use the same information system and thereby integrate data. This would resolve limitations on the issue of cross-authority student-tracking. Migration data should also be exchanged and updated regularly. At the initial stage, the Electronic Monitoring and Evaluation System (e-MES) and Data Management Center (DMC) of the Ministry of Education may be expanded to cover educational institutions in all areas and all types. In addition, data on children under the Child Support Grant Program - which gives 600 Baht per month to poor families with children aged 0-3 years - should also be collected as poor children are those with the highest likelihood of dropping out.

2) Key Implementing Agencies: Ministry of Digital Economy and Society, Ministry of Interior, Ministry of Social Development and Human Security and Ministry of Education.

3) Operational Timeframe: 3 years (2017-2019).

5.2.3 Distance Health Assistance Project:

1) Main Content: The project aims at mitigating health personnel shortages in remote areas as well as reducing the number patients who need to travel into major cities for treatment. This will be done by employing technology to facilitate medical

consultations across distant locations, particularly on specialized medical issues. This way, not only will patients not have to travel to hospitals in cities and incur large expenses, but patients at severe stages can also be transferred more effectively.

2) Key Implementing Agencies: Ministry of Digital Economy and Society, Ministry of Public Health and public hospitals not directly under the Ministry of Public Health.

3) Operational Timeframe: 5 years (2017-2021).

5.3 Educational Outcome-Based Budget Management Project:

5.3.1 Main Content: The project aims at devolving authority to educational institutions to manage their own budgets, with an emphasis on outcome evaluation. Financial measures will be used to improve the quality of education by linking quality assurance results with budget allocation. The proportion of supply-side financing - e.g. operating budget, personnel budget and investment budget - should be reduced because these types of budget do not relate to students' needs. Meanwhile, demand-side financing - per head subsidy - should be increased. Moreover, a larger amount of subsidy should be allocated to schools in remote areas in order to enhance educational access opportunities.

5.3.2 Key Implementing Agencies: Ministry of Education.

5.3.3 Operational Timeframe: 5 years (2017-2021).

5.4 Plan for Supporting Community-Based Economic Development and Community Empowerment:

5.4.1 Main Content: The plan intends to promote cooperation between the private sector and social enterprises (community enterprises) and between social enterprises (community enterprises) across areas and across types. Such cooperation will generate knowledge and management patterns that will strengthen the enterprises in the long run. The plan also includes promotion of community economies and coordinating with provincial and local administration in scaling-up successful community business models to other communities. This will support government policy under the strategy to resolve poverty, reduce inequality and stimulate growth from domestic factors.

5.4.2 Key Implementing Agencies: Ministry of Interior, Ministry of Industry, Ministry of Commerce, Local Administrative Organizations, private sector and community enterprises.

5.4.3 Operational Timeframe: 5 years (2017-2021).

Part 4

Development Strategies

Strategy **3** Strategy for Strengthening the Economy, and Underpinning Sustainable Competitiveness

During the Twelfth Plan, the global economy will remain on the path of recovery from several crises. Competition in the world market will tend to become more intense as many countries focus on adopting innovation as a means of enhancing their competitiveness. However, the Thai economy has continued to expand below its potential level for several years due both to the stagnant global economy and domestic constraints which have become hurdles for enhancing productivity and competitiveness, as well as restricting economic growth. The next five years is planned as a period of Thai economic recovery and expansion by expediting investment in infrastructure and logistics, as well as creating a favorable atmosphere to encourage private investors to expand their investment, particularly in key target sectors. In the meantime, the coming five years will be a significant period for many aspects of economic reform in order to establish the fundamentals for Thailand to become a high-income country by 2037, in line with the twenty-year National Strategy. Key factors required to build economic vitality include the use of innovations, quality of human resources, as well as improvements to rules and regulations, and good governance. The strategy for building economic strength and competitiveness emphasizes the stabilization of macroeconomic management, improving the efficiency of the financial sector, and maintaining fiscal discipline. In addition, the strategy also focuses on strengthening the sectors of the real economy, including agriculture, manufacturing and services as both conventional income sources and the means of diversifying to new production and service activities in the future.

Driving economic growth during the Twelfth Plan requires the development and incorporation of more advanced science, technology and innovation, the development of the digital economy, the development and up-grading of labor force quality, as well as the use of creativity for building new economic and income foundations together with increasing the productivity of the current production base and building upon existing modes of production and services by employing robotics, digital inputs and technology. Moreover, the strategy focuses on the use of biological resources; the support of value chain linkages; the development of new economic zones and corridors; the integration of the service sector and the trade sector, coupled with preparing the service sector to underpin freer competition; the enhancement of SME competitiveness; and the establishment of a culture for entrepreneurs to produce and sell by responding to rapid

changes in consumer demand, higher standards for products and services, as well as stricter environmental standards. It is also important to develop the systems and mechanisms, together with the spatial development, that can bring economic opportunities to local people and share benefits on a fair basis in order to reduce economic inequalities.

1. Objectives

1.1 Strengthening the economy to grow with stability and sustainability:

1.1.1 Building the strength of the economy's engines in order to raise income per capita.

1.1.2 Raising the capacity of current production and income bases as well as creating new production and income bases.

1.1.3 Supporting the diversification of economic activities and the fair sharing of benefits, as well as promoting an environmental-friendly economy.

1.1.4 Maintaining economic stability, reinforcing and sustaining monetary and fiscal discipline, as well as developing effective monetary instruments to support capitalization.

1.2 Strengthening the economy by sector in order to increase the competitiveness of agriculture, industry, services, trade and investment, as follows:

1.2.1 Promoting the development of innovations that will help increase the value and efficiency of production and services.

1.2.2 Promoting and developing the bio-economy as a new significant source of income, which requires the development of a risk management system and resilience in the face of climate change.

1.2.3 Pushing forward recognition of the quality of Thai agricultural and food products at the international level.

1.2.4 Increasing the capacity of existing industries with regard to the technologies of the future, and laying the foundation for the development of new industries based on environmentally-friendly production.

1.2.5 Increasing the capacity of existing services, and creating new services, in order to drive towards a more prominent services-based economy, as well as promoting a balanced and sustainable growth of tourism.

1.2.6 Developing elements that enable and facilitate trade and investment, helping to increase the competitiveness of Thai companies, and helping to create an entrepreneurial society.

1.2.7 Developing a national fiscal system that supports the competitiveness of production, services, trade and investment.

1.2.8 Strengthening community-based financial institutions and cooperatives in order to encourage the availability of financial services at the grassroots level for the people and small farmers.

2. Targets and Indicators

2.1 The economy will expand on a stable and sustainable path.

Target 1 The economy will grow at its full potential rate, and people will have a better standard of living and quality of life.

Indicator 1.1 The economic growth rate during the Twelfth Plan expands by not less than 5.0 percent per annum on average.

Indicator 1.2 Income per capita should not be less than 8,200 USD at the end of the Twelfth Plan (2021), and net government revenue should not be lower than 19.0 percent of GDP.

Target 2 Public and private investment will continue to expand.

Indicator 2.1 The growth rate of public investment should not be less than 10 percent per annum.

Indicator 2.2 The growth rate of private investment should not be less than 7.5 percent per annum.

Target 3 Development of the export sector will expand and will serve as a key growth engine for the Thai economy.

Indicator 3.1 The growth rate of export value should not be less than 4.0 percent per annum on average.

Target 4 The country's productivity will increase.

Indicator 4.1 The growth rate of total factor productivity should not be less than 2.5 percent per annum.

Indicator 4.2 The growth rate of labor productivity should not be less than 2.5 percent per annum.

Target 5 Economic stability will be maintained.

Indicator 5.1 The inflation rate in the medium term will be at 2.5 ± 1.5 percent.

Indicator 5.2 Public debts at the end of the Twelfth Plan should not exceed 55 percent of GDP.

Indicator 5.3 The current account should not be over two percent of GDP.

Target 6 Public and Private Partnership (PPP) investment in infrastructure projects will increase.

Indicator 6.1 The total investment value of PPP in infrastructure projects averages 47 billion Baht per annum.

Target 7 There will be an increase in the numbers of people and entrepreneurs who are included in the tax system.

Indicator 7.1 An increase in the number of tax payment forms from people and entrepreneurs who are requested to pay higher tax.

Target 8 Thailand will obtain a higher competitiveness ranking.

Indicator 8.1 Thailand's competitiveness ranking conducted by Institute of Management Development (IMD) moves up to be in the top 25 countries.

2.2 Strengthening the Economy by Sector.

Target 1 Each sector of the economy will grow strongly and will provide great fundamentals for the country's economic development.

Indicator 1.1 The annual growth of the agricultural, industrial and service sectors is not lower than 3, 4.5, and 6 percent respectively.

Target 2 Farmers will experience an increase in total cash incomes as well as a continuous increase in the area under sustainable agriculture.

Indicator 2.1 Farmers experience an increase in total cash incomes to 59,460 baht per household by 2021.

Indicator 2.2 Land that is sustainably farmed increases to 5,000,000 Rai by 2021.

Target 3 Economic and industrial zones will develop towards becoming eco-industrial towns.

Indicator 3.1 Fifteen areas are developed to become eco-industrial towns.

Target 4 Thailand's income from tourism and the competitiveness of the tourism sector will increase.

Indicator 4.1 The annual income from tourism is not below 3 trillion Baht.

Indicator 4.2 The tourism competitiveness ranking in the Travel & Tourism Competitiveness Index (TTCI) is not lower than 30.

Target 5 SMEs will play a greater role in the economic system.

Indicator 5.1 The proportion of the gross product value of SMEs to GDP increases to at least 45 percent at the end of the Twelfth Plan.

Target 6 There will be an increase in the efficiency of the financial sector as a means of supporting economic and social development.

Indicator 6.1 There is an improvement in the financial sector competitiveness ranking.

Indicator 6.2 The score for financial literacy among the Thai population reaches the same level of the global average.

Indicator 6.3 The proportion of loans taken from informal lenders decreases.

Indicator 6.4 There is an increase in the volume of individuals' electronic payments to reach 200 transactions per person per year.

3. Development Guidelines

3.1 Overall economic management: In order to strengthen economic security it is necessary to increase economic performance as a means of achieving higher growth. However, that growth should not be accompanied by balance of payments deficits, or high inflationary and fiscal burden pressures. Instead, economic activities should be dispersed to facilitate the distribution of growth. The development guidelines are summarized as follows:

3.1.1 Development of the fiscal front:

1) Enhancing the effectiveness of budget preparation procedures, including the prioritization of programs and projects, budget allocation, management and evaluation, in order to allow government expenditure effectively and efficiently to support economic growth and inequality reduction. This includes having a precise medium-term budget framework, formulating integrated and area-based budget programs, with appropriate checks and balances, which will be effective in improving the government's budgeting in order to respond to several dimensions of the national development agenda.

2) Enhancing the effectiveness of government revenue collection and tax base expansion in order to cover all employed persons who are required to pay tax and have accurate and completed tax forms. It is important to expedite the use of database sharing among public authorities through the e-government system in order to access data on registered taxpayers as well as to expedite the implementation of a negative income tax scheme which can identify target groups by income level.

3) Utilizing tax as a tool to encourage environmentally-friendly consumption and production as well as to diversify government revenue collection channels. This may be done by expediting the collection of an environmental tax or surcharge on products or materials that generate pollution, and on the exploitation of natural resources.

4) Improving the effectiveness of revenue collection of Local Administrative Organizations in order to reduce revenue dependency on the central government. This also includes accelerating the transfer of functions on some forms of tax and fee collection to Local Administrative Organizations so that they can determine appropriate tax rates and collection methods to be in line with the problems and demand in each local area. In addition, it is important for authorities to expedite the transfer of public services provision functions, specifically health and education services, as well as strengthening the capacity of Local Administrative Organizations to be suitably prepared to carry out the transferred responsibilities effectively.

5) Restructuring the management of the state-owned enterprises (SOEs), including overall administration, and restoring some SOEs which are facing financial difficulties, developing operational efficiency that is in line with international standards in order to provide quality and fair public services. Furthermore, this requires promoting public and private cooperation in term of investment and management for generating value-added from the state's properties as well as applying new financial tools for investment in order to minimize the fiscal risk to government.

3.1.2 Development of the financial sector:

1) Enhancing the efficiency of the financial system and financial institutions, in both the financial and capital markets. An efficient financial system will: (i) support economic growth and productivity; (ii) lower the cost of financial services; and (iii) support the efficiency and effectiveness of fiscal policy implementation. To achieve these goals, it is necessary to: (i) increase competition among financial institutions; (ii) promote the use of electronic financial services such as E-Money, E-payment, as well as financial innovations in the form of Fintech (Financial Technology); and (iii) further develop the financial infrastructure by reforming laws and regulations, improving customer protection schemes, strengthening the supervision system, and improving the capabilities of human resources in the financial sector, as well as supporting any policy measures under the National E-payment Master Plan and the Thailand Digital Economy and Society Development Plan. In addition, it is important to expedite public relations and better understanding in order to build up confidence in electronic financial services in both the private sector and among the general public.

2) Improving the accessibility of financial services by creating a network among financial institutions, including commercial banks, non-bank financial institutions, Specialized Financial Institutions (SFIs), and microfinance institutions. The purpose is to provide access to finance services at reasonable cost for all people in society. These services should cover savings, investment, loans, insurance, payment and money

transfer services. To strengthen Community Development Financial Institutions (CDFIs), efforts should be made to: (i) improve their management and administrative processes with assistance from SFIs and co-operatives; (ii) create a database of all customers to be shared among financial institutions; and (iii) develop the capabilities of CDFIs in order to obtain legal status. The CDFIs serve as the main mechanism for improving people's standard of living. At the same time, the government also has to educate people about financial literacy and financial discipline to support them to use financial services wisely. The ultimate goal is for people to understand how to manage their personal finances without borrowing from illegal money-lenders. To achieve this goal, it is necessary to create a Financial Literacy Master Plan, which should clearly state the guidelines for implementation. It is also necessary to integrate with relevant stakeholders, including the government sector (at both the national and local levels), financial institutions, educational institutions, and the mass media. Moreover, every financial institution should be required to plan to educate people in financial literacy and financial discipline in order to foster their Corporate Social Responsibility.

3) **Developing new financial innovations** that meet the needs of all customers within the circumstance of a changing financial landscape. The main reasons are: (i) to maximize the effectiveness of resource allocation; and (ii) to support capital market development, especially market deepening and market broadening, in order to be the source of finance for infrastructure projects. To be more specific, financial institutions should be encouraged to launch financial products that respond to the needs of each group of customers. For example, elderly people will need guaranteed retirement income. Farmers would benefit from a production insurance scheme that can help reduce risks from a loss of revenue due to crop damage and climate change. Small and Medium Enterprises may need venture capital or crowd-funding, and so on.

4) **Increasing the efficiency and stability of Specialized Financial Institutions** (SFIs) as well as promoting SFIs to be a supportive mechanism of fiscal policy implementation without creating additional risks. The mandate and objectives of each SFI should be indicated explicitly. In addition, the accounting system and performance evaluation system of both commercial operations and government policy operations should be separated. However, SFIs should focus on their policy development mandate. To promote SFIs to be modern, flexible, and active, their internal administration should be improved through technology. Finally, it will be necessary to increase the quality of human resources in the financial sector to cope with the changing financial environment.

3.2 Strengthening competitiveness in the production and service sectors. This aims to create value chain connectivity between the agricultural, industrial, service, and trade and investment sectors in order to enhance the country's competitiveness performance as well as create and distribute income for all communities. Eventually, this will engender overall and local economic security which is in line with the the principles of sustainable development. Development guidelines are summarized as follows:

3.2.1 Agricultural Development:

1) **Strengthening agricultural production towards sustainable agriculture by: (1) developing and maintaining water storage systems for agriculture, and planning the crop planting systems to match the availability of water.** Developing water storage facilities on farmland nationwide, including reservoirs, wells and ponds, according to the potential of areas by meaningfully engaging local communities. Conserving and restoring the headwater areas of watersheds. Diverting water from watersheds with water surplus to reservoirs or storage facilities with available capacity to supply water for agriculture. Formulating a water resources management plan for agriculture at the watershed level. Increasing the efficiency of water usage in agriculture; **(2) protecting potential agricultural land and expanding opportunities for farmers to access land for their livelihood.** Advocating the passage of a Protecting Agricultural Land Bill. Managing agricultural land systematically. Conserving fertile lands to secure the basis of agriculture. Designating agricultural zoning and promoting crops that are suited to the potential of land quality, water quantity, and local market demands. Accelerating soil fertility recovery and improvement. Restoring abandoned farm lands. Supporting widely access to high quality and fairly priced factor inputs; **(3) encouraging farmers to be knowledgeable in the collection, selection and improvement of plants, animals, aquatic animals, and local microorganisms.**

2) **Building and transferring technical knowledge, science, technology, innovation, and co-creation of agricultural local wisdom** to support the use of bio-based resources. Adapting agricultural production systems to be compatible with climate change, and to add value to agricultural products, in terms of safety and demand from a diverse array of consumers. In short, the new agricultural production will not create negative impacts on the quality of life and the environment. Fostering sustainable agriculture via public participation when identifying options and methodologies to be used in studies, research, development, and the application of appropriate and strict control mechanisms. Therefore, the following policies should be emphasised: **(1) supporting research into and development of factor inputs,** including plants, animals, aquatic animals, growing technology and agricultural machinery, which are responsive to climate change and the enhancement of competitiveness; **(2) conducting research and development on production technology and new agricultural processed products,** which is accessible to farmers and entrepreneurs, in order to add value and diversify the attributes of the agricultural products; **(3) developing models and processes of knowledge transfer in agricultural practice to farmers in order to change their production systems to become compatible with climate change and to realise the potential of their land.** An example is the development of prototype plots by local learning and technology transfer centers in each area.

3) **Upgrading agricultural and food production to meet appropriate standards, respond to market demands and for healthy food consumption:**

(1) developing systems of agricultural and food product standards that are internationally accepted both in food and non-food products such as herbs, supplements, medicines, renewable energy, and bio-materials. Developing systems of inspection, certification and traceability standards that are accepted by domestic and foreign markets. Enforcing laws and regulations continually and strictly to ensure the quality of agriculture and food products; **(2) promoting high quality agricultural and food products that meet safety standards for healthy consumption.** Educating farmers about standardized production processes such as Good Agriculture Practice (GAP). Promoting agricultural and food products in the niche markets that require specific standards such as organic farming, Halal foods, and environmentally-friendly products. Moreover, providing incentive measures for production improvement, setting up traceability systems, and promoting adequate and quality food production for school-aged children to enhance their health and learning potential. Raising awareness in food consumption and nutrition that affects health; **(3) promoting organic agricultural production actively.** Providing incentives for transformation towards organic agricultural products via fiscal and financial measures, and promotion of production. Upgrading the price of organic agricultural products to be higher than typical agricultural products that use chemicals in their production. Promoting marketing and other measures such as carbon credits. Moreover, providing accurate knowledge to and creating understanding by consumers. Establishing systems of inspection and certification of organic agricultural products. Encouraging the inspection process by means of a participatory approach. Adopting organic agricultural zoning in practice by initiating pilot areas that are ready, suitable, and able to link with such forms of tourism as agricultural tourism or Thai livelihood tourism, to expand the revenue for farmers.

4) Strengthening the production capacity of the agroindustry value chain: (1) enhancing the capacity of farmers' institutions and group formation to be the main management mechanisms in the entire agroindustry value chain. This is based on the model and principles of the co-operative to strengthen farmers and people in all areas. Then, scaling up this effort to connect and expand the systems of production, marketing, financing, farmer groups, community businesses, and clusters that link with industries, from the local up to the national levels. In addition, this should collaborate with the Civil State Initiative for agricultural businesses, public-private partnerships (PPP), and fair contract farming with social responsibility; **(2) fostering farmers to grow crops, raise livestock and fishing that is consistent with the land's potential and market demand (the zoning approach)** to enhance efficiency and to reduce the cost of production. Promoting agricultural practice in large-scale production and precision farming in suitable areas. Providing production supplies and agricultural machinery. Providing access to funding for production improvement. Developing necessary infrastructure for agriculture, such as logistic systems and geographic information systems (GIS), which are important for planning in production throughout the value chain. Promoting intensive farming that requires

knowledge, systematic planning and management, close attention, optimum use of land, and taking into account the ecosystems. Developing agricultural products that are registered for geographical indications (GI). Converting the cultivation of unsuitable lands to other alternative farming practices. Furthermore, promoting sustainable livestock and fishery production systems; **(3) conducting research and development (R&D) while using new technology and machinery in production procedures**, both pre- and post-harvesting, and in processing procedures, to increase efficiency and reduce production cost along the production chain; **(4) promoting the creation of value for agricultural products and harnessing the biodiversity base to further create knowledge and develop new high-value products**. Using the results from R&D to add value to agricultural and commercial products, so that they are diverse and meet market demand, via co-operative networks of farmers, the private and public sectors; **(5) managing agricultural products in the entire system**. Planning production to meet the demands of industry in order to achieve a balance in production at all levels, ranging from the local, provincial, regional, and national levels. Linking agricultural production with other production sectors, such as services and tourism, in order to rely less on basic agricultural exports; **(6) setting up management mechanisms to reduce risks in agricultural production**, including the Agricultural Futures Exchange, the Fund for Agricultural Crop Insurance, and the Early Warning System for Agriculture; **(7) cooperating with neighboring countries** in agriculture by being the source of raw materials for processing to add value and to create opportunity in the export market, both inside and outside ASEAN.

5) Supporting and replicating agricultural practices based on the Sufficiency Economy Philosophy (SEP): **(1) fostering farmers to take part in the formulation of agriculture policy** at every step from design to action, resulting in their agricultural development. The public sector will support the fundamental input factors and connect the actions with learning centers in these areas; **(2) scaling up and developing the sustainable agricultural production system** in various forms, including the New Theory Agriculture, integrated farming, agroforestry, organic farming, natural farming, and Good Agricultural Practices (GAP). In this instance, it is important to support the role of local wisdom networks for the implementation of sustainable agriculture. Modifying mechanisms and infrastructure necessary for sustainable agriculture, such as developing a database system for sustainable agriculture, creating knowledge, supporting finance in the form of green credit, and promoting marketing activities; **(3) controlling strictly the use of agricultural chemicals that are a danger to health and the environment, particularly pesticides**. Promoting the increasing use of organic products to replace agricultural chemicals. If necessary, using agricultural chemicals in a correct manner by following technical instructions to reduce health and environmental impacts. Setting fiscal and financial measures for controlling the production, import, and use of agricultural chemicals.

6) Developing enabling factors in agriculture and supporting new generation farmers: (1) **creating an accurate and reliable database of demand and supply** in agriculture that can be used in market-driven strategic planning. Promoting farmers to access and use data and technology widely. Setting up an effective disaster warning system for agriculture; (2) **producing manpower in agriculture** by developing new generation farmers via the graduates returning home program. Designing curricula that focus on learning from practice so that the new farmers are knowledgeable in upgrading their production, processing, marketing, and management. In short, they should be able to adapt to the changing global environment. Fostering the creation and formation of smart farmer groups to become business managers, from downstream production to marketing. Offering the first priority to children of farmers who own farm land to be developed as smart farmers if they intend to continue in agricultural careers. Building positive values and security for farmers and their institutions, specifically the welfare of farmers. Supporting farmers to earn additional income from non-agricultural work. Creating knowledge and connecting to information technology (IT) development networks. At the same time, setting up a knowledge management system for transferring technology; (3) amending related laws and regulations to keep them up-to-date. A few examples include laws concerning chemicals, cooperatives, land reform, food, and standards of agricultural products.

3.2.2 Industrial Sector Development:

To transform the country's economy to become a high-income country, Thailand needs to target existing competitive industrial sectors that represent a high-potential engine of growth. In parallel, future high-potential sectors should also be identified based on opportunities emerging from changes in the global context. A key global change influencing the world economy is Industry 4.0. This forces various industries in the world to shift towards more high-technology, digital economy and innovation-based production as the key sources of competitive advantage. In this light, the future industrial policy is deliberately designed based on two conditions, i.e. opportunities emanating from changes in global contexts, and the indigenous strengths of Thailand. In the Twelfth Plan, two groups of potential industries are identified. The first group is "existing competitive industries", where Thailand has a strong production foundation that can be leveraged towards more advanced industries. The second group is called "future industries", through which Thailand can capture opportunities from global changes to build up new competitive sectors to serve the country's development in the future. To develop each group of potential industries, different development approaches are explicitly addressed as follows:

1) developing and strengthening existing competitive industries towards more high-technology-based industries by promoting the application of technology and creativity and the development of innovation, based on environmentally-friendly production. The target industries for this group include: (1) future automotive and

auto-parts industry, e.g. electric vehicles; (2) smart electrical and electronics industry; (3) bio-chemicals industry; (4) advanced agro-based and food industry, e.g. functional food, creative food, and Halal food; (5) high value-added rubber and plastics products, e.g. rubber tyres, bio-plastics; and (6) human capital-based industry, e.g. creative industries. The development approaches for this group of industries include:

1.1) Upgrading the capability of the important existing income-generating industries of Thailand to be able to shift towards more advanced technology production, which meets the diverse needs of consumers. In so-doing, the application of higher levels of technology and environmentally-friendly production needs to be promoted. Moreover, the capabilities of the manufacturing workforce must be upgraded to be more advanced and multi-skilled. In addition, the promotion of the application of automation in the production process, and a boost of R&D, creativity, and local wisdom utilization are key to increasing productivity and creating higher value-added products within the manufacturing sector. Moreover, one major development focus is on building up an environment conducive to knowledge-focused and innovation-driven production by establishing an efficient platform for cooperation linkages between the academic and industrial sectors in order to develop high quality human resources for industry, and support R&D for advanced industrial technology upgrading. This cooperation can be done through different approaches and systems, such as a dual vocational training system, a cooperative education system, or other appropriate systems.

1.2) Establishing efficient and strong mechanisms, systems, and networks for collaboration linkages among business firms along a supply chain, ranging from the agricultural, manufacturing and service sectors, through a cluster development approach. Key measures include different incentives to encourage enterprises to share knowledge and cooperate in human resource development and joint R&D activities. To achieve this, academic institutions should be supported to perform efficiently as a key mechanism to establish the networks in clusters. Furthermore, building up a strong demand-driven value chain from upstream (agricultural sector) to downstream (distribution and logistics services) should be managed efficiently.

1.3) Promoting the distribution of investments to every region in the country, and in other ASEAN countries, in order to build a platform for strong regional value chain linkages within ASEAN, and to increase opportunities for Thai entrepreneurs, especially in SMEs, to insert into global value chains. Rules and regulations need to be renewed to facilitate Thai enterprises to invest in targeted economic areas and utilize investment privileges for acquiring labor and raw materials, and for accessing potential markets. Moreover, the development of infrastructure and other utilities in the targeted areas must support business investments.

1.4) **Promoting the creation and development of markets for high-quality products**, especially domestic markets. One measure, in so-doing, is to improve the local procurement system to be more standards-focused. In parallel, compulsory standards should increasingly be applied to more locally-produced and imported products. This will provide the foundation for creating a level playing field for local businesses and for encouraging local entrepreneurs to upgrade their capabilities in producing higher-standard products. On top of this, knowledge of standards and quality should be disseminated to wider groups of consumers to create awareness and increase domestic demand for high-quality products. Additionally, the capabilities of Thai entrepreneurs must be enhanced to enable them to expand their markets into the high-valued-added segments, especially in creative businesses or niches markets, i.e. the elderly segment, the environment-focused segment, the health-conscious segment, the new lifestyle segment, the high-purchasing power segment, and so on.

2) Establishing a sound foundation for future industries: to capture opportunities from global trends and disruptive technology, Thailand should consider the establishment of new industries, or so-called “future industries”, to meet novel and diverse global demand. The prioritized sectors are identified based on Thailand’s existing strengths, including: (1) *the robotics and automation industry*, which helps support manufacturing productivity improvement. To promote this sector, the initial focus should be on encouraging automation utilization within the manufacturing sector, which will increase local demand and, at the same time, create design capability for robotics and automation systems as a further stage of development; (2) *the aviation parts industry* can leverage the local strengths of the automotive parts sector. Meanwhile, the development of skilled labor and human resources should be accelerated to support the establishment of an aviation maintenance, repair, and overhaul service sector (MRO) in the future; (3) *the medical device and equipment industry*, which in the initial stage should focus on establishing strengths in simple devices and equipment manufacturing for import substitution, and to enhance Thailand’s competitiveness in international health services and health tourism. In parallel, R&D capabilities for advanced medical devices and equipment should be strengthened; and (4) *the bio-energy industry*, to underpin national energy security and utilization efficiency, and to add value in agriculture and the production of bio-based raw materials. Key development approaches for these future industries include:

2.1) **Formulating a workforce development plan to prepare human resources for the targeted future industries**, both for a prompt response to industrial demand in the immediate phase, and for establishing a foundation for competitiveness in the long-term phase. This action should be carried out holistically and continuously involving a relentless cooperation effort between the public, private, academic, and research and development sectors. In the immediate phase, it is essential to design and establish a core mechanism with high competency and flexibility to upgrade effectively the skills of the current industrial workforce and to prepare human resources to supply the new

industries in the future. In order to respond promptly to industries' labor needs in the short run, it is necessary to promote and facilitate the private sector's investment in developing special skills training institutes or training programs for producing qualified skilled labor to serve rapidly the immediate needs of the targeted future industries. Simultaneously, holistic and systematic planning for the efficient and effective supply of labor in the long-term and the development of targeted human resources for future industries should be deliberately undertaken, with a focus on developing specific skills and competencies to meet the requirements of future industries effectively.

2.2) Developing infrastructure and technology capabilities to support the development of future industries by placing a high priority on investments in physical technological infrastructure and management, e.g. the establishment of an incubation system, technology transfer systems to local firms, and the setting up of important testing centres for the targeted industries in order to shift their technology capabilities towards a more advanced level.

2.3) Supporting in-depth studies for formulating a clear and practical development policy for the targeted future industries. At the beginning, it will be necessary to have comprehensive studies to support policy makers in deciding a proper strategy to "make or buy" technology for the country's future industries, especially for industries that have low technological competence. These studies should indicate Thailand's indigenous technology capabilities and suggest policy guidelines, technology infrastructure, and development systems that can be properly applied for upgrading local firms. Simultaneously, the policy should encourage technology-owning firms to help upgrade local Thai SMEs' technological capabilities through various strategic incentive measures, e.g. promoting co-investment on R&D and human resource development between technology-owning firms and local SMEs, facilitating the process of bringing in foreign experts in targeted technologies, etc.

2.4) Revamping and renewing laws and regulations to expedite a sound business environment for enhancing the competitiveness of the targeted future industries, particularly laws and regulations regarding investment promotion, import-export, product testing and standardization, research and development, and human resource development. The focus should be on easing procedures and aligning related regulations. In this light, the reduction of any negative social and environmental impact should be highly emphasized in order to generate investor confidence and support the balancing of the economic-social-environmental development of the country.

3.2.3 Development of the Service and Tourism Sectors by:

1) Strengthening the business competitiveness of the high-potential service sector in terms of existing and new services to promote economic growth in the country, with the following development guidelines:

1.1) **Developing the capacity of existing services** - such as tourism, transportation and logistics services, wholesale and retail, real estate, construction services, ship building and ship repairing, and public utilities services, sports-related businesses, financial services, health services, meetings, incentives, conferences and exhibitions (MICE), etc. - by promoting investments to raise the competitiveness of hospitality businesses, strengthening Thai entrepreneurs to be able to adapt to dynamic changes of context, developing standards accreditation systems and setting standards for businesses in the service sector according to international standards, raising the quality level to meet market demand, and developing and raising the level of infrastructure to create links domestically and internationally to facilitate businesses, as well as supporting research and development by encouraging entrepreneurs to utilize innovation in order to develop their businesses in order to keep up with changes in the digital economy era, which includes supporting the use of suitable social media to expand the market for products and services, both locally and abroad.

1.2) **Raising the level of new service businesses that are likely to expand and have growth potential**, such as digital businesses, international education, entertainment content businesses, and occupational services in order to modernize these services by utilizing new technologies such as Cloud Services, financial application, e-learning, etc., as well as creating connections between potential hospitality businesses for integrated growth, and promoting competition based on business development and benefit incidence throughout the supply chain.

1.3) **Creating a mechanism to unify the service sectors** by defining a core host agency to drive the country's service sector strategy at both the policy and operational levels; integrating cooperation from all related sectors, which include the public sector, private sector, and the civil society sector, in order collectively to support and promote the development and regulation of the entire services sector; monitoring the results of the developments to ensure they are moving in the right direction and meeting the defined objectives and targets; and establishing a committee and a subcommittee to drive the development of the overall service sector and potential branches of the hospitality business.

2) Developing an integrated tourism industry with the following development guidelines:

2.1) **Promoting revenue generated from tourism** by: (1) encouraging the adding of value to tourism products and services by utilizing Thai identity that reflects local cultures and lifestyles in the community, such as tourism that links with One Tambon One Product (OTOP). This will universally and fairly distribute income to the people in the community and to local areas nationwide. It also seeks to promote tourism that takes carrying capacity into account to support the ecosystem in order to create

balance and sustainability in the development of the Thai tourism industry, which includes developing man-made creative tourist destinations as new attractions for quality tourists from around the world; (2) developing cluster tourism according to the capacity of an area that links with tourism activities based on market demand, such as community tourism, health tourism, agricultural tourism, marine tourism, green tourism, art and culture tourism, MICE tourism, sport tourism, and Halal tourism; (3) restoring confidence in and creating a good image of Thai tourism in the global vision; (4) implementing both passive and active marketing strategies in target markets, both existing and new potential markets, by focusing on quality tourists in order to align with tourism activities that emphasize worthwhile experiences rather than cost-effective tourism, as well as encouraging Thai tourists to travel more domestically in order to reduce dependency on foreign markets; (5) developing the skills of personnel in the hospitality and tourism sector, organizing training for foreign tour guides nationwide; and (6) developing the transportation system in order to create a network between land, water, and air transport.

2.2.) Updating tourism-related laws, and setting and enforcing tourism standards by: (1) expediting the updating of the laws and regulations that will facilitate the future development of the industry and services by emphasizing the integration of principles and the enforcement of laws and regulations that are consistent with one another in order to facilitate and develop the production and services sectors effectively in the defined direction; (2) reviewing, updating, and developing laws, rules, regulations and policy relating to sport tourism, hospitality and tourism business in the country according to situation, and bringing laws relating to Thai tourism up to international standards; and (3) promoting tourism accessibility to every group of people according to their personal rights.

2.3) Restructuring tourism management as a mechanism for managing and setting a clear direction for development by focusing on the participation of all sectors – the public sector, private sector, academia, and the civil society sector - in raising the level of the country's tourism industry to create balanced and stable growth, as well as fair and equal benefit incidence.

3) Developing a holistic sports industry by adhering to the following development guidelines:

3.1) Promoting income generation from sports, as sports is considered to be the main infrastructure for human resource development in that it affects the building of discipline, consciousness, unity, and sportsmanship, as well as creating value and quality of life for people, including strengthening the country's economy from activities and hospitality business related to the sports industry. Therefore, it is expedient to propose and support all dimensions of the sports industry in order to add value to the sports industry in terms of both production and business relating to sports equipment, hospitality business, hotel business, restaurant business, food supplements and beverages,

competitions and activities, insurance business, travel and transportation, as well as institutions that develop sports professionals at all levels in order to allow the sports industry to create opportunities, jobs, and income, including building careers for people in every sector by: (1) promoting sports activity to create income, as well as supporting international sporting events, hosting global sporting events, and organizing international conferences in terms of sports, sports medicine, and sports science; (2) promoting businesses and entrepreneurs related to sports in both the sports industry and sports-related hospitality business such as the sports equipment business, sports venue business, and athletes training business; and (3) promoting marketing and public relations activities to create awareness and for people to realize the importance of sports and encourage more sports and recreational activities.

3.2) Restructuring sports management in order to create unity in driving the country's sports industry. Therefore, it is expedient to restructure sports management in order to increase its efficiency from policy level to operational level as follows: (1) establishing a management mechanism in the form of a national committee to be responsible for making and driving national sports policy; (2) promoting the operations of the public sector and private sector in raising the levels of the sports industry; and (3) establishing sports-specific institutions in order for Thailand to become a regional hub for sports and sports science.

3.2.4 Developing the trade and investment sectors:

1) Promoting proactive marketing in order to increase domestic demand and exports by focusing on creating quality and standard-achieving goods and services, creating brands, developing product packaging, exploring new markets, extending cross-border trade between Thailand and nearby countries, and creating networks of international business partnerships. It is also important to support the establishment of international headquarters and international trading centers (ITC), utilizing international trade and investment agreements and cooperation frameworks, and encouraging enterprises to develop the skills and talents that are relevant to gaining benefits from international trade.

2) Developing trade facilitation to meet international standards in infrastructure, logistics and transportation systems. Risks insurance system in goods and services should be developed to establish reliance and reduce business risks, and trade barriers should also be reduced, particularly non-tariff measures (NTMs), by extending trade and services agreements both in ASEAN and at bilateral levels. The role of government agencies should be adjusted to be more proactive in order to reinforce and facilitate trade by focusing on tracking and negotiating solutions to NTMs problems, with an emphasis on trade support measures rather than control measures. It is important to develop a trade and investment database that is essential, accurate and timely, and establish one-stop centers to assist firms throughout the supply chain.

3) Supporting entrepreneurs to invest in information and communications technology systems, use e-commerce to enhance business productivity in the manufacturing and financial sectors, marketing, management, and logistics along with progress towards the digital economy. It is necessary that government agencies focus on developing secure electronic payment systems, developing a guarantee system for buyers and sellers that meets recognized standards and credibility, and providing support for skilled labor as well as supporting the free flow of skilled labor.

4) Promoting SMEs by: (1) encouraging new entrepreneurs with the requisite entrepreneurial spirit and business skills to adopt technology and innovation into production, management and trade, or to be smart SMEs and strengthen communities to move toward self-sufficiency by supporting the establishment of community enterprise based on the readiness and potential of each area for development. In addition, a curriculum related to entrepreneurial skills should be created and improved both at university level and vocational level so entrepreneurs are able to understand how to start or run a business, and are also aware of green business trends, with an emphasis on an educational environment that enables the learning process and stimulates entrepreneurial spirit; (2) forming social enterprise by building a business environment that has easy access to business data and useful information such as sources of investment funds, tax and non-tax incentives, innovation for SMEs, and the utilization of information technology as tools in management and marketing. With regard to SMEs, supporting business registration and developing support mechanisms should be established in parallel with creating potentiality by focusing on the participation of all segments of the private and public sectors in order to enhance growth and competitiveness; (3) promoting SMEs aggregation to form SME clusters, and linking SMEs with large enterprises or companies throughout the supply chain. Meanwhile, providing opportunities for starting a business overseas by designing policy or measures that persuade the international trading and investment companies to draw SMEs into international markets and integrate them into global value chains, in line with enhancing the role of the private sector to participate in the development of SMEs.

5) Developing the supporting factors in order to promote both inward and outward foreign direct investment. The domestic investment should, thus, emphasize: (1) developing the mechanism of Investment Protection and Investor-State Dispute Settlement in order to increase investor confidence through strengthening Thailand's arbitration system, reducing disputation between government and the private sector through an emphasis on developing administrative and contract management, and the appointment of arbitrators; (2) reducing obstacles within labor mobility procedures in order to facilitate the free flow of foreign workers by reducing the period of time taken for notification, and also extending the period for applying for a work permit. In relation to outward investment, the following should be emphasized: (1) promoting the establishment of a line agency related to outward investment promotion, especially in Cambodia, Lao

PDR, Myanmar and Vietnam, through providing in-depth information on trade and investment in the targeted countries; (2) providing measures that support and provide incentives for outward direct investment by Thai investors, in line with reducing the obstacles to cross border flows and exchanges of money, and also supporting sources of funding; (3) supporting the facilitating factors of investment through promoting risk protection services in trade, and also promoting the expansion of branches of Thailand's commercial banks into foreign countries.

6) Amending laws, rules and regulations to support fair trade and facilitate trade and investment, including SMEs business operations, through adjusting rules, regulations and guidelines on customs formalities in order to assure transparent enforcement and meet international standards. It is important to amend the Trade Competition Act in order to promote fair market competition. The efficiency of law enforcement should be enhanced in a timely manner in line with the economic situation, and laws and rules should be revised to support start-up enterprises and SMEs in parallel with enforcing effective laws related to electronic transactions and privacy protection in order to build the confidence of entrepreneurs and consumers to make more use of e-commerce.

7) Developing the intellectual property (IP) system to meet international standards, with an emphasis on enhancing the efficiency of monitoring and registration systems for intellectual property, encouraging registration, and the utilization of innovations and intellectual property in order to create added value in commodities and services, along with supporting the establishment of IP central markets. In addition, an IP database system should be developed so that researchers and entrepreneurs can be able to utilize expired intellectual property to further development and advance commercialization. Moreover, the prevention and elimination of IP infringements should be executed by integration and collaboration among relevant agencies in parallel with strengthening consumer awareness about purchasing and using copyrighted products.

4. Complementary Plans

The aim is to create connectivity by linking the development guidelines to government policies, administration plans and public agencies' roadmaps in order to operationalize the plans' directions, objectives and indicators step-by-step, for example:

4.1 The strategy for agricultural products, which includes 4 economic crops namely: maize, cassava, palm oil and sugar cane (2015-2026).

4.2 The strategy for Thai rice (2015-2019).

4.3 The strategy and operational plan to support and develop the business potential of Halal goods and services (2016-2020).

- 4.4 The strategy to develop the “Thailand Kitchen of the World”.
- 4.5 The draft strategy for the national development for organic agriculture (2016-2021).
- 4.6 The plan for agricultural development under the Twelfth Plan (2017-2021).
- 4.7 The plan for the holistic development of the rubber industry.
- 4.8 The strategy for rubber.
- 4.9 The draft roadmap for agricultural development to adjust the livestock product structure.
- 4.10 The draft strategy for Thailand’s food management.
- 4.11 The plan to protect high-potential agricultural lands.
- 4.12 The plan to protect land ownership among small-holder farmers.
- 4.13 The Master Plan of Productivity and Efficiency Enhancement in the Industrial Sector (2016-2021).
- 4.14 The Fourth SMEs Promotion Master Plan (2017-2021).
- 4.15 The Ministry of Commerce Master Plan (2012-2021).
- 4.16 The Seven-Year Investment Promotion Strategy (2015-2021).
- 4.17 The National Tourism Development Plan Volume 2 (2017-2021).
- 4.18 The National Sports Development Plan Volume 6 (2017-2021).

5. Flagship Projects

Fiscal Sector:

5.1 Collection of environmental taxes and fees:

5.1.1 **Main Content:** (1) enforcement of environmental tax and fee collection from products and materials that create pollution, based on the Polluter Pays Principle; and (2) encouraging Local Administrative Organizations to collect taxes or fees from polluters in their areas.

5.1.2 **Key implementing agencies:** Ministry of Finance and Local Administrative Organizations.

5.1.3 **Operational Timeframe:** 5 Years (2017–2021).

Financial Sector:

5.2 **Designating the financial landscape and enhancing the competitiveness of financial institutions:**

5.2.1 **Main Content:** (1) indicating the scope of operation of all financial institutions and financial service providers to restructure the financial institutional system to

be able to accommodate economic and social development, and help prepare for competition from foreign service providers; (2) increasing the competitiveness as well as improving the operational efficiency of financial institutions and financial service providers in order to satisfy all domestic customers and expand into the international market.

5.2.2 Key implementing agencies: Ministry of Finance, Bank of Thailand, The Securities and Exchange Commission, The Stock Exchange of Thailand.

5.2.3 Operational Timeframe: 5 Years (2017-2021).

5.3 Reviewing the role of specialized financial institutions and increasing their efficiency.

5.3.1 Main Content: (1) Defining precisely the role of Specialized Financial Institutions (SFIs) and their goals; (2) enhancing the competitiveness and efficiency of SFIs to help them fulfill their specific objectives and serve the function as financial institutions for development.

5.3.2 Key implementing agencies: Ministry of Finance, Bank of Thailand.

5.3.3 Operational Timeframe: 3 Years (2017-2019).

5.4 Improving Financial Literacy:

5.4.1 Main Content:: (1) Providing better knowledge and understanding on financial issues, investment tools and personal financial management to all groups of people; (2) encouraging financial intermediaries to engage in providing funds for projects or establishing capital funds that help improve financial literacy in order to cultivate corporate social responsibility.

5.4.2 Key implementing agencies: Ministry of Finance, Bank of Thailand, and financial intermediaries.

5.4.3 Operational Timeframe: 5 years (2017-2021).

Agricultural Sector:

5.5 Reducing costs of production and promoting opportunities in agricultural product competition:

5.5.1 Main Content: Collaborating with the private and government sectors to reduce input costs, including chemical fertilizers, animal feed, labor costs, service charges for agricultural machinery, land rents, electricity costs for agricultural activities, and provide capital with low interest rates. Providing farmers with training in the appropriate uses of agricultural inputs and soil improvement. Developing product standards, value creation, and marketing connectivity.

5.5.2 Key implementing agencies: Ministry of Agriculture and Cooperatives together with the Ministry of Commerce and the private sector.

5.5.3 Operational Timeframe: 5 years (2017-2021).

5.6 Project for developing the standards of agricultural products:

5.6.1 **Main Content:** Developing the standards of targeted agricultural products (plants, fisheries and livestock) to meet international standards, as well as passing inspection and quality assurance throughout the value chain. Supporting the standardization of both Halal and organic agricultural products. Developing standards for the certification of food and agricultural products to create reliability and provide safety to individual customers and the country's traders.

5.6.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives, Ministry of Public Health, Ministry of Science and Technology, Ministry of Commerce and Ministry of Industry.

5.6.3 **Operational Timeframe** 5 years (2017-2021).

5.7 Agricultural Land Management (Zoning):

5.7.1 **Main Content:** Promoting agricultural production that is compatible with land conditions in order to balance demand and supply for produce, reduce costs and increase productivity.

5.7.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives and relevant government agencies, such as the Ministry of Industry, Ministry of Commerce, Ministry of Interior, and Ministry of Science and Technology.

5.7.3 **Operational Timeframe:** 5 years (2017-2021).

5.8 Promoting the Large-Scale Agricultural Production:

5.8.1 **Main Content:** Promoting large-scale agricultural production in pilot areas initiated by farmers in order to reduce costs and increase yields. Managing and marketing by all stakeholders in an integrated approach.

5.8.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives and relevant government agencies, such as the Ministry of Industry, Ministry of Commerce, Ministry of Interior, the private sector and farmers' organizations.

5.8.3 **Operational Timeframe:** 5 years (2017-2021).

5.9 Supporting Organic Agriculture:

5.9.1 **Main Content:** Promoting organic agriculture in order to expand the farming area and supporting pilot areas such as Yasothon Province as an 'Organic Agriculture City' by strengthening existing farmers and extending knowledge networks of successful farmer groups in the areas.

5.9.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives and relevant government agencies, such as the Ministry of Commerce, Ministry of Interior, the private sector and farmers' organizations.

5.9.3 **Operational Timeframe:** 5 years (2017-2021).

5.10 **Learning Centers of Agricultural Productivity Enhancement:**

5.10.1 **Main Content:** Developing learning centers to increase productivity in farming and scaling up service provision by the centers.

5.10.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives in collaboration with farmer networks.

5.10.3 **Operational Timeframe:** 5 years (2017-2021).

5.11 **Animal Gene and Plant Seed Pools:**

5.11.1 **Main Content:** Preserving animal species and plant seeds so that poor farmers nationwide can obtain the breeds required to improve productivity and hence increase their income. Examples of these banks are Cattle and Buffalo Banks as well as Community Rice Seed Banks.

5.11.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives.

5.11.3 **Operational Timeframe:** 5 years (2017-2021).

5.12 **Preventing Illegal Unreported and Unregulated (IUU) Fishing and Developing Sustainable Fisheries and Aquaculture Systems:**

5.12.1 **Main Content:** Regulating activities to comply with the preventive measures against Illegal Unreported and Unregulated (IUU) Fishing, continuously. Managing and protecting labor in the fisheries sector according to pertinent standards and laws. Adjusting the standards of fisheries, aquaculture, processing, transporting, and marketing to meet bilateral requirements and procedures, as well as realize the potential of marine and coastal resources, between Thailand and other trade partners.

5.12.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives and related government agencies, such as the Ministry of Natural Resources and Environment, Ministry of Transport, Ministry of Labor, Ministry of Interior, Ministry of Industry, and Ministry of Defense.

5.12.3 **Operational Timeframe:** 5 years (2017-2021).

5.13 Implementing Strategies in the Related National Agendas and Development Plans of Cooperatives:

5.13.1 **Main Content:** Moving forward the national co-operative development plan to concrete implementation at local level. Enhancing the linkage potential of production networks as well as marketing and finance of cooperatives to strengthen the entire system and connect with business sustainably.

5.13.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives and related government agencies, such as the Ministry of Commerce, Ministry of Interior, the private sector and cooperatives networks.

5.13.3 **Operational Timeframe:** 5 years (2017-2021).

Industrial Sector:

5.14 Eco-industrial Town Project:

5.14.1 **Main Content:** The project focuses on developing and upgrading industries to be a key mechanism for driving the development of local economies, quality of life and environment that will bring about sustainable co-existence between industry and community. The Ministry of Industry will take a leading role in initiating the eco-industrial town project. This project includes the formulation of eco-industrial town development master plans for fifteen provincial areas, which will be used as an operational and administrative framework for short-term, middle-term, and long-term development. Furthermore, this master plan will be driven to implementation through concerted efforts to achieve the desired goals of the project.

5.14.2 **Key implementing agencies:** Ministry of Industry and the Industrial Estate Authority of Thailand.

5.14.3 **Operational Timeframe:** the fiscal years of 2016–2019.

5.15 National Automobile and Tyre Test Center:

5.15.1 **Main Content:** This project aims to support automotive and auto-parts cluster development. The establishment of the National Automotive and Tyre Test Center will initially focus on testing to UN R117 standard, and will expand for testing other tyre standards and automotive parts in the further phases. The Center also aims to become the regional center for testing and approving automotive parts standards for Thailand and in the ASEAN region. In the future, it is planned to be the center for auto-parts research & development for future automotive technologies.

5.15.2 **Key implementing agencies:** Ministry of Industry.

5.15.3 **Operational Timeframe:** fiscal years of 2017 – 2021.

5.16 Extension of the Automotive and Auto-parts Human Resource Development Academy (AHRDA):

5.16.1 **Main Content:** The project aims to support the government's policy for automotive cluster development. The key objective is to develop high skills and advanced competencies of human resources as well as upgrade capabilities in system design for the accreditation of advanced technical and managerial skills.

5.16.2 **Key implementing agencies:** Ministry of Labor and The Federation of Thai Industries.

5.16.3 **Operational Timeframe:** the five fiscal years of 2017–2021.

5.17 Manufacturing Automatic and Robotic Institute (MARI):

5.17.1 **Main Content:** This project aims to increase productivity of the manufacturing sector by encouraging and supporting the application of automation systems, such as machinery for the automotive and auto-parts industry and the electronics & electrical industry. In the initial stage, the Thai-German Institute (TGI) will be considered a core organization responsible for implementing this project.

5.17.2 **Key implementing agencies:** Ministry of Industry (Thai-German Institute) and related educational & research Institutes.

5.17.3 **Operational Timeframe:** the three fiscal year of 2017–2019.

5.18 Thailand Food Valley Project:

5.18.1 **Main Content:** This project aims to promote Thailand to become the Asian hub of food processing innovation. The project supports the creation and development of cluster networks, aiming to link businesses in the agricultural processing and food industry through a mechanism of public-private-academic partnerships.

5.18.2 **Key implementing agencies:** Ministry of Industry and relevant agencies:

5.18.3 **Operational Timeframe:** the six fiscal years of 2016–2021.

5.19 Food InnoPolis Project:

5.19.1 **Main Content:** This project aims to develop Thailand to become the R&D hub for the food industry. The project will establish an innovation area that is well-equipped with sound infrastructure and human resources in fields related to food science, technology and innovation through a collaborative effort among academic institutions, research institutions, and the private sector. Nonetheless, innovation-based businesses will also be able to enjoy benefits from attractive investment privilege and incentive packages for their operation in Food InnoPolis areas.

5.19.2 **Key implementing agencies:** Ministry of Science and Technology.

5.19.3 **Operational Timeframe:** the five fiscal years of 2017–2021.

Service Sector and Tourism:

5.20 **Endorsing and Supporting Potential Business Services Program:**

5.20.1 **Main Content:** The service sector is a crucial part of national development in terms of improving economic and social situations, creating employment, distributing income to local people and communities and also elevating the quality of life along with livelihoods. Throughout the implementation of the 11th Plan, the service sector grew consistently, and it has been viewed as an income-generating sector. Besides, several sub-services have thrived significantly due to a corresponding rise in market demand, including financial services, medical and wellness, MICE, international schools/universities, film, digital services, and transport and logistics. This growth trend is expected to continue in the 12th Plan period. Endorsing and supporting those sub-services, therefore, is essential for all related businesses and entrepreneurs to develop competitiveness skills in dynamic scenarios which will enhance their potential to expand into new markets and partnerships.

5.20.2 **Key implementing agencies:** Ministry of Commerce, Ministry of Public Health, Ministry of Education, Ministry of Finance, Ministry of Tourism and Sports, Ministry of Interior, Ministry of Culture, Ministry of Digital Economy and Society, Ministry of Transport, Thailand Convention and Exhibition Bureau (TCEB).

5.20.3 **Operational Timeframe:** 5 years (2017–2021).

5.21 **Developing and Rehabilitating the Top Tourist Attraction Program:**

5.21.1 **Main Content:** Tourism during the 11th Plan brought about economic prosperity through an increase in national income and a greater number of international tourists, accounting for an average of 25.9 million per annum from 2011-2015, which benefited the overall economic system and created jobs in related businesses. However, an increase in both income and total tourist numbers, as well as the inefficient management of tourist attractions, had a direct impact on the environment and ecosystems. Many top-ranked or even well-known destinations gradually deteriorated, where unbalanced development occurred in local, environmental and tourism sites. Consequently, a development and rehabilitation scheme, through an improvement of image and surroundings by taking long-run carrying capacity into consideration, will be essential to develop sustainable tourist attractions.

5.21.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Interior, Ministry of Natural Resources and Environment, Ministry of Culture, Tourism Authority of Thailand (TAT), Local Government Administration.

5.21.3 **Operational Timeframe:** 5 years (2017–2021).

5.22 Promoting Alternative Tourism Program: Wellness Tourism, Cultural Tourism, Marine and Railway Tourism:

5.22.1 **Main Content:** Travel behavior nowadays is mostly dependent on tourists' preferences and perceptions, and also prevailing social trends. So, many tourists are focusing increasingly on alternative tourism, such as: wellness tourism - 'Nuad Thai' (Thai massage) and Thai spa will be a unique selling point - and cultural tourism, including traditions and local identity. To achieve this goal, the program will be designed for specific types of tourism which will match with niche market tourists, especially quality tourists who value alternative tourism and activities.

5.22.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Public Health, Ministry of Culture, Ministry of Transport, Tourism Authority of Thailand (TAT), Local Government Administration as well as concerned government agencies that deal with interesting tourism issues.

5.22.3 **Operational Timeframe:** 5 years (2017–2021).

5.23 Encouraging Travel and Tourism in Tourism Development Zones Program:

5.23.1 **Main Content:** The government emphasizes area-based tourism and enhancing the tourism capabilities of secondary cities in Thailand. Accordingly, the Ministry of Tourism and Sports announced the ministerial regulations on Tourism Development Zones, including 5 tourism zones: Lanna Civilisation, Active Beach, Southern-Isan Civilisation, the Royal Coast and the Andaman Sea. Moreover, another tourism development zone will be launched to boost tourism in local areas and to connect travel routes from popular cities to nearby provinces.

5.23.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Interior, Local Government Administration.

5.23.3 **Operational Timeframe:** 5 years (2017–2021).

5.24 Establishing Creative Man-Made Tourist Attractions Program:

5.24.1 **Main Content:** The boom in the tourism industry has caused negative impacts on various tourist destinations as overcapacity has affected the environment. Establishing creative man-made tourist attractions would help to mitigate this problem, while development schemes and healthy surroundings will benefit local communities in economic terms.

5.24.2 **Key implementing agencies:** Ministry of Tourism and Sports, Tourism Authority of Thailand (TAT).

5.24.3 **Operational Timeframe:** 5 years (2017–2021).

5.25 The Study of Carrying Capacity in Conservation Areas: The Possibility of Limiting Tourist Numbers:

5.25.1 **Main Content:** Most tourist attractions in conservation areas have been facing the problem of exceeding carrying capacity, causing negative impacts on natural resources and the environment, such as oil spills at sea and ineffective island waste management. As time has progressed, these problems grow and thus cause serious implications for locals' lives in the long run. Therefore, attempts to control and limit the number of tourists to fit with the capacity of ecosystems have led to the initiation of this study in order to evaluate its appropriateness and to acquire effective tourism management mechanisms. The study will also raise environmental awareness among all travelers.

5.25.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Natural Resources and Environment, Ministry of Interior, Tourism Authority of Thailand (TAT), Local Government Administration.

5.25.3 **Operational Timeframe:** 5 years (2017–2021).

5.26 Improving Human Resources and Entrepreneurship in Tourism Program:

5.26.1 **Main Content:** Encouraging human resources in public administration to recognize the importance and necessity of tourism management as well as competitiveness enhancement for entrepreneurs in the tourism industry.

5.26.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Labor, Ministry of Education, Ministry of Interior, Tourism Council of Thailand.

5.26.3 **Operational Timeframe:** 5 years (2017–2021).

5.27 Innovative Development to Create Value-Added in the Sports Industry Program:

5.27.1 **Main Content:** Supporting sports industry stakeholders to create innovative research and further develop it for commercialization. Furthermore, the program also aims to increase value-added in sports production and services.

5.27.2 **Key implementing agencies:** Ministry of Tourism and Sports, Ministry of Science and Technology.

5.27.3 **Operational Timeframe:** 5 years (2017–2021).

Trade and Investment Sector:

5.28 Creating the Competitive Potential of Goods and Services:

5.28.1 **Main Content:** Extending the potential of commodity processing services, developing brands and packaging to gain recognition in international markets,

and making use of innovation to extend products' shelf life. Gems and jewelry merchandise are also included.

5.28.2 **Key implementing agencies:** Ministry of Commerce.

5.28.3 **Operational Timeframe:** 5 years (2017-2021).

5.29 Improving Each Dimension of Entrepreneurial Skills:

5.29.1 **Main Content:** Promoting small and medium enterprises to be able to access both domestic and global markets via e-commerce. Encouraging entrepreneurs to make use of technology and innovation in order to enhance production and management efficiency.

5.29.2 **Key implementing agencies:** Ministry of Commerce working in collaboration with relevant government agencies, for example the Office of Small and Medium Enterprise Promotion, Ministry of Industry, Ministry of Labor, Ministry of Education, and Ministry of Science and Technology.

5.29.3 **Operational Timeframe:** 5 years (2017-2021).

5.30 Promoting Fair Trade:

5.30.1 **Main Content:** Encouraging the amendment of the Trade Competition Act in parallel with revising relevant definitions and rules in order to enforce laws effectively and be able to respond to the changing trading environment in a timely manner.

5.30.2 **Key implementing agencies:** Ministry of Commerce.

5.30.3 **Operational Timeframe:** 3 years (2016–2018).

5.31 Improving the ONESTOP Export Service Center (OSEC):

5.31.1 **Main Content:** Improving the services of OSEC and enhancing the connectivity of the National Single Window (NSW) system for networking and to expand the service to local levels.

5.31.2 **Key implementing agencies:** Ministry of Commerce, and relevant agencies.

5.31.3 **Operational Timeframe:** 5 years (2017-2021).

5.32 Creating a Suitable Environment for Investment:

5.32.1 **Main Content:** Setting measures for promoting inward investment in accordance with the potential of areas, and promoting outward direct investment of Thai investors by reducing obstacles to the mobility of skilled and unskilled labor. In addition, putting emphasis on reducing the period of making notification for foreign workers, offering

visas on arrival for business visitors who are participating in meetings less than 15 days, extending the period for work permit application, reducing personal income tax for expatriates, and reducing obstacles to international money flows.

5.32.2 **Key implementing agencies:** Board of Investment of Thailand, Ministry of Labor, and Ministry of Finance.

5.32.3 **Operational Timeframe:** 5 years (2017-2021).

Section 4

Development Strategies

Strategy **4** Strategy for Environmentally-Friendly Growth for Sustainable Development

At present the country's natural resources and environmental quality are deteriorating, and have become a weakness in maintaining the basis of production, services and sustainable living. A large volume of the natural resources stock has been utilized for development, resulting in their continuous degradation. The forests have been depleted, the soil has become infertile, and biodiversity has been threatened. While exhibiting a future risk of water shortages, the existing supply of water has not been able to meet the demands of the various sectors. Conflicts over the use of natural resources stem from the unfair allocation of access and exploitation. Moreover, environmental problems have risen along with economic growth and urbanization. All of these problems have affected the quality of life and have added greater economic costs.

Meanwhile, climate change and natural disasters have become more unpredictable and severe, particularly floods and droughts, causing impacts on the economic sectors and the domestic supply chain. Furthermore, international agreements on climate change and competitive trade have intensified, and Thailand needs to be ready to take responsibility of greenhouse gas reduction. Simultaneously, the post-2015 Sustainable Development Agenda has established the global direction for the next 15 years (2016-2030), and this too will have an influence on the development of the country.

Therefore, the challenges that need to be addressed during the Twelfth Plan are the follows: to build security in the stock of natural resources and leverage environmental quality in order to support green growth (which is friendly to both the environment and the quality of life); solving the environmental crisis to reduce pollution from production and consumption; setting up a transparent and fair environmental management system; promoting and scaling up sustainable consumption and production; accelerating readiness for greenhouse gas reduction while enhancing capacity for climate change adaptation and management in order to reduce risks from natural disasters.

1. Objectives

- 1.1. To conserve, restore as well use natural resources sustainably and fairly;
- 1.2 To build national water security and to manage the entire water resources system efficiently;
- 1.3 To manage the environment and reduce pollution to achieve better environmental quality;
- 1.4 To improve the capacity for greenhouse gas reduction and adaptation. To lessen the impacts from climate change, and improve the response to natural disasters.

2. Targets and Indicators

Target 1: Conserve and restore the stock of natural resources: increase the area of forest for conservation and commercial use, and reverse mangrove forest depletion; curb biodiversity loss; solve the problem of public land encroachment and provide the poor with common rights to use land.

Indicator 1.1 Forty percent of the country is forest area, classified into forest for conservation (25 percent), and commercial forest (15 percent). The mangrove forest area is enlarged from 1.53 to 1.58 million *rai*. Watershed restoration areas also grow substantially.

Indicator 1.2 A smaller number of species and populations of living organisms with threatened status or nearly extinct.

Indicator 1.3 A complete demarcation map of public land (One Map Project) which is formally announced to the public. The number of land plots being allocated to communities for common use.

Target 2: Building water security and managing both surface and underground water resources efficiently: manage water resources at the watershed level to achieve a balance between demand and supply; solve water shortages, and minimize the number of affected people; increase the efficiency of water use in both production and consumption, while decreasing loss and damage from floods and droughts.

Indicator 2.1 Water supply systems are available in all villages.

Indicator 2.2 Twenty-five main watersheds have water resources management plans that take into account the balance between water demand and supply. More importantly, these plans should be put into action.

Indicator 2.3 Efficiency of water usage in irrigation areas is increased.

Indicator 2.4 Efficiency of water usage in both the production and consumption sectors is increased.

Indicator 2.5 There is a decrease in the area affected by floods and droughts, and a reduction in the value of loss and damage resulting from floods and droughts.

Indicator 2.6 Irrigation areas expand by 350,000 *rai* each year.

Target 3: Creating good environmental quality, reducing pollution and minimizing impacts on people's health and ecosystems: setting the prioritization of solid waste and hazardous waste management, restoring water quality in the major rivers, and finding solutions to the haze pollution problem.

Indicator 3.1 (1) at least 75 percent of waste generated by communities is properly treated or reused; (2) at least 30 percent of communities' hazardous waste is correctly disposed; and (3) all industrial waste is treated by proper management systems.

Indicator 3.2 Improved water quality of the main rivers.

Indicator 3.3 Air quality in the haze crisis zones is addressed so that it falls within national pollution standards.

Target 4: Increasing the efficiency of greenhouse gas reduction and enhancing the capacity for climate change adaptation: establishing mechanisms for minimizing impacts from climate change in the high-risk areas or sectors.

Indicator 4.1 The volume of greenhouse gas emissions in the energy and transport sectors decreases by 7 percent compared to the business as usual scenario for 2030.

Indicator 4.2 The unit costs of greenhouse gas emissions reduction decrease (baht per ton of carbon dioxide equivalent).

Indicator 4.3 There are action plans for adaptation to climate change in each of the priority sectors, such as water resources management, agriculture, health and forestry.

Indicator 4.4 Domestic climate change mitigation mechanisms are established to provide support in terms of finance, technology and capacity building.

Target 5: Increasing managerial efficiency to reduce risks from disasters, and to reduce loss of life and damage to property due to disasters.

Indicator 5.1 Systems are established for disaster forecasting and early warning for the agriculture sector, and for natural disaster management in risk-prone areas.

Indicator 5.2 An increase in the proportion of at-risk areas which have natural disaster surveillance networks.

Indicator 5.3 The number of deaths, the value of losses and damage from natural disasters, and expenditure on compensation to people affected by disasters in repeatedly at-risk areas all decrease.

3. Development Guidelines

3.1 Conserve and restore natural resources, and create a balance between conservation and sustainable utilization: Natural capital must be used within the limits of its carrying capacity and resilience, while securing the natural resource base. Economic evaluation of ecosystems should be used, as well as the generation of revenue from conservation in order to improve the efficiency of management.

3.1.1 Conserve and restore forest resources to create a balance with nature. Protect and restore forest and wildlife resources in a concrete manner: stop deforestation in order to maintain the country's forest areas of 102.3 million *rai*. Mobilize the resources of all sectors, and use information systems to manage and enforce laws and regulations efficiently and fairly. Accelerate actions to resolve the overlapping borders of public lands by using the mapping criteria for improving public land boundaries (One Map Project). Promote reforestation and forest restoration by following King Rama IX's initiative: "growing forest, cultivating mind." Apply the lessons learned from the success of the Mae Fah Luang Foundation under Royal Patronage in forestation and enhancing quality of life in communities simultaneously. Support the reforestation of unused public land along the boundaries of buffer and connected forests. Encourage community forest management for household use. Advocate community forest law: creating participatory networks of forest restoration and protection. Increasing the economic forest areas up to 15 percents of the country's total area, promoting the plantation of long-term economically valuable trees such as teak, *Azelia siamica* and Siamese rosewood, or change from short-term economically valuable trees to longer-term yield species. Set up a central market for timber trading, and develop logistic systems for trading and delivering timber, studying and piloting financial mechanisms for promoting forestation, such as forest bonds, tree banks, or reforestation funds. Support research and development (R&D) in various topics: identifying complementary plants for forestry plantation and agro-forestry to generate an additional stream of revenue for farmers while they are waiting to harvest economic forests; innovating with high-value wood products. Meanwhile, develop and foster approaches to creating revenue from conservation, such as sustainable tourism in conservation areas or community tourism for conservation.

3.1.2 Conserve and use biodiversity sustainably. Protect and conserve genetic resources and local wisdom: systematically support the existing gene banks of plants, animals and microorganisms; promote use and value creation from biodiversity resources whilst facilitating fair benefit sharing. Create research programs systematically to develop products from biodiversity resources: champion new business development, and support development strategies for herbal medicines and cosmetics with a high potential market demand. Link new and high-value bio-product development with the "One Tambon, One Product" (OTOP) development process by

searching to identify biological resources, local wisdom and culture that have real potential, in order to develop high-value innovation.

3.1.3 Develop land management systems and resolve public land encroachment. Build a database system for land management, and issue clear and complete ownership documents for all types of public land. Integrate land management mechanisms to establish the overall direction for land policies towards fair distribution of ownership. Apply economic instruments when providing communities with common land rights for collective use in developing the production system and creating revenue for communities. Design efficient land leasing systems to create opportunities in land utilization. Collect land taxes progressively. Formulate measures that prevent land ownership by foreigners. Conserve soil and land to retain its fertility.

3.1.4 Protect marine resources and prevent coastal erosion. Develop coastal areas while taking into consideration environmental impacts and long-term sustainability. Minimize the conflicting policies of infrastructure and tourism development versus artisanal fisheries and local ways of life. Classify marine and coastal zones by involving all stakeholders in expressing their views, making decisions and managing the areas collectively. Establish management and revenue collection systems for tourism activities in marine protected areas, including islands and coasts. Revenue generated from these tourism sites should be used for conservation and development to keep them plentiful and beautiful. Protect national marine interests: designate marine and coastal areas, employ restrictive measures for fisheries, ban larval and juvenile fishing, regulate the use of illegal fishing gear, and protect the artisanal fisheries. Prevent erosion along river banks and in coastal areas by taking into account the systems' dynamics. Adopt the concept of littoral cell management: classify coastal areas according to their geomorphological characteristics; design integrated wave protection and attenuation systems among those cells to prevent undesirable effects of construction along the coasts and on adjacent areas.

3.1.5 Plan and manage mineral resources to optimize their utilization whilst minimizing the impacts on the environment and human beings. Set the optimal level of mineral use, taking into consideration present needs and future values, and limit mineral exports in the form of raw materials. Forbid mining in the watershed classification 1 areas and archeological sites designated by the Fine Art Department. Strictly regulate mining activities that cause pollution and create impacts on environments and human health. Formulate long-term management strategies for high-value minerals. Such strategies should be formulated by an open process that receives views from all related parties transparently, following the principles of good governance, and based on the comparative assessment of not only economic benefits but also the costs to health and of environmental protection. Moreover, the strategies should include proper compensation schemes to affected parties, and the mining operators should be responsible for these costs. Design effective negotiation

mechanisms to reduce conflicts between communities and mining operators, bearing in mind community rights and social justice.

3.2 Increase the efficiency of the management of water resources to achieve the goals of stability, balance and sustainability in both quantity and quality. Foster a participatory process among all parties, particularly stakeholders in the watersheds, to determine the direction of surface water and groundwater resources management and utilization, corresponding to their potential and limitations in both environmental and social aspects.

3.2.1 Expedite the promulgation of the Water Resources Bill of ... to be the principal law for water resources management. This law should establish a National Committee on Water Resources Management (NCWRM) as the main mechanism for formulating national policies as well as strategic plans for the development and management of water resources, both in normal and crisis states, including droughts and floods. The mandate of the NCWRM should comprise the building of a national water resources databases and preparation of annual integrated budget plans for water resources based on the selected programs or projects proposed by government agencies, local administrations and watershed committees.

3.2.2 Accelerate the formulation of integrated water resources management plans in the country's 25 main watersheds. Set up watershed committees under the NCWRM to be the key driver at the local level. Their mandates should encompass setting up frameworks for management: developing and using water resources within the watersheds, preparing water resources programs and projects, both in normal and crisis conditions, and fostering effective networks of coordination and collaboration among local people, non-government organizations (NGO), community organizations, local administrations and government agencies.

3.2.3 Advance the use of the Strategic Environmental Assessment (SEA) process to provide development options that fit with the potential of watersheds for decision-making at the policy, plan and program levels. This is to ensure that development activities take into consideration the sustainability and carrying capacity of watershed ecosystems as well as the livelihoods of local people who can take part in the watersheds' development.

3.2.4 Raise the efficiency of storing and distributing water from storage facilities. Build clusters of small- and medium-sized water storage facilities by placing an emphasis on rural areas where there is still a lack of clean surface and ground water for consumption. Encourage communities to build small weirs. Conduct feasibility studies which provide economically viable options for groundwater development to alleviate water shortages for consumption and agriculture in drought zones. Similarly, study the feasibility of water diversion, from both domestic and international watersheds, allowing for balance, sustainability and the participation of all related parties in the watersheds.

3.2.5 Increase the efficiency of water usage and allocation per unit of production, thereby delivering higher value, both inside and outside the irrigation areas. Alter planting species, methods or systems so that they are suited to the amount of available water, the area's potential, and market demands. In other words, agricultural zoning should be adopted. Encourage farmers to adopt New Theory Agriculture into their day-to-day practices. Wastewater should be treated and reused in some industries located in the main economic zones. Ensure the sustainable use and provision of water to relieve water shortages and reduce the number of people affected.

3.3 Solve the environmental crises: speed up the control of air pollution, waste water, solid and hazardous waste from production and consumption. Build environmentally-friendly cities or green cities to create a good environment for the people. Related development guidelines should include:

3.3.1 Rapidly manage the cumulative solid waste in the crisis areas: advocate laws and mechanisms to enforce waste separation (or sorting), promote methods of turning waste into energy, apply economic instruments to reduce waste generation, and create discipline among all Thais in sustainable waste management. Support the preparation of solid waste management plans at the provincial and local levels. Encourage local administrations collectively to set up solid waste management clusters while building partnerships with the private sector to enhance the efficiency of solid waste management. Promote integrated solid waste management, including the entire chain of waste production from sources to treatment facilities. Reduce the amount of waste generation. Create mechanisms conducive to waste separation for reuse. Champion waste recycling by turning waste into energy using innovation and technology that fit with local conditions. Advocate the passing of laws and measures for managing household hazardous wastes, especially from electronic and electrical appliances. Implement both voluntary and mandatory measures, including import restrictions on those appliances, and the provision of collection and management facilities nationwide. Develop tracking systems for industrial hazardous waste transport consistent with international standards. Cultivate discipline in the habits of Thai citizens towards sustainable management by providing knowledge, creating consciousness and raising the awareness of the general public, students and youth groups. Accordingly, they will be able to take active and concrete actions in solid waste management. Support the use of economic instruments in solid waste management according to the "polluter pays principle." Review and revise the criteria and rates applied to solid waste management fees. Strictly enforce environmental laws.

3.3.2 Increase the efficiency of water quality management in the main watershed areas, particularly those facing pollution crises, by reducing wastewater from

the various sources. Accelerate the treatment of wastewater from households and industries. Improve water quality in the critical watersheds and wetlands. Decrease wastewater at source. Manage water quality within the entire systems: reuse treated wastewater for other purposes. Encourage Local Administration Organizations to operate wastewater treatment facilities: receiving wastewater from households and cities, collecting wastewater treatment fees to cover the costs of operation and maintenance (O&M), and monitoring and evaluating the efficiency of wastewater treatment systems. Promote the private sector to sub-contract from the public sector for O&M in wastewater treatment systems. Regularly monitor water quality around solid waste dumping sites. Amend laws and regulations under building codes regarding wastewater sources. Set permit criteria and methods of releasing wastewater into receptive ecosystems within their carrying capacity.

3.3.3 **Solve the crisis of forest fires in the north and south of Thailand.**

Encourage all parties to contribute to implementation continuously. Collaborate with neighboring countries at the multilateral and bilateral levels, following the ASEAN Agreement on Transboundary Haze Pollution. Strictly and fairly enforcing laws to prevent forest fires. Haze caused by burning agricultural waste (e.g. corn) should be avoided. Accordingly, it is important to change farmers' practices in agricultural waste burning by creating incentives, and providing knowledge and information about good agricultural practice. Conduct research to find substitute crops which are more suitable, have higher market demand and lower cost. Retrain farmers in alternative occupations such as community tourism.

3.3.4 Revise regulations and develop urban infrastructure to support green growth. Formulate city plans which take into account economic growth, environmental balance, and social sustainability. Improve city ordinances and building codes to encourage efficient use of resources and energy, and the utilization of environmentally-friendly materials according to appropriate building standards. Promote large infrastructure development projects that are environmentally friendly and resilient to natural disasters. Scale up existing "green cities" in different shapes and forms to be prototypes such as for livable cities, low-carbon cities, smart cities, and eco-industrial towns, green agriculture cities, and sustainable tourism cities. These green cities will set certain standards of environmentally friendly cities for benchmarking by other cities.

3.4 Encourage sustainable consumption and production (SCP): place emphasis on managing resources efficiently and sustainability while adopting the Philosophy of the Sufficiency Economy as the guiding principle, as well as applying the life cycle concept.

3.4.1 Support industrial production and investment that are environmentally friendly. Use financial and fiscal measures to support the application of standards in the production process in order to minimize pollution emissions while using

resources efficiently. Promote industrial investment that employs clean technology. Develop data management systems and practices in conformity with international standards. Encourage the design of production systems and innovation in products and services that are environmentally friendly, such as bio-plastics. Foster a proactive management approach in reducing environmental impacts from certain industries along the entire supply chain. Urge greenhouse gas reduction in the production process. Support the labeling of products regarding their carbon footprint, and their green and other environmental qualities. Promote firms and other related agencies to perform the Life Cycle Assessment (LCA) of each product. Build a Life Cycle Inventory (LCI) database for the production and transport sectors to be the basis for setting environmental footprint standards. Encourage product designs that are low-carbon and environmentally-friendly.

3.4.2 Support the transition towards sustainable agriculture. Encourage the shift from mono-cropping to sustainable agriculture, such as natural farming, integrated farming, organic farming, agro-forestry, and new-theory agriculture. Encourage farmers to produce their own organic fertilizers, and use organic materials and products instead of chemicals. Damnoen Saduak in Ratchaburi Province provides a good example of farming using fewer chemicals. Support research and pilot areas to demonstrate crop alternatives that are environmentally friendly. Set up funding sources and market mechanisms that serve as incentives for farmers to change their practices towards environmentally-friendly farming. Develop systems of standards certification and inspection of organic or environmentally-friendly products. Create safety standards to ensure that human health is unharmed. Study the feasibility of the transition of existing voluntary standards to mandatory ones. Scale up agricultural practices that follow the Philosophy of the Sufficiency Economy: encourage the process of learning and sharing knowledge so that sustainable agriculture is adopted and continued.

3.4.3 Promote sustainable tourism by taking the carrying capacity of ecosystems (destinations) into account. Upgrade the standards of natural destination management to be comparable with international standards. Restrict the improper use of tourism destinations. Develop environmental management systems in tourism sites, including solid waste and wastewater treatment facilities. Limit the numbers of tourists in any destination by setting quotas depending upon the vulnerability of such ecosystems. Design and pilot systems of revenue collection in marine protected areas, islands and marine parks. This income should be used for the conservation and development of these tourism sites. Encourage communities to gain revenue from tourism while conserving natural resources, and preserving local culture and identity. Moreover, communities can earn income from selling their local biological products.

3.4.4 Create incentives for behavioral change towards sustainable consumption. Provide accurate and adequate information to consumers. Promote sustainable ways of life in harmony with nature via both formal and informal education.

Provide public relations in a varieties of forms. Promote the production of environmentally creative media. Conduct research and development for technology and innovation that raises public awareness concerning sustainable consumption and production. Selectively provide incentives that fit with each target group. Apply economic instruments for changing consumers' behavior towards being more environmentally friendly. Incorporate the cost of natural resource extraction and waste treatment into the price of products as an incentive to reduce long-term environmental impacts. Promote the use of containers made from natural materials instead of plastics. Provide public relations communication and foster consumer networks of sustainable consumption via online social media, urban department stores, and local markets. Expand the green public procurement program to the regional and local levels. Increase the number of listed products to cover organic farm products.

3.5 Support greenhouse gas reduction as well as enhance adaptive capacity to climate change:

3.5.1 Draft and amend laws and regulations related to climate change so that they can respond to international climate change agreements in an integrated and comprehensive manner. Contribute to the reporting systems of greenhouse gas reduction under the Nationally Appropriate Mitigation Actions (NAMAs). Facilitate the setting up of new mechanisms between the government and private sector in the efficient reduction of greenhouse gases.

3.5.2 Prescribe measures and mechanisms to support greenhouse gas reduction in all sectors, with an emphasis on the following sectors: electricity generation, transport, industry, households and buildings. Reduce the use of fossil fuels in generating power while promoting the use of renewable energy, energy saving, and waste-to-energy. Build the capacity of manpower to excel in various forms of renewable energy. Support sustainable transport systems, and increase the efficiency of engines, machines and instruments. Foster the establishment of financial mechanisms between the public and private sectors in order to support climate change actions that generate cobenefits: a few examples are carbon credits, carbon markets and carbon taxes. Moreover, encourage the private sector to invest more in greenhouse gas reduction.

3.5.3 Promote the private sector, state enterprises, and local administrations to collect and report information regarding greenhouse gas emissions, particularly from energy usage. Provide technical support to all sectors in terms of data collection and setting baseline data. This information will be critical for updating the national greenhouse gas inventory, registering emissions activities, and forecasting future trends in greenhouse gas emissions.

3.5.4 Enhance the capacity of R&D in science, technology and innovation (ST&I) to support climate change adaptation. Stimulate R&D in ST&I while applying local wisdom to offer the adaptive technology necessary for the agricultural sector. Provide supportive measures to assist vulnerable and high-risk populations with a low

adaptive capacity. Plan to protect cities that might be affected by sea-level rise, extreme weather and seasonal variation. Design city or town plans based on information regarding climate risk assessment and analysis: formulate strategies or action plans for climate change adaptation at the country, sector, and local levels, with different degrees and specific types of climate risks. As a result, these strategies and plans will be more likely to be implemented on the ground.

3.5.5 Create knowledge and understanding, and raise awareness and public participation from all stakeholders in response to climate change impacts. Foster knowledge creation with respect to the impacts and risks of climate change. Enhance the capacity of individuals and organizations at various levels at both the central and local levels. Communities should gain knowledge and have the capacity to cope with climate change impacts. Facilitate the transfer of low-carbon and environmentally-friendly technology. Create environmental curricula accompanied by a Sufficiency Economy curriculum for compulsory education from primary level upwards.

3.6 Manage to reduce risks as well as minimize losses and damage from disasters in moving towards sustainable development:

3.6.1 Integrate disaster risk reduction into the planning process at the national, provincial and local community levels, and in various production sectors. Create knowledge that supports risk assessment and maps both for local communities and high-priority production sectors.

3.6.2 Enhance capacity in preparation and response to disasters. Support risk mapping at the local level. Encourage a disaster response approach which puts communities at the center. Encourage the private sector to prepare Business Contingency Plans (BCP). Champion both the private sector and local communities to work together in the prevention and reduction of disaster risks. Cultivate a mind-set of public safety.

3.6.3 Set up a disaster response system for emergency periods. Develop disaster warning systems that are accurate, reliable, and efficient. Support information access mechanisms via new technology: create integrated database systems with common standards that connect with domestic and international organizations. Develop integrated collaborative mechanisms to increase the capacity for emergency management.

3.6.4 Establish restoration and reconstruction systems after the incidence of disasters. Meet the demands of disaster victims widely and fairly. Leverage post-disaster inspection standards. Improve safety standards of buildings and infrastructure. Develop safety standards of new infrastructure which should be resilient to possible extreme disasters in the future.

3.6.5 Reinforce knowledge in disaster management. Construct curricula related to disaster management. Design systems for creating the readiness and capacity of

voluntary networks by linking closely with the government sector. This is to create teamwork during operations to rescue and help victims in an emergency period.

3.7 Develop management systems and conflict resolution mechanisms regarding natural resources and environmental issues:

3.7.1 Revise mechanisms and processes of Environmental Impact Assessment (EIA) to increase efficiency at all stages, ranging from the first step of study to the last step of monitoring and inspection. Urge government agencies with permit-granting authority strictly to monitor and inspect mitigation measures, as indicated in the EIA report. If there is no compliance, punishment measures should be applied earnestly. Moreover, monitoring and inspection conditions should be set as requirements when there is a request for permit extension, and/or for change or additional construction within the project. In general, the steps and duration of the EIA process should be streamlined. The level and procedures of public participation in the EIA process by all stakeholders should be reviewed and revised.

3.7.2 Advocate Strategic Environmental Assessments (SEA) to be legally required as a significant tool for government decision making on certain policies. The process of SEA should be comprehensive and consider the impacts of all aspects. Encourage pilot studies of SEA at the watershed level to support spatial management in economic development zones and critical ecosystems.

3.7.3 Create appropriate attitudes and awareness, as well as improve the process of public participation. To be specific, public participation should not be limited to only informing but also consulting and involving all key stakeholders throughout a project. This is to gain acceptance of and reduce conflict with local communities. In large-scale investment project, all parties will be assured that they can be involved in the monitoring and inspection of natural resource management. Establish a fund for the participatory management of natural resources and environment: encourage all stakeholders to contribute financially. This fund should be used to solve environmental issues, and to develop monitoring and inspection processes by the government and citizens groups. Enhance mechanisms to support good governance in environmental justice and public participation. Employ the mass media to run campaigns for disseminating ideas and good practices in natural resources and environmental management. Examples are the campaigns for reforestation, to end forest burning, and solid waste separation.

3.7.4 Review and revise laws and regulations. The focus should be put on the Community Forest Bill, with an emphasis on protecting communities' rights, way of life, culture and local wisdom. The livelihoods of the ethnic groups living in conservation areas and the up-stream areas of watersheds should be protected by creating a sustainable

harmony between human beings and the forests. Provide compensation measure for those affected by government policies such as flooded zones and land expropriated for development projects.

3.7.5 Enhance the role of the private sector and communities in creating synergies in implementation. Promote private businesses that adopt corporate governance by providing them with the opportunity to work with the government and communities. Support the establishment of mechanisms and funds to restore, redress and compensate those affected people, both in the short and long terms. Conduct a study to identify proper and fair fiscal measures, following the Polluter Pays Principle (PPP), prior to putting it into effect. Amend related laws and regulations such that business operators will be liable for their actions that bring about long-term losses to communities. Advance the justice process in natural resources and environment at all stages, starting from access to information, human rights protection, and proving liability. Revise laws and regulations that have become a hindrance to the sustainable and fair management of natural resources and the environment.

3.8 Create international partnerships for the environment: advocate the formulation of an ASEAN master plan on natural resources and environmental management. Develop guidelines for cooperation between ASEAN and the Greater Mekong Subregion (GMS) in terms of transboundary transport, energy and natural resource management, and transboundary haze pollution. Create knowledge, understanding, and good practice regarding international laws and agreements among stakeholders. Regularly review and follow updates of international laws and agreements on trade and the environment. This is to monitor the use of non-tariff barrier measures that might affect trade and investment. An example is the issue of Illegal, Unreported and Unregulated (IUU) fishing, as regulated by the European Union. Support detailed studies and research on the country's commitments resulting from endorsing any international environmental agreements.

4. Complementary Plans

4.1 Master Plan on Solution to Deforestation, Land Encroachment, and Sustainable Management of Natural Resources.

4.2 Master Plan on Integrated Biodiversity Management, 2015-2021.

4.3 Program on Improvement of Public Land Demarcation Map Scale 1:4000.

4.4 Master Plan on Management and Conservation of Watersheds.

4.5 Strategic Plan on Water Resources Management, 2015-2026.

4.6 Master Plan on Thai Industry Development 2012-2031.

4.7 Conceptual Framework and Direction of Environmental Quality Management Plan, 2017-2021.

4.8 Thailand Master Plan on Climate Change, 2016-2050.

4.9 Bangkok Metropolitan Master Plan on Climate Change, 2013-2023.

- 4.10 National Master Plan on Solid Waste Management, 2016-2021.
- 4.11 The Fourth National Strategies on Chemical Management, 2012-2021.
- 4.12 Thailand Roadmap on Sustainable Production and Consumption, 2017-2036.
- 4.13 (Draft) Plan on Promotion of Green Procurement, 2017-2021.

5. Flagship Projects

In order to move forward strategically, flagship programs and projects are critical as key drivers for the achievement of the targets and indicators of the Twelfth Plan. Priority has been given to implementable projects that can deliver concrete results, lead to essential changes, and generate co-benefits. More importantly, the programs or projects should support several targets concurrently, including economic growth, improved quality of life of people and communities, and enhanced environmental quality and natural resource stock. Under Strategy 4: Green Growth towards Sustainable Development, the flagship programs and projects include the following:

5.1 Project for Promoting the Cultivation of Long-Term Economic Value Trees:

5.1.1 Main Content: promote the growing of long-term economic value trees: develop afforestation procedures and the sustainable management of forest plantations. Create a high-value timber industry in the entire supply chain. In a supportive role, the government should set incentive measures, designate the suitable areas with potential in the ecological landscape and establish a central timber market. The logistics system for transporting timber should be developed. Introduce new financial mechanisms such as forest bonds, tree banks, and forestation funds. Support the study of and research into the genetic improvement of tree varieties. Create innovations that add new value to wood and timber. Restore the use of wood in conservation, construction of houses, temples and other buildings, as well as wood carving as a national art. The project aims to increase the economic forest to 15 percent of the country's total area, while forest for conservation will grow to around 25 percent. The economic forest plantations, with a long-term harvesting period, will therefore create several co-benefits including revenue generation, ecosystem restoration, and greenhouse gas sequestration. As a result, this project can contribute to green growth not only at the national but also the global level.

5.1.2 Key Implementing Agencies: This project requires an integrated implementation approach by several parties. The Office of the National Economic and Social Development Board (NESDB) needs to work with other related key agencies in the form of a working group. The working group should comprise the Department of Forestry, the Forest Industry Organization, the Plant Genetic Conservation Project under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn, the Agricultural Land Reform Office, the Bank for Agriculture and Agricultural Co-Operatives, academia, and the private sector. The

main mandate of this working group is to formulate the strategies of economic forest cultivation in the entire system and implement these strategies to achieve the stated goals.

5.1.3 Operational Timeframe: 5 years (2017-2021).

5.2 Program of Strategic Environmental Assessment in 5 Pilot Watersheds:

5.2.1 Main Content: Demonstrate the use of Strategic Environmental Assessment (SEA) as an important tool for managing water resources at the sector and watershed levels when making decisions about policy, programs and plans. Adopting SEA should ensure meaningful public participation in the process. Consequently, a balance between conservation and restoration versus the use of water resources could be reached according to the potential of each watershed. The 5 pilot watersheds will be selected based on prevailing development trends which evidence threats to the stability of natural resources and environment, leading to a major shift in people's livelihoods throughout the areas.

5.2.2 Key Implementing Agencies: the NESDB will work with the key agencies relating to the 25 main watersheds in the country, namely the National Committee on Water Resources Policy and the Watershed Committees. The project will allow the engagement of all development partners, namely the government sector, private sector, NGOs and individual stakeholders.

5.2.3 Operational Timeframe: 5 years (2017-2021).

5.3 Program and Projects under the Roadmap for Solid and Hazardous Waste Management and the National Master Plan for Waste Management, 2016-2021:

5.3.1 Main Content: over the years, solid waste issues have become a national agenda. The Ministry of Natural Resources and Environment has formulated the Roadmap for Solid and Hazardous Waste by integrating all 77 provincial solid waste management plans, including the BMA. Recently, the National Master Plan on Waste Management (2016-2021) has been adopted as the guideline for practical, efficient, and sustainable solid waste management. The Master Plan has set the framework direction for managing solid and hazardous waste in a systematic and integrated manner. All stakeholders, namely the government sector, private sector, and the people, can participate in solid and hazardous waste management such that the solutions are efficient and consistent with local conditions.

The Master Plan is comprised of several key measures, including: (1) reducing the generation of solid and hazardous waste at source; (2) increasing the potential for solid and hazardous waste management; and (3) supporting the management of solid and hazardous waste. Moreover, the Master Plan has set the priority areas for solid and hazardous waste management as follows: (1) set up an Integrated Center for Solid and Hazardous Waste Management, covering areas of different sizes ranging from large, medium and small clusters; (2) build Transfer Stations for Solid and Hazardous Waste; and

(3) promote the local management of solid waste in 349 spatial clusters. In the first period (2016), implementation should start in 67 spatial clusters, and later an additional 282 spatial clusters during 2017-2021.

5.3.2 Key Implementing Agencies: to implement the Master Plan, many agencies are relevant, including the Ministry of Natural Resources and Environment together with the Ministry of Interior, Ministry of Industry, Ministry of Health, Ministry of Education, Ministry of Finance, local administrations, provincial offices, Bangkok Metropolitan Administration (BMA), City of Pattaya, and the private sector. The monitoring and evaluation of the Master Plan should be the responsibility of the Steering and Implementing Committee of the Master Plan in Waste Management at the national and provincial levels.

5.3.3 Operational Timeframe: 5 years (2017-2021).

5.4 Project for Promoting Sustainable Production and Consumption:

5.4.1 Main Content: to promote the efficient use of natural resources and energy while minimizing greenhouse gas emissions, it is important to engage all stakeholders in society. Towards greening the supply chain, small and medium producers are encouraged to upgrade their production processes with assistance from the large producers. The government could offer special low-interest loans or use economic instruments as incentives for producers to improve their production and to request green labelling certification. The number of green products and services in the market could escalate due to higher demand from green public procurement (including state enterprises and local administrations) and the private sector. Moreover, the development of criteria and specifications for green products and services should be expanded to cover a greater varieties, particularly those with high market demand. Simultaneously, public awareness and understanding regarding the importance of green products and services in relation to environmentally and socially responsible producers, should be cultivated continuously.

5.4.2 Key Implementing Agencies: the Ministry of Natural Resources and Environment together with the Ministry of Industry, Ministry of Energy, Ministry of Interior, Ministry of Agriculture, and other related agencies.

5.4.3 Operational Timeframe: 5 years (2017-2021).

5.5 Green City Project

5.5.1 Main Content: encourage the executives of local administrations to adopt the green city (green growth in the city) into their local development plans and implement these plans accordingly. The major components of green city embrace many aspects, including waste management, green space, land use planning and efficiency of energy use in all sectors. For this reason it is helpful to promote information exchange among local authorities so that good lessons can be shared and learned. Then, the replication of new green cities is possible while building on existing successful cases. Create new financial measures to support the green growth of cities. Revise and reform related laws

if necessary. Foster local authorities to set up coordination mechanisms between municipalities and communities. Cultivate conscientiousness of individuals in communities via different channels. Allow all parties to participate in implementing action towards the green growth of cities.

5.5.2 Key Implementing Agencies: the Ministry of Interior, Ministry of Natural Resources and Environment, Ministry of Energy, Ministry of Transport, Ministry of Agriculture and Cooperatives, and other related agencies.

5.5.3 Operational Timeframe: 5 years (2017-2021).

5.6 Program of Nationally Appropriate Mitigation Actions (NAMA Roadmap) and Program of National Climate Change Adaptation (NAP):

5.6.1 Main Content: The goal of the NAMA Roadmap is to reduce greenhouse gases by 7 percent compared to the business as usual (BAU) emissions in 2020. The implementation of NAMA is based on the voluntary actions of the energy and transport sectors. Important measures include electricity generation from renewable energy, efficiency improvement in production and energy use, biofuel utilization, and other sustainable transport measures. Therefore, a greenhouse gas inventory is also critical for the development of a reliable monitoring, reporting and verification (MRV) system. Moreover, financial and market mechanisms could potentially increase efficiency in greenhouse gas reduction. Unlike NAMA, the goal of NAP is to create resilience within society and the economy. Thus, NAP fosters vulnerability assessments and mapping. In addition to NAP, it is important to focus on the following: providing adaptation alternatives to the sectors or areas that are in high risk; putting emphasis on the adaptation plans of cities and agriculture; protecting urban and coastal areas, the health sector, and preventing floods; building the database system and creating related knowledge.

5.5.2 Key Implementing Agencies: the Ministry of Natural Resources and Environment, Ministry of Transport, Ministry of Energy, Ministry of Industry, Ministry of Agriculture and Cooperatives, and other related agencies.

5.6.3 Operational Timeframe: 5 years (2017-2021).

Part 4

Development Strategy

Strategy **5** Strategy for Reinforcing National Security for the Country's Progress towards Prosperity and Sustainability

The economic, social, cultural and political changes arising from globalization and technological progress are likely to have a multi-dimensional effect on the security and stability of the entire Kingdom of Thailand. This includes external threats - such as the expanding influence and the increasing role of foreign powers in different regions of the world, territorial conflict between claimant states, transnational crimes and terrorism - and domestic threats - such as major institutions of the country being affected by the different opinions, ideas and ideologies of the Thai people, the situation in the Southern Border Provinces, as well as threats to the economy from cybercrime over the next 5 years. The Twelfth National Economic and Social Development Plan is therefore focused on **the restoration of the security foundation that is a key factor for national economic and social development, especially in a society of peaceful coexistence of different opinions and ideologies, based on a democratic regime with the King as Head of State, and prepared to deal with transnational crimes**, which will have a significant impact on the economic and social development of the country in the next 20 years.

1. Objectives

1.1. To protect the monarchy, maintain internal security and prevent the threats that hinder the country's economic, social and political development.

1.2. To create readiness and combine the forces of all sectors in strengthening security management capabilities and the country's potential to prevent and remedy situations caused by both traditional military threats and other non-traditional security threats.

1.3. To strengthen security cooperation with allied countries in support of maintaining peace and national interests.

1.4. To optimize and unite the management of national security policy with economic, social, natural resources and environmental policy.

2. Targets and Indicators

Overall Target: Stability, prosperity and sustainability for the national interest:

Target 1: Defend and glorify the monarchy as the core institution of the country:

Indicator 1.1 Increase in the number of events to honor and glorify the monarchy.

Indicator 1.2 Increase in the number of activities related to the Royal Initiative projects.

Target 2: Create solidarity within the society. People with different opinions, ideas and ideologies can live together in peace and harmony. Promote public participation in the prevention and resolution of national security issues:

Indicator 2.1 Decrease in the country's Political Instability Index score (Global Peace Index from the Institute for Economics and Peace: IEP).

Indicator 2.2 Decrease in the number of deaths from domestic conflict (Global Peace Index from the Institute for Economics and Peace: IEP).

Indicator 2.3 Increase in the number of activities related to public participation in preventing and resolving national security issues.

Target 3: People in the southern border provinces will have security of life and property. There will be an increase in opportunities for education and employment to create more revenue:

Indicator 3.1 Reduction in the cost of damage and the number of incidents from internal conflict.

Indicator 3.2 Increase in the average household income per person, and an increase in the average number of years education in the three southern border provinces of Thailand.

Indicator 3.3 Increase in the number of public benefit activities resulting from the cooperative efforts of people of all religions.

Target 4: Thailand will collaborate and cooperate on security issues with ASEAN member countries, allied countries, and various other countries in preventing threats of various forms, together with maintaining the national interests:

Indicator 4.1 Increase in Thailand's Relations with Neighboring Countries Index score (Global Peace Index from The Institute for Economics and Peace: IEP).

Indicator 4.2 Reduction in the number of transnational criminal offenses.

Indicator 4.3 Reduction in the number of incidents related to maritime laws offenses.

Indicator 4.4 Reduction in the number of drugs offenses.

Target 5: Thailand's readiness to combat both traditional military threats and non-traditional security threats will be strengthened:

Indicator 5.1 Reduced mobilization duration in the event of a threat occurring.

Indicator 5.2 Global Terrorism Index ranking below 20 (Global Terrorism Index from the Institute for Economics and Peace: IEP).

Indicator 5.3 Global Cyber Security Index ranking below 10 (Global Cyber Security Index - GCI from ABI Research and the International Telecommunication Union - ITU).

Target 6: Security plans will be integrated in accordance with the National Security Policy and the Economic, Social, Natural Resources and Environment Policy:

Indicator: Increase in the number of plans that comply with the National Security Policy and the Economic, Social, Natural Resources and Environment Policy.

3. Development Guidelines

The objectives above have determined the development guidelines for the Twelfth National Economic and Social Development Plan by defining the development of an urgently needed security strategy that expedites the development of economic, social, environmental, and national security, and requires immediate action in order to achieve the target of strengthening internal security, reducing and preventing external threats, and building trust in ASEAN and the international community in the next 5 years, as follows:

3.1. Maintain internal security to ensure peace in society and to protect core national institutions:

3.1.1. Cultivate civil awareness of nationhood and uphold the importance of nation, religion and monarchy. Promote the Royal Initiatives and ideas as a source of development and inspiration. Prescribe measures to protect the core institutions of the nation from actions which may jeopardize the stability of these institutions.

3.1.2. Strengthen national unity by creating checks and balance mechanisms for the political sector, promoting and enhancing the values and understanding of a society of peaceful coexistence of different opinions and political ideologies under the rights and duties of a democratic system, and truly recognizing the national interests and national security.

3.1.3. Prevent and resolve the unrest in the southern border provinces by peaceful means with local public participation based on differences in identity and ethnicity to eliminate conflict and reduce violence according to the **royal-initiated strategy of His Majesty King Bhumibol Adulyadej, Rama 9, following the principles “Understand, Access and Develop”**, and to create opportunities for economic and social justice development in the area.

3.2. Empower the national armed forces to respond to both traditional and non-traditional security threats:

3.2.1. Develop the capability and readiness of the armed forces to defend and protect the national interests by developing human resources to be competent and prepared to respond to any situations in a timely and adequate manner, and to be fully equipped with suitable and affordable armaments, munitions, modern technologies to support the country’s development, humanitarian assistance and disaster relief, and other important national issues, effectively and efficiently.

3.2.2. Develop an efficient intelligence system, mechanisms to strengthen cooperation, and cognitive development to analyze the trends of threats, including a database for sharing news and information between both local and international agencies in a systematic manner, with the availability of supporting data to help prepare the response to security threats, both locally and internationally.

3.2.3. Develop efficient preparedness and response mechanisms that are readily available to respond, both in normal times and in crisis situations, to traditional and

non-traditional threats that conventional mechanisms can not handle, together with appropriate action plan, tests and training protocols at all levels of operations.

3.2.4. Develop integrated preparedness systems management for the emergency response to emerging infectious diseases, pre-disaster, during a disaster, and post-disaster, including a knowledge management system that links information from the national level to the provincial level and the community level.

3.2.5. Develop a system for compiling and sharing data and information related to terrorism, both between internal departments and with external international agencies for tracking, analyzing and synthesizing knowledge to counter terrorist and security threats, coupled with the development of appropriate guidelines to support the operations in all sectors, efficiently and effectively.

3.2.6. Develop the defense industry by strengthening research and development, together with initiating collaboration between government agencies, the private sector and allied countries for knowledge creation and exchange of technologies for empowering capabilities in weapons, munitions, and ammunition development, and concurrently promote innovation in the defense industry by government agencies.

3.2.7. Take a proactive role by making use of international cooperation frameworks, both at regional and multilateral levels, to protect the national interests of Thailand, together with strengthening, exchanging, and studying best practices, and collaborating to deal with transnational security threats such as drugs problems, terrorism, illegal immigration, human trafficking, cyber-crime, disasters, plague, pestilence, emerging and recurring diseases, and other public health emergencies.

3.2.8. Support the development of physical infrastructure to prevent land loss and natural disasters, such as river bank protection works along the borders with neighboring countries.

3.3. Promote international collaboration on defense and security to integrate cooperative efforts with allied countries for social and economic benefits, and to protect against transnational threats:

3.3.1. Balance foreign relations to facilitate, promote and protect the national interests, and the economic and social development of the country, by developing cooperation with neighboring countries and ASEAN member states, and allied countries, in intelligence exchange and joint proactive action to prevent, troubleshoot and reduce the

impact of threats, including transnational security issues, international security challenges, and large-scale disasters.

3.3.2. Strengthen trust with neighboring countries and promote cooperation in security management along the borders to resolve existing problems and promote “a border of cooperation” along common borders with neighboring countries by developing strategic partnerships on border security to prevent illegal migration and immigration, boost economic development along the borders, and strengthen public-level relationships.

3.3.3. Develop a system of retention of personal data related to cyber security, and regulate the system for international exchange of personal data according to international standards.

3.3.4. Build partnerships with local, regional and international partners in the setting up of a system of surveillance, prevention and control of diseases and health hazards that meets international standards, to be ready to track, analyze and assess likely scenarios, and be prepared to take appropriate action. Prevent and deal with disasters, health epidemics, as well as rehabilitation treatment after a disaster situation returns to normal.

3.4. Protect maritime national security and maritime national interests to maintain sovereignty and maritime sovereign rights:

3.4.1. Strengthen local and international cooperation in maintaining maritime security to resolve overlapping maritime claims; develop cooperation in seeking and expediting the sustainable use of maritime natural resources; develop systems and mechanisms for effective prevention and mitigation systems at sea; and maintain safe maritime transportation that contributes to mutual benefits.

3.4.2. Resolve controversies over natural resources by maintaining the security of national maritime resources and the environmental protection, prevention, and preservation of maritime national interests from maritime offenses and maritime crises; develop practical mechanisms to safeguard national maritime interests; revise related laws and regulations to be up-to-date and cosmopolitan with a unified, effective and efficient management system to maintain the entirety of national maritime security and national maritime interests, together with integrating the use of resources, mobilization and policy into tangible practices.

3.4.3. Develop awareness and understanding about the value of the sea, maritime resource utilization with conscience and responsibility, together with accurate

knowledge about the laws related to maritime activities, as well as promote the development of maritime knowledge and innovation that will benefit future development.

3.5. Security management for development to achieve consistency between security programs and other development programs, with the participation of civil society:

3.5.1. Improve the system for monitoring, surveillance, studying, analyzing and assessing the security situation and environment and changes therein; for identifying and predicting threats; and for proposing damage control measures and giving warning of any threats that may occur. This is in order to increase operational efficiency and reduce the impact on the development of the country - particularly in cases that will pose a threat to national security - by using mechanisms at the national level to link with other mechanisms to allow the joint and combined consideration of situations that may be expected to affect national security, and the efficient and expeditious determination of possible and acceptable solutions.

3.5.2. Develop mechanisms for national security and systems to motivate the various work plans to handle security situations at national and local level by building a network to support policy-making, knowledge-generation and the creation of mechanisms to underpin work plans for economic and social development, natural resources and environmental protection, and national security. This should be in accordance with and in response to government policy, and also to support the motivation of work plans and budget allocation for integrated national security planning which involve public participation through the Pra-Cha-Rath mechanism - which is the platform for combining the power of the public sector, private sector and citizens – in the determination and motivation of national security work plans.

4. Complementary Plans

The relevant authorities have supporting plans which cover the periods of the 11th Plan and the 12th Plan as follows:

4.1. Strategic plans of the government sector, such as: (1) National Public Relations Policy and Plan No.5, (2016-2021); (2) Ministry of Foreign Affairs 4-Year Strategic Plan, 2015-2018; (3) Office of the Royal Development Strategy No. 4, (2014-2017); (4) Thailand Public Sector Development Strategy, (2013-2018).

4.2. Political Development Plan No.2 (2017-2021).

4.3. Southern Border Provinces Problem-Solving and Development Action Plan, (2015-2017).

4.4. The solution to terrorism and transnational threats, such as: (1) National Strategy for Combating Money Laundering and the Financing Of Terrorism, 2016-2020; (2) Draft National Security Strategy to Prevent and Tackle Global Terrorism, Year; (3) National Security Strategy to Prevent and Tackle Transnational Threats, 2015-2021; (4) Strategic Plan to Prevent and Resolve Drug Problems, 2015-2019; (5) Action Plan for Publicity Campaign to Prevent and Resolve Drug Problems, 2015–2019.

4.5. Health security plans, such as: (1) Thailand’s National Strategic Plan for Emerging Infectious Disease Preparedness, Prevention and Response, 2013-2016; (2) Framework for the Development of the Emergency Operations Center, Emergency Incident Command System and the Public Health, Department of Disease Control, 2016-2021.

4.6. Cyber security plans, such as: (1) Policy Framework for National Cyber Security, 2012-2016; (2) Ministry of Defense Master Plan for Information Technology and Communications No.3, 2014–2018; (3) Research Strategy and National Development Plan Related to Cyber Security No.1, 2013–2017.

4.7. Maritime security and national maritime interests, including: (1) National Maritime Security Plan, 2015–2021; (2) Measures to Promote Investment in the Merchant Navy; (3) Environmental Quality Management Plan, 2017–2012; (4) Master Plan for Integrated Management of Biodiversity; and (5) Master Plan for the 2nd Phase of Thailand Fishery Management, 5 years (2014–2018).

4.8. Disaster prevention and mitigation, namely: (1) National Disaster Prevention and Mitigation Plan, 2015; (2) National Preparedness Strategy, 2014–2018; (3) Ministry of Defense National Defense Strategy, 2017-2036; (4) Internal Security Operations Command Strategy, 2017–2021.

5. Flagship Projects

5.1. Enhance the Stability of the Core National Institutions:

5.1.1. **Main Content:** enhancing security and preventing the abuse of the core national institutions is an important and urgent task that important task that needs immediate action. The aim is to uphold the core institutions by creating awareness among the people of the need to cherish and retain the institutions of the nation, religion and monarchy to contribute to strengthening the unity of the people by reducing conflict and

enhancing the peaceful coexistence of different opinions and ideologies on the basis of a democratic regime with the King as head of state.

5.1.2. **Key implementing agencies:** Ministry of Defense, Office of the National Security Council, and every relevant agency.

5.1.3. **Operational Timeframe:** 5 years (2016–2021).

5.2. Prevent and Resolve the Unrest in the Southern Border Provinces:

5.2.1. **Main Content:** tackling the unrest in the southern border provinces is the duty of all government agencies and the Thai people, both of which must help with brainstorming to seek a peaceful solution to the conflict. This can be achieved by determining all dimensions of the basis of the conflict in order to find ways to terminate the violence and resolve the issues in a peaceful way. This will involve eliminating every condition that contributes to the conflict, avoiding giving the impression that the local people are unfairly treated and uncared for by the state when compared to the people in the rest of the country, and making the people in the southern border provinces feel proud that they can live a normal life peacefully under their own identity without pressure or assimilation, and are given opportunities to contribute to economic and social development in the area.

5.2.2. **Key Implementing Agencies:** Ministry of Defense, Ministry of Interior, Office of the National Security Council, and every relevant agency.

5.2.3. **Operational Timeframe:** 5 years (2016–2021).

5.3. Prevent and Resolve Terrorism and Transnational Crimes:

5.3.1. **Main Content:** create cooperation within and between countries at all levels. Improve legislation and law enforcement to address the issues by developing the intelligence system and the mechanisms for emergency response, promoting human resource development and the modernization and development of equipment, together with the exchange of information with allied countries to support the efficient and effective combatting of terrorism and transnational threats such as drugs and human trafficking.

5.3.2. **Key Implementing Agencies:** Office of the National Security Council, Ministry of Defense, Ministry of Foreign Affairs, Ministry of Interior, Ministry of Justice, Ministry of Digital Economy and Society, Royal Thai Police, National Intelligence Agency, Anti-Money Laundering Office, Office of the Narcotics Control Board.

5.3.3. **Operational Timeframe:** 5 years (2016–2021).

5.4. Prevent and Tackle Epidemics and Other Public Health Emergencies:

5.4.1. **Main Content:** be ready to track, analyze and assess likely scenarios in order to be prepared to tackle and take various actions to stop emergency situations, or to recover from severe epidemics and other public health emergencies in order to return to normal within the shortest possible time, most efficiently and effectively. This applies particularly to the prevention of disease outbreaks and widespread health hazards, avoiding damage to the life of the people, the economy and the society, and includes post-crisis rehabilitation to return to normalcy.

5.4.2. **Key Implementing Agencies:** Ministry of Public Health, Ministry of Interior, National Vaccine Institute.

5.4.3. **Operational Timeframe:** 5 years (2016–2021).

5.5. Prevent and Resolve Information Technology and Cyber Security Threats:

5.5.1. **Main Content:** the degree of intensity and complexity of cyber security threats and attacks has increased. Damage caused by cybercrime and cyber attacks will have serious consequences. This problem needs to be addressed, with a focus on preventive measures against cyber threats in line with the changing environment, particularly the tightening of measures and legislation related to cyber security from the national level to the individual level.

5.5.2. **Key Implementing Agencies:** Ministry of Information and Communication Technology, Ministry of Defense, Royal Thai Police.

5.5.3. **Operational Timeframe:** 5 years (2016–2021).

5.6. Development of Systems and Mechanisms to Manage Maritime Security and National Maritime Interests:

5.6.1. **Main Content:** the aim is to enhance maritime security and develop a good maritime management system by troubleshooting controversies over maritime resources; maintaining the security of the national maritime resources; strengthening environmental protection, preservation of national maritime interests and prevention of maritime offenses and maritime crises; developing practical mechanisms to assist maritime accidents, maritime rescue and disaster relief efficiently and effectively; and revising related laws and regulations to be up-to-date and cosmopolitan.

5.6.2. **Key Implementing Agencies:** Office of the National Security Council, Royal Thai Navy, Royal Thai Police.

5.6.3. **Operational Timeframe:** 5 years (2016–2021).

5.7. Development of a Maritime Disaster Prevention and Mitigation System, Both on Land and at Sea:

5.7.1. **Main Content:** develop a National Preparedness System, including associated infrastructure development, to prevent the loss of land and to handle natural disasters, both on land and at sea, by formulating policies, strategies, plans, operations plans and immediate action plans to be ready to deal with emergency situations from normality, during a crisis, and post-crisis by joint and combined operations involving all parties, to be performed efficiently and effectively in a timely manner.

5.7.2. **Key Implementing Agencies:** Office of the National Security Council, Ministry of Defense, Ministry of Interior, Internal Security Operations Command.

5.7.3. **Operational Timeframe:** 5 years (2016–2021).

Part 4

Development Strategies

Strategy **6** Strategy for Public Administration, Corruption Prevention, and Good Governance in Thai Society

The inefficiency of the public management system has been a significant obstacle to national development. Problems in public management include failure to achieve stated objectives, public services that fall below international standards, ineffectiveness of law enforcement, a lack of transparency in local public services and management, inadequate public participation in budget spending, as well as inequality and unfairness in the process and systems of justice. Furthermore, a lack of good governance in Thai society has made corruption a critical national problem. The next five years will be a significant period for the acceleration of public management reforms in order to support the successful implementation of the Twelfth Plan. The public management system should become transparent, efficient, and accountable, and the monitoring of its effectiveness should involve popular participation. Public management tasks should be decentralized, as appropriate, among central, provincial and local administrations. With reform to the public management system, the foundation will be laid to achieve the goals of the Strategic Plan by 2036.

1. Objectives

- 1.1 To reduce the size of the public sector and promote good management that achieves international standards.
- 1.2 To support Local Administration Organizations (LAOs) to achieve effectiveness, efficiency and transparency.
- 1.3 To alleviate the problems of national corruption and misconduct.
- 1.4 To improve legal processes and the justice system to be able to respond promptly and fairly to citizens' needs and demands.

2. Targets and Indicators

Target 1: Reduce expenditure on personnel and increase the efficiency of public management and services as well as the country's business competency:

Indicator 1.1: Achieving 2nd place among ASEAN countries in terms of public performance according to the International Institute for Management Development's (IMD) World Competitiveness Ranking by the end of the twelfth national development plan period.

Indicator 1.2: Achieving 2nd place among ASEAN countries in the World Bank's Ease of Doing Business ranking by the end of the twelfth national development plan period.

Indicator 1.3 A decrease in expenditure on personnel as a proportion of annual public spending.

Target 2: Enhance the efficiency of LAO governance:

Indicator 2.1: An increase in the proportion of LAOs gaining awards for good governance.

Indicator 2.2 A reduction in the number of complaints and LAO-related lawsuits.

Target 3: Improve the country's scores in the Corruption Perception Index (CPI)

Indicator: Thailand's Corruption Perception Index score reaches 50 percent or higher by the end of the twelfth national economic and social development plan period.

Target 4: Reduce the number of wrongful convictions and unjustified punishments:

Indicator: A reduction in the number of lawsuits where the state has to pay indemnities to wrongfully convicted individuals.

3. Development Guidelines

3.1 Restructure public organizations' and employees' roles, responsibilities and quality of human resources to become more efficient, transparent, modern, flexible, responsible, diverse and better qualified. Downsize public administration while ensuring that the size of LAOs is appropriate to their field of responsibility. To be achieved by the following measures:

3.1.1 Clearly define missions and areas of authority between central, regional and local public administrations to reduce task redundancy. The central and regional agencies are responsible for policy making, national planning, setting guidelines and measures, giving approvals and permits, promoting R&D, providing academic services and public services covering various administrative areas, with clear guidelines and procedures. Local public administrations are assigned to provide basic public services, the quality of which depends on the capabilities and readiness of LAOs to solve local problems and respond to local needs through public participatory approaches and public monitoring at the community level, as well as procuring the private sector to provide public services.

3.1.2 Improving public policy management to be more integrated, and to be able to support efficiently the production process of goods and services in accordance with the long-term Strategic Plan. This can be achieved by using public mechanisms to support linkages from research to meet consumers' needs, and providing facilitating funds and budgets for entrepreneurs. Moreover, rules and regulations that facilitate business proceedings should also be set, and mechanisms for strengthening coordination between the public sector, private sector, people and civil society (the "Pra-Cha-Rath" mechanism,

which is the platform for combining the power of the public sector, private sector, and citizens) should be promoted.

3.1.3 Establishing concepts and guidelines for the dissolution or downsizing of central public organizations, located in regional areas, leaving only those fulfilling special functions that cannot be substituted by or transferred to area-based organizations such as: regional public sector organizations, LAOs, the private sector, Non-Governmental Organizations (NGOs), Social Enterprises (SEs), civil society, communities, and citizens. Furthermore, public sector human resources and budgets should, as appropriate, be redistributed and transferred, in accordance with these transferred tasks, by means of laws and regulations related to public administration, which should include all categories of the public administration system. Additionally, appropriate guidelines should be defined to facilitate the rapid transfer of public manpower from central to local administration organizations.

3.1.4 Developing human resources and efficiently reforming public manpower management systems as follows:

(1) Allowing individuals from outside the government sector to be appointed as heads of organizations, exclusively for high-priority organizations that are significant for the country's development.

(2) Recruiting into the public sector, equally and fairly, people from the new generations with high potential and competencies.

(3) Introducing information technology to replace public manpower, together with studying the possibility of systematically employing retired employees, as appropriate to prevailing fiscal situations.

(4) Adjusting the remuneration systems and benefits for civil servants and public officers from governmental organizations, state-owned organizations, and independent public organizations, according to their job descriptions, expertise, competencies, job complexities and available market mechanisms.

(5) Establishing measures and methods for public official promotion and transfer, and considerations of remunerations and penalties, whilst ensuring that the system is fair, transparent and accountable, politically neutral, and in compliance with competency and merit systems.

(6) Training public officials at all levels to gain knowledge and abilities in compliance with the operations of a digital economy, particularly in the field of leadership building. Moreover, the development curricula for public executives should be improved to ensure value for money, efficiency and the highest public benefit. Also, officers' capabilities in all aspects should be assessed and evaluated.

(7) Seriously establishing performance evaluation systems for government officers who hold high positions in order to assure acceptable outcomes for the public.

3.1.5 Initiating strategies for the long-term development of state enterprises that are clear and applicable, together with reviewing their missions' compliance with the prevailing situation and needs of each state enterprise, according to its functional objectives.

(1) Merging acquiring, transferring or restructuring SOEs to reduce redundancy in cases where the private sector or other government agencies already provide the same service more efficiently.

(2) Restructuring state enterprises in order that they perform their missions efficiently. Transparent strategic management systems should also be introduced.

(3) Enhancing the regulatory and supervisory framework for SOEs to bring them into line with the industry situations in which they are placed, and clearly separating the roles of policy-makers, regulators and operators in order to underpin transparency and fairness.

3.2 Improve the budget process and establish public fiscal and monetary monitoring and evaluation systems to enhance the efficiency of budget allocation and spending, in order to strengthen its timeliness, equitability and contribution to the reduction of inequality. Furthermore, information access for the public and private sectors should be enhanced, and there should be more transparency in the monitoring of operations budgets and fiscal procedures. This will be achieved by:

3.2.1 Revising the Budget Act. B.E. 2502 (1959) to promote integrated budget allocation and area-based budgeting. Enabling provincial clusters, provinces and LAOs to receive budget allocations. Encouraging civil society to participate in making decisions concerning the budget process, including proposing projects within Community Development Plans - which are related to LAO Plans and Provincial Development Plans - and monitoring the spending of area-based budgets. Related laws and regulations - for example the State Administration Act, B.E. 2534 (1991) and the Royal Decree of Province and Provincial Cluster Integrated Administration, B.E. 2551 (2008) - should also be amended.

3.2.2 Reforming area-based development planning processes to integrate partners and stakeholders from the community level to the provincial level by:

(1) Village Level:

Formulating community plans that apply data and public participatory approaches, acquired from community brainstorming meetings. Also, drafting project proposals that respond to community needs.

(2) Tambon Level (Sub-district level):

Arranging community brainstorming at the Tambon level, facilitated by village community committees and Tambon community organization councils, as a consulting mechanism for all levels from the village level to the Tambon level, so Tambon development plans can be formulated and proposals for budget allocations from local councils can be prepared at the Tambon level.

(3) Amphur Level (District level):

Integrating Tambon development plans cumulatively in order to comply with the principle of the participatory formulation of plans and budgets.

(4) Provincial Level:

Developing provincial development plans that accurately and honestly declare situations and problems, and respond to people's needs. Furthermore, information should be transparent and accountable. Popular participation should be widely promoted in the planning process. In addition, there should be full integration of project proposals which incorporate the needs and demands of the people which LAOs at the lower level cannot handle (beyond their field of responsibility), project proposals from local government agencies, and local provincial strategies, in line with the National Strategy and government policy. Also, in terms of financing, budgets must be clearly defined whether derived from a Ministry or from area-based budgeting.

3.2.3 Setting up structures and prioritizing programs, stated in an annual spending budgets, that are consistent with the 20-year National Strategy (2017-2036), the Twelfth National Economic and Social Development Plan 2017-2021, the National Security Policy 2015-2021, and government policy. Moreover, in proposing an Annual Budget Spending Act, sources of income, estimated revenues, expected outcomes and benefits from the annual budget, and consistency with the National Strategy and other development plans should all be openly stated.

3.2.4 Improving monitoring and evaluation systems in order to measure accurately development outcomes, efficiency, effectiveness, and the impact of public organizations operations and budget spending. The evaluation results can be used as an important source of information in determining the following year's budget allocations. Public participation in auditing the budget process should also be promoted. Additionally, evaluation reports and information should be publicly declared with a designated timeframe.

3.3 Enhance efficiency and strengthen public services to achieve international standards, so that the people and the private sector receive quality, standardized and convenient services exactly according to their needs. This will be achieved by:

3.3.1 Remodelling public governance in order to leverage the participation of the public sector, private sector, citizens, and civil society, according to the principle of “Pra-Cha-Rath”.

3.3.2 Encouraging competitiveness among public-public, public-private, civil society and community organizations in providing public services, for which rules, regulations and incentives are clearly stated. The quality, standards, and readiness of public service providers should be regulated.

3.3.3 Providing various communication processes and channels to raise public awareness and understanding of the government’s future activities and current performance, as well as listening to public opinions and recommendations from all sectors.

3.3.4 Improving organizational management by establishing an online IT management system that tracks operations and progress, provides information crucial for administration, and enables stakeholders to access and participate immediately in public activities when needed. Additionally, publications to promote desirable behavior should be widely disseminated to increase acceptance of government initiatives and actions.

3.3.5 Systematically modifying typical forms of public services to accommodate digital services systems. Reducing work processes to comply with modern lifestyles and clients’ needs by putting electronic documentation into use instead of paperwork, facilitating public one-stop services which people can access by websites, mobile communication applications and through kiosks. Also, the service fees that are collected from citizens and business organizations should be set at appropriate levels. People should easily be able to monitor and follow up public service performance.

3.3.6 Developing a digital platform to support the Government Information Network (GIN). Linking the work of public agencies and integrating cross-agency information communication through digital systems, which can efficiently support co-working and information-sharing across public agencies.

3.3.7 Disclosing useful information such as statistical data and situation assessment data in a digital format, which can be easily accessed by both private and public stakeholders for further economic and social usage and innovation development.

3.4 Improve the management efficiency of Local Administration Organizations (LAOs), so people are able to receive efficient services that are accessible to all, and stakeholders have a chance to participate in developments. Additionally, LAOs are to become more flexible, more financially independent in the long-run, depend less on public subsidy budgets, as well as be able to provide standardized basic public services efficiently by:

3.4.1 Identifying clear procedures for decentralization and mission transfer to provincial administrations, especially in the fields of education and public health.

Furthermore, the accurate and clear evaluation of local potential by independent assessors' offices should be encouraged. Moreover, mechanisms and controlling measures for decentralization should be clearly established.

3.4.2 Supporting LAOs to develop various public services which directly respond to the public's requirements, using participatory approaches among LAOs, the private sector and civil society.

3.4.3 Standardizing recruitment and appointment processes for LAO officers, having a verification system for candidates, and developing the potential and knowledge of local executives, members of local councils and local staff in regard to understanding and realizing their roles and responsibilities as executives, politicians and practitioners of good governance. Additionally, LAOs should be openly and transparently monitored. Processes of local development and plan formulation that allow popular participation should also be emphasized. Furthermore, the capability to mobilize additional sources of income besides tax systems should also be supported.

3.4.4 Promoting decentralization by allowing LAOs the flexibility to formulate policies, manage human resources, undertake financial, fiscal and budgeting management, and encouraging LAOs to partner with other stakeholders in accordance with good governance frameworks. Also, civil society and communities should actively take part in monitoring the work of LAOs.

3.4.5 Improving local revenue management systems and subsidiaries by:

(1) Restructuring the revenues of central and local governments, as well as the tax structures of LAOs, by providing subsidies in accordance with their roles and missions, together with considering, as appropriate, the decentralization of tax collection to LAOs, which can be done by taking into account fiscal position gaps in different LAOs, government policy, or the fiscal capacity of LAOs to improve local communities.

(2) Revising laws and measures to increase LAOs' non-tax revenues, which includes fees or revenue from businesses, social enterprises, and area-based development, or other non-tax revenues which can be obtained in the future.

(3) Strengthening provincial financial and fiscal management and providing control and monitoring measures for revenue collection by LAOs, both tax and non-tax. Additionally, project assessment guidelines, decision-making criteria for investment project proposals and loan applications, and feasibility analysis of LAO indebtedness capacity should all be clearly established. Data systems concerning LAOs' expenditures and debts should also be developed to be accurate and up-to-date. Effective LAO monitoring systems in budget spending should be designed, and information disclosure channels for the public's easy access should be promoted.

3.4.6 Promoting transparency in local budget formulation and management through participatory processes involving the people, tertiary education and local academic agencies by encouraging the public to monitor budget and procurement information, as well as project details and reference prices.

3.5 Promoting corruption prevention and repression toward a society based on the principles of discipline, transparency, integrity, fairness and resilience, including the public, the private sector, NGOs and communities. A movement promoting anti-corruption values should also be organized. These objectives will be achieved by:

3.5.1 Raising anti-cheating awareness among Thais:

1) Supporting all sectors in society to maintain the public interest, positive attitudes, morality, ethics and the Sufficiency Economy Philosophy, through various mechanisms such as family institutions, educational institutes, religious organizations, media and social networks, in accordance with raising awareness of the importance of honesty and appropriate social values. The dangerous impact of corruption, and cognizance of corruption in Thai society, should be publicized through social mechanisms, as well as the penalties for corruption and misconduct.

2) Developing mechanisms and systems that support public officials and politicians to study and strictly abide by codes of conduct. Therefore, public, private and media channels should be widely mobilized to act as a watchdog for the misuse of power among politicians and government officials. Moreover, procedures to punish those who do not comply with or violate the code of conduct, based on the seriousness of their actions, should be set.

3) Attracting young-blood politicians with high moral standards to assume positions in the political sector through the political party system, and to foster active participatory monitoring systems from all sectors.

4) Promoting good corporate governance and a culture of integrity awareness to fight against corruption, and supporting corporate social responsibility and consumer protection. Also, the private sector should systematically apply guidelines, as stated in integrity pacts, in the procurement process. Furthermore, supervision by other agencies should be promoted.

5) Promoting codes of conduct in media groups through professional associations and self-supervision. Also, a public participatory approach should be promoted to monitor the media.

6) Encouraging coordination among independent agencies, as stated in the Constitution of the Kingdom of Thailand, which are responsible for fighting against corruption. Civil society is welcomed to participate in anti-corruption activities and good

governance monitoring mechanisms, which should include every partner in national development.

7) Advocating networking among anti-corruption watchdogs, and encouraging whistleblower protection systems for people from every walk of life.

3.5.2 Corruption prevention:

(1) Reforming laws concerning government procurement and inventory management to become more transparent and efficient. This covers the purchasing of materials, equipment and land, construction, procurement and other contracts between the private sector and the government. Also, laws should be promulgated that prohibit the spending of national budgets on election self-promotion campaigns. There should not be any conflicts of interest (between private and public) when taking public positions. Furthermore, laws relating to public information should be revised and the use of government official discretion should be reduced when implementing policies to fight against corruption. This can be achieved by standardizing steps, procedures, decision guidelines, and completion periods, as well as making government approval documents and evidence transparent and verifiable. Corruption-prone projects should particularly be encouraged to be incorporated in the Integrity Pact (IP). Also, penalties for misconduct in the private sector should be increased.

(2) Establishing an anti-corruption fund and corruption witness protection program. Moreover, knowledge and understanding of corruption types and mechanisms, as well as corruption monitoring systems, should be promoted. Corruption prevention activities in civil society should be continuously supported. Also, budget allocation for policy to fight against corruption should be cost-effective and in line with the country's fiscal position.

(3) Putting pressure on all government agencies to come up with measures to fight against corruption, with a continuous monitoring system.

(4) Strengthening the efficiency and potential of anti-corruption operation centers in every public organization to act as the main watchdog and take mutual strategic responsibility in corruption prevention and repression.

3.5.3 Corruption repression:

(1) Restructuring independent agencies and anti-corruption-related organizations by:

(1.1) Adjusting the composition of independent agency commissions, such as the Office of the National Anti-Corruption Commission (NACC), State Audit Commission (SAC), Office of the Public Sector Anti-Corruption Commission (PACC) and Office of the Election Commission of Thailand (OECT), to comprise representatives from various sectors. Also, the boards of these commissions should adhere to good governance and only one membership term should be allowed.

(1.2) Promoting unity in working mechanisms among anti-corruption agencies by merging organizations that are responsible for monitoring public anti-corruption efforts, for instance, merging the Office of Public Sector Anti-Corruption Commission with the National Anti-Corruption Commission (NACC).

(1.3) Establishing mechanisms to integrate anti-corruption information and activities for systematic connectivity among public, private and international organizations.

(2) Reforming the roles and responsibilities of independent agencies, as stated in the Constitution of the Kingdom of Thailand, particularly ones with public sector auditing roles - including the Office of the Election Commission of Thailand, the Office of the National Counter-Corruption Commission, and the Office of the Auditor General of Thailand - to be responsible for the arbitration of corruption disputes. Meanwhile, the investigation authorities should be under the purview of the Office of the Investigation Committee.

(3) Increasing corruption-related penalties among bribe-takers and -givers, especially government officials who are culprits in taking bribes or having conflicts of interests from their positions.

(4) Intensifying social sanction measures that are severe enough to discourage corruption, and making use of all types of media to engage all stakeholders in fighting against corruption.

3.6 Reforming laws and justice processes to be up-to-date, fair and in line with international standards and agreements, in order equally to protect people's rights and liberties. The reforms should aim to build stakeholders' trust, recognition, and compliance with the rule of law, facilitate the implementation of government policy, promote private investment and business operations in general. Also, they are expected to attract more foreign investment, reduce inequality and increase people's quality of life. Furthermore, law enforcement should be strictly and efficiently pursued. Judicial proceedings should be exact, timely, transparent, and fair, and should promote a reduction in the number of persons who are jailed. This will be achieved through the following approaches:

3.6.1 Reforming laws to ensure they are up-to-date:

(1) Expediting ministries, departments and related agencies to revise and abrogate laws that are obsolete, unfair, unnecessary, inappropriate to the situation, not practical and sabotage people's daily life, as well as not complying with international commitments and hindering the criteria of Thailand's advancement to higher-income country, as stated in the Decree of the Appropriateness of the Law B.E. 2558.

(2) Applying Regulatory Impact Assessment (RIA) to analyze the necessity of law revision and law enactment before making proposals to the cabinet for consideration. Moreover, public officials should be trained and educated in multi-

disciplinarily fields so they are capable of developing and applying RIA in all the processes of law enactment: before, during and after.

(3) Promoting the potential of public organizations that are responsible for legal advice to work quickly. Moreover, the capacity of the government's legal body should be enhanced in areas relating to public law, administrative prosecution, law formulation, and law interpretation.

(4) Developing and establishing organizations that are responsible for undertaking in-depth research and studies, so that rules, regulations and law categories are improved, developed or revised before enacting. Also, the organizations should provide counseling on the RIA process to related public offices, analyze the quality of RIA reports, and set standard guidelines for the public hearing process for the proposition of any new draft act for every public office to follow, as well as provide supporting information to the public or those who are affected by the law's enactment.

3.6.2 Reforming justice procedures to be more efficient:

(1) Reforming court organization, public prosecutors, attorneys and police agencies in an attempt to uphold justice in an efficient and transparent manner, by the following means:

(1.1) Court organization:

Restructuring court organization, improving judicial proceedings and courts' quorum. Moreover, the shortage of experts in court organizations should be solved and court organizations should be strengthened.

(1.2) Public prosecution organization:

Designating the public prosecution organization as one of the recognized organizations under the Constitution of the Kingdom of Thailand to act as public attorney, with full powers to conduct investigations together with the investigating officer. Also, as stated by law, prosecutors have autonomous judiciary proceeding powers without any interference. Members of the public prosecution organization can not participate in the boards of other entities, such as State-Owned Enterprises or government bodies, if there will be a conflict of interest from taking such a position.

(1.3) Attorney organization and professional standards development:

Expanding services to cover other law services, such as law consultancy and supervision of international law consultants. Furthermore, the standards for the legal profession should be set higher, life-long lawyer licenses should be cancelled, and allowing lawyers to counsel for the defense of public organizations and local administrations should be encouraged.

(1.4) Police agency:

Promoting the autonomy of organizations to be free from political interventions. The missions that are not considered as the core missions of the police office should be transferred back to the relevant government agencies, and check and balance mechanisms concerning the police's use of power should be established. Additionally, a public participatory process for the monitoring and assessment of police officers in providing satisfactory services to citizens should be developed.

(2) Developing evaluation systems for the efficiency of the whole justice process, with qualitative indicators. Also, the process of determining KPIs to allow the government and the public to monitor the quality and efficiency of justice processes in both the medium and long terms should be publicly accessible.

(3) Accelerating the judicial arbitration process, and introducing medium-term penalty measures.

(4) Promoting fair and easily-accessible alternative judicial proceedings and judicial assistance for citizens by promoting an understanding of the legal system, judicial proceedings, mediation processes, and protection mechanisms for victims of wrongful judicial proceedings and victim of public-private-community conflicts.

(5) Developing mechanisms for supervising and promoting legal literacy and knowledge regarding the legal system and judicial proceedings of the country.

(6) Encouraging law enforcement systems to be efficient, fair, non-discriminatory and easily accessible by the public in a timely manner and at reasonable cost by improving investigation, inquiry and judicial proceedings against culprits. Judicial technological systems should be developed as platforms for timely and convenient access by the people. Also, central information technology database systems for judicial processes, concerning both civil and criminal cases, should be developed.

4. Complementary Plans

- 4.1 Thai Bureaucracy Development Strategy Plan (2013-2018).
- 4.2 Strategy for Public Manpower Adjustment (2014-2018).
- 4.3 Digital Society and Economic Development Plan (2016-2020).
- 4.4 National Strategy for Corruption Prevention and Suppression, Third Phase (2017-2021).

5. Flagship Projects

5.1 Restructuring of central, provincial and local administration, coupled with amendment of laws in areas pertaining to public administration:

5.1.1 Main Content:

(1) Defining clear roles and responsibilities for public administration at all levels, from central to provincial to local government.

(2) Revising the roles and responsibilities of each government agency, and adjusting the roles, responsibilities and organizational structure accordingly to reflect the core mission of the public sector. Also, consider downsizing or closing down some agencies which are no longer needed, and decreasing the number of local offices in the regions, while improving structural guidelines for regional public offices and improving the efficiency of local administration.

(3) Amending laws in areas pertaining to public administration, categorizing related laws, and ensuring that ministerial regulations and other by-laws of the government agencies are in line with their changing roles and missions.

(4) **Key Implementing Agencies:** Office of the Civil Service Commission (OCSC).

5.1.2 Operational Timeframe: 5 years (2017-2021).

5.2 Civil Servant Development Reform:

5.2.1 Main Content:

(1) Assessing the development efficiency of public sector executives on the topic of the quality, readiness and redundancy of the training curriculum.

(2) Improving the overall professional development system for executives in the government agencies by assessing the programs' value for money and efficiency in developing the required skillset for the trainees in different fields. Also, restricting the elements that may lead to the formulation of elite/privileged networks and networks for fund raising, which would degrade governance in the public sector.

5.2.2 Key Implementing Agencies: Office of the Public Sector Development Commission (OPDC).

5.2.3 Operational Timeframe: 4 years (2017–2020).

5.3 Enhancement of Efficiency and Quality in Public Management:

5.3.1 Crucial Content:

(1) Supporting public agencies to improve their service efficiency, so that they can enhance their competency needed for increasing national competitiveness and leading to excellence.

(2) Providing full support for the private sector and other sectors to improve overall public service provision, both in terms of quantity and quality, leading to high-quality public service provision which is accessible to the people and well-organized.

5.3.2 Key Implementing Agencies: Office of the Public Sector Development Commission (OPDC).

5.3.3 Operational Timeframe: 4 years (2017–2020).

5.4 Law Reform for Area-Based Budgetary Management Systems:

5.4.1 Main Content:

(1) Amending the Budget Procedures Act (B.E. 2502) for the purpose of promoting integrated and area-based budget allocations and allowing provinces, provincial clusters and local administrations to act as budget allocation units, as well as encouraging public participation in budget decision making throughout the process, starting from project proposals according to community development plans, which link to provincial and local development plans. Also, area-based budget spending should be monitored and followed up.

(2) Amending related laws, namely the State Administration Act, B.E. 2534 (1991) and Royal Decree Integrated Province and Provincial Cluster Management, B.E. 2551 (2008).

5.4.2 Key Implementing Agencies: Bureau of the Budget (BB).

5.4.3 Operational Timeframe: 3 years (2017-2019).

5.5 Integration of Government Shared Infrastructure in Information and Communication Technology (ICT):

5.5.1 Main Content: improving the government’s shared ICT platform to be comprehensive and efficient to support digital government, such as the Government Information Network (GIN), Government Cloud (G-Cloud), and Government Common Services (G-SaaS).

5.5.2 Key Implementing Agencies: Electronic Government Agency (Public Organization).

5.5.3 Operational Timeframe: 3 years (2017-2019).

5.6 Digital Technology Engagement in Public Services:

5.6.1 Crucial Content:

(1) Using the shared central data networking system to integrate data from different agencies.

(2) Verifying the identification and rights of each individual using the Smart Card or a registered user account through a central electronic system.

(3) Providing data through one-stop service information centers that are customer-oriented.

(4) Taking feedback from customers into account to improve complaint management and move toward a proactive service in line with customers' demands.

(5) Providing basic infrastructure for electronic services and developing a plan to improve the quality of life for people in two aspects, including collaborative and proactive public service provision, and the enhancement of a labor productivity integrated virtual labor market.

5.6.2 Key Implementing Agencies: Ministry of Digital Economy and Society.

5.6.3 Operational Timeframe: 2 years (2017-2018).

5.6 Development of Community Justice Systems and Public Oriented Assistance:

5.7.1 Main Content:

(1) Promoting public-private participation in alternative judicial processes.

(2) Supporting wide and easy access by the public to justice procedures by establishing community justice centers countrywide.

(3) Educating the public with basic knowledge and understanding of the law and judicial processes.

(4) Inclusively providing legal assistance to people who are involved in judicial processes.

5.7.2 Key Implementing Agencies: Ministry of Justice.

5.7.3 Operational Timeframe: 2 years (2017-2018).

5.7 Organizational Reform of the Justice Process:

5.8.1 Main Content:

(1) Conducting research in the proper reform measures to restructure the legal organizations and judicial proceedings and move toward an efficient, accurate, timely and fast system. For example, reforming court structure, improving in-court case consideration and quorum systems, designating the public prosecution organization as one of the authorized entities under the Constitution of the Kingdom of Thailand with powers to conduct investigations alongside investigating officials, and expanding the power of the

lawyer professional association and improving the standards of the legal profession to include a wider range of public legal services.

- (2) Promoting citizens' knowledge and understanding of laws and judicial proceedings, and improving the law enforcement system to be efficient and fair.
- (3) Developing national forensic systems to enhance standards of forensic science, to facilitate lawsuit proceedings and to protect public rights and freedoms through laws and judicial processes.
- (4) Developing an IT system as a channel to support citizens' timely and convenient access to judicial proceedings, both for civil and criminal suits.

5.8.2 Key Implementing Agencies: Ministry of Justice, Office of the Court of Justice, Office of the Attorney General, Royal Thai Police, and the Lawyers Council of Thailand.

5.8.3 Operational Timeframe: 2 years (2017-2018).

5.8 Establishment of Mechanisms against Corruption and to Raise Awareness for Corruption Prevention:

5.9.1 Main Content:

(1) Checking, monitoring and setting up a risk management system to prevent risks from corruption through all processes, from analysis, assessment, monitoring and supervision, in order to reduce the risks from corruption as much as possible. Up-to-date and stringent rules concerning the public procurement system should also be promoted to prevent corruption.

(2) Publicizing knowledge and educating the public on conflicts of interest between the private and public sectors, and educating the public on how to comply with the additional measures as stated in the national guidelines to fight against corruption.

(3) Developing volunteering networks for corruption surveillance through civil society networks and volunteers in the public and private sectors to encourage the duty of non-governmental organizations and their partners to be corruption watchdogs.

(4) Promoting morality, ethics and good governance in education institutions, as one of the activities in the "Honesty School" concept campaign in order to build the knowledge and the skillsets required for learning processes that are adaptable to changing contexts and environments. Furthermore, cultivating desirable attributes, analytical skills, discipline, integrity, and the application of the Sufficiency Economy into the way of living and the public mindset should be encouraged.

(5) Advertising proactive and collaborative campaigns to raise and implant public anti-corruption awareness, and to help people to see corruption threats and

impacts. Also, developing new-generation participation networks through social media using a format that is catchy and easy to understand should be encouraged.

5.9.2 Key Implementing Agencies: anti-corruption operation centers in every public organization.

5.9.3 Operational Timeframe: 3 years (2017-2019).

5.9 Development of Qualified Public Policies: Laws and Regulations with Full Participation from All Stakeholders:

5.10.1 Main Content:

(1) Developing manuals for the assessment of policy, law and regulations, as well as manuals for the development of a public participatory approach during the processes of policy, law and regulation formulation.

(2) Enhancing the potential of organizations in every sector to assess policy, law, rules and regulations, as well as supporting the establishment of in-house units for policy and law reform in all ministries.

(3) Promoting basic knowledge and understanding of the importance of policy, law and judicial processes to the public.

(4) Arranging training on the use of the manuals for policy, law and regulation assessment, and the manuals for building up participatory processes in order to promote the quality and efficiency of participation in policy and law formulation processes from all sectors.

5.10.2 Key Implementing Agencies: The Office of the National Economic and Social Development Board (NESDB).

5.10.3 Operational Timeframe: 3 years (2017-2019).

Section 4

Development Strategies

Strategy **7** Strategy for Advancing Infrastructure and Logistics

Infrastructure and logistics are key enabling factors for economic and social development, the distribution of prosperity, urban and regional development, and improvements to the quality of life. However, in the past, Thailand has faced problems of uncertainty and discontinuity in the development of infrastructure and logistics, insufficient coverage of infrastructure, as well as lower quality of infrastructure and operational management compared with international standards. This, in turn, has hindered the country's development in other aspects that, paradoxically, appropriate infrastructure and logistics could help advance. Hence, during the Twelfth Plan, the goal is to expand the capacity of infrastructure and logistics in the country, both in terms of quantity and quality, to support the expansion of urban areas and key economic zones, and to help improve the quality of life. Connectivity within the sub-region and the ASEAN community will also systematically be increased by building infrastructure networks to support areas alongside the economic corridors. Systems of management and regulation will be upgraded to meet international standards in order to increase operational effectiveness and safety, whilst ensuring consumers' rights and providing equal and widespread access to basic infrastructure. Lastly, the country will support infrastructure-induced industries, as well as logistics entrepreneurship and organizations that have potential to expand their businesses internationally.

1. Objectives

1.1 To improve transportation and trade facilities and infrastructure, while having effective regulatory mechanisms to ensure efficiency and transparency in transportation businesses, in order to increase the country's competitiveness and improve the people's quality of life.

1.2 To ensure energy security, improve energy efficiency, increase the use of alternative and clean energy, and expand Thailand's energy-related business opportunities in ASEAN.

1.3 To increase the efficiency and coverage of digital services to be country-wide at reasonable cost, as well as encourage new digital businesses and innovations while developing appropriate cyber security systems and ensuring consumers' rights.

1.4 To expand and improve the efficiency of water supply infrastructure services nationwide, reduce non-revenue water, and establish an integrated management mechanism for water supply operations.

1.5 To promote infrastructure-induced industries to reduce imports and increase the country's economic capacity.

2. Targets and Indicators

Target 1: Overall infrastructure and logistics development: to reduce Thailand's energy intensity and logistics costs.

Indicator 1.1: The share of final energy consumption relative to GDP decreases from 8.22 to 7.70 ktoe/billion baht by 2021.

Indicator 1.2: The share of logistics costs relative to GDP decreases from 14 percent to 12 percent, while that of freight transportation costs is lower than 7 percent by 2021.

Target 2: Transportation: to increase the proportion of freight transportation that uses the railways and waterways; to raise the proportion of passengers using public transportation systems in urban areas; and to expand the capacity of the Bangkok airports and of regional airports to meet increasing demand from passengers.

Indicator 2.1: The proportion of all domestic freight transportation that uses the railways increases from 1.4 percent to 4 percent, while that using inland waterways increases from 12 percent to 15 percent by 2021.

Indicator 2.2: The proportion of passengers in the Bangkok Metropolitan Region using the mass rapid transit system increases from 5 percent to 15 percent by 2021.

Indicator 2.3: The passenger capacity of the Bangkok airports and the regional airports increases to 120 and 55 million passengers per year, respectively, by 2021.

Target 3: Logistics: to improve Thailand's logistics competitiveness and the efficiency of trade facilitation; to develop further the National Single Window (NSW) system to be fully integrated and able to handle electronically all information exchanged in the import/export process; to raise the productivity of the logistics workforce; and to increase the efficiency of freight transportation at border crossings that connect to the main transportation network.

Indicator 3.1: Thailand's rankings in the International Logistics Performance Index and the Ease of Doing Business Index rise.

Indicator 3.2: All transactions related to import/export trade are conducted electronically by 2021.

Indicator 3.3: The volume of goods flowing across Thailand's major international borders grows on average by at least 5 percent yearly.

Target 4: Energy: to increase the share of alternative energy in final energy consumption; and to reduce the dependency on natural gas for electricity generation.

Indicator 4.1: The share of alternative energy in final energy consumption increases from 12.94 percent to 17.34 percent by 2021.

Indicator 4.2: The share of natural gas in Thailand's electricity generation mix decreases from 65 percent to 47 percent by 2021.

Target 5: Digital Economy: to expand the coverage of high-speed internet services to be countrywide; to increase the number of digital businesses and innovations; and to improve cyber security systems to be in compliance with international standards in order to tackle online threats.

Indicator 5.1: Thailand's ranking on the Network Readiness Index (NRI) rises.

Indicator 5.2: The number of villages with high-speed internet access increases from 30 percent to more than 85 percent by 2021.

Indicator 5.3: At least 1,000 more digital entrepreneurs enter the economy by 2021.

Indicator 5.4: The number of government organizations with cyber security systems increases from 47 percent to more than 80 percent by 2021.

Target 6: Water Supply: to enhance tap water production capacity; to expand coverage of water supply services nationwide; and to reduce non-revenue water in the water transmission and distribution systems.

Indicator 6.1: All households in the Bangkok Metropolitan Region receive water supply services by 2018, while more than 80 percent of households in provincial areas receive water supply services by 2021.

Indicator 6.2: All villages in the country have access to clean water services by 2021.

Indicator 6.3: The non-revenue water rate in the water transmission and distribution systems is lower than 20 percent in the Bangkok Metropolitan Region, and less than 25 percent in provincial areas by 2021.

3. Development Guidelines

3.1 Transportation Infrastructure Development

3.1.1 Upgrade and expand the rail system by:

1) Improving the meter-gauge railway network to become the main transportation network by accelerating the advancement of the existing rail, signaling and telecommunications infrastructure, as well as upgrading locomotives and rolling stock. Further, the country should implement the next phase of its dual-track railways development, starting with the construction of routes within a 500-kilometer radius of Bangkok, such as Pak Nam Pho-Den Chai, Chira-Ubon Ratchathani and Chumphon-Surat Thani. In addition, feasibility studies should be conducted for routes along the economic corridors connecting to other ASEAN countries, as well as routes that could act as feeder lines from economic and industrial areas in different provinces to the main rail network. Cooperation with neighboring countries on railway services should be strengthened.

2) Devising a road map to shift from diesel to electrical locomotives in order to accommodate future changes in railway technology which will help decrease the costs of operations and services and increase the capability of the meter-gauge railway to cater for a larger volume of passenger and freight transportation, both domestic and international.

3) Developing the high-speed rail network as a principal means of passenger transportation, while the meter-gauge network feeds passenger traffic to the high-speed rail network. During the course of the Twelfth Plan, at least one high-speed railway route should be constructed, while urban development plans for areas along the route should be devised in order to decentralize development to regional cities, raise the standard of public transportation services, and create opportunities for the Thai people to be familiar with the advanced rail technology.

4) Standardizing the meter-gauge and standard-gauge railway systems as well as the mass-transit city-rail system to help streamline the procurement bidding process and to ensure a higher quality of services, which will thereby help reduce operation and maintenance costs for railway operators.

5) Developing logistics facilities and service centers (e.g. distribution centers, cargo terminals, and container lifting equipment) to serve multimodal transportation along the strategic routes connecting industrial and agricultural manufacturing bases to major trade gateways, especially international ports and important border areas.

3.1.2 Improve urban public transportation by:

1) Developing urban public transport systems to match the cities' economic and social conditions while remaining energy-efficient and eco-friendly. The country should accelerate the construction of mass-transit city-rail projects as planned in the Mass Rapid Transit Master Plan in the Bangkok Metropolitan Region (M-Map). Moreover, the public transport systems in regional cities should be developed according to the characteristics of each city, whether it be a light rail network, bus rapid transit (BRT), or trams. The initial phase of this development should initially take place in major regional cities such as Khon Kaen, Chiang Mai, Songkhla, Hat Yai, and Phuket.

2) Improving the quality of bus services and rerouting bus lines so that they can help connect passengers to the main public transportation network and increase the use of public transportation. Furthermore, local government organizations should be encouraged to increase their role in improving public transportation in order to accelerate the development of public transportation in regional areas.

3) Developing facilities in transportation stations to be in line with the direction of land development, in order to maximize the use of public transportation systems in these areas. To reap full benefits, the country should promote the stricter enforcement of urban planning regulations, the enhancement of urban areas' unique characteristics, and the pursuit of better transit-oriented development (TOD) at a level suited to the management capability of each city's local government. All of these efforts will help to facilitate more effective land development that is in accordance with the specific economic, social, and environment features of each area.

4) Expanding infrastructure and facilities to support non-motorized transportation (NMT) in urban areas by focusing on improving crosswalks, footpaths, and bicycle lanes along the local routes leading to the city's public transportation network. Standards for the safety and protection of pedestrians and cyclists in urban areas should also be improved to facilitate the proportional increase in NMT, which in turn will help boost energy efficiency and reduce environmental impacts. Moreover, infrastructure development in the next period must consider the accommodation of all users, particularly the disabled and seniors, by designing new infrastructure and improving the existing infrastructure to facilitate and serve all users under a universal design concept.

3.1.3 Upgrade the road network by:

1) Improving the quality of roads as well as road safety standards. The country should increase road capacity in bottle-neck areas. The expressway and motorway network around border crossing areas and important gateways should be upgraded and expanded to serve the increasing passenger and freight traffic resulting from

closer integration of the ASEAN Economic Community (AEC). The priority areas include the Padang Besar Border Crossing and the Ban Phunamron Border Crossing. These expansions should also aim to connect passenger and freight transportation to manufacturing bases and important travel destinations in the country.

2) Using Intelligent Transport Systems (ITS) technology to integrate all transportation data in the Bangkok Metropolitan Area in order to monitor and control traffic in real time and be able to provide travelers with information to plan their commute. A superior traffic management system will increase overall efficiency and safety, as well as help related agencies better manage crisis situations and make more-informed policy decisions regarding transportation development.

3.1.4 Further develop air transportation by:

1) Completing the extensions of Suvarnabhumi Airport and Don Mueang Airport by 2021 according to the Airport Master Plan, as well as conducting feasibility studies for future airport expansion to accommodate air transportation demand after Suvarnabhumi Airport and Don Mueang Airport have reached their maximum capacities. Utilization and maintenance plans for existing regional airports should also be developed. Feasibility studies on increasing the utilization of other potential airports should also be conducted, for instance U-Tapao Airport to be used to support Thailand's aviation industry.

2) Improving airport management performance to ensure that the quality of services in passenger and goods transportation, the qualifications of staff, the readiness of equipment, and the processes of emergency responses are all in accordance with international standards, including those established by the International Civil Aviation Organization (ICAO), the European Aviation Organization (EASA), the Federal Aviation Administration (FAA), and the Japan Civil Aviation Bureau (JCAB).

3) Developing the organizational structure of airspace management in order to improve airspace utilization to cope with future air traffic demand, reduce flight delays, better facilitate air traffic control, and increase the competitiveness of Thailand's aviation sector. Such improvements should be in accordance with global aviation policies, standards, and development plans under the ICAO.

3.1.5 Improve the inland water and marine transportation system by:

1) Increasing the utilization of existing ports. To ensure optimal use of existing infrastructure, the Marine Department and Local Administrative Organizations should operate in collaboration with related agencies to study appropriate management and marketing schemes, find ways to increase demand for the existing coastal and river ports, and create a network connecting river and coastal ports to the major deep sea ports in Thailand.

2) Regulating and monitoring public-private partnership contractors at the Laem Chabang deep sea port, increasing the level of services at the port to be on par with the world's leading deep sea ports, and preparing Laem Chabang deep sea port's third expansion phase with active public participation.

3.2 Improvement of Supporting Factors for Transportation Infrastructure

3.2.1 Encourage the growth of infrastructure-induced industries by:

1) Supporting the research and development of transportation-related technology and innovation along with human resources to raise the capacity of the country to provide world-class transportation services, and for its transportation workforce to be equipped with up-to-date skills and be adaptable to changing technology and standards. Human resource development should especially be emphasized in the aviation industry. Related agencies and academic institutions should collaborate in designing curricula and training tools that match the standards required by the ICAO, EASA, FAA, and JCAB.

2) Accelerating the development of the domestic rail industry to reduce imports and increase economic opportunities for the country by: (1) improving the procurement process for railway infrastructure, including the mass transit system and rolling stock, to help stimulate the growth of related industries; (2) increasing knowledge transfer into and between Thailand's public and private operators, as well as academic institutions; (3) increasing the capacity of railway-related human resources in Thailand; (4) improving investment incentives for railway-related businesses; and (5) encouraging more railway-related research, development, and innovation.

3) Encouraging the development of the aircraft parts manufacturing and maintenance industries by establishing aviation industrial estates containing world-class aircraft maintenance facilities. Laws and regulations should also be revised to give better incentives for foreign companies to expand their production bases in Thailand. Human resources and innovation should continuously be fostered for the country to sustain the development of its aviation industry and eventually become the region's aviation hub.

3.2.2 Improve transportation management structures by:

1) Accelerating the formation of the Department of Rail Transportation, which would act as a regulatory unit for rail operators, set standards for safety and maintenance, establish a price structure and required quality of services, put in place measures to help increase the role of the private sector in rail businesses, and ensure consumer protection. The country should also expedite the restructuring of the State Railway of Thailand to increase the efficiency of its services in passenger and freight transportation.

2) Advancing the capabilities of air and waterway transportation regulatory agencies by improving their human resources and equipment, as well as updating their regulatory frameworks to be in accordance with changes in technology and forms of services. The regulatory agencies should also revamp how they set and enforce the price structure, monitor the quality of services, and ensure consumer protection and safety, as well as their capacity for search and rescue operations and accident investigations. Preventive measures to reduce environmental impacts as well as strengthen emergency response procedures should also be improved. All of these efforts are designed to ensure that the quality and safety of services meet international standards and are in line with international agreements.

3) Creating a common fare structure for the public transportation system to increase public transport usage, and selecting an appropriate mechanism to compensate both public and private transportation operators facing losses as they support efforts to encourage a greater proportional use of public transport. These changes will be the main driving force for the reform of the urban public transportation system. For instance, a public transportation fund could be established to replace the current Public Service Obligation (PSO).

4) Updating and streamlining transportation-related measures, laws, and regulations. Related agencies should find effective ways to enforce regulations that will help push rail transportation to become the main mode of passenger and freight transportation. These measures and regulations include demand management for reducing personal motorized vehicles in urban areas, and collecting road usage fees to help the government reduce maintenance costs.

3.3 Logistics Advancement

3.3.1 Advance the country's logistics management to meet international standards, and support value-added processes across the supply chain by:

1) Upgrading logistics management in the industrial sector by encouraging businesses to increase their adoption of information technology in managing their logistics, and promoting the transition to digital logistics and supply chain management. Business management capabilities should be improved according to international standards for modern and green enterprises. Spatial logistics management should be developed by creating networks that connect the sources of raw materials to production bases and to markets in order to support related local industries, including manufacturing and tourism. The government should also encourage enterprises to plan for emergency situations and implement risk management.

2) Improving logistics management in the agricultural sector by working to increase the overall efficiency of logistics and the supply chain in the sector,

developing a Farm-to-Fork value chain for farmers, agricultural institutions, and businesses, and upgrading agricultural logistics infrastructure (e.g. facilities to sort, process, package, and distribute) for shared use in local communities.

3) Increasing the competitiveness of Thai logistics service providers (LSPs) by raising the capabilities and standards of Thai LSPs in providing shipping and insurance services that are comparable with international standards. LSPs should also use information technology to help increase efficiency in transportation management, backhaul management, and product tracking. Building business partnerships between Thai business owners and Thai LSPs should be encouraged to raise the market share of Thai companies in the logistics service industry. Tax incentives or other financial measures should be given to logistics service providers to boost investment and help logistics businesses expand in the region. Business consulting units should be established abroad to provide local information and guidance for Thai businesses to help them invest in and build logistics businesses in potential markets.

4) Encouraging private sector investments in logistics-related industries, as well as the research and development of logistics technology and innovations (e.g., shipment tracking systems, lifting equipment, and maintenance tools used in logistics activities), by using financial measures or investment incentives.

3.3.2 Enhance trade facilitation mechanisms to meet global standards by accelerating the establishment of an agency to invest in, further develop and manage the National Single Window (NSW) system. The regulatory procedures for imports and exports, such as licensing and certification approval procedures, should be revised, especially for five pilot goods including sugar, rice, rubber, frozen goods, and hazardous substances. NSW system development should be accelerated to achieve a complete network integration for import/export and logistics data, linking both government agencies and the private sector (G2B), and to be able to operate electronically as a single entry service. Legal and regulatory mechanisms concerning trade facilitation and logistics activities should be improved, especially for key gateways along major ports, airports, and borders, as well as speeding up the enactment of new regulations related to international electronic transactions.

3.3.3 Enhance the quality of logistics human resources and planning to meet the demands of the business sector. The emphasis should be on escalating workforce productivity through promoting collaboration among the business sector and educational institutes (vocational colleges, universities and training institutes) in revising both vocational and university-level educational programs and organizing training in both operational and technical skills.

3.3.4 Develop a mechanism to monitor closely and evaluate Thailand's logistics development, focusing on the performance of government agencies according to

the National Logistics Development Plan. The mechanism will also monitor any changes to international agreements and collaborations, both bilateral and multilateral, that affect logistics development, including the WTO Trade Facilitation Agreement and the Trans-Pacific Partnership (TPP). This will equip policy makers with information for revising and devising future logistics development plans. Other developments of logistics databases, such as logistics databases for the agricultural, industrial, and commercial sectors as well as key performance indicators, are encouraged.

3.4 Energy Sector Development

3.4.1 Encourage energy conservation and improve efficiency in energy consumption by:

1) Improving the subsidy system and other incentives to encourage behavioral changes in the industrial sector, the transportation sector, the business sector, and the households sector, such as incentives to improve energy conservation and policies to encourage more usage of the existing public transportation and rail systems. The government also should regularly keep the Thai people informed about energy conservation and energy efficiency, as well as cultivate understanding and a sense of responsibility regarding conservation and efficiency in energy consumption.

2) Revamping the energy price structure so it can better reflect real costs, and is fair to both consumers and producers. The tax mechanism should also be adjusted so that it can be used to incentivize the Thai people to change their energy consumption behavior.

3) Increasing efforts in enforcing laws and regulations regarding energy conservation and energy efficiency, especially the enforcement of the Building Energy Code (BEC) for new buildings and the Energy Efficiency Resources Standard (EERS) for energy producers and distributors. The government should also have a clear set of policies and implementing measures to initialize the first stage of electricity infrastructure for electric vehicles (EV), in order to lay the ground for future EV expansion.

4) Encouraging both the public and private sectors to undertake research and develop technology related to energy conservation and energy efficiency for machinery, materials, and appliances in manufacturing processes, in business operations, and in everyday life. The government then should set standards for energy conserving technology that can be applied among all sectors, including industry, business, and households, as well as pressing for these standards to be used extensively. The government should also determine the measures required to tackle materials, machinery, and appliances that do not meet these standards. The government should also support the research and

development of smart grid technology covering all stages in the process, whether it be generation, transmission, distribution, or consumption, so that the results can be further developed to be commercially viable.

3.4.2 Ensure sufficient and reliable energy supply by:

1) Diversifying the types of fuels for power generation, as planned in Thailand's Power Development Plan, and according to each area's potential. Related agencies should plan the development of transmission and distribution systems according to each area's demand for electricity, potential for power generation, and existing power supply. Regulating offices should conduct studies to find an appropriate structure for electricity tariff rates that vary by area, and examine its effects compared to the existing uniform tariff structure in terms of its ability to reflect the costs of producing and transmitting electricity.

2) Exploring and developing new drill sites as well as maximizing the utilization of natural gas in the Gulf of Thailand. Thailand should develop its natural gas pipeline networks and LNG terminals to accommodate increasing demand and improve competitiveness among natural gas businesses, while continuing to develop a third-party access regime with a fair price structure. Thailand should continue to invest in oil pipelines to increase efficiency in oil transportation.

3.4.3 Increase the country's capacity to manage, produce, and consume alternative and clean energy by:

1) Developing a database on the generation and utilization of alternative energy to help with the planning of infrastructure to support the expansion of alternative energy in the future. With the share of alternative energy projected to increase, standards should be set and enforced to ensure safety in the production and use of such fuels. The government should also work to keep the Thai people informed on alternative and clean energy.

2) Evaluating the existing incentives (feed-in tariffs) that aim to increase the share of alternative fuels in power generation, to help develop other incentives that are fair to both the producers and consumers of alternative energy. The government should also create a mechanism that allows the private sector to participate in driving the Alternative Energy Development Plan to the achievement of its objectives, whether in the process of material acquisition, fuel formulation, transportation, supply chain management, or energy generation.

3) Increasing the use of biofuels in the transportation sector by using market mechanisms to lower the price of biofuels to levels competitive with those of fossil

fuels. Concurrently, alternative energy generation should be encouraged for power and heat generation in industrial factories, businesses, and households.

4) Continuously researching and developing alternative energy technology, including solar, wind, hydropower, biomass, biogas, energy crops, and waste, so that the costs of alternative fuels can be reduced to commercially viable levels.

3.4.4 Improve regulatory processes for energy businesses, incorporating transparency and good governance practices, as well as increasing the adaptability of regulations and regulatory processes to changes in the energy markets in order to prepare Thailand for energy market liberalization in the future. Regulatory offices should also determine a cost-reflective pricing structure to give both producers and consumers the greatest net benefit. The aim should also be systematically to educate Thai citizens regarding the process of energy acquisition and the various limitations of different energy sources, in order to cultivate a sense of responsibility in their energy consumption and raise people's understanding of policy directions.

3.4.5 Promote Thailand to become ASEAN's energy trading hub and increase opportunities for Thailand to expand its energy businesses in ASEAN by:

1) Upgrading domestic energy-related infrastructure in terms of quality, reliability, and efficiency to be ready to connect to an ASEAN energy grid. Laws and regulations should also be revised to prepare Thailand to become ASEAN's energy hub and to accommodate the expansion of Thai energy businesses to the region.

2) Pushing for regional energy collaboration in developing a joint electricity network and to achieve shared refined oil standards to increase opportunities for investment and energy development. Thailand should assist neighboring countries in developing energy infrastructure and their other endeavors regarding energy development to help strengthen the economy and cultivate good relationships among the ASEAN community.

3) Encouraging Thailand's energy-related state-owned enterprises to take their expertise outside Thailand and expand their businesses to neighboring countries. Energy-related agencies and businesses should work together to increase business opportunities in neighboring countries and help propel Thailand to become ASEAN's energy trading hub.

3.5 Growth of the Digital Economy

3.5.1 Improve the country's telecommunications infrastructure coverage and efficiency by:

1) Working to achieve country-wide coverage of high-speed broadband networks, wired or wireless, as well as ensuring basic telecommunications services.

2) Developing international telecommunication networks, including international submarine cables, satellites, and terrestrial networks connecting ASEAN countries. Responsible agencies should manage frequencies and orbital positions for both commercial and public uses to ensure secure and effective international networks.

3) Facilitating shared use of telecommunication and mass communication infrastructure while devising a clear plan to utilize unused frequencies as well as frequencies near the end of their concession agreements, in order to ensure optimal utilization of resources, reduce redundancy, and decrease government spending.

3.5.2 Encourage the use of digital technology to create added value for businesses by:

1) Encouraging businesses to transition to digital by encouraging digital business and e-commerce platforms in the agricultural sector, the manufacturing sector, and the business sector, while promoting online shops and standards for online merchandise, and supporting digital start-ups, digital small and medium-sized enterprises (digital SMEs), and digital community enterprises.

2) Developing standards for coding online products as well as standards for online services to increase the reliability and competitiveness of Thailand's online businesses, and to ensure the efficiency and security of e-Commerce transactions, electronic supply chain management (e-SCM), and electronic payments (e-Payments).

3.5.3 Increase innovation and research in digital industry and space technology by:

1) Promoting telecommunications research and development to be used commercially, particularly developments regarding digital technology, high-speed wireless communication technology, software systems, transceivers, high-speed internet systems, satellite communication systems, and space and geoinformatics technology.

2) Improving human resources in the public sector, private sector, and academia to be able to support the development of digital technology and to meet future labor demand of the digital industry.

3.5.4 Ensure cyber security by establishing a cyber security council to monitor and respond to threats or incidents that are rapidly changing with technology development, particularly threats to the security of personal information and the financial sector.

3.5.5 Update laws and regulations to better support the country's information and communication businesses and digital economy development, including electronic commercial laws, standards for online identity verifications, and right-of-way regulations for telecommunications infrastructure. A council of digital service professionals should also be established to help facilitate collaboration between the government and the private sector in digital industry development.

3.6 Water Supply System Improvement

3.6.1 Improve the water supply system for all by:

1) Developing master plans regarding long-term water supply services at regional level, considering raw water sources, water production, water transmission system, water distribution system, and water demand forecast, to provide a framework to be integrated into the Strategic Plan on Thailand's Water Resources Management and to be a guideline for providing and expanding the waterworks service coverage.

2) Expanding production capacity and water transmission and distribution networks to meet increasing water needs in the future, giving priority to regional areas with potential water sources but insufficient water supply services, tourist destinations, and special economic zones.

3) Providing clean water and developing villages' water supply systems to meet basic needs in all villages, giving priority to villages without access to clean water or water supply systems but having operational readiness.

3.6.2 Increase efficiency in water usage and create related innovations by:

1) Developing water consumption management plans by sector, as well as implementing 3R measures (Reduce, Reuse, and Recycle) and wastewater fees in order to promote water-saving behavior and awareness in the residential, business, and industrial sectors.

2) Promoting research by both the public and private sectors on water production technology, in particular low-cost water desalination technology, water transmission efficiency, water saving innovations or tools for the residential, business and industrial sectors, as well as encouraging the application of this research in water supply operations for commercial and social benefits.

3.6.3 Proactively reduce non-revenue water as well as undertake maintenance to prevent wastage and leakages from the water supply system nationwide by:

1) Developing non-revenue water reduction plans in provincial areas with high non-revenue water rates, with definite operational areas, scope of tasks, non-

revenue water reduction targets, and related indicators, as well as detailed annual investment plans. Related agencies should conduct studies to determine an optimal non-revenue water rate for Thailand through the examination of various physical water loss reduction measures against their costs.

2) Increasing the private sector's participation in water loss reduction, encouraging technical knowledge transfer between public and private personnel, and raising collaboration levels with provincial authorities, providing them with technical and operational assistance in non-revenue water reduction.

3) Upgrading the information technology used in non-revenue water management to be in accordance with international standards, and increasing the adoption of this technology for better control of water pressures and management of water losses.

3.6.4 Restructure water works management by differentiating between policy making authorities, regulatory authorities, and operational authorities. A law on the establishment of a regulatory authority should be promulgated by 2019 to ensure that water supply services will be efficient, reliable, and accessible, as well as to set a pricing structure that is fair to both service providers and consumers.

4. Complementary Plans

4.1 The Transport Infrastructure Strategic Plan, 2015-2022.

4.2 The Second Industrial Logistics Master Plan, 2017-2021.

4.3 Thailand's Power Development Plan, 2015-2036 (PDP 2015).

4.4 The Energy Efficiency Plan, 2015-2036 (EEP 2015).

4.5 The Alternative Energy Development Plan, 2015-2036 (AEDP 2015).

4.6 The Oil Plan, 2015-2036 and The Gas Plan, 2015-2036.

4.7 The Digital Economy and Society Development Plan.

4.8 The Metropolitan Waterworks Authority Water Supply Infrastructure Development Plan, 2018-2047.

4.9 The Third Provincial Waterworks Authority Strategic Plan, 2017-2021.

5. Flagship Projects

5.1 Transportation

5.1.1 Key inter-city rail projects are as follows:

1) A total of 14 routes of meter-gauge double-track railway projects covering 2,500 kilometers, including 7 cabinet-approved routes (Chachoengsao-Khlong Sip Kao-

Kaeng Khoi section, Thanon Chira Junction-Khon Kaen section, Map Kabao-Thanon Chira Junction section, Prachuap Khiri Khan-Chumphon section, Lopburi-Pak Nam Pho section, Nakhon Pathom-Hua Hin section, and Hua Hin-Prachuap Khiri Khan section) and 7 routes under the process of conducting feasibility studies or designing the specifics (Pak Nam Pho-Den Chai section, Thanon Chira Junction-Ubon Ratchathani section, Khon Kaen-Nong Khai section, Chumphon-Surat Thani section, Surat Thani-Hat Yai-Songkhla section, Hat Yai-Padang Besar section (driven by electric energy), and Den Chai-Chiang Mai section). The main agency responsible for carrying out the projects is the State Railway of Thailand, with a timeline of 6 years from 2016 to 2021.

2) At least one high-speed railway project. The main agencies responsible for carrying out the project are the Ministry of Transport and the State Railway of Thailand, with a timeline of 6 years from 2016 to 2021.

3) Projects constructing new railway routes along important economic corridors (Kanchanaburi-Bangkok-Aranyaprathet section, Kanchanaburi-Bangkok-Laem Chabang section, and Den Chai-Chiang Rai-Chiang Khong section). The main agency responsible for carrying out the projects is the State Railway of Thailand, with a timeline of 5 years from 2017 to 2021.

5.1.2 Key projects for urban public transportation development are as follows:

1) A total of 10 mass rapid transit lines (13 projects) in the Bangkok Metropolitan Region, covering 384 kilometers, consisting of 7 cabinet-approved projects [Blue line (Hua Lamphong-Bang Khae and Bang Sue-Tha Phra section), Red line (Bang Sue-Rangsit section), Green line (Mo Chit- Sapanmai-Khu Khot section and Bearing-Samut Prakan section), Orange line (Thailand Cultural Centre-Min Buri-Suwinthawong section), Yellow line (Lat Phrao-Samrong section), Pink line (Khae Rai-Min Buri section), and Red line (Bang Sue-Phaya Thai-Makkasan-Hua Mak section and Bang Sue-Hua Lamphong section)] and 6 projects under the process of conducting feasibility studies or designing the specific [Blue line (Bang Khae-Phutthamonthon Sai 4 section), Red line (Rangsit-Thammasat University Rangsit Center section), Purple line (Tao Pun-Rat Burana section), Orange line (Taling Chan-Thailand Cultural Centre section), Green line (Samut Prakan-Bangpoo section), and Green line (Khu Khot-Lam Luk Ka section). The main agencies responsible for carrying out the projects are the Mass Rapid Transit Authority of Thailand and the State Railway of Thailand, with a timeline of 8 years from 2014 to 2021.

2) Public transport system development projects in major regional cities, including Khon Kaen, Chiang Mai, Songkhla, Hat Yai and Phuket. The main agencies

responsible for carrying out the projects are Local Administrative Organizations and the Office of Transport and Traffic Policy and Planning, with a timeline of 6 years from 2016 to 2021.

5.1.3 Key road network development projects include intercity motorway projects connecting border areas, special economic zones, and major trade gateways such as the Songkhla-border (Malaysia) section and the Kanchanaburi-Ban Phu Nam Ron border section, as well as road widening projects from 2 to 4 lanes to meet increasing passenger and freight transportation demand along Highway 33 (the Prachin Buri-Kabin Buri section) and Highway 408 (the Songkhla-Thungwang section). The main agencies responsible for carrying out the projects are the Department of Highways and the Department of Rural Roads, with a timeline of 6 years from 2016 to 2021.

5.1.4 Key air transportation development projects are as follows:

1) The Suvarnabhumi Airport Development, carried out by the Airport of Thailand Public Company Limited, with a timeline of 7 years and 5 years (2011–2017 and 2017–2021),

2) The Don Mueang Airport Development, carried out by the Airport of Thailand Public Company Limited, with a timeline of 5 years (2017–2021).

3) The Maesot Airport Development, carried out by the Department of Airports, with a timeline of 5 years (2017–2021).

4) The Ba Tong Airport Development, carried out by the Department of Airports, with a timeline of 2 years (2016–2017).

5) The U-Tapao Airport Development, carried out by the Royal Thai Navy and the Airport of Thailand Public Company Limited, with a timeline of 5 years (2017–2021).

5.1.5 Key waterway transportation development projects are as follows:

1) The Coastal Port (Port A) Project at the Laem Chabang deep-sea port, carried out by the Port Authority of Thailand, with a timeline of 3 years (2016–2018).

2) The Single Rail Transfer Operator (SRTO) Project at the Laem Chabang deep-sea port (Phase 1), carried out by the Port Authority of Thailand, with a timeline of 2 years (2016–2017).

3) The Laem Chabang Deep-Sea Port Development Plan (Phase 3), carried out by the Port Authority of Thailand, with a timeline of 5 years (2016–2020).

4) The Cruise Terminal Development Project, carried out by the Marine Department (2016–2020).

5.2 Plans and projects to develop facilities supporting intermodal freight transportation include the construction of intermodal facilities, cargo terminals, and container yards near key trade gateways and potential areas in order to shift from road transportation to rail and waterway transportation. Other related projects are the construction of rest areas to increase road safety. The main agencies responsible for carrying out the projects are the Department of Land Transport and the Department of Highways, with a timeline of 5 years (2017-2021).

5.3 Logistics

5.3.1 Plans to enhance industrial and agricultural logistics and supply chain management, carried out by the Ministry of Industry and the Ministry of Agriculture and Cooperatives, with a timeline of 5 years (2017-2021).

5.3.2 Competitiveness enhancement for logistics service providers, carried out by the Ministry of Commerce, with a timeline of 5 years (2017-2021).

5.3.3 Trade facilitation enhancement plans, carried out by the Ministry of Finance, with a timeline of 5 years (2017-2021).

5.3.4 Logistics human resource development and planning, carried out by the Ministry of Labor and the Ministry of Education, with a timeline of 5 years (2017-2021).

5.3.5 The development of a logistics and supply chain database and indicators along with a monitoring mechanism for changes in international agreements, carried out by the Office of the National Economic and Social Development Board, with a timeline of 5 years (2017–2021).

5.4 Energy

5.4.1 The Mae Moh Power Plant Replacement Project for Units 4-7, carried out by the Electricity Generating Authority of Thailand, with a timeline of 4 years (2014-2017).

5.4.2 Improvement of the Transmission System for Greater Reliability in the Western and Southern Regions, carried out by the Electricity Generating Authority of Thailand, with a timeline of 9 years (2014-2022).

5.4.3 Factory and building energy management plans and measures, carried out by the Ministry of Energy, with a timeline of 5 years (2017-2021).

5.4.4 Energy efficiency plans and measures in the transportation sector, carried out by the Ministry of Energy and the Ministry of Transport, with a timeline of 5 years (2017-2021).

5.4.5 Pilot projects for building energy management systems (BEMSs), demand response measures, micro grids, and energy storage systems, carried out by the Ministry of Energy and the Office of the Energy Regulatory Commission, with a timeline of 5 years (2017-2021).

5.4.6 Power generation development plans and projects, carried out by the Ministry of Energy and the Electricity Generating Authority of Thailand, with a timeline of 5 years (2017-2021).

5.4.7 Transmission and distribution system development plans and projects, carried out by the Ministry of Energy, the Ministry of Interior, the Electricity Generating Authority of Thailand, the Provincial Electricity Authority, and the Metropolitan Electricity Authority, with a timeline of 5 years (2017-2021).

5.4.8 Promotion of rooftop solar installments, carried out by the Ministry of Energy, with a timeline of 5 years (2017-2021).

5.4.9 The development of a floating storage and regasification unit (FSRU), carried out by the Ministry of Energy, with a timeline of 5 years (2017-2021).

5.5 Digital Economy

5.5.1 Asia Pacific Gateway (APG) Project expanding the fiber optic cable network, carried out by CAT Telecom Public Company Limited, with a timeline of 7 years (2013-2019).

5.5.2 High Speed Packet Access (HSPA) Project, carried out by CAT Telecom Public Company Limited, with a timeline of 13 years (2013-2025).

5.5.3 International Submarine Cable Network Project, carried out by TOT Public Company Limited, with a timeline of 5 years (2014-2018).

5.5.4 The Expansion of High-Speed Broadband (1.6 million ports), carried out by TOT Public Company Limited, with a timeline of 3 years (2017-2019).

5.5.5 Development plans for a high-speed internet telecommunications network, carried out by the Ministry of Digital Economy and Society, with a timeline of 5 years (2017-2021).

5.5.6 Development plans for small and medium-sized enterprises (SMEs), carried out by the Ministry of Digital Economy and Society and the Software Industry Promotion Agency (Public Organization), with a timeline of 5 years (2017-2021).

5.5.7 Development plans for human resources and innovations for digital advancement, carried out by the Ministry of Digital Economy and Society and the Ministry of Education, with a timeline of 5 years (2017-2021).

5.5.8 Development plans for cyber security systems, carried out by the Ministry of Digital Economy and Society, with a timeline of 5 years (2017-2021).

5.6 Waterworks

5.6.1 The Ninth Bangkok Water Supply Improvement Project, carried out by the Metropolitan Waterworks Authority, Ministry of Interior, with a timeline of 7 years (2016-2022).

5.6.2 The Tenth Bangkok Water Supply Improvement Project, carried out by the Metropolitan Waterworks Authority, Ministry of Interior, with a timeline of 4 years (2018-2021).

5.6.3 PWA Waterworks Development Project 2015, carried out by the Provincial Waterworks Authority (PWA), Ministry of Interior, with a timeline of 3 years (2015-2017).

5.6.4 PWA Phranakhon Sri Ayutthaya Waterworks Expansion Project 2015, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2015-2017).

5.6.5 PWA Phetchaburi Waterworks Expansion Project 2015, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2015-2017).

5.6.6 PWA Waterworks Development Project 2016, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2016-2018).

5.6.7 PWA Khon Kaen-Nam Phong Waterworks Expansion Project Phase 1: 2016, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2016-2018).

5.6.8 PWA Pattaya–Laem Chabang–Sriracha Waterworks Expansion Project 2016, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2016-2018).

5.6.9 PWA Waterworks Development Project 2017, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2017-2019).

5.6.10 PWA Khon Kaen-Nam Phong Waterworks Expansion Project, Phases 2-3: 2017, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2017-2019).

5.6.11 PWA Chonburi–Phanatnikhom–(Phan Thong)–(Tha Bun Mi) Waterworks Expansion Project Phase 1: 2017, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2017-2019).

5.6.12 PWA Phuket Waterworks Expansion Project 2017, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2017-2019).

5.6.13 PWA Waterworks Development Project 2018, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2018-2020).

5.6.14 PWA Samutsakhon Waterworks Expansion Project, Phases 1-4: 2018, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2018-2020).

5.6.15 PWA Om Noi Waterworks Expansion Project 2018, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2018-2020).

5.6.16 PWA Waterworks Development Project 2019, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2019-2021).

5.6.17 PWA Samutsakhon Waterworks Expansion Project, Phases 5-7: 2019, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2019-2021).

5.6.18 PWA Udon Thani–Nong Khai Waterworks Expansion Project 2019, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2019-2021).

5.6.19 PWA Waterworks Development Project 2020, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2020-2022).

5.6.20 PWA Phanomsarakarm-Bang Khla-Plaang Yao-Thepparat Waterworks Expansion Project: 2020, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2020-2022).

5.6.21 PWA Chiang Mai Waterworks Expansion Project 2020, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2020-2022).

5.6.22 PWA Koh Samui Waterworks Expansion Project, Phase 2: 2020, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2020-2022).

5.6.23 PWA Waterworks Development Project 2021, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2021-2023).

5.6.24 PWA Pattaya–Laem Chabang-Sriracha Waterworks Expansion Project 2021, carried out by the Provincial Waterworks Authority, Ministry of Interior, with a timeline of 3 years (2021-2023).

Section 4 Development Strategies

Strategy 8 Strategy for the Development of Science, Technology, Research, and Innovation

The previous phase of Thailand's economic development, in addition to relying on the country's labor pool and natural resources, also depended on modern technology imports rather than indigenous knowledge as the way to drive technology advancement. This allowed foreign technology manufacturers to gain a large domestic market share of technology value-added. Research and Development (R&D) investment in Thailand, especially in applied research and its utilization, has not been enough to drive Thailand to become a country characterized by innovation. At the same time, the rapid advancement of technology has caused economic and social changes across the world. Developed countries such as South Korea, USA, Japan and Sweden have become role models as innovative countries. To enhance Thailand's competitiveness, the adaptation of technology, the acquisition of knowledge, and an emphasis of R&D and innovation are essential.

The new era of science, technology, research and innovation development in Thailand should focus on reforming working practice with the aim of strengthening cooperation between the public and private sectors with regards to R&D investment. The action plan will include identifying the main R&D issues which must be addressed in order to enhance the capabilities of those components of the country's agricultural, industrial, and service sectors which already have a competitive advantage. Next, there is a need to expand the capabilities of new target industries by building an innovative society, including creating innovations for the benefit of society, especially for the elderly and the disabled; developing human resources; developing laboratories and a world class body for certification and accreditation; issuing measures to strengthen national science, technology and R&D; revising law and enforcement; and restructuring the intellectual property (IP) system. These measures aim to minimize Thailand's dependency on foreign technologies, and encourage the country to develop its own.

In conclusion, to become an innovative country and a developed country, the 5-year 12th National Economic and Social Development Plan of Thailand emphasizes the importance of the intensive utilization by both the private and public sectors of knowledge in science, R&D, technology, and innovation. Moreover, it is also important to create an environment that welcomes R&D investment and facilitates the development of research

personnel capabilities as well as the efficiency of the research management system. This will allow Thailand to fulfill its goals for the development of science, technology, research, and innovation.

1. Objectives

1.1 To strengthen and enhance the capability of advanced science and technology to support higher value-added in target production and service industries.

1.2 To create opportunities for farmers, community enterprises, and SMEs to access and utilize technology.

1.3 To develop innovation that helps reduce inequality and enhance the quality of life.

1.4 To integrate the management systems of science, technology, research, and innovation to move in the same direction.

2. Targets and Indicators

Target 1: To strengthen the provision of science and technology in Thailand:

Indicator 1.1 The volume of R&D investment increases to 1.5 percent of GDP.

Indicator 1.2 The R&D investment ratio of the private sector to the public sector is 70:30.

Indicator 1.3 the R&D investment ratio of (i) strategic industries to (ii) basic research to (iii) infrastructure, human resources, and standards is 55:25:20.

Indicator 1.4 The number of R&D personnel increases to 25 persons per 10,000 people.

Target 2 To promote the application of science, technology, and innovation to increase competitiveness in the agricultural, industrial, and service sectors, and enhance the quality of life:

Indicator 2.1 The country's global competitiveness ranking in science and technology infrastructure rises to the top 30.

Indicator 2.2 More than 30 percent of R&D products and technology are ready to use for value creation, including production value, service value, and business value.

Indicator 2.3 The volume of R&D corporate tax exemption increases by more than 20 percent per year.

Indicator 2.4 Innovations which are created within the country for society, the elderly, and the disabled increase more than two-fold.

3. Development Guidelines

3.1 Promote R&D investment, social adoption, and commercialization:

3.1.1 Invest in R&D and technology in competent industries, such as food and agricultural technology, medical technology, environmental technology, creative industrial technology, and cultural technology in order to build new economic bases by continuously allocating sufficient budget to create innovations along the value chain, and by focusing on applied and experimental R&D which includes product prototypes, marketing, product testing, and pilot plants. The aforementioned guidelines aim to transform research into benefits for commercial and social purposes.

3.1.2 Invest in R&D and technology, causing a leap in the growth of such areas as medical hubs, biological technology (biological products, pharmacogenomics, processed foods, biomass for bio-fuel and chemical fuel, and alternative energy), robotics and smart devices, next generation automotive (electric vehicles (EV) and hybrid vehicles (HV)), electromechanical systems, digital technology, Internet of Things, artificial intelligence, embedded systems, and rail and aviation technology. In order to develop the aforementioned technology, Thailand should attach great importance to public private partnership (PPP) investment, and play a role in creating new potential technology in the world market by establishing funds such as strategic industry competitiveness funds and technopreneur development funds. Furthermore, the government should invest in higher-risk disruptive technology, including the concept of reverse engineering, and concentrate on mega project investment in order to promote the development of science, technology, research, and innovation.

3.1.3 Invest in R&D and technology for society to promote inclusive growth and quality of life, such as educational technology, information and communication technology (ICT), technology for the disabled and the elderly, as well as medical technology (medicines, vaccines, and medical equipment). These groups of technological advancement should be developed through networks of education institutes, research institutes, the public sector, the private sector, and civil society.

3.1.4 Accelerate R&D and technology transfer to farmers, community enterprises, and SMEs by hiring technology transfer specialists through networks involving education institutes, research institutes, the public sector, and the private sector.

3.1.5 Develop the Thai technology and innovation market by improving the registration system for the Thai Invention Database and Thai Innovation Database Programs, the government procurement programs. This will lead to technology and innovation development in the country, and thereby reduce the import of technologies.

3.1.6 Promote an effective world class IP system to create value-added products and a user-friendly IP database. The improved IP system should be helpful for tracking or analyzing registered technology from the IP database.

3.2 Develop Technopreneurs:

3.2.1 Enhance entrepreneurs to play a key role in innovation and technology, and co-lead direction by working along with education institutes, research institutes, the public sector, the private sector, and civil society. In parallel, Thailand should revise regulations and issue measures to support private sector investment in R&D, and provide opportunities for the private sector in conducting research for the government. These actions should develop public-private partnership investment in technology in order to eventualize a leap in growth.

3.2.2 Promote innovative creation, especially in design and technology-related business management by issuing measures to support the agricultural, industrial, and service sectors to create innovations, and enhance capability and competitiveness such as through funds, tax incentives, and low interest rate loans, etc.

3.2.3 Support start-ups and SMEs to access capital and funds, to work with researchers and specialists in education institutes and research institutes, and to access technology-related services provided by government.

3.2.4 Provide a proper environment for districts and communities to learn and develop creative thinking by developing learning centers, providing innovative/creative idea-sharing spaces, searching for role models, and promoting innovative products and successful innovation models to be well-known and widely used.

3.2.5 Promote a campaign to increase people's engagement in R&D, increase people's respect for IP, and increase logical thinkers by using media, activities, and mechanisms which will pass on science and technology knowledge and services to every district and community.

3.3 Develop a proper environment for the promotion of science, technology, research, and innovation:

3.3.1 Developing human resources:

1) **Increase, both qualitatively and quantitatively, the science and technology personnel who are needed in labor market, especially in the STEM (Science: S, Technology: T, Engineer: E, Mathematics: M) subjects** by drawing people's attention to these fields, motivating people, supporting funds, and so on in order to increase the number of graduates, lecturers, and personnel in STEM, and enhance the STEM-related educational system.

2) Accelerate the development of researchers especially in such occupations as production engineers, physicians, data scientists, designers and others, consistent with the development of strategic industries and national growth. This includes R&D and innovation personnel such as R&D managers, technology transfer specialists, evaluators, and IP specialists, etc. Researcher management will be undertaken in parallel with individual career development plans and research personnel market development by setting agreements between the public sector and other involved sectors to affirm conjectural research before investing in mega projects.

3) Enhance researcher capability in order to understand technology, markets, business management, IP management, and end-users by prioritizing market needs. Therefore, feasibility studies of each investment project can be used to evaluate the economic and social impact of each project.

4) Use tax incentive channels to attract specialists, researchers, and scientists in strategic industries from abroad to work in public and private institutes to strengthen the country's R&D, and use tax incentives to support technology development in the agricultural, industrial, and service sectors.

3.3.2 Develop science and technology infrastructure:

1) Improve and develop an effective research system to support new significant technology: such as ICT, graphene,¹ educational technology, technology to support demographic changes and to enhance the quality of life (technology for elderly and disabled), technology which will add agricultural product value, transportation and logistics technology, green technology, and future technology. Furthermore, Thailand should promote R&D and technology in the space industry, and develop user-friendly indexes and databases for science, technology, and innovation.

2) Enhance science and technology infrastructure to support fast-changing technology: by promoting research center investment, focusing on competent areas of development, and providing proper measures. Moreover, Thailand should promote domestic and international R&D partnerships, particularly in strategic industrial research centers, and also encourage industrial estate modification into science business parks. Other important activities cover promoting the private sector to invest in science business parks, developing and promoting all science parks and research institutes in Thailand to work with networks (academic sector, private sector, and civil society) in order to solve critical problems in the agricultural, industrial, and service sectors.

¹ Graphene technology is another form of material technology for the future which will play an important role in electronics, medical health, and energy.

3) **Promote quality systems, standards systems, and national metrology systems:** including measurement, calibration, and accreditation to be in line with international standards. In addition, Thailand should enhance and develop the private sector's world class metrology centers in the country through providing proper funds and incentives.

4) **Accelerate the utilization of the full capacity of government ICT:** including public access to government and public data, and developing the Government Service Platform and applications which will allow government agencies to access and share information. This should be performed in parallel with the development of the government service platform and applications.

5) **Support new financial tools as funding mechanisms:** such as joint ventures, funds, and money markets in order to enhance innovation creation, research translation, and commercialization.

6) **Promote the sharing of R&D facilities, such as tools, equipment, and laboratories** among research institutes, education institutes, the public sector, and the private sector.

7) **Encourage and accelerate legislation for research translation and commercialization:** e.g. a (proposed) R&D Translation and Commercialization Promotion Act, B.E., which will offer opportunities for the private sector to own technology and innovation funded by the government, and to be flexible to pass on technology and innovation to the agricultural, industrial, and service sectors. However, the government can retrieve technology and innovation ownership in the case of national security or the public interest.

3.3.3 Develop management systems:

1) **Restructure public organizations and their role in integrating the country's operation of science, technology, research, and innovation development,** including organizations that are responsible for policy formulation, research funding, undertaking research, knowledge management, and so on. Restructuring organizations and their roles will reduce overlapping operations among public organizations so that science, technology, research, and innovation will be efficiently driven.

2) **Improve government budgeting systems,** from functional-based budgeting into program-based budgeting in order to integrate programs, activities and budgets between public organizations, and decide on strategic plans or exit plans.

3) **Evaluate research institutes' capabilities in terms of science, technology, research, and innovation capability, management systems, monitoring and**

evaluation of the country's flagship research projects, and continuous public disclosure and reporting.

4) Launch a Technology Roadmap and R&D strategic plan in important sectors in order to prioritize programs/activities in the strategic industries, including the agricultural sector, industrial sector, tourism sector, and sports sector, in accordance with the science, technology, research, and innovation strategic plans. This should lead to cooperation among the involved organizations to drive Thailand's science, technology, research, and innovation concretely.

5) Promote research and studies consistent with area and provincial development to support provincial/provincial cluster development plans. This should upgrade provinces' capability to adopt research, create product value, and solve community problems with cooperation from local education institutes and research institutes.

6) Encourage knowledge exchange and in-depth development in science, technology, research, and innovation via existing mechanisms, such as promoting the capability of the science, technology, and innovation councils in order to recruit specialists in science, engineering, and related fields to advise the government and the public on science, technology, research, and innovation development. Moreover, it is important to promote science diplomacy in order to exchange knowledge in policy planning and implementation with other countries.

4. Complementary Plans

4.1 The National Science, Technology and Innovation Policy and Plan I, (2012–2021).

4.2 The National Research Policy and Strategy XI, (2017–2021).

4.3 The National Biotechnology Policy Framework, (2012–2021).

4.4 The National Nanotechnology Policy Framework, (2012–2021).

4.5 The National Metrology Development Master Plan III, (2017–2021).

4.6 Supporting involved organizations to create action plans on research and innovation in different fields such as agriculture, industry, tourism, sports, and so on.

5. Flagship Projects

5.1 Promote Thai entrepreneurs to play a leadership role, and use innovation to create value in their goods and services, consisting of sub-projects such as joint venture projects, in order to provide the technology needed for a leap in business growth.

5.1.1 Key Implementing Agencies: include the Ministry of Science and Technology, in collaboration with the Ministry of Finance, Ministry of Industry, Ministry of Agriculture and Cooperatives, Ministry of Commerce, Ministry of Interior, the Federation of Thai Industries, Thai Chamber of Commerce, and other involved organizations.

5.1.2 Operational Timeframe: 5 years (2017–2021).

5.2 Encourage Thai entrepreneurs to participate in global production networks, particularly in competent industries such as Thailand’s R&D Hub.

5.2.1 Key Implementing Agencies: the Ministry of Science and Technology, in collaboration with the Ministry of Commerce, Ministry of Industry, Ministry of Agriculture and Cooperatives, Ministry of Public Health, the Federation of Thai Industries, Thai Chamber of Commerce, and other involved organizations.

5.2.2 Operational Timeframe: 5 years (2017–2021).

5.3 Support Thai goods and services to meet appropriate standards and be listed on the Thai Invention Database and the Thai Innovation Database Programs for procurement.

5.3.1 Key Implementing Agencies: the Ministry of Science and Technology, in collaboration with the National Research Council of Thailand, Ministry of Industry, Ministry of Agriculture and Cooperatives, Ministry of Public Health, and other involved organizations.

5.3.2 Operational Timeframe: 3 years (2017–2019).

Part 4

Development Strategies

Strategy 9 Strategy for Regional, Urban, and Economic Zone Development

For Thailand to achieve the key goals of the Twelfth National Economic and Social Development Plan of upgrading the existing production and service bases while developing new ones, it needs to utilize the economic potential and geosocial attributes of each specific area. The prospects of extending prosperity and increasing per capita income will be improved through a proactive strategy that focusses on strengthening the prominent attributes of each region and province. With appropriate urban development in addition to infrastructure and logistics improvement, prospective cities can be developed to become livable cities with the capacity to accommodate increasing trade and investment. The results will help to (1) alleviate development concentration in Bangkok and the Central Region, (2) improve national competitiveness, and (3) provide a wide range of economic and social benefits, in much the same way as Thailand gained from the development of the Eastern Seaboard, which is now one of ASEAN's leading economic areas. In addition, Thailand also has the opportunity to develop new economic zones within the border areas to enhance cross-border trade, investment, and connectivity as a member of the ASEAN Economic Community.

The Twelfth National Economic and Social Development Plan emphasizes key developments and activities to be undertaken in a timely manner, namely: (1) strengthening the existing production and service bases; (2) creating new production and service bases to generate income for people in all regions; (3) supporting the quality growth of urban areas; (4) developing and reviving the Eastern Seaboard areas to accommodate future industrial expansion; (5) enabling the sound management of border economic areas to attain sustainable growth and competitiveness; and (6) enhancing the efficiency of urban and regional development implementation mechanisms to deliver concrete outcomes.

1. Objectives

- 1.1 To distribute regional growth and economic opportunities more equitably.
- 1.2 To develop the city centers of each province to become livable cities for all.
- 1.3 To develop and revive key economic areas to grow ecologically and improve the living standards of their communities.

1.4 To develop new economic areas to enhance competitiveness and attain sustainable growth.

2. Targets and Indicators

Target 1: Improved income distribution among regions:

Indicator 1.1 Reduced disparity of Gross Regional Product per capita.

Indicator 1.2 Reduced Gini Coefficient among regions.

Target 2: More livable cities for all:

Indicator Increased number of provincial city centers to be developed as livable cities for all.

Target 3 Key economic areas to have highly efficient and environmentally friendly production systems:

Indicator 3.1 The average level of Volatile Organic Compounds (VOCs) in Map Ta Phut's key industrial areas to be controlled within predefined emissions standards.

Indicator 3.2 Reduced number of complaints regarding negative impacts of industrial operations in the key economic areas.

Target 4: Increasing investments in new economic zones along the border areas:

Indicator 4.1 Investment in border economic zones increases by 20 percent through the course of the Plan.

Indicator 4.2 Increased number of businesses established in the new economic zones.

3. Development Guidelines

3.1 Regional development to create and distribute economic opportunities:

3.1.1 Northern Region: developing towards a high-value creative economy:

1) To develop quality and sustainable tourism with healthcare-related services, high-standard education, and high-value creative products.

(1) Developing potential tourism clusters, namely:
(1.1) Lanna Cultural Tourism Cluster and Ethnic Tourism in Eight Provinces of Upper Northern Provincial Clusters: by enhancing the uniqueness of Lanna culture with its distinct

identities and local wisdom to develop creative tourism services and products; (1.2) World Heritage Tourism Cluster by restoring the World Heritage Sites in Sukhothai¹ and Kamphaengphet while developing tourism routes linking Sukhothai Historical Park–Si Satchanalai–Kamphaengphet to the surrounding tourist destinations; and (1.3) Natural Tourism Clusters in Chiang Mai, Chiang Rai, Mae Hong Son, Nan, Phetchaboon, and Uthai Thani by creating new tourist destinations in addition to tourism infrastructure and facilities improvement.

(2) Upgrading quality tourism for specific target groups in Chiang Mai, Mae Hong Son and Nan, such as Meetings-Incentives-Conferences-Exhibitions (MICE), sports and adventure tourism, health tourism, long-stay tourism, and leisure tourism. Key actions include: (2.1) creating tourism-related activities, (2.2) developing facilities according to tourists' needs, and (2.3) promoting online marketing.

(3) Supporting Chiang Mai to be a hub for food and health products, medical and healthcare services, international educational services, as well as creative products, particularly digital creations, which are high-potential target services and industries of the Northern Region, by applying technologies and innovation to differentiate value-added products and services for niche markets.

2) To improve agricultural productivity, value-added products, safe and organic agriculture under Good Agricultural Practice (GAP), as well as to develop various agro-processing products to serve market demand:

(1) Developing the Upper Northern Provincial Clusters to be an organic agricultural production base, and the Lower Northern Provincial Clusters to be a safe agricultural production base (smart farms) by: (1.1) reducing chemical use in order to transform chemical-based agriculture into organic agriculture with GAP, (1.2) applying green technologies in the production process, and (1.3) supporting farmer groups or cooperatives for effective joint production planning and marketing networks.

(2) Upgrading agro-processing industries by: (2.1) Chiang Mai, Chiang Rai, Lampang and Lamphun becoming the main producing areas for vegetables, fruits, and herbal products, and (2.2) Phichit, Kamphangphet, and Nakhon Sawan becoming the main producing areas for rice, field crops and energy crops. In order to enhance value-added agricultural production, innovation and technologies shall be utilized to increase efficiency, and new products shall be created to serve niche markets.

(3) Developing areas in Nakhon Sawan and Kamphangphet for alternative energy production by: utilizing agricultural products and

¹ All references in this section are to provinces unless otherwise stated.

residues from plantations and animal farming to generate energy which helps create value from agricultural raw materials and reduce environmental problems.

3) Rehabilitating natural resources and environmental fertility for a balanced ecosystem to cope with climate change:

(1) Rehabilitating and conserving watershed forests in 8 provinces of the Upper Northern Region by: restoring the degraded watershed forests to improve water storage capability in each watershed area, alongside with preventing forest encroachment and promoting reforestation in watershed forests.

(2) Developing water management systems in the main watershed areas of the Northern Region, namely the Ping, Wang, Yom, and Nan basins by: (2.1) developing and improving irrigation systems to supply adequate water for agricultural areas, (2.2) conducting water diversion projects, (2.3) constructing tunnels to deliver water, (2.4) creating water storage facilities according to each area's potential, and (2.5) developing water storage facilities outside the irrigated areas in the form of lagoons or "monkey's cheeks" in the Lower Northern Provincial Cluster.

(3) Solving smog problems in the Upper Northern Region and Tak Province by: (3.1) shifting from monoculture to agroforestry systems, (3.2) organizing the burning cycle in agricultural areas by identifying suitable burning periods (before the critical smog problem period), (3.3) utilizing agricultural residues to make organic fertilizer or fuel briquettes, and (3.4) enhancing stakeholder participation among the public sector, private sectors, local people, and local governments in preventing and mitigating smog problems.

4) Developing elderly care service systems as a provision for the fast-growing aging society of the Northern Region (ten years faster than the national level):

(1) Promoting employment for the elderly and income generation for the elders by supporting occupational groups and community enterprises for the local elders to have the opportunity continuously to earn incomes and develop their abilities.

(2) Developing innovations for the long-term care of the elderly to cope with the increasing numbers of dependent elders and the shortage of care-providers.

(3) Strengthening family institutions and communities in order to foster communities to play an important role in sustainable welfare provision and to create a social safety net for the elderly.

3.1.2 Northeastern Region: eradicating poverty and becoming self-sufficient:

1) To enhance the potential of agricultural production towards organic agriculture and to achieve appropriate food safety standards:

(1) Developing the Thung Kula Rong Hai plateau in Yasothon, Surin, Roi-Et, Maha Sarakham, and Sisaket, and including other high-potential areas, to become a premium Thai jasmine rice production base by: (1.1) improving production processes according to organic agricultural standards, (1.2) developing the organic agricultural value chain, (1.3) expanding organic farmlands, (1.4) fostering participatory guarantee systems among farmer groups and local communities, (1.5) supporting research and innovation development in responding to the domestic market for healthy products, as well as for export, (1.6) initiating organic agricultural funds and green markets in local communities, and (1.7) encouraging farmers and farmer associations to utilize e-commerce to reach domestic and international markets.

(2) Promoting the cultivation of alternative agricultural products according to each area's potential through: (2.1) vegetable, fruit, and flower plantations in Loei, Nong Khai, Bueng Kan, Nakhon Phanom, Sisaket, and Ubon Ratchathani, (2.2) high-grade beef cattle husbandry in Sakon Nakhon, Mukdahan, and Nakhon Phanom, and (2.3) dairy production in Nakhon Ratchasima and Ubon Ratchathani.

(3) Reinforcing farmers and farmer institutes to be self-sufficient in Amnat Chareon, Kalasin and Khon Kaen by: (3.1) supporting the establishment of farmer groups, community enterprise networks and agricultural cooperatives, (3.2) encouraging saving while improving financial services accessibility for farmers, (3.3) developing young smart farmers by adopting the Philosophy of the Sufficiency Economy, the New Agricultural Theory, and the 1-Rai-1-Hundred Thousand-Baht Scheme, (3.4) supporting successful farmers to be role models for others, and (3.5) promoting the wide expansion of local agricultural markets and e-commerce.

2) To develop the agro-processing industry for high-value added products:

(1) Developing Nakhon Ratchasima to become the center of agro-processing and food industries by: (1.1) supporting research and development activities to enhance regional food-industry competitiveness, and (1.2) encouraging networking of the private sector, local scholars, and government agencies to share their knowledge, information, technology, and innovations for the agro-processing and food industries in order to produce high value-added products to meet the market demand.

(2) Upgrading the standards of Thai silk commodities, cotton and indigo-dyed cotton fabrics, including fostering the high-potential provinces such as Khon Kaen, Nakhon Ratchasima, Surin, and Sakon Nakhon to become international fashion centers by: (2.1) supporting the development of product quality, design, and branding, (2.2) developing technology and innovation to create value, (2.3) encouraging entrepreneurs to upgrade OTOP goods while fostering networks of community enterprises, SMEs, and the industrial sector, and (2.4) promoting business matching between community enterprises, SMEs and the business sector to create business opportunities.

(3) Supporting local small-scale producers of consumer goods along the East-West Economic Corridor (EWEC), namely Chaiyaphum, Khon Kaen, Kalasin, Roi-Et, and Mukdahan Provinces to export to neighboring countries by: (3.1) supporting green industries, and (3.2) utilizing local raw materials.

(4) Enhancing renewable energy production in the Central and Lower Northeastern provincial clusters by: (4.1) balancing food and energy crop plantations, (4.2) suggesting suitable areas for farmers to grow energy crops, and (4.3) encouraging manufacturers, local communities, and local authorities to generate renewable energy from solar energy, wind power, biomass, and solid waste.

3) To upgrade cultural tourism (Khmer civilization and the prehistoric era), ecotourism, and sports tourism to international standards:

(1) Promoting cultural tourism in all areas, such as Khmer civilization in the Lower Northeastern provincial clusters, Mekong culture and healthcare in the Upper Northeastern provincial clusters, prehistoric sites in Udon Thani, Khon Kaen, and Kalasin, sports tourism in Buriram, Sisaket, and Nakhon Ratchasima, and ecotourism in Chaiyaphum, Loei, Nakhon Ratchasima, and Ubon Ratchathani by: (1.1) developing tourism service innovations to meet diverse market demand, (1.2) improving tourist attractions to meet high standards, (1.3) creating year-round tourism activities, and (1.4) developing tourism routes network linking tourist attractions from major cities to minor cities and local communities.

(2) Developing transportation routes which link tourist attractions with neighboring countries, such as the Lan Xang Cultural Square links among Loei-Udon Thani-Nongbua Lamphu-Nong Khai-Lao PDR by: (2.1) expediting the construction of tourism routes to link tourist attractions geographically, and (2.2) connecting tourism activities between the private sector and local communities in Thailand and with neighboring countries, in accordance with tourist demand.

4) **To improve water resource management for sustainable development:**

(1) **Improving existing water supply facilities and natural water resources to enhance water storage capacity** by improving existing water reservoirs, swamps, weirs, and natural water resources to increase water supply volume in the Central Northeastern, Lower Northeastern 1 and Lower Northeastern 2 provincial clusters which are key cultivation bases for the major economic crops of the region.

(2) **Developing new water resources in the Loei, Chi, and Mun river basins while constructing new water reservoirs (monkey's cheeks), weirs, and ponds in suitable agricultural areas** by: (2.1) acquiring areas to develop new water resources, (2.2) developing water distribution systems to reach plantation areas in the dry season, and (2.3) protecting underground water from salinization.

5) **To rehabilitate forestry resources and conserve biodiversity in upstream areas of Loei, Udon Thani, Sakon Nakhon, Chaiyaphum and Nakhon Ratchasima** by: (1) identifying distinctive demarcation of the natural conservation forest areas, (2) encouraging local communities to take part in forest rehabilitation, reforestation, and forest encroachment prevention in order to protect upstream areas and avoid soil erosion, and (3) promoting wetland conservation and supporting the sustainable utilization of community forests.

3.1.3 Central Region: being the leading economic base:

1) **To strengthen the competitiveness of the existing industrial bases and promoting future industrial development as a new income source by upgrading the industrial economic base of Central Region to become the leading green industrial center of Southeast Asia:**

(1) **Developing and upgrading the industrial clusters in Pathumthani, Ayutthaya, Chachoengsao, Prachinburi, Chonburi, and Rayong to become the production base for high-tech and future industries**, such as automotive and auto-parts, electronic, electrical, and telecommunication appliances, and environmentally-friendly chemical and petrochemical industrial clusters, by improving endorsement measures regarding investment privileges, human and technological development, infrastructure development, rules and regulations amendment, and provision of financial support in order to attract investments in the target areas.

(2) **Developing Kanchanaburi, Ratchaburi and Upper Phetchaburi to be industrial processing centers of livestock and agro-products, as well as centers for the textile and garment industries linking with production sources in Myanmar** by improving logistics systems to reduce transportation costs while upgrading the

quality of locally-produced industrial products to be modernized and comply with international standards for the ASEAN market.

2) To develop the quality and standards of food and agricultural products in accordance with international standards for the Central Region to become Thailand's food-producing center:

(1) Improving the efficiency of food production in Chainat, Singburi, Angthong, Ayuthaya, Suphanburi, Chachoengsao, Ratchaburi and Prachuapkhirikhan, which are production bases of rice, vegetable, coconut, and freshwater fisheries, to become the major food exporting base and meet the needs of customers in niche and high-end markets by: (1.1) focusing on value-adding processes, and (1.2) restoring coconut plantation areas.

(2) Developing the fruit-trading business in eastern Rayong, Chanthaburi, Nakhonnayok, Prachinburi, and Chachoengsao to be the production and trading bases for fruit exports by improving productivity and quality control in the processes of production, packaging, processing, and trading.

(3) Promoting livestock husbandry, such as dairy and beef cattle in Saraburi and Ratchaburi, and pig, chicken, and duck farming in Ratchaburi, Nakhon Pathom, Chonburi, and Chachoengsao, in order to produce quality and safe products which meet the needs of international and domestic consumers by (3.1) enhancing farmers' ability to utilize modern production technologies as well as to select suitable livestock breeds, and (3.2) improving market management efficiency.

(4) Developing capabilities in coastal areas along the Gulf of Thailand in fisheries and marine culture in Prachuapkhirikhan, Phetchaburi, Samut Songkram, Samut Sakorn, Samut Prakarn, Chonburi, Rayong, Chanthaburi, and Trat for the coastal natural resources to remain abundant and sustainable by: (4.1) conserving, restoring, and managing fishery resources, (4.2) adopting research and technological transfer on aquaculture management to improve quality and create value-added products, (4.3) promoting artisanal fisheries, and (4.4) supporting and developing the fishery business.

3) To improve tourism-related products and services to meet international standards in order to be the world-renowned tourist center of ASEAN:

(1) Developing international coastal destinations in Chonburi, Phetchaburi, and Prachuapkhirikhan to distribute income and create job by upgrading tourism services to meet with international standards.

(2) Rehabilitating and improving eco-tourism, health tourism, agricultural tourism, and community-based tourism in Nakhonnayok,

Chachoengsao, Prachinburi, Chanthaburi, and Trat by: (2.1) improving tourist attractions as well as travel-related services and facilities, (2.2) creating tourism activities, and (2.3) developing tourism-related products and services to meet international standards.

(3) Supporting and promoting the development of tourism in Ayuthaya, Angthong, Lopburi, Chainat, and Kanchanaburi as centers of historical, cultural and agricultural tourism by improving tourist destinations and activities to be valuable, diverse, and sustainably connected with provincial clusters.

(4) Rehabilitating and conserving Khmer cultural tourism in Prachinburi and Sakaeo by: (4.1) rehabilitating and reconstructing archeological sites and antiquities, (4.2) improving and conserving the environment, and (4.3) ensuring suitable land use for sustainable development.

4) To enhance the efficiency of water management systems and to mitigate disputes over water use among industries, agriculture, tourism and communities in the Eastern Region:

(1) Improving and preserving existing water sources.

(2) Providing and developing additional water sources to support the increasing demand due to economic expansion and the growing population.

(3) Constructing small ponds in the Upper Central Region's agricultural areas in order to cope with water shortages.

3.1.4 Southern Region: providing income diversity:

1) To strengthen the agricultural sectors to be fully capable of developing the value chain while continuously and sustainably contributing to regional revenue:

(1) Strengthening the productivity of rubber and palm oil by: (1.1) promoting and supporting technologies to increase productivity, (1.2) conducting research to create value-added products, and (1.3) promoting small-scale farmers to be able sustainably to improve productivity, such as mixed agricultural practices and New Theory Agriculture, to accentuate the Southern Region as Thailand's key producer of rubber and palm oil in order to increase income and minimize the risk of fluctuating rubber and palm oil prices.

(2) Developing and promoting the identity fruits of the Southern Region, such as coconut, cavendish banana, mangosteen, and durian, to meet international standards for export by: (2.1) improving technologies concerning harvesting and fresh produce storage, and (2.2) supporting research and development on fruit production

and processing to create value-added products such as food supplements, medical and cosmetic products to meet international standards.

(3) Developing high-potential areas with efficient transportation infrastructure to be the agro-processing base by developing and promoting the establishment of: (3.1) a comprehensive palm oil processing industrial center as well as biodiesel production in Krabi and SuratThani, and (3.2) a rubber-processing industrial center in Songkhla.

(4) Upgrading the environmentally-friendly industries of shrimp culture and marine culture in Surat Thani, Nakorn Si Thammarat, Songkhla, and Pattani in order to promote the Southern Region as the main source of seafood products which meet international standards by: (4.1) supporting and promoting standardized farm management systems with efficient and hygienic production procedures in accordance with international standards, (4.2) developing market systems, and (4.3) enhancing the efficiency of seafood processing in order to create value-added products and generate income for local populations.

(5) Supporting and promoting the development of Srivichai beef cattle in Chumphon, Surat Thani, Nakhon Si Thammarat, and Patthalung to become the production base for high-quality beef by: (5.1) improving breed development, (5.2) expanding farming areas, and (5.3) setting standards and developing beef product quality to support the tourist market as well as to be the key export products of the region.

2) Continuously raise revenues derived from tourism and improve income distribution to local communities:

(1) Supporting Phuket, Phang Nga, Krabi, and Koh Samui District, Surat Thani to attain continuously increasing income from tourism with due consideration to the carrying capacity of each area, for the Southern Region to become a destination of yacht and cruise tourism by: (1.1) encouraging all stakeholders to create value for quality and environmentally-friendly tourism services, (1.2) developing the yacht and cruise tourism businesses in Krabi and Koh Samui District of Surat Thani, (1.3) improving public infrastructure and facilities to be standardized and adequate, and (1.4) developing security systems according to international standards.

(2) Promoting and developing connectivity among tourist destinations along the coasts of the Andaman Sea and the Gulf of Thailand, including the high-potential inland tourist destinations, by: supporting the development of new inland tourist destinations such as Rajjaprabha Dam in Surat Thani, Khao Luang Natural Park in Nakhon Si Thammarat, and other high-potential community attractions in order to create

tourist routes networks in Phuket, Phang Nga, Krabi, Surat Thani (Koh Samui, Koh Pha-ngan, Koh Toa), Chumphon, and Nakhon Si Thammarat (Sichon and Khanom beaches).

(3) Promoting and developing community-based tourism in Chumphon, Surat Thani, Patthalung, Ranong, Trang, and Satun by: (3.1) supporting the development of diverse community attractions, (3.2) encouraging local communities to take action in community tourism management, and (3.3) strengthening the network of community-based tourism in association with large tourism service providers in order to create jobs and distribute income toward local communities.

(4) Developing potential tourism cities to create value-added for the Southern Region in order to attract domestic and foreign tourists while developing the economic base sustainably to generate income distribution for local communities by: (4.1) promoting Ranong to be the city of healthcare and spas, (4.2) promoting Chumphon to be the city of agricultural tourism, (4.3) promoting Nakhon Si Thammarat to be the city of world heritage and Srivichai historical sites, (4.4) improving and developing tourist attraction areas, tourism-related infrastructure and facilities, (4.5) developing diverse tourism businesses and services to attain international standards, and (4.6) enhancing efficient marketing and tourism administration.

3) To develop the Southern border provinces to be Specific Economic Areas:

(1) Developing three pilot districts, namely Betong, Nong chik, and Sungai Kolok, as specific economic area and then expanding to the surrounding areas by offering privileges on tariff and non-tariff incentives at a higher level than in other areas.

(2) Improving the efficiency of the approval process to be in line with international standards.

(3) Developing infrastructure to improve both domestic and Thailand–Malaysia connectivity.

(4) Developing urban areas to accommodate economic expansion and increasing social activities.

(5) Promoting the participation process to include all stakeholders in the conduct of security and safety plans to create confidence among international and domestic investors.

4) To prevent and mitigate the degradation of natural resources and the environment in order to maintain a balanced ecosystem and create sustainable watershed areas in Surat Thani, Nakhon Si Thammarat, Trang, Patthalung,

Songkhla, Saton, Yala, Narathiwat and the coastal erosion areas in Nakhon Si Thammarat and Songkhla:

(1) Integrating the participatory process of all stakeholders in water management in watershed areas.

(2) Utilizing information systems to enhance management efficiency.

(2) Promoting awareness of natural resources and environmental conservation.

(3) Enforcing environmental laws and urban planning, especially in the control of activities in coastal areas to minimize impacts on coastal erosion in the long run.

3.2 Urban Development:

3.2.1 Key Developments: for provincial city centers to become livable cities for all groups of people in the society. The intended livable cities shall be safe, environmentally friendly, economically vibrant, easy to travel within, accessible to high-quality public utilities, consistent with local identity, diversity and potential, and based on inclusive participatory principles.

1) To develop provincial city centers as livable cities in order to serve the universal needs of all groups of people in the society while accommodating balanced economic and social development:

(1) Providing high quality public utilities and facilities to accommodate both public and business demand.

(2) Organizing standardized public service systems including residences for low-income people.

(3) Emphasizing urban planning and green areas.

(4) Ensuring public safety from accidents, crimes, and traffic incidents.

2) To endorse integrated urban environmental management with inclusive participatory approaches:

(1) Employing comprehensive waste management guidelines to improve waste collection, waste separation, recycling processes, and establish joint communal waste management facilities.

(2) Promoting water conservation and reducing water pollution.

(3) Improving energy efficiency in urban areas.

3) To develop urban public transportation systems in order to alleviate traffic congestion and to provide accessible, environmentally-friendly public transportation at low-cost.

(1) Employing safe, convenient, and inclusive public transport guidelines on urban public transport development, including the bus system, bicycle lanes, and pedestrian paths.

(2) Improving transportation connectivity between urban and rural areas.

4) To preserve township identity and create value from local resources for local income distribution:

(1) Preserving local traditions, cultures, architecture, and old town areas.

(2) Applying digital economy to enhance urban development while encouraging the community learning process to create a brand identity of towns in order to reinforce valuable development for both economic and social benefits.

5) To enhance the efficiency of urban management:

(1) Merging urban municipalities to be appropriately sized while enhancing local governments' competitiveness and cooperation.

(2) Empowering local people in the participatory process for urban development, including urban planning and its enforcement.

(3) Expanding the roles of central government agencies to support urban development in both technical and budgetary aspects.

(4) Considering the Public Private Partnership (PPP) model and informational technology in urban planning.

3.2.2 Key Strategic Areas and Regional Cities:

1) Bangkok: to be the hub of international businesses, education, and medical-health care services with high-standard transportation and ICT facilities:

(1) Developing urban transport hubs, e.g. Bang Sue.

(2) Organizing land use regulations, public utilities and facilities, social services, and residential areas to accommodate the increasing demand from the urban population.

(3) Tackling traffic congestion, waste, waste water, air pollution and flood problems.

(4) Improving the city landscape with green spaces and public parks.

2) Urban areas in the metropolitan vicinity (Samut Prakan, Nonthaburi, Pathum Thani, Nakhon Pathom, and Samut Sakhon) to be developed as centers of business, commerce, logistics, medical and health care services, education, and housing:

(1) Integrating urban zoning with infrastructure networks, public transportation systems, social facilities, and urban environmental management to accommodate a well-balanced urban expansion

(2) Enhancing the efficiency of transportation networks, flood protection systems, and wastewater treatment systems for the urban areas to be safe and livable.

(3) Increasing green areas in order to cope with economic expansion from tourism activities, industrial development, commerce, transportation, and the growing urban population.

3) Urban areas in Chiang Mai and Phitsanulok to be developed as centers of commerce, services, medical, education, and digital business:

(1) Improving road routing networks, public transportation, and multimodal transportation linking with other cities and surrounding areas.

(2) Developing efficiency of information technology networks to accommodate the digital society and urban environmental management systems for sustainable urban development.

4) Urban areas in Khon Kaen and Nakhon Ratchasima to be developed as centers of trade and investment as well as hubs of medical services and education:

(1) Improving public transportation systems and developing infrastructure connectivity both within the Northeastern region and with other regions.

(2) Considering the balanced ecosystem principle in the process of infrastructure development.

5) Urban areas in Phuket and Hat Yai to be developed as livable cities while accommodating economic expansion, including social and environmental transformations:

(1) Improving public transportation systems and information technology infrastructure.

(2) Developing residential areas to accommodate the growing population with appropriate waste management systems.

6) Key strategic cities with major railway stations, such as the cities of Ayutthaya, Nakorn Sawan, Khonkaen, Thung Song, as well as border cities, namely Betong, Sadao, Phu Nam Ron, Aranyaprathet, Nakorn Phanom, Nong Khai, and Chiang Khong, to be developed according to each area's potential for connectivity development.

(1) Adopting the Transit-Oriented Development (TOD) concept.

(2) Initiating pilot projects on land reform, urban planning, and energy-efficient urban development.

3.3 Key Economic Areas Development:

3.3.1 Eastern Seaboard Areas (ESB): by taking a balanced development approach and executing an efficient area revival program based on participatory processes, the ESB shall be able to accommodate future industrial expansion according to its potential. The purpose is to obtain high-quality transportation infrastructure, public utilities and facilities, social services, and environmental management which are accessible for all, beneficial to local people, and correspond with the sustainable development of the manufacturing sector.

Development Guidelines

1) To expedite the problem-solving process regarding pollution and environmental problems in key economic areas:

(1) Meticulously and continuously monitor the implementation and enforcement of environmental laws, rules, and regulation concerning factories.

(2) Empower local governments, educational institutions, and people to take part in the environmental monitoring process.

(3) Develop an interconnected environmental data and monitoring system to be efficient and transparent in order to create trust and diminish conflict between the industrial sector and local communities.

2) To support the development of eco-friendly high-technology industries consistent with an area's capacity:

(1) Encourage the industrial sector to improve the production process while supporting high-technology industry development to minimize

negative impacts on the environment and communities, reduce emissions, and diminish VOCs leakage in Map Ta Phut area.

(2) Promote industrial area expansion as industrial estate development to control environmental impacts.

(3) Encourage cluster development of related industries to minimize waste by providing investment incentives, efficient facilitation from government agencies, proper urban planning and implementation.

(4) Empower local people and local governments in the participatory process for balanced development.

3) To enhance the capability of marine tourism:

(1) Develop seaports for ferries and cruise ships connecting the east and west coasts of the gulf of Thailand.

(2) Raise the standard of port operation to increase maritime safety and improve linkages to other modes of transportation.

4) To upgrade economic, social, and environmental infrastructure in order to improve the standard of living and be set for the development of the Eastern Economic Corridor:

(1) Enhance the capacity of every mode of transportation infrastructure to be integrated and interconnected, such as international airports (Suvarnabhumi, Donmuang, and U-Tapao), roads, railways, and waterways in order to support increasing activities in the area and connect the ESB to the global market.

(2) Develop public utilities and facilities, such as the water distribution network, electricity, information technology, environmental management, and public health services.

(3) Improve educational standards in vocational education, especially in the fields of engineering and technology.

5) To distribute the benefits from development to local populations:

(1) Connect the key economic sectors (industry, services, and tourism) to the community economy (SMEs, community enterprises, and social businesses).

3.3.2 Border Special Economic Zones: ten high-potential border areas (Tak, Sakaeo, Songkhla, Nongkhai, Nakorn Phanom, Mukdahan, Trat, Kanchanaburi, Chiang Rai, and Narathiwat) will be developed to be new economic gateways connecting Thailand with neighboring countries and which aim for sustainable and tangible development.

Development Guidelines

1) To promote and facilitate investments in border special economic zones:

(1) Create appropriate tax and non-tax incentives for both domestic and international investors.

(2) Enhance the capacity of the One-Stop-Service-Center to be able to carry out authorizing activities in licensing, approval-granting, and decision-making regarding usage of land and target activities in each area.

(3) Improve soft infrastructure and border stations to facilitate cross-border investment and transportation.

(4) Develop border towns to be able to accommodate urban area expansion and economic growth.

2) To encourage and promote economic activities to be environmentally friendly according to the area's potential:

(1) Upgrade activities in manufacturing, trade, logistics, services, and the tourism sectors to be in line with each area's location, resources, identity, culture, and opportunities.

(2) Develop labor skills while employing advanced technology and conducting research and development to upgrade manufacturing and service standards.

3) To encourage people and other development partners to participate in and benefit from development:

(1) Enhance the capacity of community enterprise and local businesses.

(2) Encourage participation from civil society, the private sector, and local and central government in the development process.

(3) Develop social infrastructure to improve people's standard of living and support spatial development.

4) To include participatory processes in the management of natural resources and the environment in the special economic zones:

(1) Conserve and rehabilitate natural resources and the environment through efficient resource utilization.

(2) Solve solid waste problems by applying the 3Rs concept (Reduce, Reuse, and Recycle) and establishing communal waste management centers.

(3) Create measures to control negative impacts from activities operating within the special economic zones.

5) To manage public health, labor, and security issues:

(1) Improve the public health service system in the border areas to be efficient and integrated with the border crossing system, health insurance system, and alien labor system.

(2) Organize a complete One-Stop-Service-Center for labor with the ability to provide services regarding border crossing documents, electronic identification, and a fingerprints system which link to the central database.

(3) Create security measures and communication systems in the area.

4. Complementary Plans

4.1 Provinces and Provincial Clusters: Province Development Plan and Provincial Cluster Development Plan.

4.2 Eastern Seaboard Areas: Transportation Infrastructure Development Plan in the Eastern Seaboard Area and Pollution Reduction and Elimination Action Plan in Rayong's Pollution Control Area, 2017–2021.

4.3 Border Special Economic Zones: 1) Special Economic Zone Integrated Budget Plan, 2) Infrastructure and Customs Checkpoint Development Plan, 3) Industrial Estate Development Plan, 4) Labor Management Plan, and 5) Natural Resources and Environment Management Plan.

5. Flagship Projects

Northern Region:

5.1 Developing a Lanna Culture Cluster towards Creative Tourism Project:

5.1.1 Main Content: upgrading tourism activities in the Lanna culture cluster to embrace distinct identity and sustainability, as well as fostering value creation by using Lanna identity and wisdom to develop creative tourism products and services.

5.1.2 Key Implementing Agencies: Department of Tourism, Ministry of Tourism and Sports, Tourism Authority of Thailand (Northern office) and Provincial Tourism and Sports Offices.

5.1.3 Operational Timeframe: 5 years (2017-2021).

5.2 Promoting GAP Agriculture in the Lower Northern Sub-region Project:

5.2.1 Main Content: developing a quality and safe agricultural production system in the Lower Northern Sub-region in order to create value-added from agricultural commodities, as well as generating greater income to farmers.

5.2.2 Key Implementing Agencies: Department of Agricultural Extension, Department of Land Development and Provincial Agricultural Offices.

5.2.3 Operational Timeframe: 5 years (2017-2021).

5.3 Managing Agricultural By-Products for Protecting the Smog Problem in the Northern Region Project:

5.3.1 Main Content: developing a system for managing agricultural by-products efficiently to protect the smog problem in the Northern Region, and which farmers can adapt to their existing practices for income-generation.

5.3.2 Key Implementing Agency: Ministry of Agriculture and Cooperatives.

5.3.3 Operational Timeframe: 5 years (2017-2021).

Northeastern Region

5.4 Organic Agriculture Practices Implementation and Innovation for Agro-processing Products Development in the Northeast Region Project:

5.4.1 Main content: creating a value chain for organic agriculture, upgrading the Thai organic certification service to become an internationally-recognized organic certification service, promoting research and innovation in responding to the domestic and export healthy-products markets.

5.4.2 Key Implementing Agencies: Department of Agricultural Extension, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives, Department of Industrial Promotion, Ministry of Industry.

5.4.3 Operational Timeframe: 5 years (2017-2021).

5.5 Integrated Water Resource Management for Sustainable Development in the Northeast Region Project:

5.5.1 Main Content: increasing the capacity of existing water storage facilities and natural water resources, developing new water resources in the Loei, Chi, and Mun river basins, constructing small Kaem-Ling reservoirs in high potential areas for agriculture, promoting reforestation and encouraging participatory resources management in local communities.

5.5.2 Key Implementing Agencies: Royal Irrigation Department, Department of Water Resources, Ministry of Natural Resources and Environment.

5.5.3 Operational Timeframe: 5 years (2017-2021).

Central Region

5.6 Upgrading International Beach Tourism Activities and Services in the Central Region Project:

5.6.1 Main Content: rehabilitating tourist attractions and improving adequate facilities for tourism activities, products and services towards international standards.

5.6.2 Key Implementing Agencies: Ministry of Tourism and Sports and Tourism Authority of Thailand.

5.6.3 Operational Timeframe: 5 years (2017-2021).

5.7 Upgrading Production Processes and Agro-Processing to Meet Standards and Safety Project:

5.7.1 Main Content: developing quality and international standard agricultural production systems to meet quality, safety, and standards requirements, fostering research and development in the use of modern technological production and appropriate breeding, including diversified processing in response to the demands of both domestic and international consumers, and delivering an efficient market management system.

5.7.2 Key Implementing Agencies: Department of Agricultural Extension, Department of Livestock, Ministry of Agriculture and Cooperatives, Department of Industrial Promotion, Ministry of Industry.

5.7.3 Operational Timeframe: 5 years (2017-2021).

5.8 Protecting and Participatory Management of Coastal Erosion in Central Region Project:

5.8.1 Main Content: promoting collaboration between the public (including Local Administration Organizations), private and civic sectors in managing and protecting coastal erosion, including the sustainable rehabilitation of coastal resources.

5.8.2 Key Implementing Agencies: Ministry of Natural Resources and Environment, Ministry of Interior and Local Administration Organizations.

5.8.3 Operational Timeframe: 5 years (2017-2021).

Southern Region

5.9 Developing and Promoting the Production of Rubber Products in the Southern Region Project:

5.9.1 Main Content: developing and promoting the production of rubber with diversified products, higher value, as well as responding to market demands in order to generate sustainable income for both farmers and para-rubber processing entrepreneurs.

5.9.2 Key Implementing Agencies: Ministry of Industry, Ministry of Science and Technology, educational institutions and Institute for Small and Medium Enterprises Development.

5.9.3 Operational Timeframe: 5 years (2017-2021).

5.10 Increasing Palm Oil Productivity and Cultivation Areas in the Southern-Most Provinces Project:

5.10.1 Main Content: developing and promoting the expansion of the cultivated areas, including provision of knowledge on production technology to farmers in order to increase production efficiency and the quality of palm oil and crops to be used as raw material responding to investment demands in the Southern border provinces.

5.10.2 Key Implementing Agencies: Ministry of Agriculture and Cooperatives and Ministry of Interior.

5.10.3 Operational Timeframe: 5 years (2017-2021).

5.11 Developing the Srivijaya Beef Cattle Industry in the Southern Region (Thai Gulf) Project:

5.11.1 Main Content: promoting and developing production and processing of high-quality Srivijaya beef cattle, which is a local strain of the Southern region (Thai Gulf), responding to the needs of the tourism markets in the Southern Region, and being strategic local commodities to be exported by using new technology and innovations ranging from breeding to processing and distribution and defining geographical indication to gain international acceptance.

5.11.2 Key Implementing Agencies: Ministry of Agriculture and Cooperatives, Ministry of Science and Technology, Ministry of Commerce, educational and research institutions, Joint Public-Private Partnership Committee of Southern Clustering Provinces (Thai Gulf).

5.11.3 Operational Timeframe: 5 years (2017-2021).

5.12 Developing the World Heritage City and Srivichai Culture Tourism Site in Nakhon Sri Thammarat Project:

5.12.1 Main Content: improving Phra Borommathat Mahavoraviharn temple, improving and developing historical tourism sites, as well as developing the landscape in Nakhon Sri Thammarat city in correspondence with the development of a World Heritage City and the Srivijaya historical culture tourism site, to attract both Thai and foreign tourists in order to generate and distribute income to local people.

5.12.2 Key Implementing Agencies: the Fine Arts Department, Ministry of Culture, Department of Tourism, Ministry of Tourism and Sports and Ministry of Interior.

5.12.3 Operational Timeframe: 5 years (2017-2021).

5.13 The Environmentally-Friendly Coastal Aquaculture and Shrimp-Farming Industry Development Project:

5.13.1 Main Content: (1) developing farm management systems, (2) improving the production process to be efficient and hygienic according to international standards, rules and regulations, (3) developing market systems, and (4) promoting marine aquacultural product processing in order to create higher value and generate incomes for local populations

5.13.2 Key Implementing Agencies: Department of Fisheries, Ministry of Agriculture and Cooperatives, and educational institutions.

5.13.3 Operational Timeframe: 5 years (2017-2021).

5.14 Tourism Network Enhancement for the Southern Region's Andaman Coastline, Gulf of Thailand Coastline, and Potential Inland Tourism Locations:

5.14.1 Main Content: developing inland tourism locations and potential community attractions to create tourism networks linking popular tourism areas in Phuket, Phang Nga, Krabi, Surat Thani (Koh Samui, Koh Pha Ngan, and Koh Tao), Chumphon, and Nakorn Si Thammarat (Sichon and Khanom).

5.14.2 Key Implementing Agencies: Department of Tourism, Ministry of Tourism and Sports, and Tourism Authority of Thailand,

5.14.3 Operational Timeframe: 5 years (2017-2021).

5.15 The Health/Medical Tourism Destinations Development Project:

5.15.1 Main Content: improving health/medical tourism by (1) utilizing natural resources and local wisdom, (2) restoring tourist attractions and landscape architecture, (3) developing infrastructure and facilities in natural tourist attractions, (4) promoting local cultures and communities, and (5) enhancing service quality.

5.15.2 Key Implementing Agencies: Ministry of Tourism and Sports, Ministry of Public Health, Ministry of Culture, and Ministry of Interior.

5.15.3 Operational Timeframe: 5 years (2017-2021).

5.16 The Coastal Erosion Prevention and Mitigation Participatory Project:

5.16.1 Main Content: creating a partnership among government, private sector, local people, and local governments in coordinative management to prevent and mitigate coastal erosion problems, as well as to achieve the sustainable restoration of coastal resources.

5.16.2 Key Implementing Agencies: Ministry of Natural Resources and Environment, Ministry of Interior, and local governments.

5.16.3 Operational Timeframe: 5 years (2017-2021).

Urban Areas

5.17 The Urban Environmental Improvement and Development Project:

5.17.1 Main Content: (1) a livable urban environment for all, (2) social services, (3) public transportation development in urban areas, (4) waste and waste water management, (5) green spaces, (6) efficient urban planning measures, and (7) safety from crime, accidents, and traffic incidents.

5.17.2 Key Implementing Agencies: local government, Department of Local Administration, Department of Public Works and Town & Country Planning, Department Provincial Administration, provinces, Office of Natural Resources and Environmental Policy and Planning, Pollution Control Department, Department of Environmental Quality, Office of Transport and Traffic Policy and Planning, Department of Land Transport, and Department of Health.

5.17.3 Operational Timeframe: 5 years (2017–2021).

Eastern Seaboard Area

5.18 The Volatile Organic Compounds (VOCs) Monitoring and Mitigation Project in Map Ta Phut and Surrounding Areas in Rayong Province:

5.18.1 Main Content: Volatile Organic Compounds (VOCs) monitoring and problem-solving activities in the Map Ta Phut industrial areas

5.18.2 Key Implementing Agencies: Pollution Control Department, Industrial Estate Authority of Thailand, and Office of Natural Resources and Environment, Rayong Province.

5.18.3 Operational Timeframe: 5 years (2017–2021).

5.19 The Eastern Seaboard Industrial Estate Development Project:

5.19.1 **Main Content:** industrial estate development for environmentally-friendly industries.

5.19.2 **Key Implementing Agencies:** Industrial Estate Authority of Thailand and the private sector.

5.19.3 **Operational Timeframe:** 5 years (2017–2021).

Border Special Economic Zones

5.20 Special Economic Zone Industrial Estate Development Projects in Sakaeo, Tak, Songkhla, and Nong Khai.

5.20.1 **Main Content:** industrial estate development to accommodate manufacturing and logistics investments.

5.20.2 **Key Implementing Agencies:** Industrial Estate Authority of Thailand.

5.19.3 **Operational Timeframe:** 5 years (2017–2021).

Part 4

Development Strategies

Strategy 10 Strategy for International Cooperation for Development

Thailand's strategy to advance international cooperation under the Twelfth Plan is based on the principles of free thinking, liberalization, and opportunity creation to expand and intensify cooperation with partner countries on the economy, society, security, and in other fields. This builds on the strategy to enhance sub-regional and regional connectivity under the Eleventh Plan by: promoting liberalized, open, and transparent trade and investment policies to ensure a conducive business environment; implementing a strategic approach to identify new markets; encouraging Thai entrepreneurs to invest overseas; and promoting collaboration with countries in the sub-region, region, and beyond. The strategy also calls for innovation development based on various cooperation initiatives, such as in regulation, accountable and transparent government, public sector reform under APEC (Asia-Pacific Economic Cooperation), labor skills development to meet international standards, measures and best practices for eco-friendly development, and human resources development.

The next five-year period will be fundamentally crucial in pushing forward institutional connectivity at the sub-regional and regional levels to implementation, extending linkages across borders under various sub-regional and regional frameworks, and reducing Non-Tariff Barriers (NTBs), while also improving physical infrastructure both domestically and internationally with respect to infrastructure investment schemes. It is also an opportunity for Thailand to emerge as a gateway to the east and the west, expand physical connectivity to enhance economic zones and community development along the economic corridors to boost the level of competitiveness and distribute wealth to communities, cities, and provinces along the economic corridors, and other key areas in the vicinity of the country. At the same time, Thailand is prompted to employ a proactive strategy to encourage Thai entrepreneurs to invest overseas, especially in the CLMV countries (Cambodia, Laos, Myanmar, and Vietnam) and ASEAN, and to benefit from the partnerships between ASEAN and other countries, and with development partners from other regions, to highlight more prominently Thailand's strategic location and emerge as one of the key economic and trade centers of the region.

Thailand also has to place the importance of international cooperation within bigger contexts, such as the Regional Comprehensive Economic Partnership (RCEP), the Asia-Pacific

Economic Cooperation, and the Group of 77. Efforts as a member country include showing a strong commitment to and compliance with standards at all levels, and aligning country development with international practices and agreements, such as the Sustainable Development Goals (SDGs), the CO2 emissions protocol, aviation laws, human rights treaties, and international labor standards. International cooperation should serve as an effective mechanism to intensify and support Thailand's economic and social development. The Twelfth Plan focuses on adjusting domestic mechanisms towards integration, promoting creative, fair, and inclusive mechanisms at the sub-regional and regional levels, and refining Thailand's role with our neighbors in sub-regional and regional development.

1. Objectives

1.1 To utilize fully Thailand's strategic location as a key connecting point between several economic corridors to promote the country's economic and social development;

1.2 To expand cross-border trade and investment opportunities and emerge as an attractive and productive investment and production base; and,

1.3 To play a more influential part on the international stage by promoting Thailand's constructive role under various cooperation initiatives, and supporting development under the Sustainable Development Goals (SDGs).

2. Targets and Indicators

Target 1 Inclusive linkage networks along economic corridors generating full benefits:

Indicator 1.1 Accomplishment in establishing logistics connectivity on land, rail, at sea and in the air within the region to ensure convenience, and reduce travel time and transportation costs.

Indicator 1.2 Successful implementation of the Cross-Border Transport Agreement (CBTA) at border crossing points between Thailand and neighboring countries.

Target 2 Increased sub-regional and ASEAN value chains:

Indicator 2.1 Improved Border Management Capability Subindex rating under the Enabling Trade Index.

Indicator 2.2 Increased value of intermediate goods in transit.

Indicator 2.3 Increased trade and investment value between Thailand and countries in the region.

Indicator 2.4 Increased services value of Thai entrepreneurs in the region.

Target 3 Thailand to become a major economic, trade, and investment base in the sub-region, region, ASEAN, and Asia, and expand sub-regional economic corridors to cover ASEAN, East Asia, and South Asia:

Indicator 3.1 Increased volume of transport in goods and services.

Indicator 3.2 Increased cross-border trade value between Thailand and countries in the region.

Indicator 3.3 Increased investment value of Thai entrepreneurs in the region.

Indicator 3.4 Revised laws and regulations to support Thailand as a production, investment, and services hub.

Target 4 Thailand to become a crucial development partner at all levels:

Indicator 4.1 Thailand's assistance value in the sub-region and region increases.

Indicator 4.2 Successful implementation of development initiatives between Thailand and countries in the region.

Indicator 4.3 Achievements under the Sustainable Development Goals (SDGs).

3. Development Guidelines

3.1 Expand cooperation on trade and investment with partner countries, and identify new markets to accommodate Thai products and services:

Fully utilize existing economic agreements, strengthen cooperation with emerging markets both bilaterally and multilaterally, and employ a proactive strategy in public and private partnership to identify new markets and trade partners.

3.2 Promote connectivity in transport, logistics, and telecommunication under various sub-regional frameworks including the GMS, ACMECS, IMT-GT, BIMSTEC, JDS, and ASEAN to facilitate and ensure lower logistical costs:

Establish a clear timeframe equipped with enabling regulations to become a regional connectivity hub, and expand economic and social opportunities to the provinces and local areas by connecting external economic corridors with domestic spatial development by:

3.2.1 Implementing the Master Plan on ASEAN Connectivity with consistency to achieve a complete connectivity network:

Implementing the transport and logistics connectivity scheme with ASEAN and other sub-regions, in alignment with the strategies and development plans of the neighboring countries, Great Powers, and the newly emerging economies of the world. The

government will lead investment in strategically important initiatives in economic areas, and stimulate private investment to achieve concrete results.

3.2.2 Advancing efficient and internationally standardized transportation and logistics system and services:

Covering land (road and rail), air, maritime, and coastal transport, development of border checkpoints, and border procedure facilitation. Uplifting transport network efficiency, and the cross-border transport of goods and people to realize physical infrastructure connectivity, and support economic area development. Assuring linkages among economic areas in the sub-region and between sub-regions in ASEAN, and domestic linkages that support spatial, regional, and urban development.

3.2.3 Streamlining relevant regulations on the transportation of goods and people:

Implementing the Cross-Border Transport Agreement (CBTA), which all the GMS member countries have ratified, comprising the implementation of the pilot scheme at the Thailand-Lao PDR-Vietnam border at the Mukdahan-Savannakhet checkpoint, operations between Thailand-Cambodia at the Aranyaprathet-Poipet checkpoint, operations between Thailand-Lao PDR-China at the Chiang Khong-Huay Xai checkpoint, negotiations with Myanmar to commence a CBTA at the Mae Sot-Myawaddy and Mae Sai-Tachileik checkpoints, and to establish the Phu Nam Ron-Dawei and Sinkhon-Marid checkpoints, the Thailand-Myanmar bilateral cross-border agreement, and the Thailand-Cambodia bilateral cross-border agreement.

3.2.4 Improving human resources capacity in transportation and logistics services:

Raising the competitiveness of the Thai private sector in providing and managing logistics, becoming proficient in foreign languages, and having substantial knowledge and understanding of relevant regulations to add value in transportation and logistics businesses, both in the domestic and international supply chains.

3.2.5 Linking economic development in border areas and border economic zones, and linking border and domestic production networks:

Establishing transportation and logistics linkages between resources and production bases throughout the international production chain, ensuring a standardized and efficient export gateway; fostering economic linkages between large economic zones in neighboring countries and Thailand's border and domestic economic zones, based on Thailand's interdisciplinary services and ideal location to establish regional operation centers or parent companies.

3.3 Develop and promote Thailand as a distinct business, service, and investment base in the region:

Providing educational, financial, health, and logistics services, and attracting investment to contribute to research and development. Serving as a basis for cooperation in Asia by highlighting Thailand's strategic location and potential to link value chains with neighboring countries and countries in ASEAN (through Thailand+1) by:

3.3.1 Boosting joint economic zone development between Thailand and neighboring countries, and promoting border trade and services:

Distributing economic and social opportunities, narrowing the development gap, and supporting regional and global economic connectivity.

3.3.2 Integrating Thailand's spatial development scheme with that of the neighboring countries to ensure security and stability in the areas:

Establishing a joint production network to deliver services, distribution, and natural resource and labor allocation that benefit all countries. Possibly inaugurating joint production and services clusters in the future once all the countries have reached the same level. Product development in the production chain with neighboring countries should mainly take into account the supplying of the sub-regional and target markets.

3.4 Encourage outward investment among Thai entrepreneurs:

Increasing the return benefits from capital, knowledge, and technology in the production and services in which Thailand specializes, and supporting Thailand to become a trading nation. Playing an active role in the ASEAN Economic Community Post-2015 to support a single market and production base, and utilizing the RCEP to become a new investment and export base. Supporting Thai entrepreneurs in production and trade, internationalizing the Thai workforce, creating smart traders with the use of technology in regional trade management, and advocating demand-oriented trade by:

3.4.1 Improving entrepreneurial skills, especially in Small and Medium Enterprises (SMEs), to advance businesses with neighboring countries:

Expanding access to infrastructure connectivity information in sub-regional economic areas and export channels, and building the Thai entrepreneurial capacity to meet international standards to promote cross-border businesses. Acting as a development partner in providing technical assistance to neighboring countries to help improve regulations and human resources in the transportation and logistics sectors.

3.4.2 Human resources, technology, and innovation development:

Enhancing new generations of entrepreneurs equipped with technology and innovation, and guiding research and development, technology and innovation, management, and branding to add value to businesses, products, and services.

3.4.3 Improving the business environment, and supporting the Business Council as a mechanism under various cooperation initiatives:

Including removing regulations that impede and obstruct trade/investment, and pushing forward special economic zone development to create a conducive business environment that promotes trade and investment, and allows Thailand to become a regional services hub.

3.4.4 Providing supporting financial resources and in-depth information on production bases abroad:

Taking into account different rules and regulations among cities and countries. Promoting public and private partnerships to reach out to the market and study market needs.

3.5 Opening trade gateways, and advancing cooperation with neighboring countries as Thailand's strategic partners at the sub-regional and regional levels:

Building trust, and generating mutual benefits by providing finance, techniques, and technical assistance to neighboring countries. Expanding economic cooperation by identifying target markets by taking their trade importance and level of economic growth or development into consideration.

3.6 Building development partnership with countries in the sub-region, region, and beyond:

Strengthening cooperation with various countries, bilaterally and multilaterally, to increase stability in the sub-region, region, and beyond. Promoting advancement, and reducing inequality in a sustainable manner in all aspects by:

3.6.1 Increasing Thailand's role and participation in international organizations:

Guiding development in the sub-region, region, as well as developing economies in other regions, particularly development under the Sustainable Development Goals (SDGs), poverty alleviation and inequality reduction, social opportunities for the vulnerable, women, and the elderly, natural disaster management, energy security, food, water resources, and greenhouse gas reduction, etc.

3.6.2 Increasing Thailand's development assistance:

Providing assistance to developing economies to help strengthen connectivity, research and development, and human resources development. Expanding

sub-regional and regional cooperation while maintaining balanced relations with the Great Powers.

3.7 Entering into international cooperative partnerships with a creative role:

Defining Thailand's foreign policy alternatives on the global stage to maintain balanced relations with the Great Powers in the region and the world. Securing benefits in trade, food and energy security, market opportunities for Thai products, and access to new and modern financial and capital markets. Strengthening people-to-people connectivity across nations, and assuring Thailand's and the region's security and stability by:

3.7.1 Maintaining an active role in strategy formulation of various cooperation frameworks in which Thailand participates:

Including the Asia-Pacific Economic Cooperation, and the East Asia Summit. Actively monitoring and taking part in newly established frameworks, such as the RCEP and TPP. Conducting feasibility studies to establish free trade areas with new trade partners to open up trade and investment opportunities in the global market.

3.7.2 Maintaining balanced relations with traditional and newly-emerging economies:

Assuring sustainable economic stability, access to science, advanced technology and innovation, and liberalized economic policies that promote domestic competition.

3.7.3 Meeting international norms and standards to comply with international obligations:

Adapting to the regulations and mechanisms at the regional and global levels, as well as international practices, such as anti-slavery and human trafficking treaties, aviation laws and regulations specified by the International Civil Aviation Organization (ICAO), Trafficking in Persons Report (TIP Report), Illegal, Unreported, and Unregulated (IUU) Fishing, the United Nations' 21st Conference of the Parties (COP21), ASEAN Mutual Recognition Agreement (MRA), and Sustainable Development Goals (SDGs) to support Thailand's creative and influential role in the region and the world.

3.8 Promoting regional and international cooperation to ensure security:

Contributing to the well-being of the people through energy, food, and environmental security, and natural disaster management. Preventing all forms of attack such as terrorism and cyber crime, etc.

3.9 Integrating missions in international cooperation and internaional affairs:

Reviewing domestic mechanisms to promote international cooperation in all aspects and at all levels, based on mutual understanding of Thai agencies on common goals and strategies. Advocating operations under "Team Thailand" to ensure consistency and

complementarity in international cooperation, contributing to an ultimate benefit of country development. Creating a knowledge base in international affairs, and providing knowledge on international affairs and its benefits to the country and the general public. Creating understanding, trust, a good image, and higher economic competitiveness.

3.10 Promoting significant domestic changes:

By: (1) preparing mechanisms to minimize negative externalities from trade and investment policy to prevent further inequality and unfairness as a result of free trade and investment policies and international cooperation; (2) developing human resources capability to meet international standards, including skills in foreign languages, competency, and open and forward-looking attitudes to become Thai, ASEAN, and global citizens, with Thailand taking up a leading role on the global stage as stated in the Twenty-Year National Strategy; and (3) changing attitudes, and creating awareness and understanding among Thai people to realize mutual benefits derived from sub-regional and regional cooperation, and under other cooperation initiatives in a wider aspect.

4. Complementary Plans and Flagship Projects

4.1 Initiative to support and encourage Thai entrepreneurs to invest overseas:

(1) **Main Content:** To support and encourage Thai entrepreneurs to invest in the neighboring countries, in the sub-region, and in ASEAN by streamlining regulations, and supporting value chain linkages in competitive production areas and services to improve Thailand's target industries in the sub-region and ASEAN. To expand business opportunities for Thai entrepreneurs in border areas, particularly along the economic corridors.

(2) **Key implementing agencies:** Ministry of Commerce, Ministry of Industry, and Board of Investment (BOI).

(3) **Operational Timeframe:** from 2017 onwards.

4.2 Greater Mekong Sub-region Economic Cooperation Program (GMS). Implementing the GMS Strategic Framework for 2012-2022, covering:

4.2.1 Transport and infrastructure development:

1) **Main Content:** to advance seamless and full connectivity in the six GMS countries, improve transport and logistics services to be effective and meet international standards, and streamline regulations on the cross-border transport of goods and people under the CBTA. To uplift the competitiveness of the Thai private sector in providing and managing logistics services, and carry out border area development to link the border production networks with the rest of the country and neighboring countries. To implement:

1.1) The GMS Transport Strategy Action Plan (2016-2025).

1.2) Support for implementing the Action Plan for the GMS Cross-Border Transport Agreement (CBTA).

1.3) Support for implementing the Roadmap for Expanded Energy Cooperation (2009-2018).

1.4) The Telecommunications and Information Superhighway Network Action Plan Phase II (2016-2023).

1.5) The Urban Development Strategy Action Plan (2015-2022).

2) **Key implementing agencies:** Ministry of Transport, the Energy Policy and Planning Office, Ministry of Energy, Ministry of Digital Economy and Society, the Customs Department, and Neighboring Countries Economic Development Cooperation Agency (Public Organization), Ministry of Finance, Department of Public Works and Town & Country Planning, Ministry of Interior, and Ministry of Foreign Affairs.

3) **Operational Timeframe:** 2017-2021.

4.2.2 Economic competitiveness enhancement:

1) **Main Content:** to enhance economic competitiveness by facilitating cross-border goods transport to increase the capacity of the Thai private sector in logistics management. To strengthen the agricultural production network between Thailand and neighboring countries, enhance labor skills and capacity in the sub-region, and promote tourism for Thailand to emerge as a regional tourist hub. To implement:

1.1) The Core Agriculture Support Program Phase II (2011-2020).

1.2) The Competitiveness and Food and Agricultural Product Facilitation Action Plan (2019-2020).

1.3) The Transport and Trade Facilitation Action Plan.

1.4) The GMS Tourism Sector Strategy (2016-2025).

2) **Key implementing agencies:** Office of Agricultural Economics, and National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperatives, the Customs Department, Ministry of Finance, Department of Skill Development, Ministry of Labor, and Ministry of Commerce.

3) **Operational Timeframe:** 2017-2021.

4.2.3 Human resources, social, and environmental development:

1) **Main Content:** to improve education, public health, labor, society, and the environment in the Greater Mekong Sub-region to achieve the Sustainable Development Goals (SDGs). To implement:

1.1) The Strategic Framework and Action Plan for Human Resource Development Phase III (2018-2022).

1.2) The Core Environment Program and Biodiversity Conservation Corridors Initiative Phase III (2017-2021).

2) **Key implementing agencies:** Thailand International Cooperation Agency, Ministry of Foreign Affairs, Ministry of Education, Ministry of Labor, Ministry of Public Health, Ministry of Social Development and Human Security, and Ministry of Natural Resources and Environment.

3) **Operational Timeframe:** 2017-2021.

4.2.4 Economic corridor development in the six GMS countries:

1) **Main Content:** to advance connectivity between Thailand and the economic zones in the six GMS countries, ASEAN, East Asia, South Asia, as well as the 21st Century Maritime Silk Road. To develop Dawei Special Economic Zone, and Thailand's Special Economic Zones (SEZs) to link economic activities with neighboring countries. To boost the competitiveness of Small and Medium Enterprises (SMEs), expand the production network along the economic corridors with neighboring countries, improve the workforce, and minimize the social impact of economic corridor development in the six GMS countries. To implement:

1.1) **The Southern Economic Corridor Development**, including: (1) Dawei Special Economic Zone; (2) Dawei deep seaport to link with Laem Chabang and Map Ta Phut deep seaports; (3) four-lane highway at the Thai-Myanmar border to link with Dawei Special Economic Zone; (4) road from Chedi Sam Ong-Phaya Tong Su-Thanyuayay border crossing point, and customs facility; (5) dual-track train along the Southern Economic Corridor (Laem Chabang-Kanchanaburi); (6) highway network at Nong Ian border crossing point, Aranyaprathet, Sa Kaew, customs facility and road to Highway 5 at Steung Bot, Poipet, Banteay Meanchey, Cambodia; (7) operations between Thailand-Myanmar and Thailand-Cambodia under the Cross-Border Transport Agreement (CBTA); (8) SME development along the economic corridors; (9) human resources development and labor improvement along the economic corridors; and (10) social impact reduction of economic corridor development in the GMS.

1.2) **The East-West Economic Corridor Development**, including: (1) the Second Thai-Myanmar Friendship Bridge (Mae Sot-Myawaddy), and customs facility at Mae Sot-Myawaddy border crossing point; (2) electricity grid development in Yanggon, Myanmar; (3) bridge over the Mekong River at Beung Kan-Paksan; (4) bridge over the Mekong River at Ubon Ratchathani-Salawan; (5) high voltage power transmission poles and cables between Thailand-Lao PDR to handle 500 kilowatts; (6) operations between Thailand-Lao PDR-Vietnam under the Cross-Border Transport Agreement (CBTA); (7) SME

development along the economic corridors; (8) human resources development and labor improvement along the economic corridors; and (9) social impact reduction of economic corridor development in the GMS.

1.3) **The North-South Economic Corridor Development**, including: (1) Den Chai-Chiang Rai train; (2) power transmission cables to handle 115 kilowatts, and Namtong-Houay Xai power station in Lao PDR; (3) Hongsa-Ban Chiang Mai road; (4) operations between Thailand-Lao PDR-China under the Cross-Border Transport Agreement (CBTA); (5) SME development along the economic corridors; (6) human resources and labor improvement along the economic corridors; and (7) social impact reduction of economic corridor development in the GMS.

2) **Key implementing agencies:** Ministry of Transport, the Customs Department, and Neighboring Countries Economic Development Cooperation Agency (Public Organization), Ministry of Finance, Ministry of Digital Economy and Society, Ministry of Energy, Thailand International Cooperation Agency, Ministry of Foreign Affairs, Ministry of Labor, and Ministry of Social Development and Human Security.

3) **Operational Timeframe:** 2017-2021.

4.3 Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT):

4.3.1 Transport and infrastructure development:

1) **Main Content:** to improve domestic infrastructure and transport networks to link with neighboring countries, provide cross-border trade and investment facilitation, and make use of the border areas as gateways to international trade. Key projects include:

1.1) Construction of the new Sadao CIQ in Songkhla (2016-2019), and construction of Sadao Border Post facilities in Songkhla (arrival) (2016-2017).

1.2) Upgrading of Padang Besar customs house in Songkhla (2016-2017).

1.3) Expansion of Wang Prachan CIQ in Satun (2016-2018).

1.4) Upgrading of Betong customs house in Yala (2016-2017).

1.5) Upgrading of Bu Ke Ta customs house in Narathiwat (2016-2017).

1.6) Construction of the new Tak Bai CIQ in Narathiwat (near the new bridge over the Kolok River) (2017-2019).

1.7) Construction of the bridge over the Kolok River in Tak Bai, Narathiwat-Tumpat, Kelantan (2016-2019).

1.8) Construction of the second bridge over the Kolok River in Sungai Kolok, Narathiwat-Rantau Panjang, Kelantan (2016-2018).

1.9) Green Cities Initiatives in Songkhla (Hat Yai and Songkhla municipalities) (2016-2018) (to be expanded to cover all provinces).

2) **Key implementing agencies:** the Customs Department, Ministry of Finance, State Railway of Thailand, and Department of Civil Aviation, Ministry of Transport, and Department of Public Works and Town & Country Planning, Ministry of Interior.

3) **Operational Timeframe:** 2016-2020.

4.3.2 Trade and investment:

1) **Main Content:** to develop potential border areas with neighboring countries with support from various development initiatives. To establish a common production base in the cross-border production chain, and production clusters to ensure economic and social benefits are distributed in border areas. Key projects include:

1.1) Sadao-Kedah and Sadao-Perlis Special Economic Zones, and Narathiwat-Kelantan Special Economic Zone (2016-2020).

1.2) Thailand-Malaysia Rubber City Project (2016-2018).

1.3) Cross-border Trade and Transport Facilitation (2017-2021).

1.4) IMT-GT Database of Trade, Investment, and Tourism (2017-2021).

2) **Key implementing agencies:** Department of Foreign Trade, Ministry of Tourism and Sports, Board of Investment (BOI), and the National Statistical Office.

3) **Operational Timeframe:** 2016-2021.

4.3.3 Tourism:

1) **Main Content:** to realize the potential and jointly develop the tourism industry with neighboring countries. To develop historical and cultural tourist attractions to raise local pride and preserve national heritage. Key projects include the improvement of dive sites over five years (2015-2019), and the improvement of diving routes over four years (2015-2018).

2) **Key implementing agencies:** Ministry of Tourism and Sports.

3) **Operational Timeframe:** 2016-2021.

4.3.4 Halal products and services:

1) **Main Content:** to strengthen cooperation and raise the quality of Halal products and services in Thailand and neighboring countries to gain international recognition. To support Halal products and services to enter the global market. Key projects include:

1.1) IQRAH System (H-numbers) between Thailand and Malaysia (2016-2017).

1.2) Harmonization and Standardization of Halal Standards through the Halal Verification System, Halal Education and Research, Halal Logistics and Supply Chain, and Laboratory Program (2017-2021).

1.3) Halal SMEs Competitiveness (2017-2021).

1.4) Halal Verification System for Entrepreneurs (2017-2021).

2) **Key implementing agencies:** the Halal Science Center, Chulalongkorn University, Halal Standards Institute of Thailand, and Prince of Songkhla University.

3) **Operational Timeframe:** 2016-2021.

4.3.5 Human resources development:

1) **Main Content:** to improve labor skills and uplift labor standards with neighboring countries to support skilled labor movement, and increase labor competitiveness to accommodate an expanded labor market under the IMT-GT. Key projects include:

1.1) Joint Labor Skill Certification (2017-2021).

1.2) Labor Skill Standard and Certification, in accordance with the ASEAN Qualification Reference Framework (AQR) (2017-2021).

1.3) IMT-GT Labor Database (2017-2021).

2) **Key implementing agencies:** Thailand International Cooperation Agency, Ministry of Foreign Affairs, and Department of Skill Development, Ministry of Labor.

3) **Operational Timeframe:** 2017-2021.

4.3.6 Agriculture, agro industry, and the environment:

4.1 **Main Content:** to upgrade the agricultural sector to become part of a higher value-added production chain, and raise income for farmers. To advance research and development to add value to products, and preserve the environment to assure sustainable development. Key projects include:

1.1) Agriculture and Agro-based Technology Exchange through research and development of public agencies, the private sector, and the academia (2017-2021).

1.2) Development of the Surath Red Goat Breed to strengthen the sub-regional food production base (2017-2021).

4.2 **Key implementing agencies:** Ministry of Agriculture and Cooperatives, and Ministry of Natural Resources and Environment.

4.3 **Operational Timeframe:** 2017-2021.

4.4 Asia-Pacific Economic Cooperation (APEC):

4.4.1 Strategic Study for a Free Trade Area of the Asia-Pacific (FTAAP):

1) **Main Content:** a target to be achieved after the Bogor Goals reach completion in 2020. The study covers new trade issues, analysis of opportunities, challenges, recommendations, and processes to establish a Free Trade Area of the Asia-Pacific (FTAAP), which Thailand gives importance to. However, the level of development and readiness in each economy still differs significantly. Thus, competitiveness enhancement and preparation in related sectors, capacity building for government officials, and awareness building in the general public on the Free Trade Area of the Asia-Pacific (FTAAP) are crucial.

2) **Key implementing agencies:** Department of Trade Negotiations, Ministry of Commerce.

3) **Operational Timeframe:** study completed in 2016. Awaiting agreement and confirmation from members to commence Free Trade Area of the Asia-Pacific (FTAAP) establishment.

4.4.2 **APEC Services Competitiveness Roadmap:**

1) **Main Content:** to be a long-term mutual goal to enhance services competitiveness by 2025.

2) **Key implementing agencies:** Department of Trade Negotiations, Ministry of Commerce.

3) **Operational Timeframe:** framework laid out in 2016, and used as an operational framework to achieve the long-term mutual goal to enhance services competitiveness by 2025.

4.4.3 **APEC Food Security Roadmap Towards 2020:**

1) **Main Content:** to cover urban and rural development, regional food supply chains, and a conducive environment for infrastructure investment to support the food system in APEC, and minimize climate change impact. To remove trade barriers in the food sector to promote regional food trade, increase agricultural productivity, enhance farmers' competitiveness, support local farmers to enter the global value chain, and increase income for Micro, Small and Medium Enterprises (MSMEs), following the Boracay Action Agenda 2016-2020. To increase MSMEs participation in services and the global value chain, with the APEC Strategy for Green and Sustainable MSMEs.

2) **Key implementing agencies:** Office of Agricultural Economics, Ministry of Agriculture and Cooperatives, Office of Small and Medium Enterprises Promotion.

3) **Operational Timeframe:** 2016-2020.

4.4.4 **APEC Framework for Boosting Youth Employment and Entrepreneurship:**

1) **Main Content:** to strengthen human capital, apply innovation to enhance learning ability, and increase employment opportunity and access to the labor market, particularly regional labor mobility and employment.

2) **Key implementing agencies:** Ministry of Education.

3) **Operational Timeframe:** 2016-2017.

4.4.5 **APEC New Strategy for Structural Reform (ANSSR) (2016-2020):**

1) **Main Content:** to comply with the structural reform plan of the country, which focuses on market competition, a liberalized, systemized, and transparent market, and public participation, including Micro, Small and Medium Enterprises (MSMEs), women, youth, elderly workforce, and people with disabilities. To formulate social policy for sustainability, focusing on (1) public sector reform to utilize digital services and expand data linkages; (2) regulatory reform to promote market competition, consumer protection, and business facilitation; (3) system and process development for Regulatory Impact Assessment (RIA); (4) target market in the services sector to improve and reform the services sector, and

enhance competitiveness and opportunities of Micro, Small and Medium Enterprises (MSMEs); and (5) labor skill and competency improvement, and the green labor initiative.

2) **Key implementing agencies:** National Economic and Social Development Board, Ministry of Foreign Affairs, Office of the Public Sector Development Commission, Office of the Council of State, Ministry of Justice, Office of Small and Medium Enterprises Promotion.

3) **Operational Timeframe:** 2016-2025.

Part 5

Implementation, Monitoring and Evaluation of the Twelfth Plan

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Implementation, Monitoring and Evaluation of the Twelfth Plan

Successful translation of the Plan into action relies on a variety of important factors, such as the clarity of its contents, a sense of awareness and understanding of the Plan's objectives, a sense of ownership, and the shared responsibilities of every sector in society. Moreover, the mechanisms that drive the Plan into action should be connected at different levels, linking the National Strategy, the Twelfth Plan, specific plans, operational plans, and the budget allocation system all together. Such connectivity aims to facilitate the Plan's implementation in an efficient manner, and to encourage integrated, area-based and sustainable developments. Similarly, cross-cutting issues are extracted from various development agendas as indicated in the Twelfth Plan, government policies and important reform objectives.

Apart from continuing to move forward with the development strategies that were introduced under the Eleventh Plan, the Twelfth Plan also aims to deliver an improved integrated budget allocation system. The Plan also focuses on fostering cooperation between the public sector, private sector and the general population. The participatory monitoring and evaluation system will be improved to achieve an enhanced level of efficiency, and will also reflect the translation of the National Strategy and the Twelfth Plan into ministerial and provincial operational plans. Targets as well as output, outcome and impact indicators within those plans should be harmonized. Additionally, public agencies' capacity for monitoring and evaluation in order to fulfill the Plan's targets should be consistent, as should their overall performance levels. This can be achieved by establishing common goals and indicators, and also coherence between targets and indicators. Common indicators regarding the execution of cross-cutting issues will also be identified.

1. Translating Strategies into Action

1.1 Principles:

1.1.1 Propelling national development by using the Twelfth Plan as the main framework for translating development objectives into action at all levels, as they relate to socio-geographic conditions.

1.1.2 Distributing development efforts to different areas and levels by using the Area-Function-Participation (AFP) approach. In this instance, provinces will become the focal point for linking national development with local development and *vice versa*.

1.1.3 Utilizing knowledge, technology, innovation, and creativity as the main tools to drive implementation at every level, such as area and community.

1.1.4 Employing methods and tools from all stakeholders in a holistic manner to drive the plans effectively. Networks and clusters should be created to respond to local needs and each area's development potential.

1.1.5 Enhancing the Plan's implementation systems to operate coherently and harmoniously. At the strategic level, the Twelfth Plan will connect national economic and social development objectives with specific action plans, and the budget allocation system will comply with integrated development, area development, and continuous development. The monitoring and evaluation systems will function in line with the key development issues, development objectives, and intended development outcomes.

1.2 Implementation Guidelines

1.2.1 Create a common understanding among all development partners to accept the Plan and participate in making it work. The Office of the National Economic and Social Development Board (NESDB) will create mutual understanding of the Plan's goals with all development partners through appropriate communication. Public relations efforts via the conventional media as well as modern communication methods and through activities at the national and local levels will be mobilized to reach the target groups. In addition, information networks will extensively distribute the Twelfth Plan to different areas. A Twelfth Plan implementation handbook will be published and later distributed to all development partners. Its purpose is to coordinate plans at each level and to enable all development partners to work together in an integrated manner. Moreover, attempts to create an understanding of the Plan's goals and guidelines for the political sector will also be emphasized. The political parties will be encouraged to integrate major development issues into their manifestos, and subsequently government policies, especially those that seek to lay the foundation for long-term development.

1.2.2 Link the Twelfth Plan with the National Strategy, Government Policies, Specific Plans and Operational Plans by:

1) **Designating significant strategic issues and presenting these to the public.** This will lead to the effective identification of plans and projects, an accumulation of resources, and the efficient integration of working guidelines for all development partners.

2) **Integrating development issues to formulate specific strategic investment plans.** These will encompass issues of growth and the roles of stakeholders. Operational plans should be precise and should cover programs, projects, budgets, partners, processes, timing and key personnel who will be responsible for implementing the Plan in an effective manner. Priority should be given to the recruitment of personnel for project management. Moreover, science and technology utilization should be applied to these plans/projects. Approaches are listed as follows:

2.1) **Formulate investment plans for development by prioritizing key issues as reflected in the Twelfth Plan. This approach will lead to appropriate budget allocation.** This will also bring about appropriate integrated budget allocation for important development issues and reforms. This will lead to overall development achievement.

2.2) **Encourage Public-Private Partnerships (PPP) in mega-projects such as infrastructure development and logistics systems.** This should encourage the private sector to expand investment in such projects, respond to public needs and create value for money.

2.3) **Translate development issues into action through Ministerial Plans by integrating the main tasks that have concrete targets and indicators into the Plans.** The NESDB and involved agencies will jointly monitor and evaluate outputs and outcomes. The integration of programs and projects both within and outside ministries should be encouraged.

1.2.3 Link concepts, strategies, development issues and specific proposals under the Twelfth Plan with the National Strategy, the Reform Plan, government policies, and other plans. To execute the Plan, actions will be carried out at different levels ranging from government policies, the Government Administrative Plan, and the plans of central and local agencies, LAOs, communities and stakeholders. Plan

implementation should be executed step-by-step starting from objectives and goals through to indicators, as follows:

1) **Integrate high-priority development issues and specific plans under the Twelfth Plan with government policies, and present them to Parliament.** An integrated budget allocation should be established. This includes working period, monitoring, and evaluation. Central government agencies should integrate the Twelfth Plan into their budget allocation strategies in order to provide a framework for the ministries when it comes to budget proposals.

2) **The NESBD will formulate strategies concerning the development of regional, urban and economic areas** by adhering to the Twelfth Plan. These development strategies are designed to create the direction for regional and area development so that the development partners involved are able to use them as the framework for establishing their own development plans, including strategic plans and action plans, both of which should support each other. Ministries, departments, provinces and provincial groups will use their own development plans as the framework for formulating 4-year strategic plans and annual action plans. The development guidelines must be linked to the missions of the local agencies. There is also a need to create linkages between projects in an integrated manner based on the area-function-participation principle.

3) **Ministries and departments will formulate strategies and annual action plans.** They should use a regional, urban and economic area development strategy under the Twelfth Plan as a means of helping them to analyze the relevance of ministries' and departments' missions. The results of the analysis will be used to formulate a four-year strategic plan as well as project formulation which conforms to the organization's annual action plan. Integration between objectives, goals, and provinces' and provincial clusters' plans/projects is to be prioritized.

4) **Provinces and provincial clusters will formulate a 4-year development plan and annual action plans.** These plans should be based on the guidelines and criteria under the Royal Decree on Integrated Administration of Provinces and Provincial Clusters (2008), and should harmonize with government policies and regional, urban and economic area development strategy under the Twelfth Plan. These plans should also respond to challenges, people's needs, areas' potential/limitations and opportunities. Ultimately, they should integrate with the 4-year strategic plans of the ministries/departments.

5) **Local Administrative Organizations (LAOs) will formulate a 3-year development plan as well as annual projects.** Provincial administrative organizations, municipalities, and sub-district administrative organizations will formulate 3-year

development plans and annual projects that will conform to every strategy under the Twelfth Plan, especially regional, urban and economic area development strategies. According to the guidelines for major developments and important city developments, urban development should match the existing conditions and people's needs in that area, and should also be linked to the province's and district's development plans.

1.2.4 Create a budget allocation strategy that utilizes participation.

Annual budget allocation is a major tool to establish the priorities for government agency tasks that relate to the Twelfth Plan. To achieve effectively the objectives of the Plan through popular participation, the following actions should be undertaken:

1) **The Bureau of the Budget and the NESDB should emphasize the significant issues of the Twelfth Plan as they relate to budget allocation.** In particular, the focus should be on the priorities that have been set in the Government Administrative Plan and Budget Allocation Strategy. In addition, the guidelines used to realize programs and projects and to monitor and evaluate national development at all levels should be approved by the Cabinet and Parliament.

2) **The Bureau of the Budget, NESDB and all involved agencies should work closely on the guidelines for budget allocation to support local, provincial and cluster development plans.** The process of creating understanding must be carried out by all government agencies so that the links between development plans and the budget system, from the national to the local levels, can be achieved. In addition, representatives of all development partners should participate throughout the budgeting process to create a system in which budget allocation is a genuine reflection of the development activities demanded by the public.

1.2.5 Encourage the private sector to integrate important development issues when they formulate their business investment plans. This will create development partnerships while also promoting the Joint Public-Private Consultative Committee for Solving Economic Problems (JPPCC) as a key mechanism for linking the public and private sectors. The JPPCC will have to delegate more responsibilities to provincial and provincial cluster joint committees, and consider the National Strategy as it links to local needs.

1.2.6 Enhance stakeholders' capabilities by providing an enabling environment. The main factors will be adjusted so they become development tools as follows:

1) **Use research and development as essential tools to propel the nation's development in all dimensions.** Policy-level government agencies will work cooperatively and utilize research and development (R&D) to accommodate national and area-based developments. Cooperation by research agencies will be advocated, especially networks of (a) the National Research Council of Thailand (NRCT), (b) the Thailand Research

Fund (TRF), (c) the National Science and Technology Development Agency (NSTDA), (e) the National Science Technology and Innovation Policy Office (STI), (f) the Health Systems Research Institute (HSRI), and (g) the Agricultural Research Development Agency (ARDA). Also, academic institutions and involved public agencies such as the Regional Science Parks should coordinate R&D at the local level, especially when high-priority development is undertaken.

2) **Amend regulations to enable efficient execution of the Plan at every level.** Laws will be amended to reduce redundancy, increase efficiency in existing systems, and to overcome obstacles to development. Examples are a push to issue a law concerning early childhood development and a law concerning long-term care for the elderly, and the amendment of laws concerning land reform, land possession and land use in order to enhance fair distribution of land to low-income households and those who are on the verge of poverty. Moreover, important bills that should be passed are listed as follows: a bill concerning the state's finances B.E. ..., the promotion of tax incentives for the private sector that support Corporate Social Responsibility (CSR), a bill concerning management of electrical waste products, electronics waste and other wastes B.E. ..., a bill regarding the Committee for Digital Economy and Society B.E. ..., a bill concerning National Cyber Security, and a bill concerning Water Resources (which is currently under consideration by the National Legislative Assembly).

3) **Create development databases that the public can access so that they can make use of the data to bring about development.** Economic, social, natural resource and environmental databases will be developed and kept up to date. They will contain specific data of each area, which are suitable for analysis and relate to the Plan. This will lead to an improvement in the formulation of development plans that are able to address problems and bring about progress in each area. The strengths, knowledge and experience of each area will be integrated as the plans evolve.

4) **Introduce channels for public participation in the development process at both the policy and area-based levels.** Public forums will be provided and thereby development partners can organize activities such as civil society forums and dialogue. Online networks will be used as a platform for information sharing and activities for development.

1.2.7 Enhance the efficiency of development methods to drive the implementation of the Twelfth Plan at the local and national levels. The NESDB is responsible for creating understanding and connecting development partners with the plan implementation committees at all levels so that they are able concretely to translate the Plan into action as follows:

1) **Link national committees in order to use the strategies under the Twelfth Plan as guidelines for implementation.** A responsible agency in each development field will work in a “horizontal” approach through different national committees. These committees are responsible for the implementation of the development agendas that have a high priority, for instance the Joint Public-Private Sectors Consultative Committee for Solving Economic Problems (JPPCC), the Committee on Neighboring Countries Development Cooperation, the National Water Resources Committee, the Innovation Development Committee, and the National Logistics Committee. A national committee to support urban development should also be encouraged. It should be noted that, together, the national committees should be responsible for the overall goals and indicators of the Twelfth Plan.

2) **Improve the efficiency of the public administration’s working mechanisms and processes.** The mechanisms needed to review and evaluate development performance, including committees, agencies, and public organizations, will be revised and evaluated to increase their flexibility and reduce redundancy. The government and central agencies are in charge of overall policies and the approaches to achieve them. The ministries coordinate programs, budgetary and human resources, while government agencies at the regional level execute strategies that address problems and enhance areas’ potential.

3) **Use the provinces as a focal point to translate the Twelfth Plan into action, and evaluate its impact.** By law, the provinces are responsible for creating Provincial Development Plans, which should be linked to other plans in both top-down and bottom-up directions. The top-down direction is the National Development Plan, the Government Administrative Plan, and the Ministry’s Action Plan. The bottom-up direction is from the community, local organizations, and the private sector. Key development issues, objectives and indicators should be introduced into Provincial and Provincial Cluster Development Plans. The implementation process should integrate the tasks of various agencies so they can handle problems in each area efficiently.

4) **Encourage a “Civil State” approach as one of the ways of vigorously driving the Twelfth Plan into action.** Coordination is required among development partners that operate in networks, including the private sector, academic institutions, professional associations, and independent organizations such as the National

Farmers Council, the Board of Trade of Thailand, the Federation of Thai Industry, the National Reform Assembly, and cooperative groups. These networks will work through local structures to formulate and implement strategies together.

1.2.8 Strengthen the ability of stakeholders to make effective contributions to progress at every level by:

1) **Enabling all stakeholders to contribute to collaboration in the development process and exercise their citizenship effectively.** Thai people should be moral, ethical and citizens of quality, aware of their responsibilities and roles in accordance with their social status and culture. They should respect the laws, rights and freedom of others, possess public awareness and be eager to participate in solving community and societal problems. Learning in both the formal and informal education sectors should be promoted to equip them with the ability to propel the country towards peace, progress, and prosperity.

2) **Empowering communities and local authorities to adapt to changes and participate in advancement for the common good.** Communities should be strengthened through information. Their ability to manage affairs, and to benefit from knowledge from outside sources through local research networks should be supported. Knowledge sharing should be promoted at all levels to support accomplishments and manage risks. Community plans should reflect local culture. Local citizens should drive plan implementation. Cooperation among citizens, LAOs, and local academic institutions should be encouraged.

3) **Strengthening Local Administrative Organizations.** In order to perform their duties efficiently, the capabilities of LAOs should be enhanced and their administration simplified and made more flexible. Rules and regulations should guide their operations, and they should be fully self-sufficient. Public agencies should provide support so they can manage and make decisions about local developments and personnel. This will help them achieve the goals of their delegated projects. The responsibilities of LAOs should be clearly defined. Their capabilities should be upgraded in the areas of management, anti-corruption and good governance.

4) **Encouraging regional universities and vocational institutions to participate in community development.** Universities should make use of research

outputs and serve as coordinators to support community development. Vocational institutions should provide technological skills training to assist local development.

5) **Enhancing the role of the private sector in economic and social development.** Corporate governance should be emphasized, and business targets should be linked to the nation's development. Proactive cooperation and creativity should be promoted along with corporate social responsibility. The private sector should form alliances with communities, non-governmental organizations (NGOs) and academic institutions to bring about collaboration in social activities.

6) **Encouraging the media to deliver constructive messages.** The media should present information that promotes benefits for society, be impartial, deliver accurate information and reflect the needs of the people.

7) **Motivating NGOs to work jointly with local and regional organizations as well as with civil society.** The public sector will encourage NGOs to participate extensively in development activities. NGOs have the advantage of being able to work flexibly and they can maintain a close relationship with local citizens to enhance performance effectively.

8) **Amending the roles of government personnel and their work methods to accommodate the overall development efforts and encourage regional public agencies to be coordinators for connecting other sectors at the local level.** Provincial organizations should join development partners in efforts to work towards the common goals, fulfill national strategies, solve problems and increase performance at the local and community levels.

9) **Enhancing cooperation with international communities and institutions.** International forums to share knowledge should be organized, especially for countries involved in regional and sub-regional cooperation. These will lead to mutual assistance in achieving significant development goals. Cooperation in the technical and innovative sectors should be encouraged to support both domestic and international growth.

2. Monitoring and Evaluation of the Twelfth Plan

Participatory monitoring and evaluation of the Twelfth Plan is managed both at the ministerial level or equivalent and the provincial or area level, particularly in fields where there is an evaluation linkage between the Twelfth Plan and the National Strategy. Performance is measured through Joint Key Performance Indicators (Joint KPIs).

2.1 Concepts and Principles of Participatory Monitoring and Evaluation:

2.1.1 A participatory monitoring and evaluation system is one that opens up the opportunity for stakeholders to participate in the monitoring and evaluation processes. This aims to enhance the rights of the people, as they are entitled to receive news and information from the responsible organizations. This should be done through public hearings and fora that welcome all participants from every sector, for instance responsible organizations, scholars, communities and the general population. They will be able to scrutinize the process and gain free and fair information.

2.1.2 It is an integrated evaluation system that aims to present outputs, outcomes and impacts. It is used to measure the successes and failures of the Plan. The system must be effective, standardized and well-accepted. The aim is to assess the feasibility and appropriateness of implementation both during and after the work process.

2.1.3 It involves self-evaluation assessment that creates a learning and monitoring process, and concurrently allows independent organizations to undertake evaluations. This is a clear, transparent, and impartial system, and is also based on academic principles.

2.1.4 It utilizes monitoring and evaluation criteria and indicators that are clear, transparent, independent, standardized and also based on academic principles and facts. These can be used as guidelines to improve and review measures, policies and plans/projects at the overall, ministerial and provincial levels in order to respond to people's needs in a just and fair manner.

2.2 Guidelines for the Participatory Evaluation of the Plan:

2.2.1 Establish a monitoring and evaluation process in three phases:

1) **Ex-ante evaluation** is a process which evaluates the situation and finds appropriate facts. Possible assumptions, such as the potential for area development and the costs of working procedures, are made in terms of both proscribed and non-proscribed policy formulation processes in order to filter projects.

2) **On-going evaluation** is a process which measures progress of an on-going work or operation in order to look into both internal and external challenges that might affect working procedures.

3) **Ex-post evaluation** is a final process which concludes how far the objectives and goals have been accomplished when compared to those originally set. Outputs and outcomes are expected to appear after the Twelfth Plan period is completed. Ex-post evaluation is an analysis of effectiveness,¹ efficiency² and negative and positive impacts.³

2.2.2 Establish a monitoring and evaluation system for ministries' plans/projects and for works that are relevant to more than one ministry. Linking the indicators of ministries'/ministry clusters' operational plans with the goals of the National Strategy and the Twelfth Plan's development agendas by:

1) Creating a platform to communicate with the involved agencies, especially in areas where the National Strategy's development goals are linked to the Twelfth Plan's development agendas and goals. One development agenda can relate to more than one ministry, and this is called a cross-cutting agenda. A ministry's development agendas can involve either business-as-usual activities or new investment projects. A ministry uses development agendas as a framework for the formulation of plans/projects, which form part of the ministry's operational plan. This process aims to analyze budget allocation before presenting it to the cabinet.

2) Monitoring and evaluating progress resulting from using the principles of the Sufficiency Economy to drive on-going plans/projects. This is used as an analytical framework to apply for supporting budgets.

3) Evaluating plans/projects after they are completed at the output, outcome and impact levels. The results are used as a framework to evaluate the Twelfth Plan and the National Strategy. Output Joint KPI, Outcome Joint KPI and Impact Joint KPI are used as tools to measure the country's overall development efforts.

¹ **Effectiveness** is a measure to indicate whether and how far objectives and goals have been accomplished and to identify the underlying reasons for success or failure.

² **Efficiency** is a measure to indicate the results of a work effort in relation to its costs, and helps determine whether and how far other approaches could achieve the set goals. It considers production capability and input costs in terms of outputs.

³ **Impact** considers how the outputs resulting from work efforts that follow identified goals, affect overall economic and social development and the target groups.

2.2.3 Establish a monitoring and evaluation system for plans/projects at the provincial and area levels:

1) Create a platform to communicate with the involved agencies and to identify provinces' development agendas that link to the Twelfth Plan's development agendas and goals, and then integrate these linked issues to the National Strategy's goals. This aims to establish a framework for the formulation of provincial and provincial clusters' operational plans.

2) Monitor and evaluate progress resulting from using the principles of the Sufficiency Economy to drive on-going plans/projects. This is used as an analytical framework to apply for supporting budgets.

3) Evaluate plans/projects after they are completed at the output, outcome and impact levels. The results are used as a framework to evaluate the Twelfth Plan and the National Strategy. Output Joint KPI, Outcome Joint KPI and Impact Joint KPI are used as tools to measure the country's overall development efforts.

2.2.4 Create a research center, training course, and standard-checking system for monitoring and evaluation. This aims to universalize and modernize the monitoring and evaluation system, improve training procedures, techniques, and approaches as well as guidelines for ex-ante, on-going, and ex-post evaluations. For example, Regulatory Impact Assessment (RIA) is used by the developed nations as a tool to evaluate bills before enactment.

2.2.5 Enhance collaboration between the NESDB, the Office of the Public Sector Development Commission (OPDC), the Bureau of the Budget, and other relevant public institutions, both in central and local government. This will lead to an efficient and effective participatory monitoring and evaluation system.

2.2.6 Set up a central organization that is efficient, expert and well-accepted and able to undertake neutral evaluations. This will create a universal, reliable, and accurate monitoring and evaluation system that helps facilitate the government's decision-making. The central organization should be responsible for formulating projects from an outside-in approach. It must not have any conflict of interest and should not be a profit-driven organization. It should be expert and well-accepted by all parties. The structure

of the organization should embrace the teamwork approach and partnership. Partners are composed of communities, volunteers, intellectuals, villagers, academic institutions, NESDB, OPDC and other related bodies.

2.2.7 Bring indicators and joint KPIs more in line with international standards in order to evaluate the level of the Plan's implementation success, as well as that of the National Strategy. The success level can be measured by using joint KPIs in terms of outputs, outcomes, and impacts. The procedure is listed as follows:

1) **Establish indicator criteria.** Each indicator must be internationally standardized and also reflect the particular characteristics of the public sector. This is because public sector work is about public services, which do not usually regard profits as their priority but instead mainly value the benefits for people, society and the environment. Therefore, there should be a wider range of evaluation criteria as compared to those of the private sector. In terms of the **economy**: it should grow and be able to compete, for example GDP must continuously increase; there should be innovation creation; a rise in income per capita in order to overcome the middle-income trap; equitable income and wealth distribution; and green growth. In terms of **society**: the population should have the opportunity to access public services; they should be moral, intelligent and respect the rights of others. In terms of **the environment**: conservation of natural resources should be emphasized for the purpose of sustainability; the quality of the environment should be taken care of for the benefit of the people and communities. In terms of the **public sector**: adequate, efficient, and standardized public services should be emphasized; it should serve the needs of the population in a timely manner; the fair and proper use of resources in the public sector should be supported; the public sector should also be responsible and ethical.

2) **Impact Joint-KPI management.** This approach seeks to study and learn the goals and indicators of the 20-year National Strategy, which aims to drive Thailand to become a developed nation. Important indicators for the status of a developed nation are as follows: a high-income country whose income per capita is above 13,000 USD per year; average economic growth of 5-6 percent per year; a rise into the top 10 in terms of international competitiveness, as ranked by the IMD; the Thai population of all ages is healthy and able to learn throughout their lives; the HDI is not less than 0.9279; the Gini coefficient of income inequality should be reduced to 0.36; the forest area should cover 40

percent of the country; and the Corruption Perception Index should reach 2nd place in ASEAN.

3) **Outcome Joint-KPI management** by: (1) **identifying development agendas of the Twelfth Plan that connect with goals and indicators under the National Strategy.** It should be noted that under the Twelfth Plan there is a clear indication of connectivity between the development agendas and the National Strategy; (2) **find indicators that are international and well-accepted** by studying the indicators used by international organizations, for instance: economic indicators used by the IMD World Competitiveness Center, the World Economic Forum (WEF), and Ease of Doing Business; human quality indicators used by the Human Development Index; environmental indicators used in the Sustainable Development Goals; and corruption indicators as used by the Corruption Perception Index; (3) **make use of international organizations' sub-indicators** as a framework for reducing redundancy in the number of the sub-indicators used. These indicators are divided into four important categories, which are economic, social, environmental and public sector; (4) **link the international organizations' sub-indicators with the key development issues under the National Strategy and the Twelfth Plan.** Nowadays, the Bureau of the Budget uses the Plan's key development issues and targets, linked to the National Strategy, as a framework for budget allocation to the ministries. This obliges projects under the ministries' operational plans to be in line with international sub-indicators that are considered clear and of a high standard.

4) **Output Joint-KPI management.** This is divided into two levels, as follows:

4.1) **Ministerial level.** Activities and work stages will be identified to grasp linkages throughout the work process. Activities will be carried out in phases. Project-level indicators should be established in 3 parts. Outputs stemming from one project will be linked to outputs from other projects. In terms of a project's outcome, it shall be linked with the development agendas' indicators/goals under the Twelfth Plan. This is called Output Joint KPI. In terms of a project's impact, its indicators shall be linked to the National Strategy's indicators/goals.

4.2) **Provincial/area level, encompassing area-based indicators.** A province's development agenda goals should be identified that link to the

Twelfth Plan's development agendas. Each province has a different development agenda, as this depends on its potential and socio-geographical conditions. Activities and stages of work will be identified to grasp linkages throughout the work process. Each activity will require the involvement of more than one ministry whose responsibility is to formulate projects and identify output, outcome and impact indicators. Moreover, an output must be the result of activities or projects. An outcome must be linked to a province's development agendas and the Twelfth Plan. An outcome can also in fact be linked to plans/projects between provinces and ministries to reduce overlaps. An impact is linked to the National Strategy's goals.

5) **Guidelines for establishing an Output Joint-KPI, an Outcome Joint-KPI and an Impact Joint-KPI.** Techniques used to develop these joint KPIs should be based on academic principles as follows:

5.1) Select qualified indicators based on academic principles.

5.2) Establish a benchmark value for each indicator for the purpose of comparing the results in percentage terms. There are a variety of means of establishing the benchmark value, for example using the targets of the strategies as the benchmark values, or using benchmark values based on international criteria or formulated by international organizations.

5.3) Improve calculation techniques, which can be done in a variety of ways, for example by making a comparison between the measured value and the benchmark, and representing this in percentage terms. Popular methods used to measure the implementation success of each project can be derived by using Gap Analysis. Gap Analysis refers to a comparison between the achieved results and the set goals. The difference in value is then translated into percentage terms. If the development project result is close to 100, this demonstrates that there has been development progress.

5.4) There are two approaches to weighting a component within any indicator. First, if **every component is weighted equally**, there is a need to find an average in calculating an index value. Second, if **every component is not weighted equally**, this is a differential index. In order to finalize this index, it is necessary to multiply an index value by its appropriate weighting.

2.2.8 Establish a public forum in which stakeholders are able to discuss openly and freely debate issues concerning implementation. The forum should be set in a way that encourages dialogue and active participation between parties, rather than a monologue. There should be direct exchange between stakeholders from both sides, for instance policymakers and target groups.

2.2.9 Present monitoring and evaluation results to all involved parties, which include concerned members of the public, policy-makers, implementation agencies, funding agencies, and the general public.

2.2.10 Develop databases and technology applications in order to optimize the evaluation process by establishing information management systems, supporting the analysis and accessibility of information, and enhancing the effectiveness of the evaluation process. This will also encourage the proper utilization of information to inform policy options, and stimulate innovation in the field of management.
