
KING
RAMA IX
AND CLIMATE CHANGE

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PREFACE

King Bhumibol Adulyadej has an accumulated work of 70 years long resulted in several thousands Initiative Projects. All of this for the well being of Thai people. In the event of The Royal Cremation Ceremony for King Bhumibol Adulyadej on the date of 26th October 2017, Department Of Environmental Quality Promotion as Thailand's Majour Supporter for proactive Action for Climate Empowerment. We hold our duty to facilitate with information and knowledge about our Late King Bhumibol Adulyadej to both Thai and International Communities. We inherently publish this book "**King Rama IX and Climate Change**" in remembrance to our Great King Bhumibol Adulyadej. Uncovering ideas and initiative projects and conducted study in which King Bhumibol Adulyadej has touched on Global Warming and Climate Change angle.

This book presents overall sense of King Bhumibol Adulyadej's initiative work and his majesty creative and visionary view in order to lessen the effect of Global Warming and Climate Change. Lead to his majesty way of Greenhouse Gas Emission Reduction as well as his majesty methods to build a concrete foundation for Climate Change resolution such as Renewable Energy source as an alternative to mainstream Energy source or Lessening the drought with Artificial Rainmaking Project. King Bhumibol Adulyadej also covered on food security with over thousands agricultural projects. This book hope to preserve said wisdom and his majesty good will and strong royal ethics to ensure the safety and brighter future for Thailand as well as a guide for the World Community towards crisis time with firm standpoint.

The Department of Environmental Quality Promotion

CONTENTS

CLIMATE CHANGE

MOVEMENT UNDER H.M. KING BHUMIBOL ADULYADEJ THE GREATE

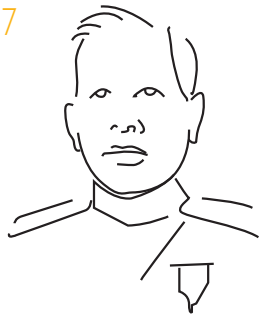
STORY BY DR. ROBERT MATHER

When H.M. King Bhumibol came to the throne on 9 June 1946, as the ninth monarch of the Chakri Dynasty (otherwise known as Rama IX), Thailand's population was around 20 million (or about 0.85% of the global population), and per capita GDP was $200.[1] It is safe to assume that not a single citizen of Thailand was concerned about climate change at that time. And they had no need to be. From the time of the first Thai Kingdom at Sukhothai to the time His Majesty ascended to the throne, it had remained true in Thailand that "in the fields there is rice, in the water there are fish" and most of the population made their living from the land in the same way their families had done for countless generations. The country at that time faced many development challenges related to poverty, education and health – but climate change was not one of them. Greenhouse Gas emissions were only about 0.1 metric tons per capita per year.[2]

THE GOVERNMENT OF MR. PLAEK PHIBUNSONGKHRAM

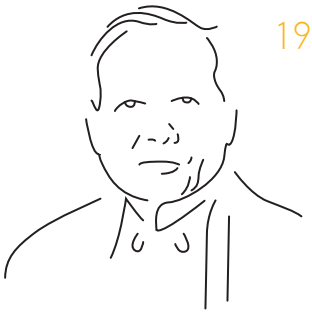
1951-1957

During the early years of his reign and in the period of the government of Plaek Phibunsongkhram (1951-1957) His Majesty played a mostly ceremonial role. Starting in 1958, from the time of the Sarit Thanarat government, the King was much more directly involved in development of the country.



ROYALLY-INITIATED PROJECTS 1960S AND 1970S

Royally-initiated projects were implemented with the financial and political support of successive governments. In the 1960s and 1970s these projects helped poverty alleviation and improved living condition initially with a strong focus in areas where the communist party of Thailand was particularly active at that time, in ethnic minority highland areas in northern Thailand, and in other border areas.



1981-1987

THE GOVERNMENT OF PREM TINSULANONDA

who later became President of His Majesty's Privy Council, started to officially allocate Government budgets and manpower to Royal Projects, including the development of many large-scale irrigation projects in rural areas. In the context of climate change, the impact of His Majesty's philosophy, approach and project interventions has been most clearly seen in rural development and agricultural land-use practices that contribute to both Climate Change Mitigation and Adaptation in many different ways.

THE CHAIPATTANA FOUNDATION

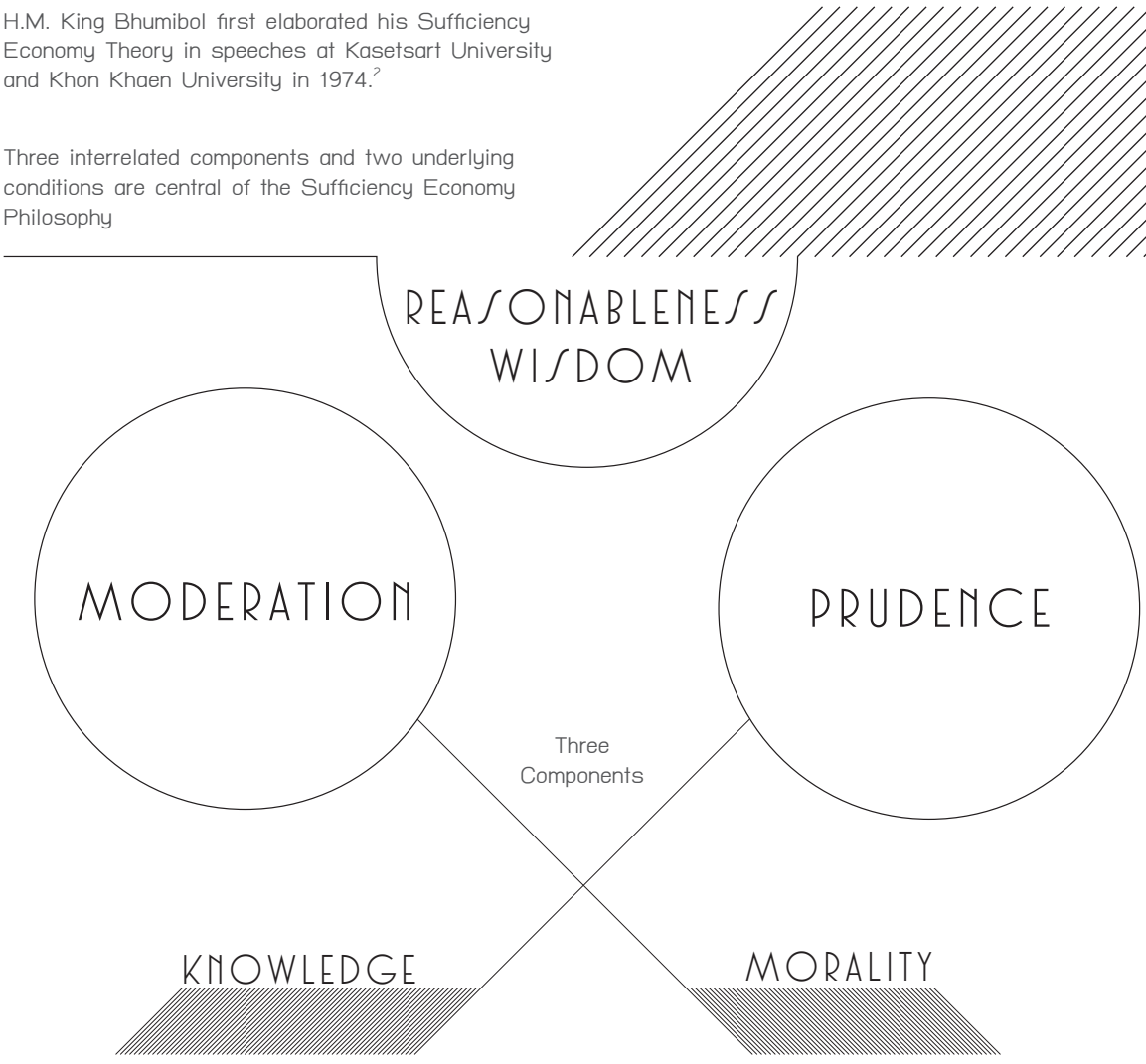
POST 1988

Post 1988 the structured development of Royal projects reached its peak. The Chaipattana Foundation was established, and widely promoted His Majesty's Sufficiency Economy Philosophy.

THE SUFFICIENCY ECONOMY PHILOSOPHY AND CLIMATE CHANGE

H.M. King Bhumibol first elaborated his Sufficiency Economy Theory in speeches at Kasetsart University and Khon Khaen University in 1974.[2]

Three interrelated components and two underlying conditions are central of the Sufficiency Economy Philosophy



Two Underlying Conditions

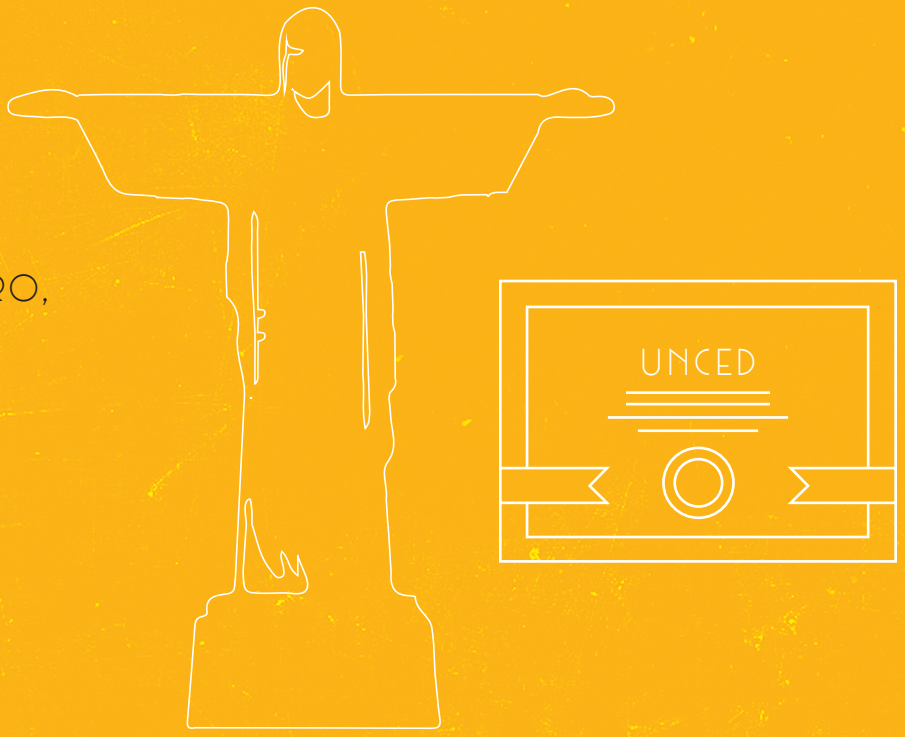
THE CHAIPATTANA FOUNDATION SAYS SUFFICIENCY ECONOMY IS

"....A METHOD OF DEVELOPMENT BASED ON MODERATION, PRUDENCE AND SOCIAL IMMUNITY. ONE THAT USES KNOWLEDGE AND VIRTUE AS GUIDELINES IN LIVING"[4]

THE SUFFICIENCY ECONOMY PHILOSOPHY HAS SIMILAR PRINCIPLES TO THAT OF "BUDDHIST ECONOMICS" THE TERM COINED AND PROMOTED IN "SMALL IS BEAUTIFUL" BY E.F. SCHUMACHER, A BOOK THAT WAS TRANSLATED BY HIS MAJESTY INTO THAI.[5,6] SUFFICIENCY ECONOMY IS NOT A THEORY ABOUT HOW THE ECONOMY OF A COUNTRY WORKS, BUT RATHER IT IS A GUIDE FOR MAKING DECISIONS THAT WILL PRODUCE OUTCOMES BENEFICIAL TO DEVELOPMENT.

By the time of the United Nations Conference on Environment and Development (UNCED) commonly referred to as the "Earth Summit" in Rio de Janeiro, in June 1992, the global community was starting to catch up with what His Majesty had essentially been promoting since the 1970s – living within our ecological means. Thailand's population was 58 million (accounting for 1% of global population – having slightly outpaced global population growth up to this point) and its GDP was $2,000 and GHG emissions were 2 metric tons per capita.[2] Compared with the start of King Bhumibol's reign, the population of Thailand had increased almost 3 times, and was producing 20 times as much GHG for every person – or in other words, the total GHG emissions had gone up by almost 60 times!. Similar transformations had happened in many other countries across the world, and Climate Change had started to become part of the global agenda.

EARTH SUMMIT
IN RIO DE JANEIRO,
IN 1992,



The UN Framework Convention on Climate Change UNFCCC was opened for signature, with the objective to "*stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*".

The UNFCCC set no binding limits on individual countries and has no enforcement mechanisms, but it outlined how specific international treaties (Protocols or Agreements) may be negotiated to specify further action. It came into force on 21 March 1994.[7, 8] Subsequently in 1997 the Kyoto protocol was concluded and established legally binding obligations for the developed countries to reduce GHG emissions in the period 2008-2012.[9]

In the same year however, economic crisis struck Thailand, per capita GDP which had climbed to $3,000 by 1995 fell back to the 1992 level of $2,000. GHG emissions that had climbed to 3 metric tons per capita in 1995 also dropped back - but only to 2.65[2] – still much greater than the 1992 level of 2 metric tons per capita.

It was then that his Majesty's Sufficiency Economy Philosophy really came to prominence when His Majesty said

> "RECENTLY SO MANY PROJECTS HAVE BEEN IMPLEMENTED, SO MANY FACTORIES HAVE BEEN BUILT, THAT IT WAS THOUGHT THAT THAILAND WOULD BECOME A LITTLE TIGER, THEN A BIG TIGER. PEOPLE WERE CRAZY ABOUT BECOMING A TIGER....BEING A TIGER IS NOT IMPORTANT. THE IMPORTANT THING FOR US IS TO HAVE A SUFFICIENT ECONOMY. A SUFFICIENT ECONOMY MEANS HAVING ENOUGH TO SUPPORT OURSELVES...."

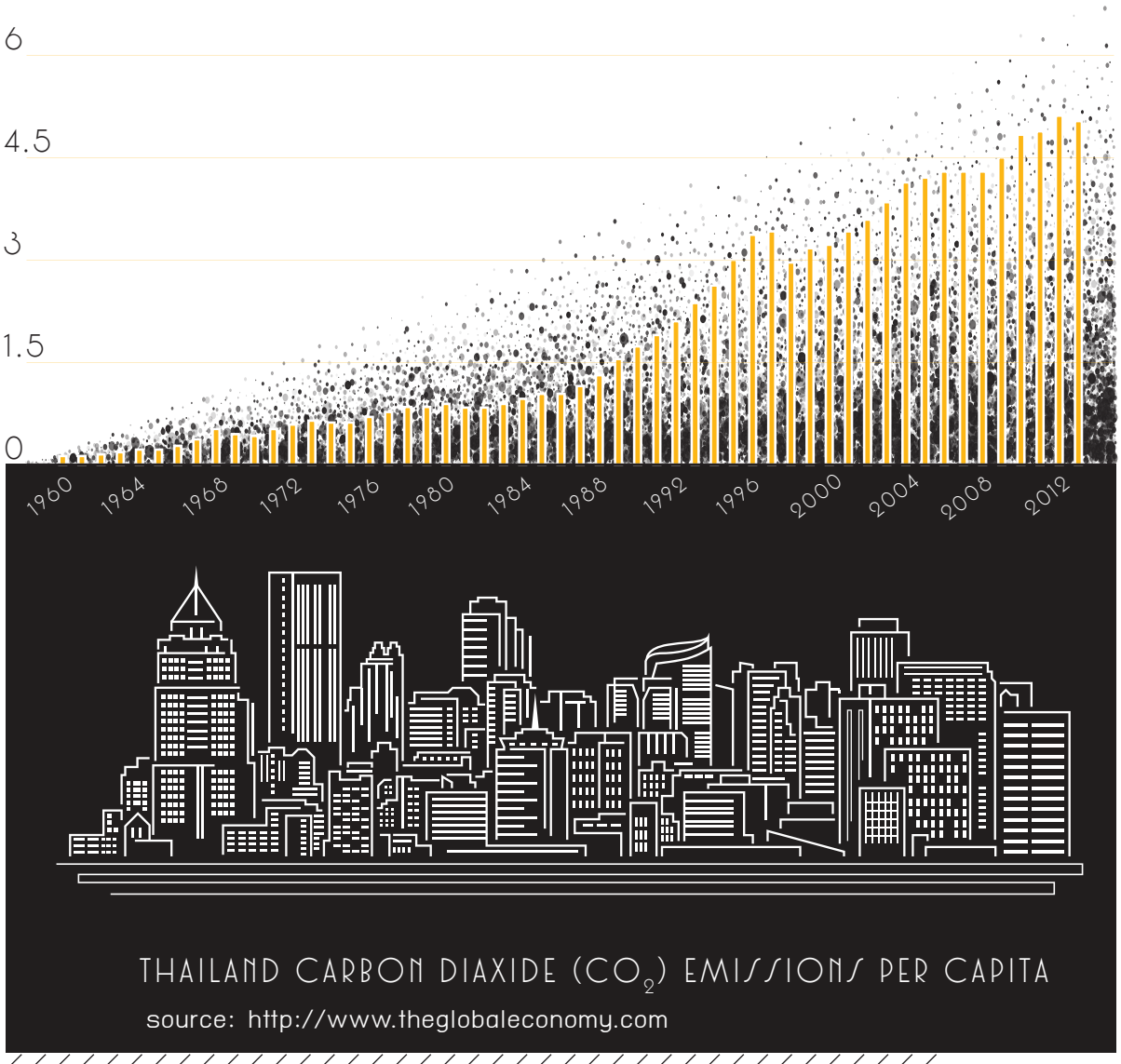
The World Summit on Sustainable Development (WSSD) or "One Earth Summit" (also known as Rio +10) was held in Johannesburg in September 2002 around the theme of how to build a green economy to achieve sustainable development and lift people out of poverty. It led to over 300 partnership projects helping to deliver the Millennium Development Goals. Again, one cannot help feel that once again, the global community was playing catch-up to what His Majesty was already proposing in Thailand. Thailand's population was 63 million, and per capita GDP was around $2,100 while GHG emissions had now reached 3 metric tons per capita[2].

The 2010 Cancun agreement stated that future global warming should be limited to below 2.0 degrees centigrade relative to the pre-industrial level.[10] The Doha amendment of 2012 was intended to cover the period 2013-2020, but never entered into force.

The United Nations Conference on Sustainable Development (UNCSD) also known as Rio+20 in June 2012 produced the non-binding document "The Future We Want" including language that supported the subsequent development of Sustainable Development Goals (SDGs). All nations reaffirmed commitments to phase out fossil fuels.

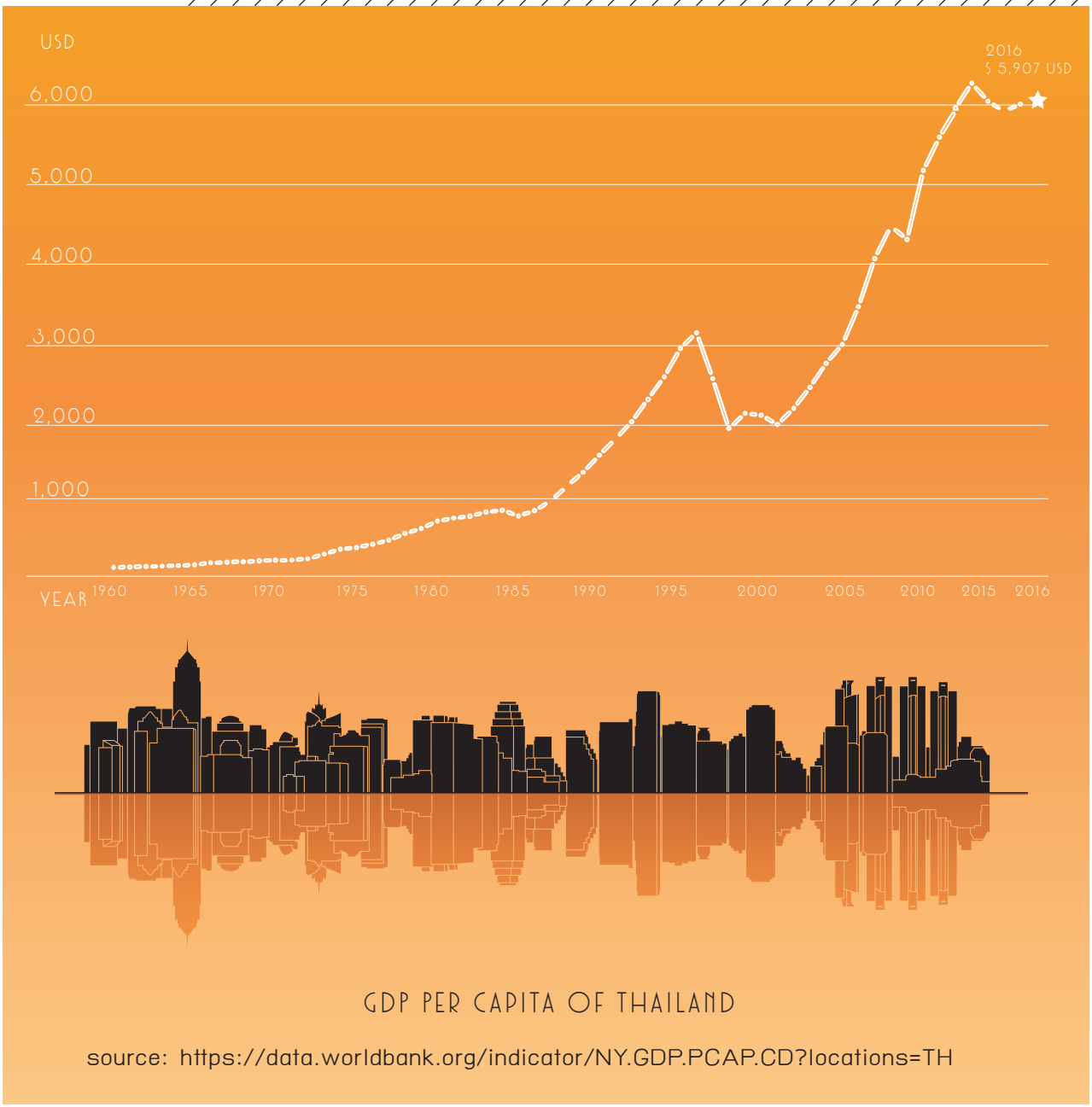
THE FUTURE WE WANT

Despite rapid growth, between 1990 and 2012, Thailand accounted for 0.75% of cumulative global GHG emissions[2] – lower than its share of global population – meaning Thais emitted less GHG per capita than the global average. Thailand's emissions per unit of GDP are also lower than the world average. In 2015 Thailand was responsible for an even smaller share – only 0.64% of global emissions.



THAILAND CARBON DIAXIDE (CO_2) EMISSIONS PER CAPITA

source: http://www.theglobaleconomy.com



GDP PER CAPITA OF THAILAND

source: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=TH

At the 19th Conference of the Parties in Warsaw in 2013, the UNFCCC created a mechanism for recording Intended Nationally Determined Contributions (INDCs), reflecting nationally appropriate mitigation and adaptation actions (NAMAs). Thailand's Climate Change Master plan 2015 to 2050 includes the following medium and long-term goals:

THAILAND'S CLIMATE CHANGE MASTER PLAN

MEDIUM TERM GOALS, 2020

ADAPTATION

FORECASTING AND
EARLY-WARNING

CLIMATE INSURANCE SYSTEMS

NATIONAL ADAPTATION
FUND

MAXIMUM CONSERVATION AREA
FOR BIODIVERSITY PROTECTION

ALL COASTAL CITIES WITH
COASTAL RESTORATION PLAN

DEVELOPMENT OF LOCAL-LEVEL
ACTION PLANS
ON CLIMATE CHANGE ADAPTATION

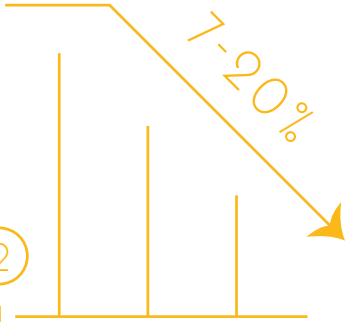
THAILAND'S CLIMATE CHANGE MASTER PLAN

MEDIUM TERM GOALS, 2020

MITIGATION

1

40% GROWTH IN FOREST COVER

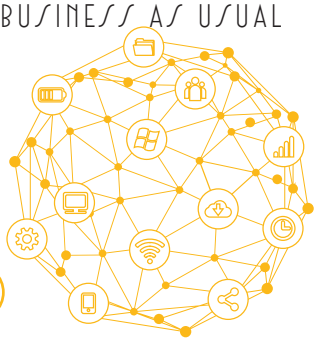


2

7-20% REDUCTION OF GREENHOUSE GAS EMISSION FROM ENERGY AND TRANSPORT SECTORS, RELATIVE TO BUSINESS AS USUAL

3

25% SHARE OF RENEWABLE ENERGY IN FINAL ENERGY CONSUMPTION



4

SMART GRID TECHNOLOGY DEPLOYED

5

+10 m^2

MORE MUNICIPALITIES WITH OVER 10m^2 PER CAPITA OF URBAN GREEN SPACE

THAILAND'S CLIMATE CHANGE MASTER PLAN
LONG TERM GOAL (2050) & CONTINUOUS

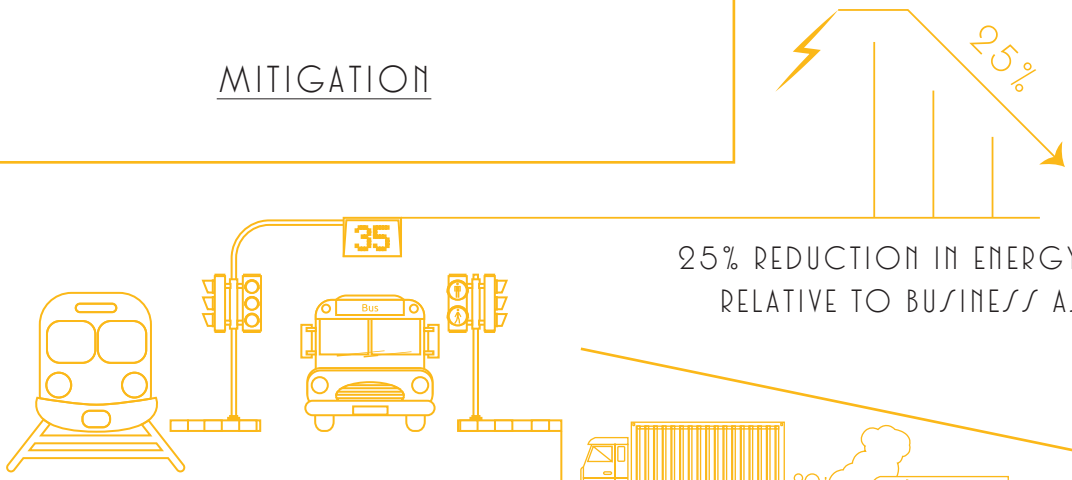
ADAPTATION

MORE FARM LAND OUTSIDE IRRIGATION AREA
WITH WATER RESOURCE DEVELOPMENT

FEWER ENDANGERED SPECIES AND MORE ECO-TOURISM, etc.

More information: http://www.deqp.go.th/media/36631/แผนแม-บท_2558_2593.pdf

MITIGATION



25% REDUCTION IN ENERGY INTENSITY RELATIVE TO BUSINESS AS USUAL

MORE PUBLIC TRANSPORT TRAVEL

LESS GHG EMISSION FROM LAND TRANSPORT SECTOR

LESS OPEN DUMPING AREA

MORE LOW-CARBON AND ENVIRONMENTAL-FRIENDLY INVESTMENTS IN INDUSTRY

MORE FARM LAND WITH GAP OR ORGANIC STANDARDS

LESS GHG EMISSION PER GDP

LESS AGRICULTURAL BURNING

Thailand's First Biennial Update report to UNFCCC in 2015[12] identifies that in Thailand 32% of land has forest cover, 46% is agricultural land and 22% is used for all other purposes. Two-thirds of all agricultural land (or almost one-third of the entire country) is used to cultivate only rice and other field crops.

While agricultural land makes up nearly half of the country it contributes a declining share to GDP – currently around 8% but at the same time accounts for around 18% of GHG emissions. The majority of these are methane emission from rice paddies, and nitrogen dioxide emissions from agricultural soils.

At the same time, the Land-use, Land-use Change and Forestry Sector (LULUCF) as a whole currently removes 114 million tons of carbon dioxide from the atmosphere each year. This figure has increased significantly since the year 2000, partially because of reforestation and better forest protection, but also because of the rapid growth of rubber plantations (often created by conversion of former rice-growing areas to rubber). Increases in soil carbon through improved agricultural practices are not yet calculated in this equation.

LULUCF, and in particular in rural poor small-holder agriculture, is where we can see the biggest impact on climate change adaptation from the work of His Majesty King Bumiphol. Ever since forest cover in Thailand reduced to below 40% of the land area, the Royal Forest Department has set a national target to get back to that 40% amount. His Majesty always promoted the importance of forest conservation for its multiple benefit in terms of regulating water supply, enhancing air quality, and supporting local livelihoods – even before the role of forest in climate change mitigation became such a global issue. His Majesty's concern for forest conservation also included urban forest such as Bang Krachao – the so-called green lung of Bangkok, which His Majesty urged should be protected from development.

In 1993 a nationwide reforestation scheme was launched marking His Majesty King Bhumibol's 65th Birthday. Amongst the many successful projects dating from this time was the reforestation of Khao Peng Ma – a denuded hillside in the buffer zone of Khao Yai National Park, conducted by Wildlife Fund Thailand. The Prime Minister at that time, Chuan Leekpai planted the first tree. Now Khao Peng Ma is well known not only as a restored forest, but for the regular presence of a herd of 50 or more gaur - a type of wild cattle (*Bos gaurus*).

His Majesty's Sufficiency Economy philosophy also provided the inspiration for an innovative "Family Forest" movement in Thailand. In several countries in Europe, there is a long tradition of individual families owning forest within communities, that has been managed sustainably for hundreds of years, but this has never been the case in Thailand.

FAMILY FOREST

Currently Germany and France each have about 30% forest cover. In France 12 million hectares or 75 million rai (= 74% of the total forest), is privately owned. In Germany, 2.5 million people each own an average of about 2 hectares (or 12.5 rai) of forest. Finland has 24 million hectares (or 150 million rai) of forest. About 60% of the forest is owned by 900,000 people, with an average of 100 rai of forest each. In the United States of America there are currently about 240 million hectares (or 1,500 million rai) of forests. Of this, 80 million hectares (500 million rai) is owned by 10 million people (an average of 8 hectares or 50 rai each). More interestingly, over 50% of the production forest in America is privately owned. Many privately owned (or family) forests are part of local production and marketing cooperatives, which in turn may be members of national associations or federations. Family forest production is also supported by research and development. For example, the University of Massachusetts Forest Services Program conducts research into family forests. There is also an International Family Forest Alliance – but this currently has no members from Asia.

In the history of modern Thailand, forest land, by legal definition, has always belonged to the state. Private ownership of land was acquired through the clearance of forest and conversion of the land to agricultural use. Although over the last two-three decades there has been much discussion about and promotion of community forests, (and there are now around 9,000 officially recognized community forests in the Kingdom), family forest had never really been considered. The recent development of family forest in Thailand is a major new innovation that can be traced to the efforts of one person – Siripong Thonongto, in Ban Rai District of Uthai Thani Province in western Thailand. Starting in the early 2000s, inspired by His Majesty, Siripong painstakingly restored a plot of barren agricultural land used for growing cassava, to a multi-storey forest filled with useful trees and edible and medicinal plants. The Thai Greenhouse Gas Organization (TGO) audited the forest and recognized Siripong's efforts with the very first Letter of Recognition (LOR) for voluntary carbon offsets in Thailand – LOR 0001. The approach is now spreading in different parts of the country. The Biodiversity-based livelihoods for Economic Development Public organization (BEDO) recently conducted a research study on 49 family forest plots and concluded that they provided an average income of around 20,000 baht/rai (or just under $4,000/hectare) per year – much more than Thai farmers can get from growing any kind of cash crops for commodity markets.

If Thailand is to truly regain 40% forest cover, this requires the creation of 26 million hectares of new forests. But there is not enough non-forested land owned by the state to be able to achieve this. Widespread promotion and support for Family Forest could easily be the answer – if 10 million farmers set aside 0.416 hectares each to grow family forests, the target would be achieved.

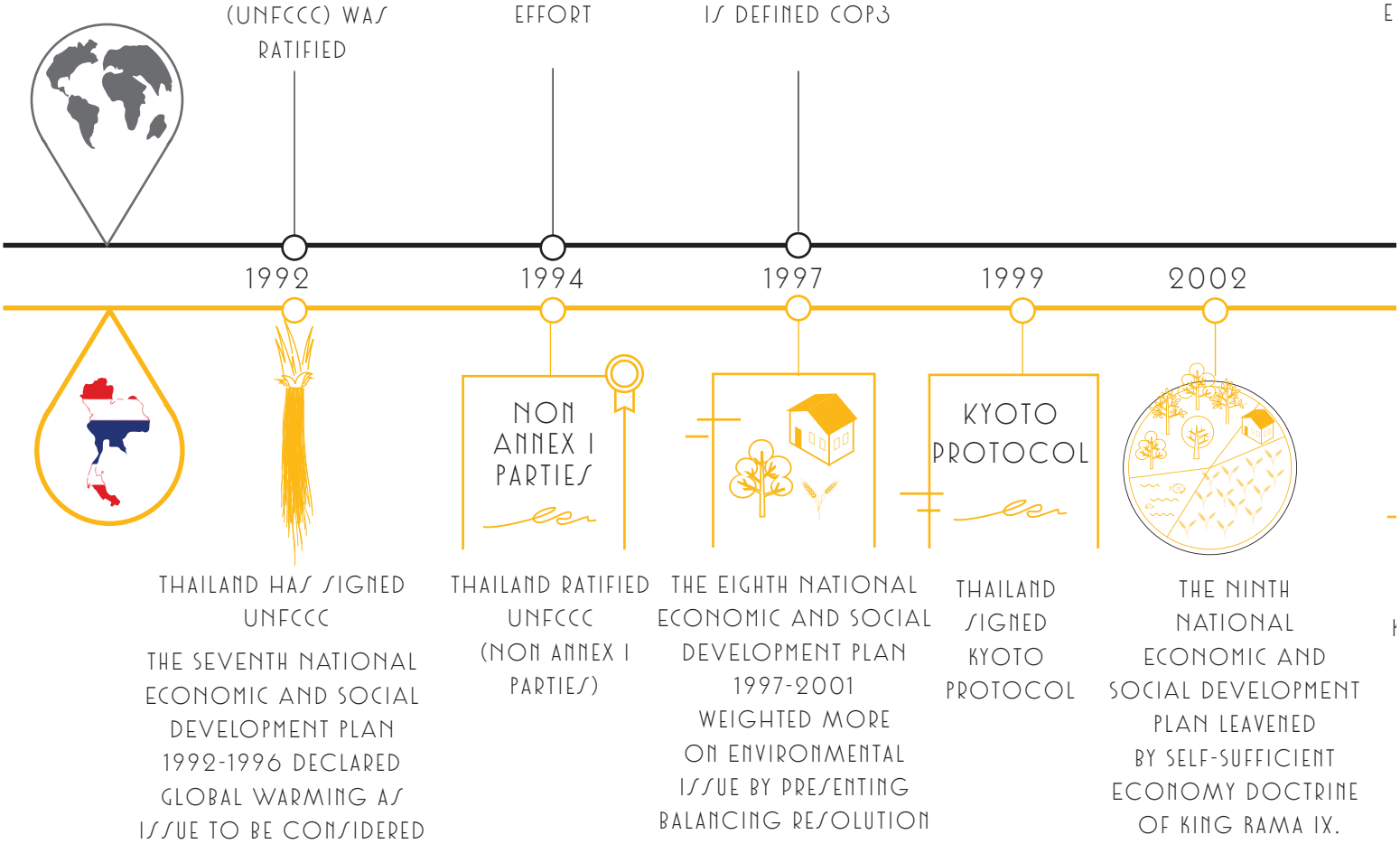
In 2015 UNFCCC Parties came together for the UN Climate Change Conference and adopted the Paris Agreement, aimed at limiting global warming to less than two degrees Celsius. INDCs became NDCs when countries subsequently ratified the Paris Agreement.

Between 1947 and 1992, population increased 3 times, per capita GDP increased ten-fold and per capita GHG emissions increased by 20 times as the country rapidly industrialized. From 1992 to 1995, both per Capita GDP and GHG emissions increased by a further incredible 50% each, before taking a hit in the economic crisis of 1997. In 2016, per capita GDP stood at around $5,900, almost double its 1995 peak before the 1997 crash, while GHG emission has climbed to 4.5 metric tons per capita or 1.5 times its 1995 peak. This presents an interesting picture – before 1997 GHG emissions increased by 4 times for every doubling of GDP. Since 1997 GHG emissions only increased 1.5 times when GDP doubled – implying that economic growth in Thailand in the last two decades is much less GHG intensive than it was in the years before 1997.

This could be due to the relative growth of the services sector (including tourism) versus the industrial sector; more efficient manufacturing and industrial processes requiring less energy per unit of GDP, and diversification of energy production to include more renewable energy. All of this is entirely in line with the approaches espoused by the Sufficiency Economy Theory.


Nations Unies
les Changements C
COP21/CMP11
Paris-Le
Thaïlande
Thailand

ความพยายามในการแก้ปัญหาโลกร้อน



2005

KYOTO PROTOCOL

KYOTO PROTOCOL ENTERED INTO FORCE

KYOTO PROTOCOL

THAILAND RATIFIED KYOTO PROTOCOL IN 2002

2007

COP 13/ CMP 3

BALI RAODMAP ADOPTED AS A SET OF DECISIONS THAT REPRESENTED THE VARIOUS TRACKS THAT WERE SEEN AS KEY TO REACHING GLOBAL CLIMATE DEAL COP13/CMP3

THE TENTH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN PUT MORE WEIGHT TO PRESERVATION OF NATIONAL RESOUCE WHILE ENCOURAGING ORGANIC AGRICULTURAL

2012

COP18/CMP8

DOHA AMENDMENT RELATING TO THE 2ND COMMITMENT PERIOD OF KYOTO PROTOCOL COP18/CMP8

THE ELEVENTH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN 2012-2016 AS WELL AS 20 YEARS THAILAND ROAD MAP STRESSED ON SUSTAINABLE USE OF ENERGY ENCOURAGING BIO-ENERGY AND PREPARING FOR CLIMATE CHANGE IMPACT.

2014

THAILAND SUBMITTED NATIONALLY APPROPRIATE MITIGATION ACTIONS (NAMAS) TO 7-20% WITHIN THE YEAR OF 2030

2015

THE PARIS AGREEMENT ADOPTED BY CONCENSUS (COP21)

THAILAND SUBMITTED NATIONAL STATEMENT ON INDC TO 20-25% WITHIN THE YEAR OF 2030

THAILAND HAS ROUTED MASTER PLAN IN CORRESPONDING TO CLIMATE CHANGE CIRCUMSTANCE

2017

2017

THE TWELVTH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN SHOWED THAILAND'S VISION OF CLIMATE CHANGE SITUATION AS BEING SIGNIFICANT AS WELL AS CONCRETE MEASURE IN CASE OF RISK MANAGEMENT TOWARDS CLIMATE CHANGE CIRCUMSTANCES

The Paris Agreement entered into force on 4th November 2016 – 34 days after the death of His Majesty King Bhumibol on 13 October 2016. His Majesty passed away as the world's longest serving Head of State and the longest reigning monarch in Thai history, having been served by 30 Prime Ministers, and leaving behind an amazing legacy including over 23,000 villages with Sufficiency Economy programmes, many of which make significant contributions to both Climate Change Mitigation and Adaptation.

Thailand's population is expected to peak in 2025 at 68.6 million or 0.85% of global population, then start declining. By 2050 it is expected to be back at its 2000 level of around 62.5 million (which will be only 0.64% of global population). A large number of those people will not have had the good fortune to be born in the reign of Rama IX – but we can hope that in 2050 all Thais will still heed His Majesty's timeless advice and practical examples of how to prosper through a sufficiency economy.

[1] *South-South in Action; Sustainability in Thailand; Experiences for Developing Countries*. New York: United Nations Office for South-South Cooperation and Ministry of Foreign Affairs of Thailand, 2017.

[2] Thailand: Carbon dioxide (CO_2) emissions per capita, the global economy, http://www.theglobaleconomy.com

[3] *Thailand Human Development report 2007; Sufficiency Economy and Human Development*. Bangkok, United Nations Development Programme (UNDP) 2007. ISBN 974-88126-3-4.

[4] *Philosophy of Sufficiency Economy*. Chai Pattana Foundation www.chaipat.or.th accessed 12 August 2017.

[5] Schumaker, E.F. 1973 "Buddhist Economics" *Small is Beautiful; Economics as if People Mattered*. London: Blond and Briggs, Ltd.

[6] Mongsawad, Prasopchoke (2010) *"The Philosophy of the Sufficiency Economy: A contribution to the Theory of Development"* Asia-Pacific Development Journal. 17 (1):123-143.

[7] The United Nations Framework convention on Climate Change.

[8] Status of Ratification of the Convention, UNFCCC.

[9] R. Stavins, J. Zhou, et al., "International Cooperation: Agreements and instruments" Chapter 13 in: *Climate Change2014: Mitigation of Climate Change. Contribution to Working Group III to the Fifth Assessment report of the IPCC*. Cambridge University Press. 2014.

[10] King, D et al., (2011) *Copenhagen and Cancun International Climate Change Negotiations: Key Lessons and Next Steps*. Oxford, UK: Smith School of Enterprise and Environment, University of Oxford.

[11] Asvapoositkul, N (2014) *Thailand's Climate Change Policies*. Presentation to the 12th Workshop on GHG Inventories in Asia. ONEP, 2014.

[12] *Thailand's First Biennial Update report to UNFCCC*.ONEP, 2015.

The Development KING

Story by Anocha Pichaisiri

Your Majesty has made an extraordinary contribution to human development. As the world's 'Development King,' Your Majesty has reached out to the poorest and the most vulnerable people of Thailand–regardless of their status, ethnicity or religion–and listened to their problems, and empowered them to take their lives in their own hands. His Majesty's rural development projects have benefited millions of people across Thailand. His Majesty's visionary thinking has helped shape the global development dialogue. His Majesty's "Sufficiency Economy" philosophy–emphasizing moderation, responsible consumption, and resilience to external shocks–is of great relevance to communities everywhere during these times of rapid globalization. The philosophy's "middle path" approach strongly reinforces the United Nations' own advocacy of a people-centered and sustainable path towards human development.

Made by Mr. Kofi Annan, former Secretary-General of the United Nations, the testimony above was part of an oration honoring His Majesty the late King of Thailand during the presentation of the UNDP Human Development Lifetime Achievement Award. The award, presented to His Majesty the late King Bhumibol Adulyadej on May 26, 2006, demonstrated the recognition of His Majesty's dedication to eliminate the poverty of his subjects along with laying the foundations for a resilient development of Thai society on the principles of Sufficiency Economy, a globally accepted philosophy used to propel sustainable human development in society.

“We shall reign with righteouness for the benefits and happiness of the people of Siam”

On 5 May 1950, the Accession Oath made by His Majesty the late King Bhumibol Adulyadej to the citizens of Thailand upon His Royal Coronation and Accession to the Throne, “*We shall reign with righteousness for the benefits and happiness of the people of Siam.*”, had indicated His Majesty’s resolve to carry out his royal duties to better the lives and happiness of his people. Over 70 years of his reign, His Majesty had demonstrated to both the citizens of Thailand and the global community his persistence and commitment to eliminate the sufferings and to bring forth happiness through improving the living condition and the betterment of his subjects nationwide. A familiar sight of His Majesty in everyone’s mind would be one of His Majesty tirelessly journeying to every part of Thailand to ease the sufferings of his people. This had led to various development projects designed to ameliorate the Thai citizens’ quality of life. Such dedication and commitment meant that it would not be mistaken to say that “*His Majesty shared the same sufferings and joy as his people.*” It was due to such gracious patronage and benevolence that His Majesty became such a loved and revered monarch, as well as receiving international accolades from around the world.

The beginning of the department initiatives

The initial stage of development was finding the resolution to immediate problems that the people were facing. Examples include providing aid in social welfare, public health and healthcare to the Thai people at the time when medical care was scarce and more difficult to access. His Majesty foresaw that the healthiness and wellbeing of his people would be the foundation in furthering developments in other sectors. Important projects during that period include the establishment of the Royal Medical Unit, the Vejapaha Barge project–a mobile medical unit which treats citizens residing along the riverbanks and canals–as well as a research project to produce saline for domestic use.

Building the way to Self-Sufficiency Economy

The development projects between 1953 - 1977[1] were meant to encourage the development of self-sufficiency. His Majesty began the development projects after visiting his subjects throughout every region across Thailand in 1952, in which he travelled across the country to rural areas to inspect and acknowledge his people's sufferings. His Majesty had studied facts and information on the living conditions of each region to find a suitable solution that responds directly to the needs of his people, as well as being suitable to each region's geography and Socio -Geography. After his journey, His Majesty proceeded to initiate multitudinous development projects to improve the living conditions of the people. His Majesty's first Royal Initiative began during the visit to Baan Huay Mongkol in Prachuap Khiri Khan Province, a village situated far from transportation routes, which resulted in the difficulties of transporting agricultural products out for sale. His Majesty thus initiated the Huay Mongkol Road Project, which became the first royally initiated rural development project. Following the Huay Mongkol Road Project, in 1953, His Majesty ordered for the construction of the Khao Tao Reservoire in Hua Hin, Prachuap Khiri Khan. Introduced to relieve the dearth of water caused by the drought, the Khao Tao Reservoire became His Majesty's first royally-initiated irrigation project.

The development projects during this period focused on providing basic public utility to promote a self-sufficient community. The projects included the Water Resources Development Project and roadwork construction. His Majesty also initiated development projects that placed an emphasis on ensuring that the population live and eat well with sufficiency.

[1] His Majesty the King and the Development of Thailand: The Chaipattana Foundation

Dr. Sumet Tantivejkul, secretary-general of The Chaipattana Foundation, who had closely served King Rama IX over many decades, explained that in economic terms, His Majesty's address can be implicated as such: rather than placing an emphasis on the expansion of the industrial sector as a means to lead the country's development, it is more fitting to create a strong and stable economic foundation, that is, by ensuring that the population of the rural area have enough to subsist on. This direction of development is one that places an emphasis on the distribution of income, in order to form a strong foundation for the country's economic stability[2].

Important projects during this period include the Royal Rain project, in which His Majesty had initiated the experiment to produce artificial rain to resolve the issue of the drought for his people. The project took over 14 years to develop before the test was carried out for the first time in 1969. Each year, the Royal Rainmaking project provides the needed rainwater to over 33 million hectares of rice fields and plantations.

The Royal Project began from the ideas of aiding the Thai hill tribes residing in the Northern region of Thailand, where they originally grew opium and practiced shifting cultivation, to turn to growing cash crop to generate income. The first Royal Project was founded at Doi Ang Khang in Chiang Mai Province, which was considered at the time to be a prime area for opium production. The initial stage of the project was researching for suitable highland agriculture that can be grown on these high mountainous areas. Once the research and experiments had been proven successful, farmers were encouraged to grow the selected fruits, plants and vegetables, which were then arranged to be sold at markets supplied by the project as well as being turned into industrially processed food. Today, through the success of the

[2] Sufficiency Economy: Bringing the Happiness of Sustainable Living, Dr. Sumet Tantivejkul

Royal Project, Thailand is no longer one of the world's largest opium producer. To this day, the Royal Project Foundation has four research stations and 38 Royal Project Development Centers located across the high mountains in the Northern region of Thailand, covering over 280,900 hectares and benefitting 30,566 households or 145,898 people.[3]

Up to 37% the minority hill tribe people

within the Royal Project area has an average annual income that surpasses the poverty line. The average annual income is 4,335 USD/household.[4]

[3] Annual Report, The Royal Project Foundation, 2009

[4] The Economic and Social Conditions of Farmers Within the Areas of Royal Project Development Center, years 2008/2009, Chiang Mai University

Sufficient
to sustainable

The development projects between the period of 1969–the present focus on developments that will lead to sustainability using the Philosophy of Sufficiency Economy.

The development guidelines used to develop the country by previous Thai governments placed an emphasis on developmental strategies of free trade, which encouraged economic expansion, whose measurement of stability is based on the rate of economic growth and the average annual income of the population. Although the direction of such development did enable material progress, access to basic infrastructure still remained concentrated to a certain group within the society. Even the production system itself was reliant on the market and in turn reduced the society's ability to be self-reliant. This had led to drastic changes in the economical, social, environmental, political and cultural aspects of Thai society.

King Rama IX saw the changes and warned the people of the importance of living a "sufficient" lifestyle, which was later named by His Majesty as the "Philosophy of Sufficiency Economy", which would lead to sustainable development. His Majesty emphasized that development has to start from "self-reliance", based on the basis of moderation and risk management. He also noted that one must bear in mind moderation, reasonableness and self-immunity, so that everyone adhere first and foremost to the application of knowledge with due consideration, to the principles of honesty and integrity. In addition, a way of life based on patience, perseverance, diligence, wisdom and prudence is indispensable in creating balance, and in coping appropriately with critical challenges arising from extensive and rapid socio-economic, environmental and cultural changes in the world.

Sufficiency Economy

can be applied at all levels and sectors of economy with similar principles of modesty, reason and immunity for oneself and society

In 2006, the United Nations presented His Majesty **"the Human Development Lifetime Achievement Award"** and praised the Philosophy of Sufficiency Economy as a guideline for every country that wishes to create an enduring stability within the nation. In addition to this, the United Nations Development Programme in Thailand had also produced a report on "Sufficiency Economy and Human Development" in 2007 which was published worldwide.

Notable projects during this period include the establishment of six Royal Development Study Centers across different regions between 1979 - 1983 to conduct experiments and researches on the means to solve the agricultural problems of each region, which varies depending on the geographical and socio-geographical environment of each area. The Royal Development Study Centers also served as a means to transfer knowledge to the local people on the principles that they have to be self-reliant. At the same time, the knowledge given must also simultaneously promote the conservation of natural resources and the environment.

The New Theory Project

The New Theory Project is a land and water management model to maximize the benefits of a smallholding. His Majesty had experimented on the project and after coming to a successful result, had given the practical concepts to the people to apply. To the present, the New Theory is widely practiced and can be deemed a physical realization of self-reliability as per the Philosophy of Sufficiency Economy.

The Vetiver Grass Project

The Vetiver Grass Project is the application of vetiver grass, which has a long root system (deep-penetrating, the roots form a vertical net within the soil) in soil and water conservation. The vetiver grass is also used to rehabilitate the quality of natural resources and the environment, as the grass helps to slow down and lessens the loss of humidity within the soil, along with preventing soil erosion. Vetiver grass also absorbs toxic heavy metals that, in turn, prevents the contamination of water. From 1993 - 2014, 4,563 million vetiver grass have been planted, benefitting 1,753,144 hectares[5]

[5] The Management of a Sustainable Use of Vetiver Grass, Ministry of Agriculture and Cooperatives, July 2015

As a result of soil development and conversation, which successfully solved the problems in agriculture, The International Union of Soil Science thus presented

The Humanitarian Soil Scientist award

to honor His Majesty King Rama IX. In addition to this, the International Union of Soil Science had also marked December 5 (which falls on the royal birthday of King Rama IX) as "World Soil Day".

Decoding His Majesty's Wisdom "Vetiver Grass"

Properties

- Resilient, easy to grow in all types of soil
- Rapid growth rate and easily multiplied shoots
- A deep-reaching and fibrous root system which helps to retain and absorb water within the soil

Benefits in Soil and Water Conservation

1. Prevents soil erosion
2. Holds soil particles together, (60-80%) trapping sediments from water runoff and reducing the loss of soil organic matter
3. Reduces water runoffs and overland flows (50-70%)
4. Absorbs and retain humidity to the soil (20-25%)
5. Increases soil organic matter (SOM) 64 g./sprout or 413 kg./Rai
6. Enables better water drainage and ventilation, as well as increasing the activities of beneficial micro-organisms within the soil

Benefits in Environmental

1. Conserves the water quality and water source
2. Forms a living barrier which filters toxic substance and hard metals from entering the soil
3. Helps to reduce and treat polluted water by filtering residues and sediments from entering the water source
4. Prevents the erosion and damaging of road shoulders

The number of vetiver grass assigned by the Land Development Department and the results from the fiscal years 1993 – 2014[6]

Fiscal Year	Goal (Sprouts)	Results	
		Number of Sprouts	Hectare
1993	4,000,000	6,436,765	2,574
1994	8,000,000	8,562,210	3,424
1995	20,000,000	21,533,871	8,613
1996	27,000,000	26,561,019	10,624
1997	80,000,000	86,399,999	34,560
1998	95,000,000	98,010,346	39,204
1999	95,000,000	97,905,158	39,162
2000	190,000,000	194,449,173	77,779
2001	200,000,000	199,858,830	79,943
2002	170,000,000	170,531,060	68,212
2003	200,000,000	202,000,000	80,800
2004	300,000,000	315,017,163	126,006
2005	300,000,000	319,886,671	127,954
2006	300,000,000	333,825,141	133,530
2007	300,000,000	350,854,960	140,341
2008	300,000,000	334,759,522	133,903
2009	300,000,000	326,306,820	130,522
2010	270,000,000	294,182,923	117,673
2011	270,000,000	310,203,492	124,081
2012	321,000,000	323,349,675	129,339
2013	270,000,000	271,750,120	108,700
2014	270,000,000	271,048,090	108,419

[6] The Management of a Sustainable Use of Vetiver Grass, Ministry of Agriculture and Cooperatives, July 2015

Goal (Sprouts)
1993–2014

4,290,487,060

Results of
Number of Sprouts

4,563,433,008

Water

3,204

North 1,233
Central 503
Northeast 841
South 627

Agriculture

169

North 46 Central 51
Northeast 44 South 28

There are currently

4,685

royally-initiated projects located across every region of Thailand[7]

North 1,770
Central 805
Northeast 1,178
South 908
Unidentified 24

Transportation/ Communication

86

North 22
Central 22
Northeast 20
South 22

Social Welfare/ Education

393

North 199
Central 74
Northeast 53
South 63
Unidentified 4

[7]The Royal Projects by His Majesty King Bhumibol Adulyadej and six royal family members: Office of the Royal Development Projects Board, November 2017

Environmental
177

North 62
Central 41
Northeast 37
South 34
Unidentified 3

Career Development
341

North 89
Central 36
Northeast 122
South 94

Public Health
57

North 15 Central 16
Northeast 9
South 7 Unidentified 10

Integrated Development/ Others
258

North 104
Central 62
Northeast 52
South 33
Unidentified 7

In addition to the success of the development projects that His Majesty King Rama IX had laboriously and dedicatedly worked on, which has formed a foundation for a stable development of the country, another lesson that Thai people have learned from His Majesty is his work ethics and principles. His Majesty's principles in development aims for the well-being of his citizens, placing an emphasis on **"human development"** to ensure that each individual is self-reliant. His Majesty adopted the stratagem of "Understand, Access, and Develop", where the work must be gradual and in line with the terrain and the Socio-Geography of the area and without destroying the environment. Most importantly, each project required a meticulous study and research before being passed on the public and implemented by relevant agencies. His Majesty's idea of a

"development which not only leads to progress, but also stability"

has become a foundation that His Majesty had given to the Thai society over the 70 years of his reign and helped to form a strong and stable self-sufficient society.

HIS MAJESTY'S ROYAL BIOGRAPHY AND BRILLANCE

9

December 5, 1927

Born in Massachusetts, the United States of America under the name "Bhumibol" which means "Strength of the Land".

July 9, 1946

His Accession to the Throne

was on July 9, 1946 at the age of 19.

His Majesty originally read Engineering but upon being bestowed the royal duty to take on the Thai Crown, turned to the subjects of

Sociology, Law and Political Science.

His Majesty was fluent in multiple languages, including French, English, German and Latin.

KING RAMA

9

April 28, 1950

His Majesty became married to Mom Rajawongse Sirikit Kitiyakara on April 28, 1950. Mom Rajawongse Sirikit Kitiyakara later received the Order of the Royal House of Chakri, in which she was established as Somdet Phra Nang Chao Sirikit Phra Borommarachininat, or Her Majesty Queen Sirikit on May 5, 1950.

107 Paintings's the Great Artist

His Majesty was interested in painting, and had produced over 107 paintings himself.

A Talented Photographer

His Majesty self-taught himself through books. In addition to this, he is also skilled in photographic processing, and had used photography as one of the tools and means in planning the country's development.

48 Songs by His Majesty

A world-renowned composer and musician, His Majesty was presented with the Certificate of Bestowal of Honorary Membership by the Viennese Hochschule Für Musik und Darstellende Künst (Academy for Music and Performing Arts), the 23rd person so honoured, in 1964. His Majesty had composed 48 royal compositions between the years 1946 - 1995.

KING RAMA

9

Father of Thai Innovation

His Majesty was an innovative inventor in the field of development. His royal inventions include the Chaipattana Aerator - treating polluted water with water turbines, and the Royal Rain - an artificial rainmaking innovation used to solve the problem of the drought.

Genius of Literature

Skilled in literature, His Majesty's literary works include four royal compositions and three royal translations.

13 October 2016

His Majesty passed away

on October 13, 2016 at

the age of 89.

Reigning for 70 years, 4 months and 4 days, His Majesty the late King Bhumibol Adulyadej was the world's longest-reigning monarch.

HIS MAJESTY
ON GLOBAL WARMING

Story: Anocha Pichaisiri

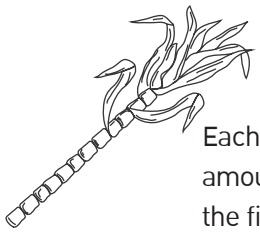

Plant


Burn

"This problem, as I have discussed elsewhere before, concerns the state of the world's environment, which is currently in disarray. Adults and children in Europe, America and Asia are all exchanging views about it—about how these environmental issues will change the world... Some people say that foreigners are pointing towards us and saying, "Bangkok will eventually submerge and flood will ravage within the next few years." In truth, we do know that Bangkok faces flooding. However, they are saying that flood will surface from the ocean because of the change of the environment. There is excess carbon being released into the air, producing what is comparable to a glass wall encasing the globe and trapping heat. When the Earth has increasingly warmed up, there are greater chances of icebergs melting into the ocean. Seawater will expand because heated things have the tendency to increase in volume. When seawater multiplies, a low-lying land like Bangkok will sink below sea level...What makes carbon (in the form of carbon dioxide) in the atmosphere increase is the burning of fuels from fossil fuels and forest fires... If there is nothing that will reduce this chemical compound in the air, the gas will then act as a glass dome that traps heat and warms up the earth, leading to the problems discussed earlier... To solve this, we have to burn less and plant more trees... I am saying this because I see that there are a lot of individuals here that are responsible for varying sectors. And the mentioned issue concerns all fields, as it has an impact on the Earth and correlates with several other existing problems."

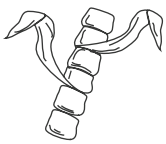
Royal remarks by
His Majesty King Bhumibol Adulyadej
December 4, 1989

The initial royal observation illustrates King Rama IX's great vision on the subject of global warming. His Majesty had also presented recommendations on solving this issue more than 10 years in advance, prior to when Thais were as perceptive and informed about its impacts as they are today. If we take a closer look at more than 4,000 royal development projects that were initiated throughout His Majesty's reign, we will discover that a great number of them not only aimed at improving the living conditions of his citizens. A lot of those projects have also played an important part in reducing greenhouse gas emissions as well as laid the foundations that will tackle climate change. These may include the renewable energy project, artificial rainmaking to alleviate droughts or even the New Theory agricultural program for sustainable cultivation, especially when being challenged by increasingly erratic spells of natural disasters.



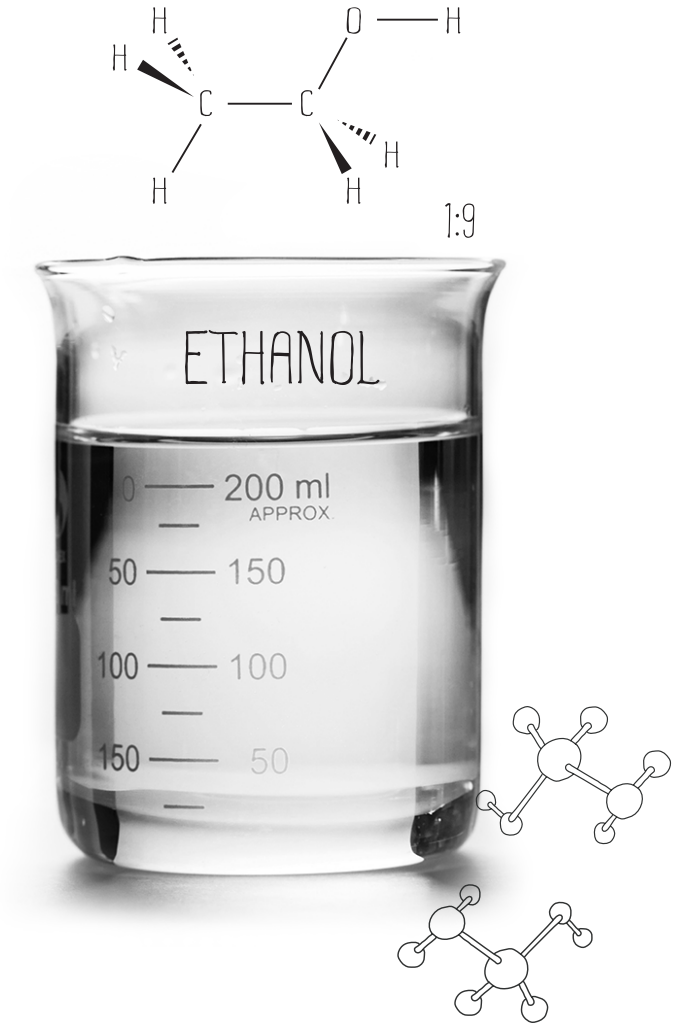
HIS MAJESTY`S RENEWABLE ENERGY

Each year, Thailand has to import an increasing amount of energy, especially crude oil. Throughout the first six months of 2017, 86[1] percent of crude oil used in this country was imported, as there is a great shortage of local resources. If there are no alternative energy development plans, Thailand will lack stability in the area. His Majesty King Rama IX foresaw what was about to happen and called for research and experimentation on alternative fuels that could be used instead. That was the beginning of what were to become the development of renewable energy utilized today.



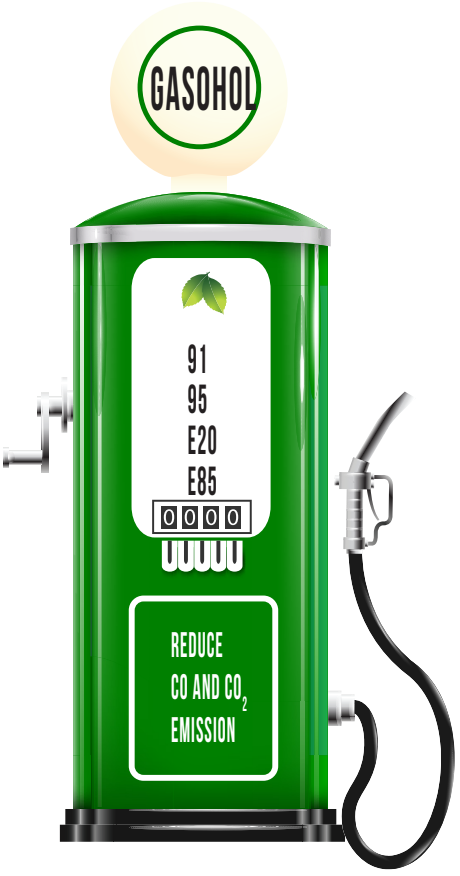
Ethanol

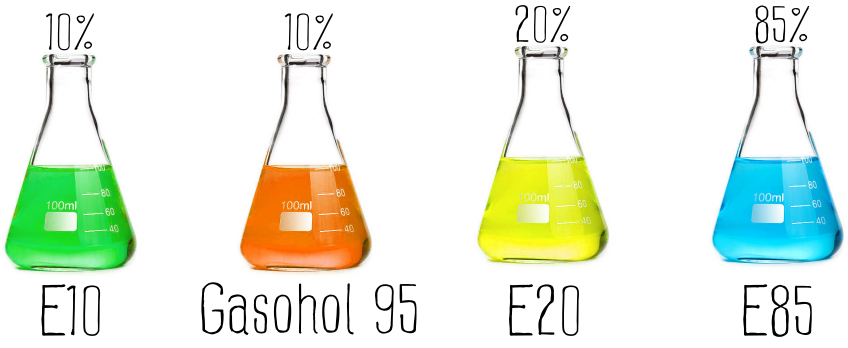
In 1985, His Majesty King Bhumibol Adulyadej entrusted officials to embark on the experimentation of using sugarcane to produce ethanol that will then be blended with benzene in the form of gasohol for automobiles. To start with, sugarcane-planting trials were initiated in order to select the best breed for ethanol production. Apart from the sugarcane grown under the Royal Chitralada Projects, it was also bought from farmers as raw materials for production. Inside the ethanol plant built on the grounds of the Chitralada Villa were sugarcane juice extractor machines, fermentation tanks and small distilleries. Production started in 1986 and was able to yield 91 percent ethanol at 2.8 liters per hours. In 1994, there was an increase in production capacity in order to generate enough ethanol to be mixed with Benzene 91 at a rate of 1:9. This was then used as fuel for all cars under the Royal Chitralada Projects. In 2001, the trial for gasohol production was initiated and was subsequently commercialized.



[1]Energy overview between January-June 2017, Energy Policy and Planning Office, Ministry of Energy

Since 2006, there has been an increase in ethanol production every year as the Ministry of Energy, Thailand's main unit of management and sourcing of fuels, had implemented His Majesty's guiding principles and amplified his efforts. There proved to be a significant increase in the encouragement of gasohol usage, in which it was specified that 10 percent of ethanol is to be blended in benzene. The formula is applicable to both European and Asian automobiles that were produced after 1995, and does not require engine tuning. Furthermore, the selling price of gasohol 95 is cheaper than benzene 95 at 0.21 USD.[2] *"From then until now, blending ethanol with benzene has become a standard measure. More than 95 percent of the benzene fuel we use today is mixed with ethanol, which is produced from crops grown in Thailand, including sugarcane and cassava,"* said Tevin Vongvanich, Chief Executive Officer and President of PTT Public Company Limited, the first private company to distribute gasohol 95 as well as the country's largest high-speed diesel (HSD) trader. Currently, there are four different types of benzene gasoline that contain ethanol, including gasohol 95, E10, E20, E85 all of which are available at petrol stations nationwide. In addition, there are now 21 ethanol production plants that together have the capacity to generate 4.44 million liters per day.[3]





"If 10 percent of ethanol is mixed with benzene, it is called gasohol 95 or E10. However, if the proportion is increased to 20 percent or 85 percent, it will be called gasohol E20 and gasohol E85 respectively. Ethanol helps to save up to 90 million USD worth of import of octane and also helps to reduce up to 30[4] percent of carbon dioxide and hydrocarbons."

[2]Oil price structure as recorded on August 28, 2017, Energy Policy and Planning Office, Ministry of Energy

[3]Database from December 31, 2016, Energy Policy and Planning Office, Ministry of Energy

[4]Brazilian Automotive Industry Association

ETHANOL SUPPLY CHAIN

Cassava

Cassava

1

Cassava Processing Plant
Cassava Starch and Casava Chips

Factory

2

Factory : 21 factories,
Capacity : 4.44 m. liters/Day
- Molasses 1.93 m. liters/Day
- Cane juice 0.23 m. liters/Day
- Cassava 1.43 m. liters/Day
- Cassava & Molasses 0.85 m. liters/Day

Sugarcane

Sugar Mill
- Molasses
- Cane juice

Sugarcane

4


Gasohol
3
10%, 20%, 85%
E10, E20, E85
Ethanol in the Gasohol Mix
250 ml
200
150
100
approx. vol.
C_2H_5OH
Domestic
Market

From Palm Fruits to the Nation's Energy

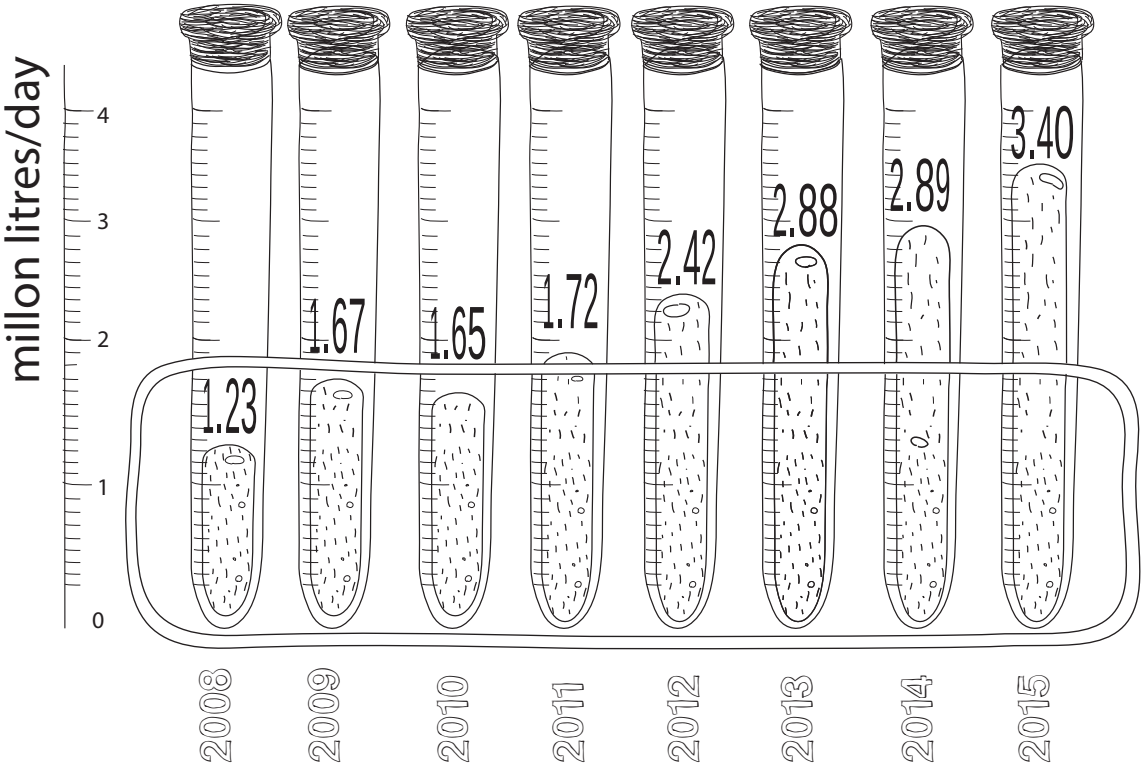
King Rama IX's conceptualization about biodiesel transpired while he was visiting a palm oil plantation at Kuan Kalong District, Satun Province in 1975. He showed great interest in palm oil and engaged in a comprehensive discussion, predicting that it would later become a valuable industrial drop. Eight years later, His Majesty commissioned Prince of Songkla University to take on a research project on producing fuel for diesel engines from palm oil. In 1985, a small palm oil mill started running in Ao Luk District of Krabi Province to encourage farmers to work together to extract crude palm oil to sell. Subsequently in 1988, His Majesty graciously commissioned the construction of a small palm oil extraction and processing plant at Narathiwat's Pikul Thong Royal Development Study Center. The processed palm oil was produced from the experimental plot, also allowing knowledge exchange amongst farmers in the area.

In the year 2000, the usage of 100 percent biodiesel or B100 was tested on diesel engines at Klai Kangwol Palace in Hua Hin District, Prachuab Khiri Khan Province. The result was satisfactory as it could be used in replacement of diesel fuel without having to mix it with other fuels. Hence, it is considered more environmentally friendly, while also reduces the costs of importing fuels. Most importantly, it offers more alternative means of utilizing agricultural produce so that it adds greater economic value for the farmers.

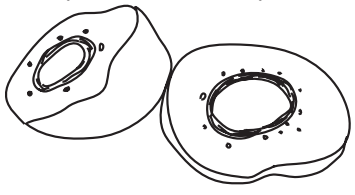
While His Majesty was the initiator of biodiesel production, he also pioneered the shift of usage towards this type of fuel by using 100 percent processed biodiesel for his royal vehicle. In 2010, B100 was used as the fuel for his royal barge, one with two 1,000-horsepower engines. It was the first in the world to introduce 100 percent biodiesel in driving a large motor without affecting the engines.

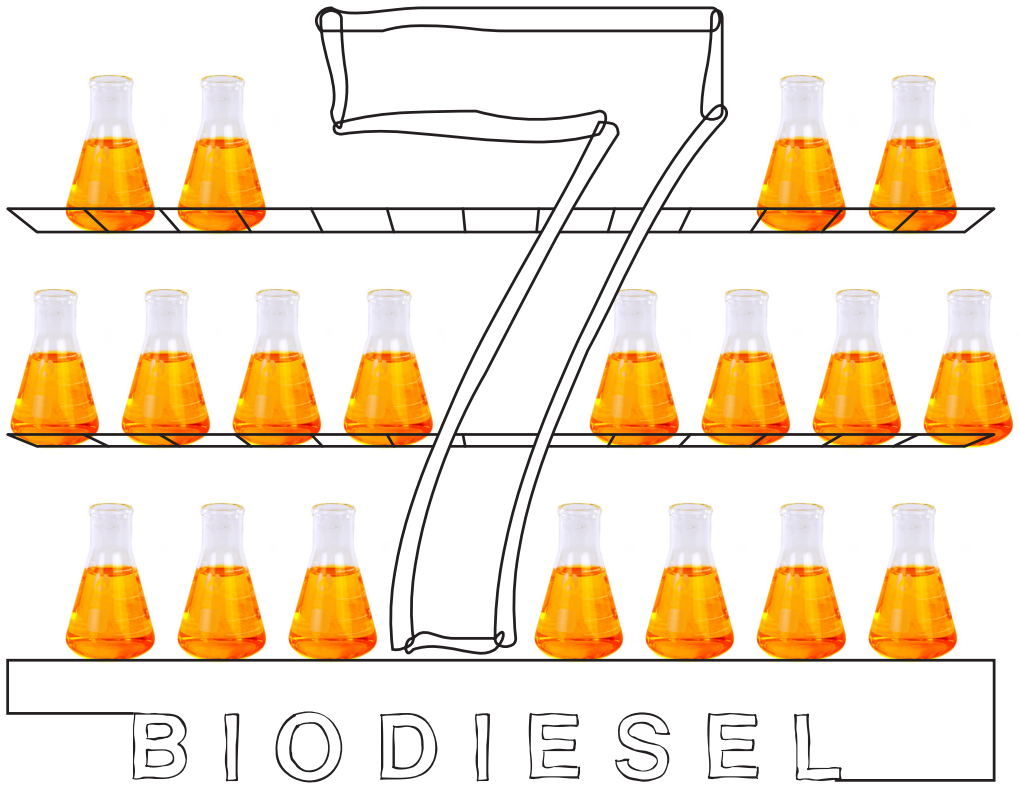
"The purified palm oil formula used for King Rama IX's diesel engines was patented on April 9, 2001. In the same year, His Majesty was presented with the Gold Medal with Mention award in recognition of his innovative use of technology as well as an honorable mention of his biofuel project from Brussels Eureka 2001 in Belgium, a prominent international award for science and technology."

Thailand Biodiesel Consumption



Since 2001, Thai society has been increasingly aware about biodiesel. Currently, there are up to 800,000 hectares of palm oil plantations across the country, compared to the 80,000 hectares of land 15 years back. From producing biodiesel through a small engine at a modest palm oil processing plant in Krabi, which only had the capacity to produce 50 liters, there are currently 19 large-scale plants that could together generate up to 6.6 million liters per day and produce 3.4 million liters of biodiesel per day. The raw materials used in the production are generally from crude palm oil. Moreover, the Thai government has carried on His Majesty's aspiration to replace imported energy with biodiesel, gradually promoting its consumption amongst Thai society. To start, B2 and B5 biodiesel was released within the Bangkok vicinity Chiang Mai as well as in some Southern provinces. In 2008, PTT Public Company Limited became the first company to launch diesel fuel (B2) at all petrol stations across the country. Up until mid 2016, the Department of Energy Business, Ministry of Energy had released an announcement to increase the ratio of biodiesel (B100) in diesel fuel from the original five percent to seven percent.





"Today, Thailand's biodiesel industry is considered the seventh largest in the world.[5]"

"Today, 100 percent of all the diesel fuel in Thailand is mixed with biodiesel in varying proportions. The mixing ratio will vary depending on the engine and technology. As of now, the ratio is five to seven percent. At present, Thailand's gasoline, including benzene and diesel, all contain ethanol and biodiesel, which comes from energy crop mainly produced in the country," said Tevin Vongvanich.

Additionally, Dr Tara Sutabutr, Director of the Energy Policy and Planning Office, provided further information, "*The government aims to increase the ratio of 100 percent biodiesel unto diesel fuel by 10 percent. The plan is to commercialize it to the public within 2018, but in the meantime B10 biodiesel will also be introduced to automobiles used in the government sector and the private sector will be encouraged to develop diesel engines to support the use of B10 that will be sold in the near future.*" Throughout the years, His Majesty's dedicated efforts in searching for the most suitable alternative energy for Thailand had eventually transformed a modest palm oil plantation in Satun into one of the country's most important source of energy substitute. While palm oil had contributed to a stronger energy sector, it has also been instrumental in the reduction of greenhouse gas emissions, which is the cause of climate change.

[5]Leading biodiesel producers worldwide in 2016

BIODIESEL

What is biodiesel?

Biodiesel is a mixture of different fatty acid methyl esters that is a synthesis of palm oil, alkaline transesterification and methanol.

Vegetable Oil and Oil from Animal Fat + NaOH + CH_3OH

The Method of Biodiesel Synthesis

1

Heat triglyceride compounds such as palm oil

2

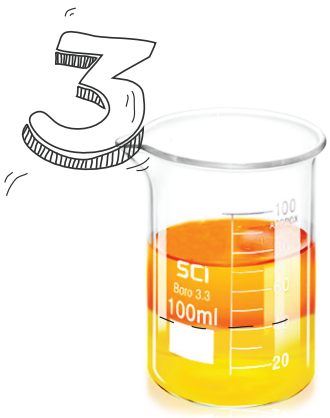
NaOH + CH_3OH

Add in alkali such as caustic soda and methanol, which will cause a transesterification reaction and produce biodiesel (FAME) and glycerol

=

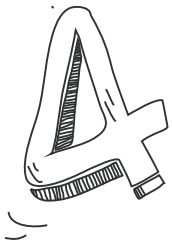
FAME

3



Separate glycerol from biodiesel, in which glycerol can be used as a chemical precursor in other industries

4



Biodiesel

The benefits of biodiesel

- Reduces black smoke by more than 50 percent
- Reduces carbon monoxide by 20 percent
- Reduces dust particles by 39 percent
- Reduces sulfur dioxide by 99 percent
- Reduces carbon dioxide emissions by 78 percent[6]

[6]U.S. Department of Energy, 2004

TACKLING GLOBAL WARMING WITH THE KING` S PHILOSOPHY

The image of His Majesty King Bhumibol Adulyadej that is most evident amongst Thais and people across the globe is him as the "Development King," one who has worked tirelessly for his subjects throughout 70 years of his reign. His Majesty laid the foundations and guidelines for the development of the country in so many ways, essentially establishing the "King's Philosophy," a combination of academic knowledge and his development experiences throughout his reign. The essence and the heart of the King's Philosophy surrounds the science of innovation and self-conducts, acting as a paradigm for a peaceful society.[7]

If we take a closer look into His Majesty's philosophy, we will discover that there are more academic principles that are beneficial to the populace. Apart from contributing to the better livelihood of the people and instigating greater immunity in the society, His Majesty also prepares us for climate change.

[7]A lecture by Mr Wissanu Krea-ngam at the "The King's Philosophy, The Philosophy of the Kingdom" seminar on February 18, 2017

Water Management

During the last few decades, Thailand had faced great fluctuations in climate and weather—shifts in rainy seasons, arid summers and severe floods have affected people in many areas. These are all partially due to climate change. His Majesty is mindful that water is especially vital for those who depend on agriculture for a living. For that reason, he had initiated numerous royal commissions on water management, including the development of water sources and irrigation management, both of which help to restore and prevent water problems efficiently.

“

... In improving water sources, the main factor is to control water–both the volume and quality–as per a set purpose. When there is too much water, it is necessary to drain excess water before it becomes problematic. And when there is shortage, there should be enough quality water stored for agricultural, industrial and consumer purposes. The problem is that the development of water sources may have some negative effects on the environment. But if there is no adequate water management implemented, when hit with a natural disaster, it will affect both the economy and the living conditions of the people, as well as have a serious impact on the environment...

”

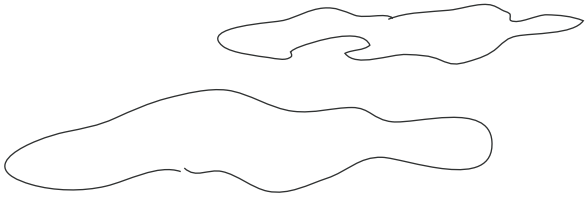
Royal remarks by His Majesty King Bhumibol Adulyadej
The opening ceremony of The Third Chulabhorn Science Congress (P C III)
on “Water and Development: Water is Comparable to Life”
December 11, 1995

Managing Drought with Artificial Rain

The Royal Rainmaking Project is amongst the thousands of other water management projects that His Majesty King Bhumibol Adulyadej initiated to alleviate the various problems from natural disasters his subjects were facing. His Majesty shared that the conceptualization of the artificial rain project emerged in 1955 when he visited Kalasin Province in the Northeast of Thailand. At the time, the land was especially dry and rugged. It was during a dry season, but he noticed that there were a lot of huge clouds in the sky. He started contemplating if it was possible to pull down the clouds so that they generate rain and relieve drought for his subjects. Hence, His Majesty engaged in a thorough research, subsequently certain that it could actually be achieved. He then presented his idea to specialist the Ministry of Agriculture and Cooperatives, in which they successfully developed the concept 14 years later. The first artificial rain trial was done in the skies of Khao Yai National Park, in which the mission was effectively accomplished and they were able to enforce rain onto targeted areas.

The achievement in 1972 attracted attention from the Singaporean government. They were genuinely interested and later sent officials to learn from Thailand. King Rama IX took on the responsibility of conducting the demonstration himself at the Kaeng Krachan dam, Phetchaburi Province. The operation was able to generate rain onto the targeted area within five hours.

The Royal Rainmaking Project was a combination of nature and science. His Majesty showered chemicals across the sky, inducing vapor in the air to form clouds and accelerating their density. More chemicals were used to speed up imbalance, until very large water droplets were formed and showered rain onto marked surfaces. His Majesty King Bhumibol Adulyadej has conferred these chemicals the title of "Artificial Rain".[8]

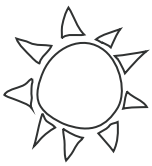


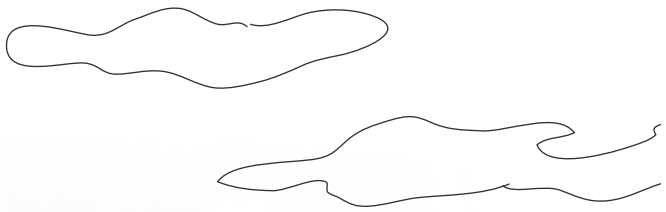
[8]The Father of Water Management

Three years later on September 21, 1975, the Royal Rainmaking office was established. In 2013, the operations unit was upgraded into the Department of Royal Rainmaking and Agricultural Aviation. Currently, there are several units under the Department of Royal Rainmaking and Agricultural Aviation that are dispersed across the country. Each year, it is able to help alleviate over millions of hectares of drought problem and has extended its contributions to other countries, such as Jordan.

"In 2016, there were up to 98 percent successful artificial rainmaking on targeted areas, which benefited at least 33.44 million hectares of agricultural and forest grounds per year."

While King Rama IX's Royal Rainmaking Project helps alleviate dry spells on agricultural plots across the country, it is also instrumental in reducing the impact of climate change.





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In 2005, the European Patent Office (EPO) has granted His Majesty King Bhumibol Adulyadej a rainmaking patent, numbered 1491088 and entitled "Weather Modification by Royal Rainmaking Technology". While the patent was registered across 30 countries under the European Union, 10 other countries also officially issued patents to the King.

"

1 Before Taking Off

Check the weather conditions of the area targeted for rainfall. Examine the type of clouds, the temperature of the clouds, the humidity of the air and the wind directions.

2 Prepare the Chemicals or Saline

Cooler Clouds
(< 0 Celsius)

Use silver iodide

Warmer Clouds
(> 0 Celsius)

Use saline

Ratio: 150 kilograms of salt per 1,000 liters of water

DECODING HIS MAJESTY`S KNOWLEDGE : ROYAL RAINMAKING

Disseminate the chemicals or saline

3

Warmer Clouds:

Saline will drop the surrounding temperature. When collided with humidity in a warmer air, droplets of water will be produced

Cooler Clouds:

Silver iodide will help make clouds crystallize into ice faster, therefore, making the clouds bigger

Rain Falls

4

When clouds expand in size from water droplets or crystallized ice, they will transform into rain

Tacking with Global Warming Through A New Agrarian Theory

"The New Theory by His Majesty is a royal initiative bestowed upon as a lifestyle ideology, while serving as a guideline towards various levels and steps of self-reliance. Based on the philosophy of sufficiency economy, it reduces the risks that come with change and nature's metamorphosis."[9]

[9]The New Theory, A Concept on Sustainable Self-Reliance of the Office of the Royal Development Projects Board

Hard to Easy

Although the origination of the new agrarian theory did not transpire to directly reduce the effects of global warming, it cannot be denied that His Majesty King Bhumibol Adulyadej's research and experimentation for the New Theory have significantly assisted millions of farmers to adjust themselves to the changing world—from economic fluctuations to climate change. One of the guidelines under the New Theory is the ability to manage water in order to deal with flooding. It also highlights on the variety of plant species that will help reduce the risk of unpredictable natural disasters. Moreoever, it also emphasizes on better soil management, which helps in increasing the amount of organic substances and absorbing carbon in the soil.

What makes the New Theory a turning point that truly enhanced and strengthened the living standards of Thai farmers was the combination of moderate usage of natural resources and better farming management. Additionally, it was able to convert ideologies into real practices, making what seems to be hard now "easy". Thus, the new agragrian theory later became widespread in many other countries.

His Majesty King Rama IX began studying the characteristics of farmers and their land usage. He discovered that one family of farmers would have around 1.6-2.4 hectares of land. In moderation, he slowly thought about and experimented with the various ways that they could best utilize the land they have. The ideal goal was to cultivate enough produce to consume the whole year, reducing expenses and generating income from crop rotation. His Majesty started his first trial in 1989 on a 2.4 hectares plot of land, then expanded his project to other areas in the form of learning centers. At present, the concept has been implemented by farmers across the country, and in 2017, the government had extended the theory with 70,000 new agricultural projects throughout Thailand.

DECODING HIS MAJESTY`S KNOWLEDGE : THE NEW THEORY

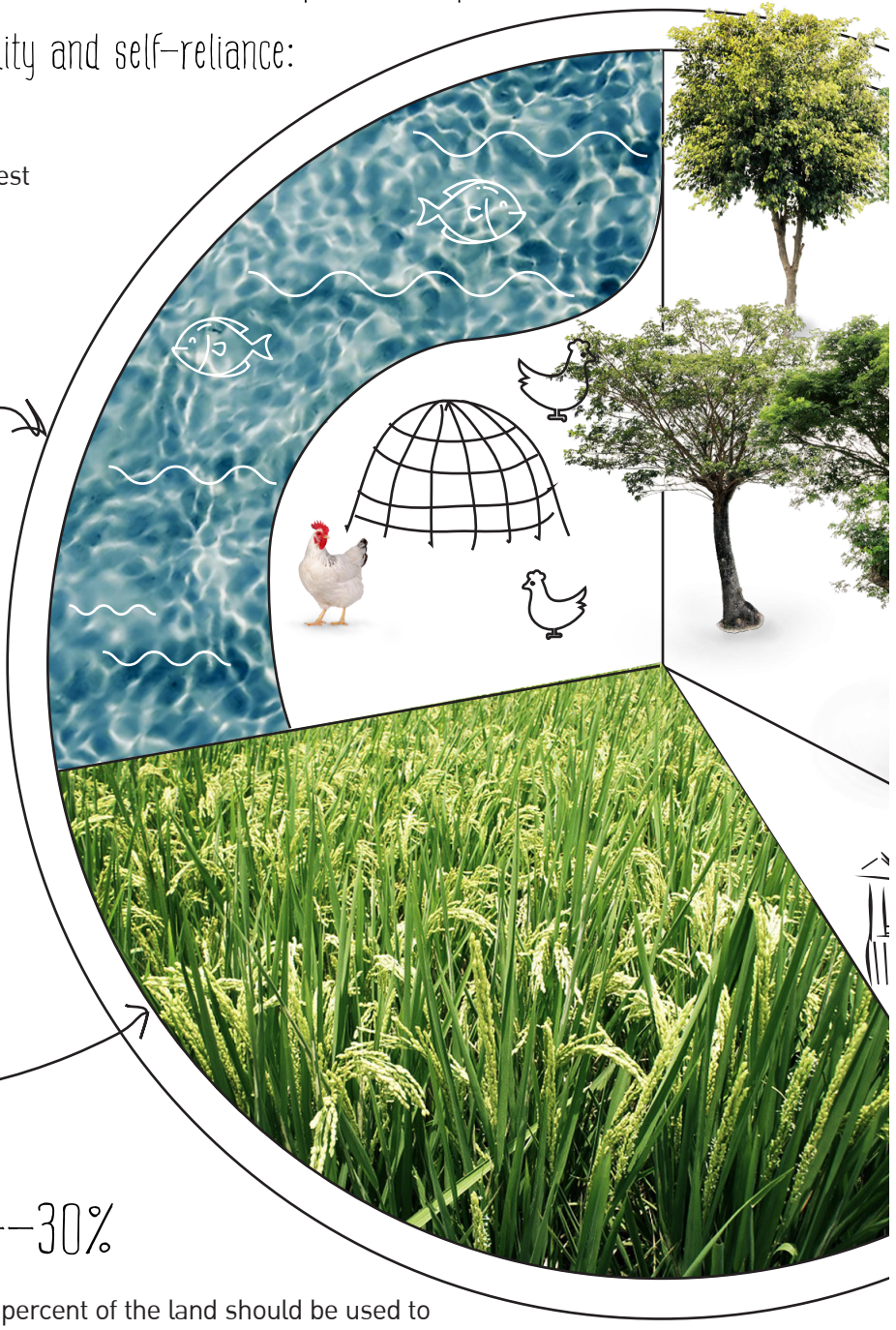
The New Theory farming system is divided into three important steps

1. Modest cultivation for sustainability and self-reliance:

An emphasis should be placed on the management of natural resources, such as soil, water and land management for the best efficiency, through modest cultivation and self-reliance. Land should be divided into four shares as the following:

30%-- 1

Thirty percent of the land should be used to dig up a pond for water storage and to grow aquatic plants and farm animals (farm fish as well as build chicken and duck houses above the water)



2 --30%

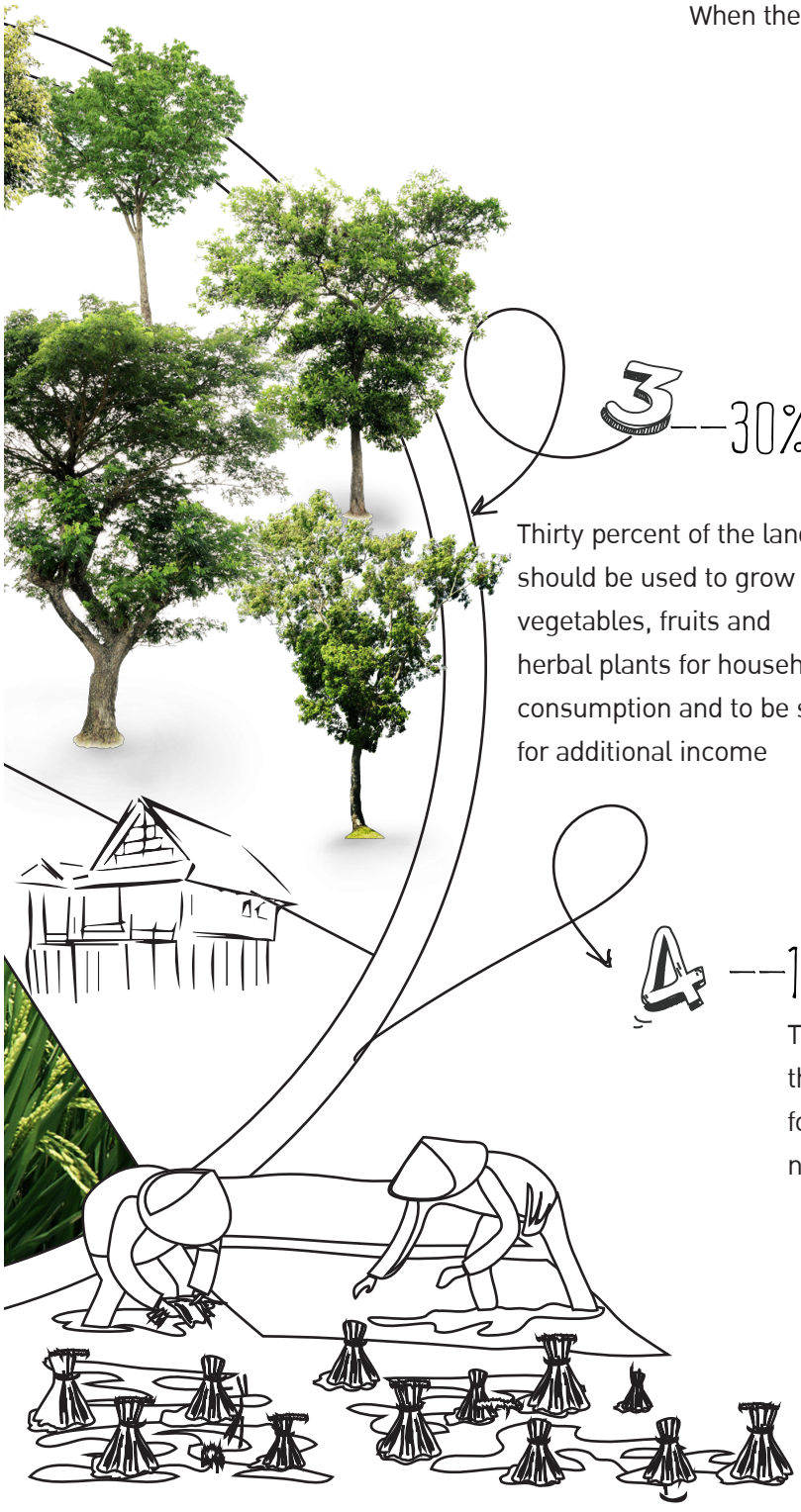
Thirty percent of the land should be used to grow rice that can be used to consume within the household to reduce expenses

2. Combining or strengthening groups or co-operatives:

When the first step is completed, farmers should join hands to strengthen the community in the form of groups or co-operatives to assist each other in issues such as production, distribution and welfare.

3. Contacting and collaborating to find funding sources:

The last step entails contacting funders to support and strengthen community initiatives based on mutual benefits of both parties. For instance, farmers have distribution outlets, while retailing companies get their hands on high quality, but inexpensive produces.



3 —30%

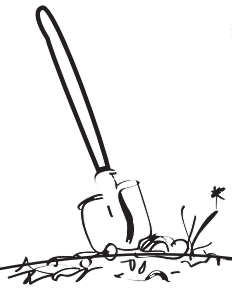
Thirty percent of the land should be used to grow vegetables, fruits and herbal plants for household consumption and to be sold for additional income

4 —10%

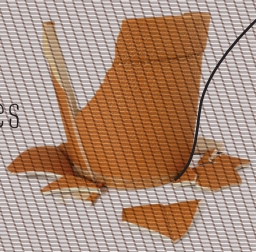
Ten percent of the land should contain the family dwellings and outbuildings for raising livestock and other necessities

The New Theory and the Strength of Thai Society[10]

Monoculture

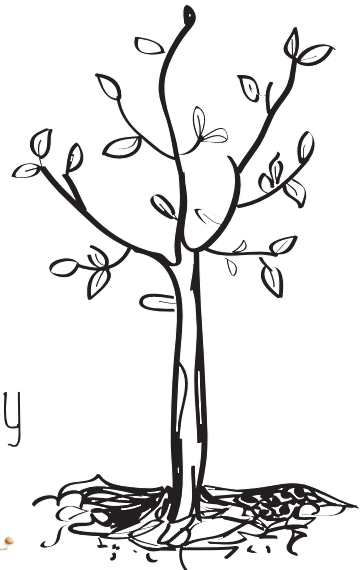


- Relies on market price/ Relies on a middleman/ Exchanges produce with money to buy household goods and food
- Sells plot of land / Leaves homeland to find a job in the city



- Family problems, low living standards, poverty, societal concerns, conflicts, clustered communities and degrading natural resources

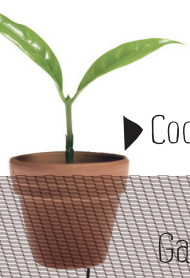
[10]The Agri-nature Foundation (http://agrinature.or.th/node/160)



The New Theory

▶ Moderate resources and sustainable economy/ Plant crops and consume within household / Relies on self

▶ Get together in the form of co-operatives/ Join hands in production and marketing processes / Take care of each other's livelihood, education, public welfare, society and religion



▶ Coordinate with funding sources/ Undergo a developments/ Gather together to improve sales, career opportunities and quality of living

▶ Families live together to help generate job opportunities, income and additional earnings / Solve poverty and live sustainably/ Restore natural resources such as soil, water and forest/ Inherit household knowledge and traditions / Community is stronger

The New Theory that His Majesty King Bhumibol Adulyadej presented to his subjects was instrumental in guiding the society through several crisis. For instance, in 1997 during Thailand's great economic downfall, many people were able to stand on their feet again by embracing the philosophy of sufficiency economy and the New Theory. Today, in a era where the topic of global warming continues to be a concern for all mankind. His Majesty's new agrarian theory continues to help farmers effectively cope with floodings, dry spells and insect pests that come with the impacts of climate change–it also continues to serve as a survival alternative for all generations.

"The significant point of all is to always have water:
to use in daily routine, to watering plantation. This is because life is where water is.
If there is water, an average man can live and settle his life.
Without water, a man cannot survive. Man can live
without electricity but cannot live without water."

King Rama IX Bhumibol Adulyadej
Chitralada Villa Royal Residence
17th of March 1986

From "KHAO TAO" to "CHUNG HUA MUN"

Aspiration to be Inspired by King Rama IX Royal Project.

"King Bhumibol Adulyadej is a father to all of us. A father who has never ceased to work for 70 years. No vacation at all. He transformed his palace into a lab to help flourish agriculture for all farmers. He is just a father who wants to do his best for all of his 70 million children who are still suffering in poverty. The pinnacle reason of why he could not stop working even for a day. For if he works for 1 day more, it means one day of his children's happiness. Our king might not suits the fairytale king's reputation; of living in a luxe and grandiose palace. He lives in very simple way of being which appears to be the greatest way to still live inside all Thai's heart."

This verse is reported out of one Thai who had been interviewed by CNN at the time all Thais were shocked about King Rama IX's passing away. On 13 October 2016, this was aired and it was exactly the words from all Thais have ever felted, the respect and love that translate so simply yet powerfully into words. For I have not felt differently from all Thais that this has been our great loss and that he is the soul of the nation.

After spending several moments digest what happened to our nation, my thought has become clearer and crystallized into this writing. The realization that our King Bhumibol Adulyadej has never left us. He is still here in every steps he took to develop borders and in inside every Thai's heart. The way to truly embrace this grave loss is to turn his majesty's legacy into practical method or better, reality.

“One King with Great Vision”

For me as a writer, more than being the great developer of Thailand’s King Bhumibol Adulyadej being a king who can see right into the future as a Visionary. For if you have constantly been with the environmentalist side of Thailand, you would have noticed by now most of his majesty Royal Project during 70 years of his reigns has reached all 17 articles in Sustainable Development Goals : SDGs of United Nations. In fact, most of King Bhumibol Adulyadej work has predestined the SDGs, especially the articles 13 of the Goals which is take urgent action to combat climate change and its impacts.

Story: Chonticha Lermthong

Climate change and Global Warming which would sound more alarmingly important than it is called now is a critical situation we are all faced on planet earth. This deranges all resources on earth; land resource, water resource, biodiversity, ecosystem therefore this affects everyone living on this planet.

From my point of view, Climate change main urgency is not to have clean and enough drinking water due to the dry season and drought that continually happens also flood too occurred more frequent in certain areas. This is near to us all. A situation where everyone suffers at the same level of hardship.

Fortunately, Thailand has King Rama IX, The Visionary King who has all plans laid out for this climate change even before it was picked up by mass media at the time. His majesty's work for laid down the foundation has been recognized for the prize of UNDP Human Development Lifetime Achievement Award 2006 and is the only one person who has achieved such great award and being place as "The Visionary King".

This derived from the success of thousands of Royal Initiative Project in which our belated King has influenced for the benefits of his own people, Thai people. No discrimination based on any causes be it race or religions. Every single royal projects has the same ultimate goal which is to develop better standard of living for all Thais and at the same time all Royal Projects had paid significant weight on being environmental friendly. Restoring natural resources that has been used back to its maximum capacity and promote sustainable development of such resources.

If one looks closely into details of these royal projects, one will see the base principle that is to prepare Thailand for climate change adaptation. This involves 3,550 projects. 3,204 projects are in water resource. 169 projects are in Agricultural development and 177 projects targeted directly at Environmental development. His majesty always said "Water is life" just as one of his majesty words;

"The significant point of all is to always have water: to use in daily routine, to watering plantation. This is because life is where water is. If there is water, an average man can live and settle his life. Without water, a man cannot survive. Man can live without electricity but cannot live without water."

King Rama IX Bhumibol Adulyadej
Chitralada Villa Royal Residence
17th of March 1986

A Journey to

"Inspiration"

I decided to discover the meaningful legacy of his majesty by myself. This is to lessen the feeling of loss for our Visionary King. If we come to talk about the story of the Royal Project, there are tremendous amount of books, pamphlets, research papers or numerous of TV series based on his majesty Royal Project as a main story line. Even with all of resources still the best way is to see his majesty work with my own eyes. Our King has walked the most deserted and distant area of Thailand to transform into a land where it means better standard of living for Thai people. That means 50 years ago, he had walked the wilderness so I can walk into the Royal Project and study his work comfortably, a feeling of no difference than walking into a study center.

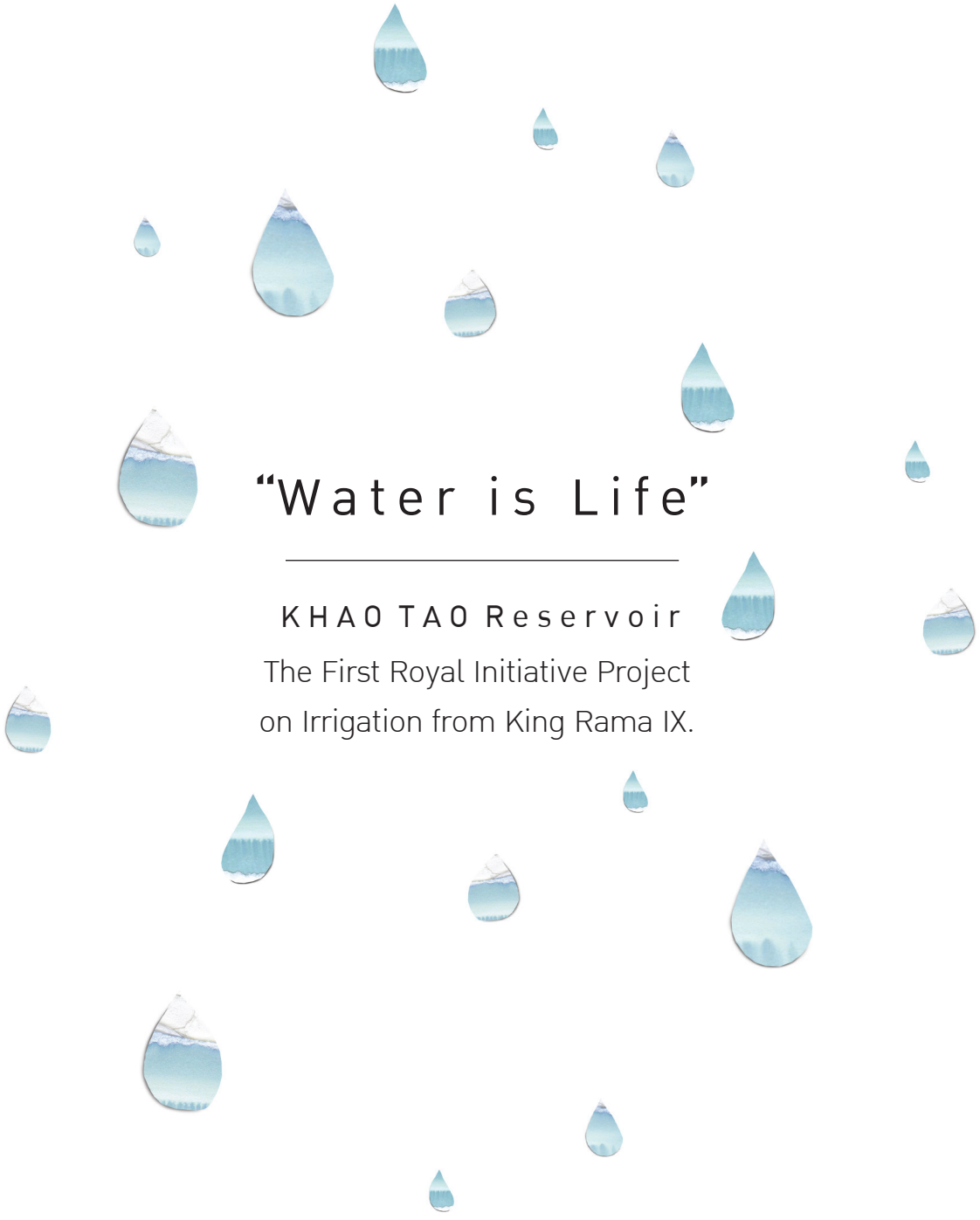
Moreover, I would like to find an inspiration for my own 0.32 hectares plantation which I have owned and already been on the process of planting organic grown vegetables along with diversification of plants within the plantation and family's yard. I have incorporated Solar Cell as a source of alternative electricity for water dropping system. Biogas is produced to be used in cooking with a great by product which is fermented fertilizer. I have incorporated all of this to my plantation with only one goal in my mind which is to be able to provide solely for my whole family on a self-sufficient method.

The system which has been implemented onto my plantation has raised great curiosity and awareness from people within my community. They are looking forward for the complete system and would see my plantation as a good place to study about the technique of clean renewable energy. The community sees this as a good chance for them to learn a valuable and clean technology. I have always wanted to spread out his majesty seamless method but after a long while of struggle I have felt as if my inspiration had left me and also increasing amount of doubt in my own ability to be able to achieve at such a great level. The pride of being the new generation who is born in the world where there are several newer technologies and to demonstrate to my community on how to implement them to their plantation is gone. I was in a deep pit of desperation and need to fill myself with hope again so that I can bring back all of the work, the marvelous work and concept from his majesty, back to my own community.

I am born in Phetchaburi province, Central Thailand. Rise here and proud. I chose to find back my inspiration by looking for Royal Project near my own home where I grew up. The area is Hua Hin, Prachuap Khiri Khan Province. We can say that Prachuap Khiri Khan province is one of those early days' projects where his majesty made frequent visits. With Phetchaburi province holds the most numbers of Royal Project in Central part of Thailand. Phetchaburi province has 111 Royal Projects while Prachuap Khiri Khan Province stands also huge number of 93 Royal Projects. These are vast amount of projects that could bring back my inspiration.

I have taken a liberty to call this Discovery project of my own "From Khao Tao to Chung Hua Mun" The reason behind this is that Khao Tao reservoir Nong Kae district, Hua Hin, Prachuap Khiri Khan is the first irrigation project under King Rama IX with the Royal Project called "Chung Hua Mun" Khao Krapuk sub-district, Tha Yang District being the last project from his majesty as his effort to heighten up the quality of farmer's life.

This writing from now will get into the discovery project of my own "From Khao Tao to Chung Hua Mun" For I would like to lay here what our Visionary King has planned and seen to. For many of his majesty plans have answered the problem of Global Warming or Climate Change with grace and simplicity yet fully effective.



“Water is Life”

KHAO TAO Reservoir

The First Royal Initiative Project
on Irrigation from King Rama IX.

BAAN KAO TAO

Because Water is Life

Khao Tao Reservoir

Khao Tao, a peaceful little village not far from the seaside. "Tao" in Thai means Turtle. This village is named after the Mountain near the village which forms the shape of a turtle shell. Most of the villagers live the life of fishermen and have always been for centuries. In the past, this area is hard to make a living and also live in. Now Khao Tao has become one of the notorious tourist spots in Hua Hin district. Khao Tao is host to Royal Initiative Project on Irrigation. The first Royal Initiative Project on irrigation from King Rama IX. I have a chance to meet Mr. Lae Sungsook or Teacher Lae 88 years old devotee of this Royal Project who has worked closely with King Rama IX and also former principal of Ban Khao Tao Municipal School. Teacher Lae possesses an honor to King Bhumibol Adulyadej's Royal Cypher Medal (Rama IX)

Teacher Lae told me 50 years ago when his majesty would come to Hua Hin often and saw the hardship of villagers who lived there. With villagers lived their life without proper constructed road, the villagers need to walk everywhere or use a cart. No proper water well which is hygienic to the standard of drinking. When the sea rise up on its sea level, the salty sea water would rinse into Tung Takad and ruins all crops. (Takad - is the villagers word to describe the area or the plane that will get flood when the sea water level is high and once the sea water level is low the area will transform into a mud plane.)

Teacher Lae said *"that the point King Bhumibol Adulyadej realised the hardship of life of the villagers in Khao Tao is when his majesty car was stuck in the mud plane of Tung Takad. He witnessed how the villagers had to walk great distances to obtain fresh water from a well near the beach area. The king initiated the project to build Khao Tao reservoir to reserve fresh water for villagers. His majesty funded 60,000 Thai baht at the time to build the reservoir in 1962 with 1 year the reservoir was completed. Khao Tao reservoir has the capacity of 600,000 cubic meter. The villagers live a better life after the completion with additional chance besides enough water for agriculture they could also raise fish in fish cage as one more source of household income."*

What I have seen here is when I stood here, I have faced the simple fact that Khao Tao has become the first natural school for his majesty to study about water resource problem as well as the way to better manage it. Water is vital resource and is main tool to comprehend in order to tackle the climate change operation. With the heighten of degree centigrade follows the dry season and drought. The first problem to arise is the cut out from water resource which Khao Tao villagers were among the first who have followed in this scenario.

“

Water is a key to this as The Visionary King realised so his majesty had placed a significant weight on building and reserving water resource as much as possible so Thailand could be better equip when the climate change comes knocking at the door. Water fuels life for each species on this planet and with water brings earth the balance it needs. Water would fuels for flourish forest and forest provides for animals and human alike. No matter how much the time passed, this simple lines of balance is a wisdom we need to keep in each and any methodology to manage our water resource.

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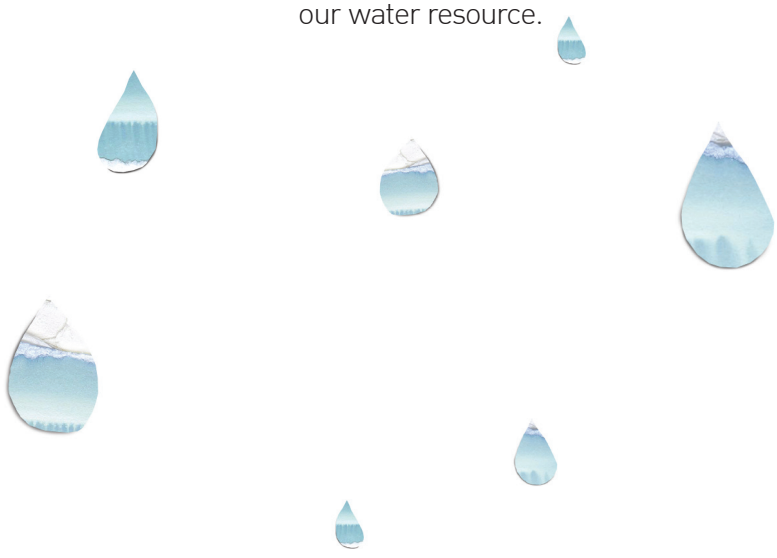


Role Model Biodiesel Plant -

Your Alternative Option in the World Where Fossils Fuel Price Hits Sky Rocket High.

The Reforestation project of Chaipattana Mae Fah Luang Nong Phlap, Hua Hin District, Prachuap Khiri Khan of Chaipattana Foundation situated not so far from Khao Tao. At this project stands Role Model biodiesel Plant to processed plant oil into biodiesel. The first biodiesel station in Thailand is also here. This place is one of the Royal initiative project in renewable and clean energy. Using raw Palm oil to process into biodiesel to be used with diesel engine.

King Bhumibol Adulyadej worried about fossils fuel since it is nonrenewable. His majesty then took interest in alternative choices for energy to replace fossils fuel usage in the country as much as possible. Thailand import fossils fuel in great volume and with biodiesel produced from crops, it helps farmers lower their production cost builds energy security for the nation by reducing the volume of fossils fuel Thailand has to import each year.

The Visionary King has started his research for alternative clean types of energy since 1985 through the work and project under the patron name of His Royal Highness Chitralada Project. He started with several kinds of plant that could be extracted for oil later. He discovered that Palm is the most suitable choice with the amount of oil. It could be extracted from therefore palm is his majesty choice to be processed into biodiesel. By doing this, his majesty has offered a clear answer to the question in the case agriculture product market price is at the low point. Also to used up every parts of plants and crops, his majesty has built the integrated biodiesel plant to answer all of the questions.

In 1993, his majesty had initiated the reforestation plan for an area in Nong Phlap because at the time the area of 1,600 hectare was all victim of soil deterioration. His majesty initiated the palm plantation in 32 hectare of the area as a prototype phase. The prototype phase was quite a strain on the palm itself. The first 7 years there was no success for the palm to yield its fruit so his majesty went on working on irrigation problem by building more Check Dams in order to supply enough water for palm plantation. The success comes after there were enough Check Dams to provide certain amount of water. The palm as a transpiration plant for the area also turned the area to hold more moisture and suffer no further drought as a result of his majesty's effort.

In front of my eyes, is a biodiesel station with pick-up trucks and tractors with green palm plantation in the back. It is hard to believe what I have learnt would match what I have seen in front of me now. I almost failed to imagine the area as the area of soil deterioration. The biodiesel station could produce 400 litres of biodiesel daily with all of this being used only in activities of Chaipattana Foundation. Nowadays with the lower price of diesel fuels but there was once a time when it reached 1.2 USD a litre. Biodiesel station is the place where farmers can obtain fuel and pay for less. The price of 0.63-0.78 a litre had helped villagers back in the time with grace.

H U B
K A
P O N G

Learning Center

Hubkapong Learning Center According to Royal Initiative Project from Sand Land to Green Land.

I moved away from biodiesel station and head to Hubkapong Learning Center according to Royal Initiative Project which is the highlight part in my mind and my intention for this inspiration trip. As Phetchaburi is my hometown I have felt so guilty that with the frequent hearing of the learning center since my second grade and several drive passes, I have never touched the center for once in my life.

All the long drive to the learning center, many questions popped in my head ... how of all areas of Nong Phlap, Rai Mai Pattana, Hubkapong and several other district as well as the famous Cha-am and Hua Hin district. Became green? Especially Rai Mai Pattana district, the area where my parents said when they were young many villagers have tried to claim the area so they can have their own plantation but none succeeded. The soil within that area crumbed so hard together that it is more like rock than soil. No plants could survive such hardness of soil.

But today what I saw is just green everywhere. Along the green and humidity of the side of the road while on the ride, it is as if my car is heading towards National Park...there remains question as what happened here and how? From the hardness of soil every plant gave up for 1,600 hectares into perfect green countryside. Not even a spot that told away the truth of the past. Finally, I reached Hubkapong. My childhood dream has come true. I only nitpicked about I should have visited the learning center earlier because it is just 50 kilometres from my house. My curiosity alerted me to find out answers for all questions popped in my head all this long way down.

“

1 9 6 4

King Bhumibol Adulyadej Visited

The long time resident here told the story of the year 1964 King Bhumibol Adulyadej visited the area and everything changed. His majesty taught the villagers ways to improve the quality of soil, the use of green manure. His majesty suggested for the villagers to grow plant within Fabaceae family and fermented their own fertilizer and compost. Villagers plant Vetiver grass to help the soil hold together. Nothing is new here only everything has combined for the better use for the situation. Even so, it took full decade to actually transform Hubkapong into green scenery as I have seen today.

”

Israeli government has provided help for water in agriculture technology back at the time with Hubkapong being the first tester of "Springer" technology. With the cooperation from both Thai and Israel which is one of the best water management country in the world at the time made villagers less dependant on weather to produce their crops. Another hidden weapon is the building of Baan Tung Kham Reservoir, Sai Ngam Reservoir, Huay Tapad Reservoir, Huay Sai Reservoir, Khao Krapuk clarifier, Baan Tung Kham Reservoir, Huay Sai Ngam Reservoir, Hubkapong Reservoir. All of these reservoirs possess connected plumbing system when one reservoir is low on water level, it is possible to transfer certain amount of water from other reservoirs which are fuller. With this tactic Hubkapong and area surrounding it has all year round water resource for consumption and agriculture without any shortages.

The Visionary King also stressed on the importance of cohabitating with fuller forest. We cannot reject the truth that all the water management and improvement for agricultural purpose has to be in accordance to reforestation. With the new upcoming forest, there has to be diversification of plants. Plant that yields fruit. Plant which is all year green. Plant with beneficial parts. This new forest prevents the erosion and also heightens moisture level. The whole area turned to cooler and greener place like never before.

Royal Initiative Project

C H A N G
H U A
M U N
Drought? Sure We Grow!

Chang Hua Mun has a distinct tale of how this name came to be. There was this one time King Bhumibol Adulyadej said for his servant to place a sweet potato on one of the ancient scale inside his majesty office then his majesty left for Bangkok. By the time he returned, the same sweet potato sprouted. His majesty thought that this is marvelous "Oh how this one could survive and sprout anywhere it wants to." He asked for his servant to grow this sweet potato in the tree pot. The same sweet potato has been the first sweet potato to root in this last Royal initiative project called Chang Hua Mun (scale-weighting the sweet potato).

2009

CHANG HUA MUN

The Last Royal Initiative Project
Phetchaburi Province

Chang Hua Mun, Khaoyai sub-district, Cha-am District, Phetchaburi Province about 30 Kilometers aways from Hubkapong Royal Project Learning Center. This is the last Royal Initiative Royal Project founded in 2009. 10 years ago this area also faced the same fate as Hubkapong. Today it is an Oasis.

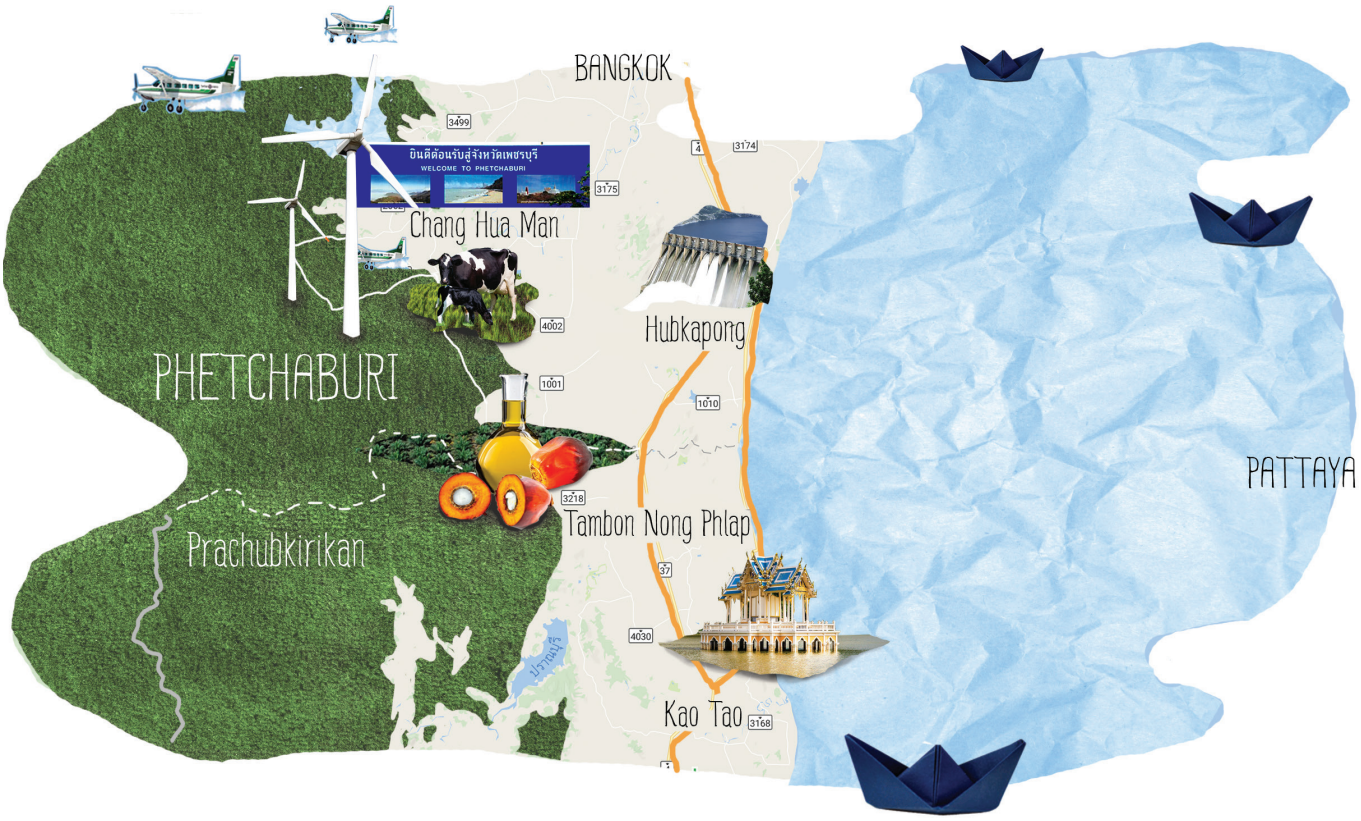
The success of this project and the unstoppable development since 2009 proved that even the area with soil deterioration, there are ways to make it possible to do agriculture. With all support from everyone government and private sectors alike, under the name "All power, Chang Hua Mun" made everyone joined force and make this project a great role model to study agriculture and livestock. The knowledge would benefit those who use it in an applied way to their own farm and land. This is the true success of Chang Hua Mun Royal Initiative Project.

The project aimed to share the knowledge to villager and resident in the area and nearby about agriculture as well as the center of various breeds and strain of botanicals specimen.

The other distinctive part of the project is the way this project manage energy production and usage. There are 20 wind turbines to produce electricity with 50 kilowatts in production capacity. The same to solar cell system with 50 kilowatts in production capacity that would then shared to Provincial Electricity Authority.

I have contemplated all of his majesty work for the overall picture of all the projects I have visited on this journey. Now I all heard about Climate Change and the situation is in the limelight in world stage but all of these project without even mention about climate change directly had all been the way to lay foundation for Thailand to suffer less of the situation and contribute less to the Climate Change problem even before it was being targeted as a world threat.

Especially, Chang Hua Mun Royal Initiative Project designed for everyone to be able to learn together and start from their own level of understanding. It has been in the stage of recovery after being a sufferer from the global warming situation directly. From the land that all plants



has given up to grow to the green we now see. What I learnt is if we truly see the crisis that comes forward and we join force in every groups from every directions; government, private sectors, villagers, residents, educational institution, NGOs etc. We can truly solve any crisis for the greater good.

This project also shows how to attack the problem at the point where one can solve. In this case, the example is the Climate Change situation. We can solve from where we have a share on from reforestation and using clean renewable energy and start from where we are instead of actually a goal which rarely common people easily understand about Macro Carbon emission.

As easy as setting a reachable goal so everyone is now a climate change problem solver. From development of better soil quality by using green manure or building more reservoir. Everyone only needs to have a heart into the problem and tackle it with patience. We can all work pass our climate change situation.



2017

Next Step

My discovery project to find my inspiration "From Khao Tao to Chang Hua Mun" has completed. With my full willpower restored, I have understood the meaning of "Understand, Access, and Develop" which is the method lies under his majesty way of working and tackling all problems. Every one of us could use this in our life as well as to solve the Climate Change. If we all truly understand the problem in front of us and we are actually there at the place where all chaos occurred, we would be able to solve the problem with true efforts we can handle any crisis to come and manage it thoroughly.

I have told myself that today I have understood and I have gotten to the method lies under his majesty way of working on any types of work. The rest falls on me to develop the method to what I desire to achieve. I have no intention to quit or pretend not to see any obsatacle lies ahead of me in my "Rai Tang Term Fun" project. I have all I have ever needed, water resource and land. With grounded intention and better management, I am sure to achieve the goal to provide food security for my family as well as served as a small learning center for people in my village. Nothing great comes without obstacles. With flexibility and uncompromising effort to achieve my goal. I have the best role model in my heart. The Visionary King that means I will not falter. There is an underlying meaning in my achievement from now on. The further I complete my goal, I have shown to the world the continuous of work incorporating his majesty concept and to be one Thai who has continue his majesty work from now on.



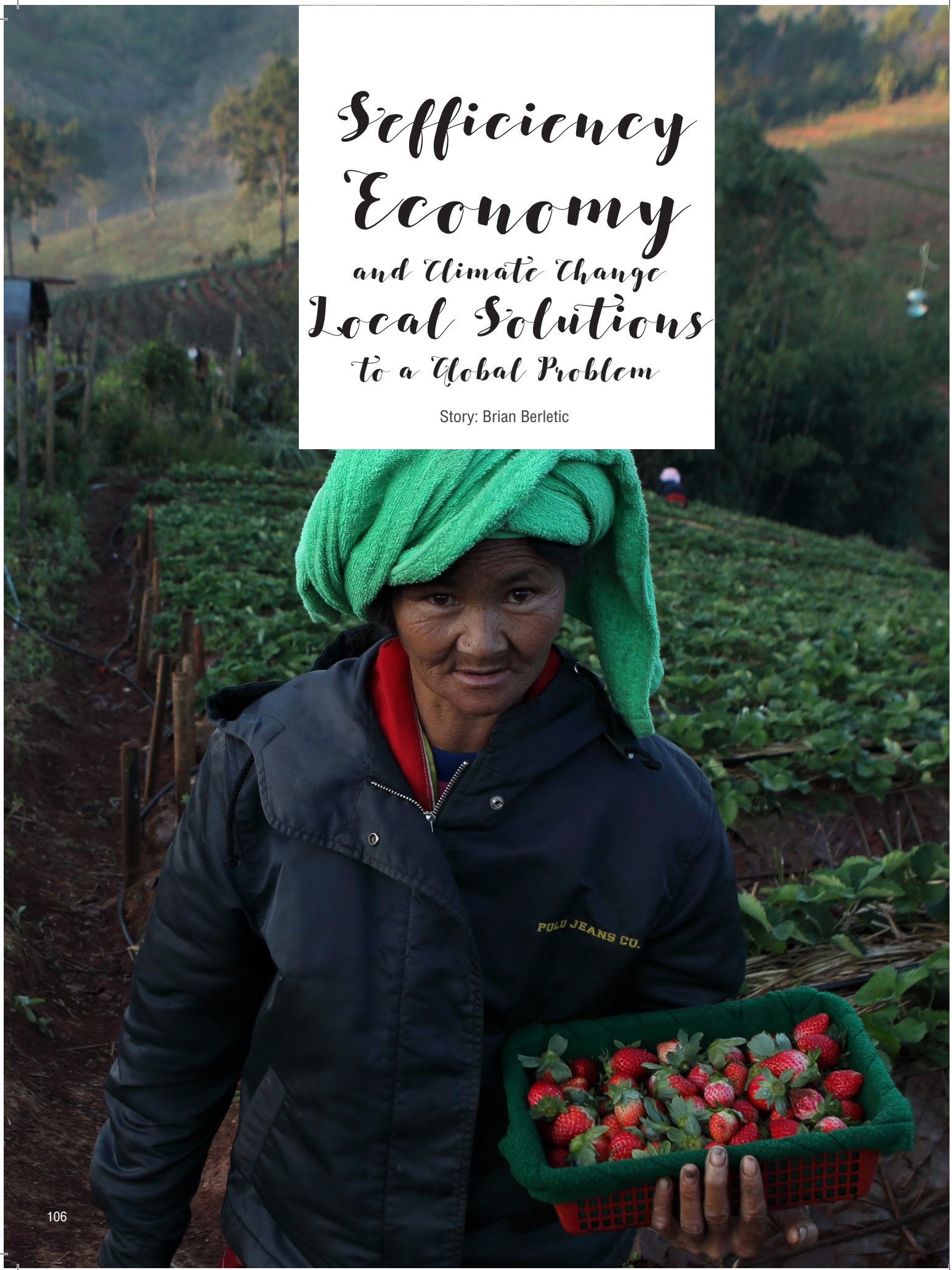


Understanding and Getting to the True Development

Which is the Method Lies Under His Majesty
Way of Working and Tackling All Problems.

Sefficiency Economy and Climate Change Local Solutions to a Global Problem

Story: Brian Berletic



Introduction

King Bhumibol Adulyadej's Sufficiency Economy is an idea as big as the Kingdom of Thailand itself. There is scarcely a corner of the Kingdom that has not been influenced and improved by it over the decades. However, because it emphasizes localization, it can be easily understood by zooming in on specific communities and individuals successfully practicing it.

It began as a means for farmers to hedge their bets against an increasingly globalized economy, full of dramatic market spikes and plunges, bubbles and busts. The Sufficiency Economy has not only allowed those who practice it to enjoy a more sustainable and prosperous life, but has a clear, positive environmental impact as well, particularly in regards to reducing humanity's impact on climate by reducing dependence on large-scale, energy-intensive and often inefficient logistical and retailer networks traditional globalization is built on.

The idea behind the Sufficiency Economy is for farmers to sustain themselves and their communities first, then use surplus to sell to markets. With the additional income, sustainable investment could be used to create further value and economic independence, giving them freedom from large-scale, centralized businesses that have traditionally collected the efforts of their labor and sold it afar for much greater profits in markets driven by unstable, often unsustainable global forces.

The Sufficiency Economy's process can be broken down into:

- Implementation and Production;
- Expansion and Marketing and;
- Advancement, Processing, and Adding Value.

Expansion and diversification not only allows farmers to feed themselves with a variety of food, it also allows them to take advantage of different markets as prices surge in one, while retreating in another.

Within the Sufficiency Economy, extra income is to be allotted to acquiring additional assets, particularly technology, to improve and diversify economic activity; processing equipment to help farmers add value to their own products, machinery to pursue other economic activity altogether, and other means of reducing dependency on others as well as reducing the risk and cost associated with such dependencies.

All of these acquisitions are made sustainably, step-by-step, when extra resources are available, rather than through incurring inescapable debt.

Today, as technology advances, the basic concepts underpinning the Sufficiency Economy are expanding in width and depth.

Solar panels are allowing local communities to become energy independent. Cheaper and improved processing and manufacturing equipment is making it possible for local communities to pursue a much wider variety of economic activity once reserved only for wealthy investors. And information technology (IT) is allowing farmers and independent entrepreneurs in local communities to not only collaborate better together, but to connect more directly with consumers both locally and nationally, cutting out marketing and logistical intermediaries as well as centralized distributors.

From a purely socioeconomic point of view, the Sufficiency Economy's principles have yielded a resilient economic mesh able to adapt and absorb turbulent economic forces that are wreaking havoc on those still dependent on highly centralized economic activity like large-scale rice farming, rubber farming, and other "all or nothing" forms of monoculture agriculture.

From an environmental point of view, it turns out the Sufficiency Economy, particularly aspects of self-sufficiency and localization, are also yielding immense benefits.

Consider a farmer who must ship crops by petrol-fueled truck to a processing plant, which is then shipped to a distribution center, which is then shipped to a supermarket or convenience store, which in turn, requires consumers to drive in their petrol-fueled cars or on motorcycles to access and acquire before returning home. Consider also that these supermarkets and convenience stores, some of which are open 24 hours a day, must use energy to keep lights on, refrigerators and air conditioners running, and a staff on hand, paid the most minimum wage possible. Now consider a farmer who processes and markets their crops directly to consumers, whether they are individuals or restaurants. Before the product leaves a farmer's farm or village, it is already prepared and packaged. It makes one trip to its final destination where it is consumed. Value and profit is exchanged directly between the consumer and the farmer.

Absent is the network of logistics and centralized processing and distribution characteristic of modern, globalized consumerism. Also absent is the fossil-fuel intensive energy required to move, process, and present a farmer's products to potential consumers. Absent also is the waste involved when a product cannot be sold to consumers, which includes not only food that has been produced and not eaten, but all the energy and pollution required to truck it off and either incinerate and bury the ash, or bury it as is in landfills.

Under the Sufficiency Economy, because the farmer is directly marketing what they produce, they can track for themselves trends among their customers and potential customers, adjusting supply and demand locally and directly, rather than the slow response, bubbles, and busts seen in massive, globalized markets today. This too reduces waste and risk tremendously.

A farmer in Thailand able to better connect directly with consumers means a farmer better able to find consumers locally, rather than across the country. Ideally, localization would leave the majority of producers selling to local consumers. A socioeconomic mesh built upon principles of economic diversification, financially sustainable economic activity, and a process that moves forward, embracing advances in technology to enhance the mesh's efficiency, equates into an equally sustainable paradigm for using resources and protecting the environment.

Localization means that negative environmental impact from economic activity is felt directly by those causing it. Within globalization, a company whose business model is profiting from destroying forests or watersheds on the other side of the planet can more easily ignore the consequences of its actions than a company or entrepreneur doing it directly in their own community.

Localization reduces energy required for processing, logistics, and waste management. It also localizes responsibility for the impact, good or bad, economic activity has on a community and the environment around it.

Examples of the Sufficiency Economy in Practice

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Composite created from food waste and farmyard manure within the container of 8 cubic meters PVC bag yields excellent grade of biogas with the equivalent of 0.84 kg. LPG a day. Lower the chance of carbon dioxide emission of 2.6 kg a day. With this biogas being used in cooking meals – reduce the amount money payment for gas/fuel about 300 baht a month. For the course of using as Benzyl substation to run an electric generator of 2.5 Kilowatt-hour, this means an entire house lid up for a period of 6-8 hours straight which lower the use of fossil fuel like Benzyl itself for 4 liters worth 180 baht a day.

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Solar and Biogas: The Pa Deng Model

Travel to the remote sub-district of Pa Deng in Kaeng Krachan, Phetchaburi in western Thailand and you will cross over into an area disconnected from both Thailand's national power grid and telecommunications networks. There are no power lines, no cell towers, and few if any paved roads. The houses are very rustic, and the entire sub-district looks at first like you've traveled back in time.

However, almost precisely where the Ministry of Energy's power lines end, an innovative project bringing power and cooking gas to this remote region beings. Called the "Pa Deng model," this project involves disseminating solar and biogas technology across Pa Deng. In this "land that time has forgotten," you will see solar panels rising up next to old wooden houses and biogas balloons sitting out back like giant sleeping pet dragons.

Started independently by a small team including an employee of the Ministry of Energy, the Pa Deng model seeks not just to hand out technology to users, but to teach them how to use it, modify it, and adapt it precisely to their needs. Rather than being "off grid," Pa Deng is building their own grid. Instead of being connected by power lines and utility meters, it is instead connected by knowledge and both technical and social collaboration.

Self-sufficiency practiced in this remote village can clearly and obviously translate into benefits for the environment. The benefits of solar power are already widely understood, and instead of wrestling away a carbon-intensive power system from users and convincing them to switch to solar, the people of Pa Deng are building their power grid from the ground up based on renewable energy from the beginning.

Biogas used for cooking and running generators on cloudy days also pays dividends for the environment.

Biogas is produced by breaking down biomass through anaerobic bacteria contained in the large, heavy plastic fabric "balloons." This is biomass from kitchen scraps or agricultural processes that might otherwise be thrown away or worse still, burned in open fires. Instead, they are broken down by bacteria, producing daily cooking gas as well as high-quality, organic fertilizer as a by-product. The cooking gas produced onsite negates the need for industrialized natural gas extraction, refining, shipping to distribution centers, shipping again to retailers, who in turn either ship it to consumers, or sell it to consumers who drive to their shops to pick it up. Every step of natural gas distribution involves driving fossil fuel-burning cars and trucks.

Biogas production in Pa Deng eliminates the need for this fossil fuel-intensive logistical network to extend its reach there. As the Pa Deng project helps other communities across Thailand adopt localized biogas production, dependence on fossil fuel-intensive distribution of natural gas will be further reduced.

King Bhumibol Adulyadej's Sufficiency Economy stresses cooperation and encourages the adaptation of new technology to increase local economic independence. Something as fundamental and essential as energy, either in the form of electricity or gas for cooking, created and maintained on a local level is an impressive example of the Sufficiency Economy in practice.

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Khao Kwan Suphan, organic grown rice product emerged from an experimentation creating variation of rice grain by mixing between the local rice strain and the popular off-season rice grain. The new rice breed has tremendous endurance towards insects which plays a big part as this allows farmers to grow without really using any insecticides in growth process. This counts as great satisfaction rice breed directly from the community of organic rice farmers.

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Organic Agriculture Networks: The Kao Kwan Foundation

Modern, centralized industrialized farming focuses heavily on chemicals destructive to the environment, massive national logistical networks dependent on fleets of fossil fuel-burning vehicles to move products from field to market, and giant retailers who place products out on display, consuming immense amounts of energy for air conditioning, refrigeration, and lighting.

The hub and spoke model of food production and distribution found around the world has many negative, tangible impacts on not only society, but the environment as well.

Networks across Thailand practicing King Bhumibol Adulyadej's Sufficiency Economy have focused on decentralizing and diversifying this hub and spoke model, as well as focusing on more economically and environmentally sustainable agricultural practices.

The Kao Kwan Foundation in Suphanburi province, Thailand, provides farmers practicing chemical-intensive monoculture training and support for switching over to more sustainable and diversified organic agriculture.

Part of the course involves bringing farmers out into a "living" rice field, where chemicals have not been used, and a complete ecosystem of insects, birds, and even fish thrive. Through balancing this ecosystem and with greater crop diversification, farmers are taught how elements of the ecosystem itself can be used to keep pests under control.

Fertilizer production onsite is also taught. Farmers learn how to compost and produce living fertilizers they can culture and reuse season to season. Like producing biogas onsite, onsite organic fertilizer production not only provides farmers with an essentially free and healthier alternative to chemical fertilizers, but eliminates the need for the fossil fuel-intensive production and logistical networks required to keep farmers stocked with chemicals.

The Kao Kwan Foundation also encourages moving away from monoculture, the practice of farming and depending on only one crop each season. As a result, farmers are able to sustain themselves season to season with food they grow themselves, as well as find alternative markets for other crops in addition to their main crop, rice.

By creating local, organic agricultural networks, they move away from the same sort of centralized networks used to extract, distribute, and resell natural gas. Farmers selling produce locally not only keep more money for themselves, but eliminate the need for more energy and pollution required to sell their produce to large national distributors and retailers.

The reduction of chemicals harmful to the environment as well as eliminating the need for fossil fuel-intensive logistics to supply farmers with harmful chemicals and bring their products to market is another example of how King Bhumibol Adulyadej's Sufficiency Economy has benefited both society and the environment through localization as well as sensible and sustainable practices.

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Sisaengtham School has incorporated renewable energy; Solar energy for several electrical components as in Drinking Water Tap tank and its generator. The school also makes its own version of solar powered tri-cycle. The solar power incorporation has been in a complete stage that this school is powered solely by solar energy and pay only 40 baht a month as a fee to preserve the school's electrical meter which is required by Provincial Electricity.

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The Solar Monk

Sisaengtham School in Thailand's northeastern Ubon Ratchathani province is unique for several reasons. In addition to teaching basic subjects you would expect to find at any school, it also teaches students the basic principles of designing, building, and maintaining solar power grids. That's because the school itself is powered by solar panels.

In addition to producing its own power, students maintain an organic garden onsite to produce food for school lunches. To say that the school is a living and very successful example of King Bhumibol Adulyadej's Sufficiency Economy would be an understatement.

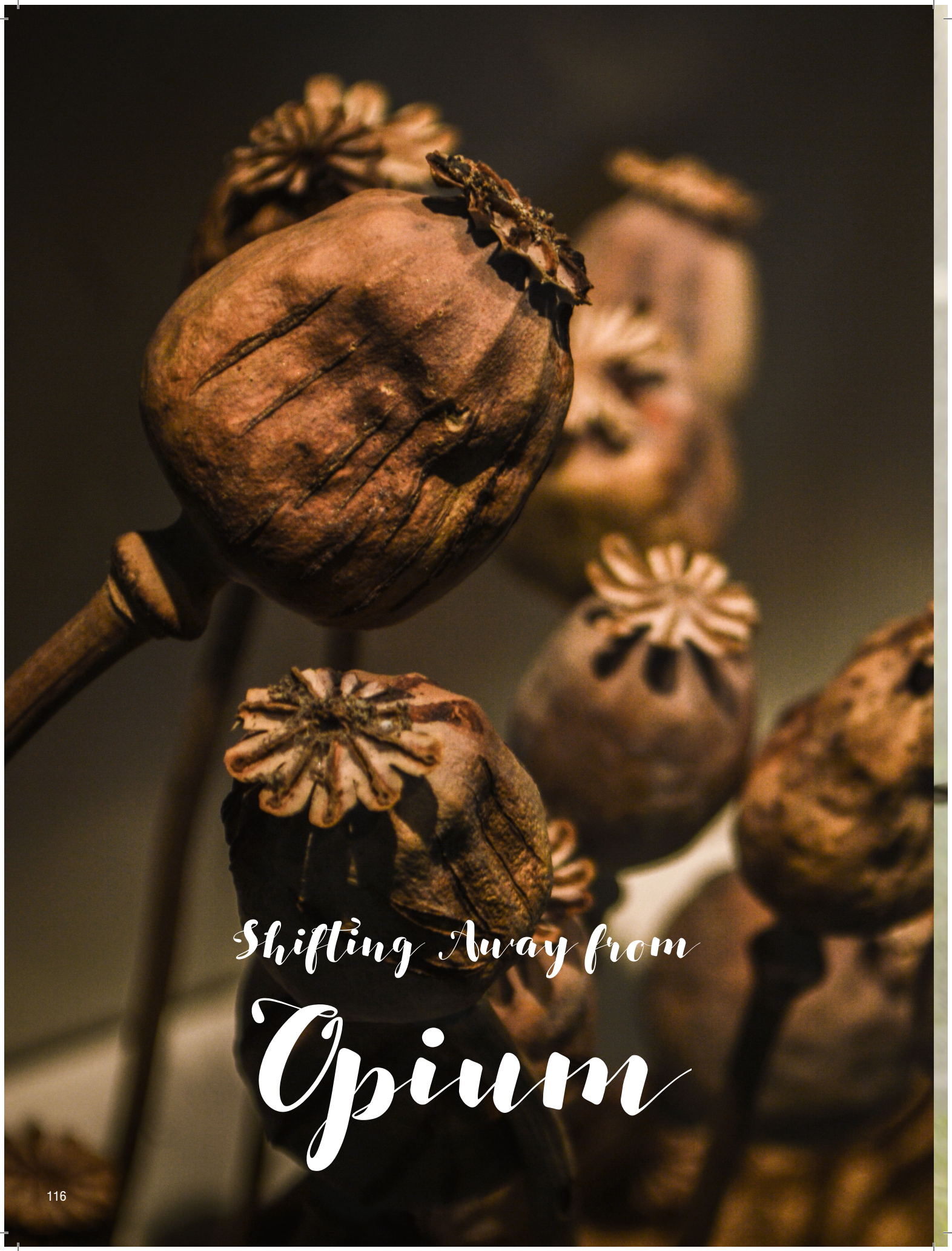
The school's founder, Prakruwimolpanyakhun, also known as the "Solar Monk," has proven that solar power not only works, but that Thailand is ready for it in a much bigger way.

(Above) Mobile solar car distributed food to the people camped around the Grand Palace in The Royal Cremation Ceremony of His Majesty King Bhumibol Adulyadej, October 25-29, 2017

He has worked hard not only for his students and his local community, but has gone as far as Phuket in Thailand's south to bring solar power and the knowledge to use it to needy communities. He and his students have also worked on projects for clients, giving students valuable work experience and creating working examples of sustainable, renewable energy to inspire others.

Through tireless advocacy, the Solar Monk has inspired a large following enthusiastic about renewable energy, and solar power in particular. In his own pursuit of self-sufficiency and sustainability in Ubon Ratchathani, he has generated a desire across the nation for the same sort of clean and independent power he and his students enjoy.

The Solar Monk has proven that self-sufficiency and environmental sustainability go hand-in-hand, where panels you place on your rooftop to produce energy for yourself, benefits the wider community and the planet in turn.



Shifting Away from Opium

Walk into Sustainable Agricultural

The Doi Tung Development Project

King Bhumibol Adulyadej is renowned for many impressive accomplishments, and among them is an initiative he undertook not to eradicate opium production in northern Thailand through a devastating "war on drugs," but a constructive program to replace opium production with more sustainable and less risky agricultural activity.

Opium production not only was a social problem in northern Thailand, it led to encroachment on the nation's forests, with opium farmers clearing them to expand production. The destruction of the forests created a multitude of negative effects, including an impact on local water supplies, shifts in weather, and an increase in haze from fires. Solving the opium problem in a constructive manner would not only benefit Thailand socially, but environmentally as well.

The program King Bhumibol Adulyadej pioneered in Thailand was so successful that others around the world have attempted to replicate it everywhere from Latin America to Afghanistan. It was, and still is, in essence, a highly-focused version of the Sufficiency Economy.

The Doi Tung Development Project provides the clearest and most successful example of this program and how the Sufficiency Economy's principles were put into practice in a uniuqe and highly effective way.

Doi Tung is a mountain in Thailand's far north province of Chiang Rai. It had long been amid the epicenter of Southeast Asia's notorious "Golden Triangle" of opium production and distribution. Beginning in 1988, the Mae Fah Luang Foundation Under Royal Patronage set out to replace opium production there in three stages:

- Providing basic services and education;
- Providing local entrepreneurial opportunities and;
- Building and expanding the Doi Tung brand.

Basic health services as well as training and education were provided to villagers of Doi Tung. With basic healthcare and a proper education, farmers dependent on the risky opium trade were able to find better jobs either locally or elsewhere in Thailand.

Creating entrepreneurial opportunities for the Doi Tung region itself meant that locals could stay local, avoiding the need give up their homes to migrate to cities and take up menial jobs.

The final and still ongoing stage of the Doi Tung Development Project includes identifying alternative crops farmers can grow and sell, as well as building the Doi Tung brand by finding new markets to sell these products in.

Today, you can walk into many stores around Thailand and find Doi Tung products on the shelves.

The work in Doi Tung involved dozens of villages and thousands of people. Between 1991 and 2000 alone, it reduced opium production by a factor of four, and was declared by the UN Office of Drugs and Crime as one of the best examples of such a program in the world.

Additionally, with more sustainable agricultural practices being followed by farmers in Doi Tung, the need for slashing national forests for opium production were all but eliminated. Recent shifts toward organic agriculture further enhances the environmental sustainability of Doi Tung's activities.


DOITUNG
#Doi Tung


DOITUNG
#Doi Tung

Other projects have looked to the Doi Tung Development Project as a model and inspiration for imilar activities elsewhere in Thailand's north, elsewhere around the country, and even around the world.

The project and those that followed prove that constructive self-sufficiency within the principles of King Bhumibol Adulyadej's Sufficiency Economy can dramatically change the lives of people for the better not only in socioeconomic terms, but also in terms of improving the environment. It also demonstrates that socioeconomic health and environmental health are often inseparably linked.

Just as constructive alternatives were used to shepherd opium producers away from a socially and environmentally destructive and destabilizing economic activity, the principles underpinning King Bhumibol Adulyadej's Sufficiency Economy can be used today to guide economic activity in Thailand away from other environmentally harmful and unsustainable centralization, toward more efficient, sustainable, and decentralized production and distribution.

By providing people with a constructive and beneficial alternative, the necessity and dependency for legislation alone to shape a nation's economic activity and environmental sustainability diminishes, and as it does, the realistic expectation of tangible, positive results increases.

While legislation may help provide extra incentive for individuals and collective industries to change course, economic sustainability and prosperity is the primary motive. As long as alternatives are not as attractive as environmentally destructive practices, many are willing to take the risk in challenging legislation to continue with what is profitable.

Opium production, for example, was always illegal, but it wasn't until viable alternatives were available that the risk of producing opium was no longer as appealing as growing alternative crops.

Similarly, a negative human impact on the environment, including on the planet's climate, has serious, negative implications for humanity and its future. But it will only be until viable alternatives are available that this realization, coupled with the right incentives, change our collective behavior for the better.

As examples such as solar and biogas production in remote villages, organic agriculture networks, and national solar power advocacy prove, opportunities and success do indeed go hand-in-hand with sustainable, local, self-sufficiency and good environmental stewardship.

Producing power with localized utility grids owned by the people themselves is a notion increasingly more attractive to people as solar power and other forms of alternative, renewable energy drop in price, competing with traditional, centralized power production.

Organic agricultural networks that help farmers cut costs on dangerous chemicals that jeopardize the health of themselves and their customers, coupled with the prospect of selling directly to customers means more profit for themselves. It also means less impact on the environment.

And solar power advocacy that powers schools in northeast Thailand, lights up disadvantaged communities in Thailand's south, and is teaching a new generation of Thais the skills necessary to literally light up their future with solar power grids is another perfect example of self-sufficiency, sustainability, localism, and socioeconomic opportunities balanced with environmentally sound practices.

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- In the year of 1988 an average income for villagers within the project raised from 3,772 baht to 12,177 baht later the year of 1993.
- With the reforestation being initiated the forest area went up 98% within the period of 4 year (1989-1993).
- In 2001 UN Office on Drugs and Crime – UNODC presented Doi Tung product with UN own symbol stated the product from Doi Tung has helped the community overcome Drugs and Crime.
- Macadamia nut has become the sole star of Doi Tung development project's product since its first start plantation in 1995. The purpose back then was to help tribal people along the hillside find new income source which is not opium plantation. Nowadays, this macadamia nut product makes its own trip around the world supermarket shelf.

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Each example proves that environmentally sustainable practices can also appeal socioeconomically to the individuals and communities using them. They do not need to pick between economic success or environmental sustainability. Through self-sufficiency, technology, and innovation, they can have both.

King Bhumibol Adulyadej's Sufficiency Economy, as it has been put into practice by networks, villages, and individuals all across Thailand, prove that local solutions provide the best and most sustainable hope to fighting global problems, including humanity's impact on the environment.

The legacy of King Bhumibol Adulyadej will not simply be ideas he offered to the world, but ideas that he tangibly put into practice nationwide. He did this by trekking into the most remote regions of the Kingdom, solving problems at the most local of levels, but in doing this he has inspired people worldwide, proving that local independence, economic success and security, as well as environmental sustainability are not at odds with one another, but work best when working together.

DAD
in Loving Memory

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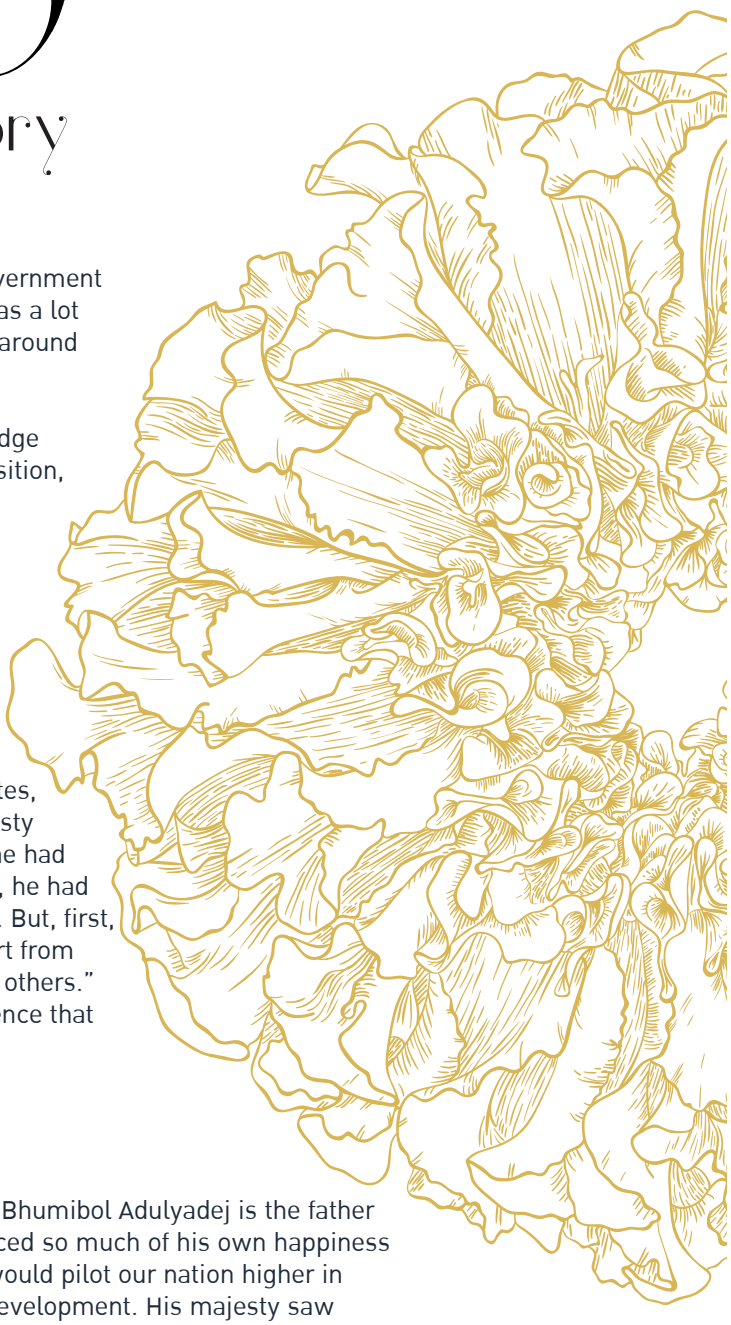
When I first found out that I was delegated from the government to serve His Majesty King Bhumibol Adulyadej, there was a lot of fear and anxiety. My education background revolves around political science and governance, and I was aware that His Majesty's works were mostly surrounding natural resources, water and soil, which I had no basic knowledge about. Two or three weeks after I was conferred the position, His Majesty had requested for my audience, wherein I expressed my honest concerns about not being able to serve him as he might have expected. His Majesty asked, "Why?" I replied, "I did not study it in school." He said, "It does not matter—we all can learn." His Majesty was incredibly gracious. He taught me everything—he taught me so much that I have now received Doctorate degrees in agriculture from around 14 universities already. His Majesty did not just teach about the theories, he taught about behavioural etiquettes, principles of conducts and ethics. At all times, His Majesty taught us about helping others. It was something that he had always emphasised since my first audience. At the end, he had said, "Thank you for coming to help me with my duties. But, first, I have to let you know that I have nothing to offer—apart from the shared happiness that we will receive from helping others." It is a sentence that stays dear in my heart, and a sentence that has influenced how I live my life from then on.

Dr. Sumet Tantivejkul
Secretary-General of the Chaipattana Foundation



Of all 70 years under his majesty's reign, King Rama IX Bhumibol Adulyadej is the father of Energy resource development in Thailand. He sacrificed so much of his own happiness and put his majesty time up for the development that would pilot our nation higher in whichever way in need especially in energy resource development. His majesty saw the essential part of developing a renewable energy source. He is "The Visionary King" who laid foundation for energy resource development in Thailand and the plan to sustainably use energy to its full potential. All of this for the security of Thailand's energy resource situation.

Dr. Twarath Sutabutr,
Deputy Director-general
Energy Policy and Planning Office, Ministry of Energy

Throughout more than seven decades of His Majesty King Bhumibol Adulyadej's reign, His Majesty had given prominence to the conservations of natural resources and the environment, including the preservations of the soil, water, forest and coastal resources. He focused on preserving the biodiversity and the balance of the ecosystem so that people and nature could coexist harmoniously. In addition, he was a role model in the management of natural resources and the environment—from the mountaintops to the rivers. This can be observed through his various royal initiatives, such as the protection of watershed forests by using the principle of reforestation without planting, which includes creating condensation to the soil by means of building check dams. His Majesty suggested the use of vetiver to conserve soil and water, as well as the restorations of mangrove forests. Due to these royal initiatives, Thai people have therefore revered him as Thailand's father of natural resources and environmental conservation.

Mr. Rutchada Suriyakul Na Ayutya
Director-General of Department of Environmental Quality Promotion

King Bhumibol Adulyadej has filled in majour role in environmental work in Thailand. His majesty was capable and delivered many effective methods which solves problem in real practice. The Visionary King took his duty seriously and worked hard towards the result for Thai people wellbeing. One such example is his given speech addressing to Global Warming or Climate Change Issue.

Just one day before The Royal Anniversary in 4th December 1989, Dusidalai Hall, Chitralada Villa Royal Residence, Dusit palace, his majesty gave his speech therein : "... It has been said that there will be flood occur from the rising of sea-level. This is because the nature has changed due to the raising of Carbon in the atmosphere. It is as if there is a cubic glass cover this earth so the temperature will be higher so it is warmer. When the earth gets warmer, we can certainly see that the ice at both poles will melt into liquid water state and then rise together with seawater. Seawater body will also be more vast since the sea temperature rises therefore it will need more space to plunge into. This seawater will flood in any area lower than sea-level. An example is Bangkok. Bangkok will be flooded as in said thought"

The Visionary King has given this speech in very early year of 1989 since before the international community would pay attention to climate change issue and even before the year of 1992 of United Nations Framework Convention on Climate Change adoption. His majesty Vision and Resolution in preparing for Climate Change Issue is worth great respect. Several Initiative Projects implemented in order to prepare Thailand to the situation ; Chang Hua Man Agricultural Project, Kaem Ling or Monkey's Cheeks project, Royal Artificial Rainmaking Project, Por Piang Economy or Sufficient Economy and New Theory Agriculture etc. All of these projects stand as stable resolution towards Global Warming and Climate Change Issue in Thailand to this day.

Dr. Raweewan Bhuridej
Secretary General Office of Natural Resources and Environmental Policy and Planning

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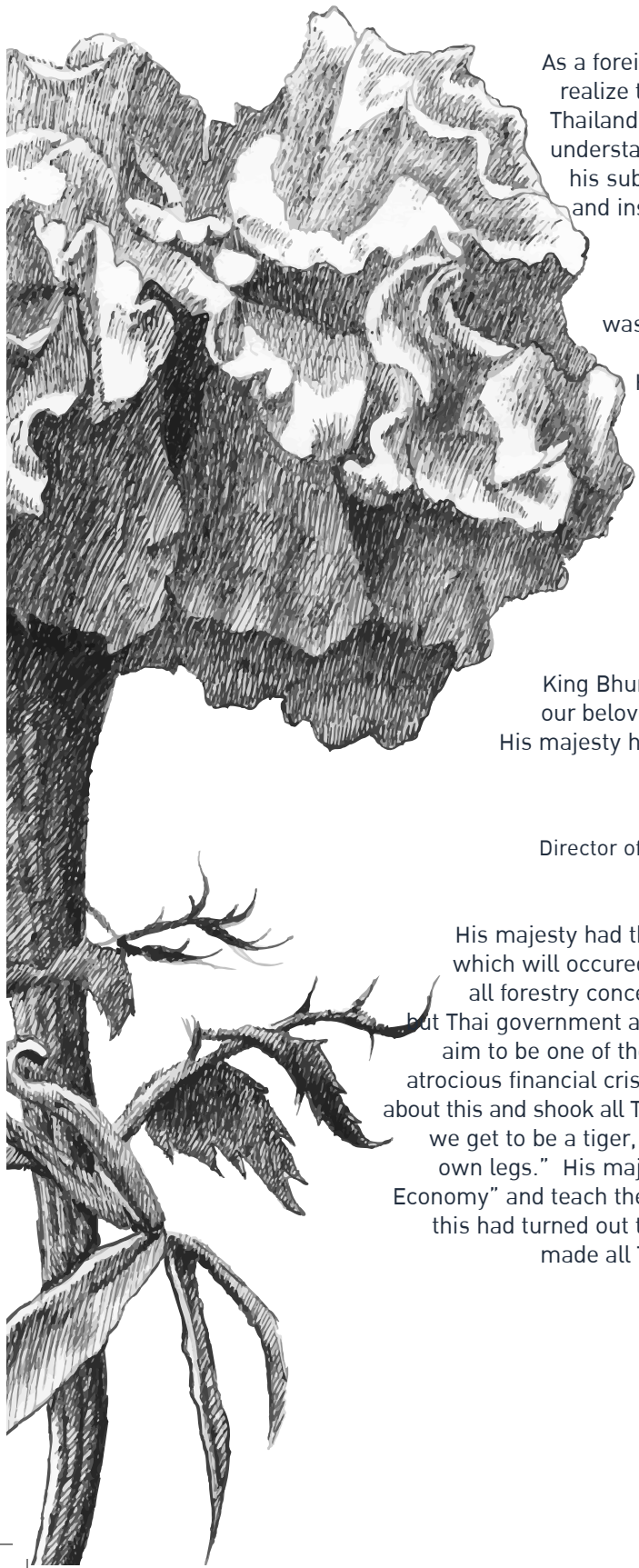

As a foreigner newly arrived in Thailand in 1983, it didn't take long to realize the immense love, respect and reverence that the people of Thailand held for King Bhumiphol. It didn't take much longer to also understand the love, concerns and aspirations that the King held for his subjects, which in turn provided the motivation, determination and inspiration for his life-long quest to improve the quality of life and opportunities for all the people of His Kingdom.

The closest I came to His Majesty King Bhumibol in life, was during a State Dinner at the Oriental Hotel on the occasion of the State visit of Her Majesty Queen Elizabeth II, and HRH Prince Philip. Earlier this year, I was fortunate to have the opportunity to participate in prayers and to pay my last respects to His Majesty as he was Lying in State. While I never had the privilege of meeting His Majesty in person, nevertheless I can proudly say that I am lucky to have lived and worked in Thailand in the reign of Rama IX.

Dr. Robert Mather
Chief of Party and Objective 4 Lead, USAID Wildlife Asia

King Bhumibol, "Bhumibol", this very name is distinct and unique to our beloved king while "Bhumi" means Earth ... "Bol" means Power. His majesty had been the power from this earth. The only one grounding powerful force for all Thais. Even in physical death with

Mr. Siripong Thonongto
Director of Family Forest Network, Ban Rai District, Uthai Thani Province

His majesty had thought and spoken out since 1989 about the climate change which will occured from fossil fuel usage. Within the same year, Thailand had all forestry concession voided just before the Rio de Janeiro "Earth Summit" but Thai government at the time was still stress out about economical growth and aim to be one of the new Asia's Tiger ; 5th Tiger. The effort ended with Thailand atrocious financial crisis of 1997. King Bhumibol Adulyadej had come out to public about this and shook all Thais up to reality with the simple "It does not matter whether we get to be a tiger, the required quality here is we are still able to stand on our own legs." His majesty had spreaded out Sedthakit Porpiang or "The Sufficient Economy" and teach the way to be able to live a sustainable way of life. With time, this had turned out to be concept which widely needed internationally. This had made all Thai people so proud of their king and his majesty teaching.

Mr. Prayong Atthachack
Director of Loei Fund Foundation, Loei Province

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