



## Industry, innovation, infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation



**F**lash floods, perennial droughts, poor health or lack of education are all causes for the suffering of the marginalised people in Thailand. In different regions, many poor Thais still suffer from natural and social imbalances. Improving their living conditions requires not only physical development work but also creative and forward-looking thinking.

As a former science and technology major before he switched law and political science after his accession to the throne, His Majesty the King has continued to fall back on his early passion to create innovations to benefit his people. During the six decades of his reign, His Majesty the King has come up with creative and practical ideas to tackle his subjects' problems. The following are highlights of some of the more than 2,000 projects initiated by His Majesty.





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### Royal Quotes

*"The development of the country must be fostered in stages. It must start with the construction of infrastructure, that is, the provision of food and basic necessities for the people by methods, which are economic, cautious and conforming with principles. Once the foundation is firmly established, progress can be continually, carefully and economically promoted. This approach will prevent incurring mistakes and failures, and lead us to the certain and complete achievement of the objectives."*

- Kasetsart University Commencement Ceremony,  
19 July 1974

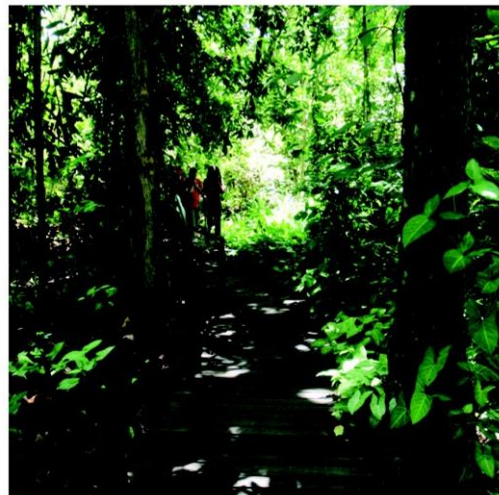
*"At present science and technology are the keys to national development. We should therefore promote invention of our own technology as appropriate to the environment and the demands of the nation. The more we invent, the wider the technology will benefit various work and save us money on importing foreign technology."*

- To mark the National Science Week, 1 August 1988

*"Rainmaking is like a warship: you fire the missile far, then closer in order to properly hit the target. Since we have facilities for rainmaking, we should be sure to use it properly to get rain in the right places."*

- Chitralada Villa, 30 July 1986

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## ROYAL RAIN

In 1955, while flying to visit villagers in the Phuphan Mountains in northeastern Thailand, His Majesty noticed that although there were plenty of heavy clouds along his flight path, they failed to bring rainfall to the parched lands below.

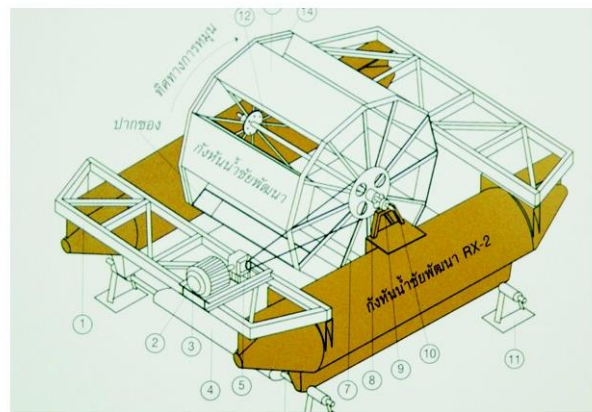
Water scarcity brings extreme hardship to farmers. Population increases and industrial expansion also place great strain on existing water resources.

Analysing the information and scientific data available, His Majesty made it known to one of his close aides, M.R. Debriddhi Devakul, of his firm intention to search for a way to bring down "more rain than that given by nature."

The Royal Rain, or artificial rain, project was thus born. Soon afterwards, an official agency, the Royal Rain Operations Office, was established to assume responsibility for cloud seeding operations.

## TRICKING THE SOIL

This soil improvement project, known in Thai as "Klaeng Din" was initiated by HM the King in Narathiwat







in 1984 to solve the problem of soil acidification. Following HM the King's advice, water management and an irrigation system were used to simulate the dry and rainy seasons, and a constant cycle of soaking and draining by fresh water to remove sulphite from the soil, essentially "Tricking the Soil." The technique was later replicated in Nakhon Nayok and other provinces that suffered from similar problems.

### THE CHAIPATTANA AERATOR

Witnessing the increasing severity of water pollution, His Majesty ordered that a low-cost locally built water aeration device be developed. With financial assistance from the Chaipattana Foundation, the Royal Irrigation Department manufactured a waste water treatment device known as the Chaipattana aerator. Since 1989, the oxygen-enhancing aerator has been installed for trial use at Phra Mongkutklao Hospital and Wat Bovornives Vihara.

Nine models are currently being tested. The

development of the Chaipattana aerator offers an alternative to treating polluted water that is efficient, easy to use and cost-effective. The machine is capable of treating water pollution with BOD of 250 milligrams per litre at a rate of 600 cubic metres per day, reducing BOD by more than 90 per cent.

In 1993, the Chaipattana Aerator Model RX-2 was granted a patent under His Majesty's name. It was the first patent in the world given to a monarch.

In 2000, the Thai Cabinet approved the proposal by the Office of National Identity Promotion to honour HM the King as the "Father of Technology of Thailand" and make 19 October "Thailand's Technology Day."

In 2006, His Majesty the King was recognised the Thai Cabinet as the "Father of Thai Innovation" following a proposal by the Ministry of Science and Technology, and 5 October was designated "National Innovation Day."





## Reduced inequalities: Reduce inequality within and among countries



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### Royal Quote

*"If we are moderate in our wants, we will have little greed, which means we will exploit others less."*

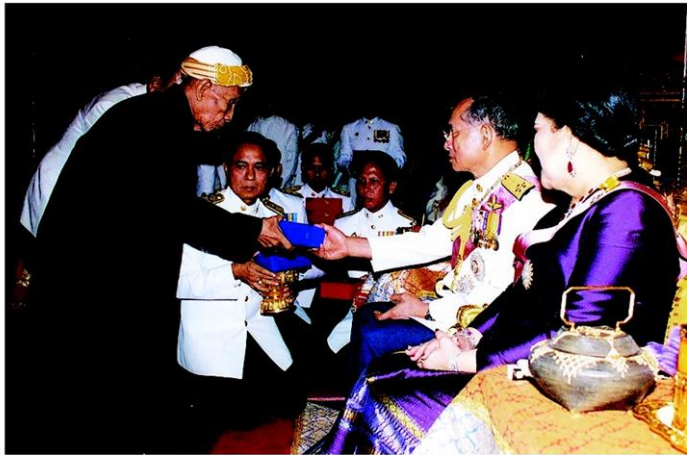
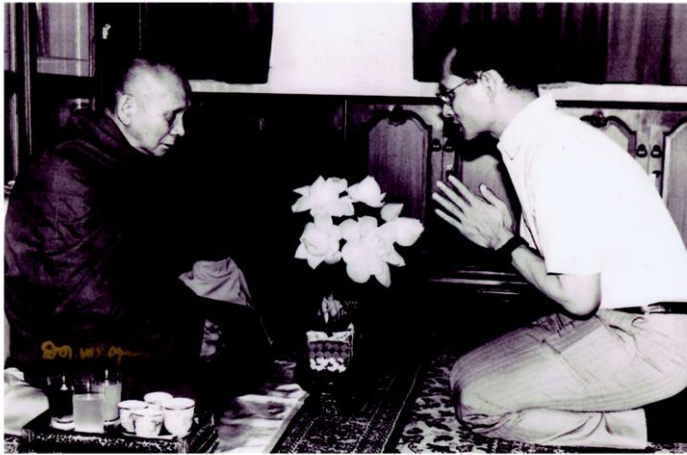
*"If every country has this idea, that is, moderation, not driven to extremes, and no greed, then people can live in peace"*

— Royal birthday address, 4 December 1998

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**H**aving witnessed abject poverty in the countryside since very early in his reign, His Majesty the King realised that the crucial first step to bridge inequalities is to help the rural poor overcome hunger and poverty by pulling their resources together.

The projects he initiated – be they the rice banks, buffalo banks, or fish breeding – did not aim at only helping the villagers have enough food or other basic necessities. More importantly, they aimed to help the villagers get organised so they can work to solve other problems together in the future. Any assistance, stressed the monarch, must be done in ways that they can eventually support themselves.

His Majesty went beyond providing the villagers with the means to improve their income and quality of life. To address inequalities, His Majesty tackles the heart of top-down administration – the officialdom's lack of respect for the poor.

During his upcountry visits, it was common to see the King sitting on the ground, with a map and a pencil in his hands, asking the villagers about their needs, the topography of their areas, and other first-hand information.

Teaching by example – that was his way to teach government officials who followed him on royal trips upcountry. His message: Get the facts right. Go to the sites. Listen to the people. Build co-ordination with other state agencies. And never give up.

For that is what the King has been doing throughout his reign.

His Majesty does not only address disparity suffered by poor Thai villagers. In the face of prevailing ethnic discrimination in mainstream society which aggravates inequalities, the King and other members in the Royal Family made annual upcountry trips to visit hill tribes peoples in the North, ethnic Malay Muslims in the South, and Isan peoples in the Northeast.

Apart from improving their livelihoods, the King showed him his respect to their way of life, beliefs, and traditional knowledge, setting the tone for state authorities to follow. The Royal Family has also revived many of their dying arts and crafts to strengthen their cultural confidence, pass it on to the younger generations and to generate more income.



His Majesty is well aware that social and economic inequalities – be it between the rich and the poor, the city and rural people, the dominant Thais and ethnic minorities – are structural, such as lack of education opportunity, unjust laws, and unregulated development.

To address lack of educational opportunity, the King set up royal scholarship fund for needy children. To help the poorest of the poor who cannot afford formal education, the King set up the Dabos project to provide underprivileged children with occupational trainings. The teachers are recruited from experienced artisans in the communities, which shows the King's respect for experiential knowledge and local wisdom.

The King also uses his own personal money to help poor patients with free medical treatment, rescuing their illnesses, even deaths, and a plunge into abject poverty from medical costs.

To tackle unjust law, His Majesty often uses his royal addresses to express his views. On forest encroachment, for example, state authorities treat human settlements in forest areas as illegal encroachers subjected to arrest, eviction and imprisonment. When authorities do not recognise human settlements that have long existed prior to the forest demarcation, it is the case of the law violating the people, not people violating the law, pointed

out the King, stressing the forest peoples' human rights long before this issue became a global concern.

To ease inequitable land ownership, His Majesty is supportive of land distribution schemes for landless farmers, but he stresses the need for co-operatives so they can work together work to tackle common problems. Self-reliance is always the royal aim.

A devout Buddhist, His Majesty believes greed is the root cause of on-going plundering of natural resources and exploitation of the weak. In the world where big fish eats small fish, when economic growth figures and profit



### Royal Quote

*"This is a period of decline, it seems. People complain a lot; they complain that the traffic is extremely congested.*

*...In fact, the solution has been under study for a long time already. But the difficulty resides in the fact that the solution cannot keep in stride with the problem. That is 50 per cent has been solved, the problem grows to 60 per cent meaning a loss of 10 per cent. That is quite normal but it does not mean that we are defeated.*

*We must strive to solve the ten per cent lost, otherwise the problems will snowball until they are insoluble."*

– Royal Birthday Address, Chitralada Villa,  
4 December 1993

maximisation remain policy makers' and the industry's ultimate goals, the gap within the country and between nations will grow ever wider and the Earth will also revolt through more extreme weathers.

Peace is His Majesty the King's ultimate goal. He is well aware that if inequalities remain unaddressed, the country is heading for bitter conflicts. By bridging the disparity gap, the poor, he said in a royal address that "they will repay you with peace. Then the nation can survive." So will other countries if they take His Majesty's wisdom to heart.





## Sustainable cities and communities: Make cities and human settlements inclusive, safe, resilient and sustainable



**A**s Bangkok is bursting at the seams, His Majesty the King's vision and royal intervention has prevented the capital from being paralysed and unliveable.

In 1970, when the government wanted to build a monument to celebrate His Majesty the King's 25th anniversary of accession to the throne, the king suggested the construction of a ring road instead. Hence the Ratchadaphisek ring road which later expanded into the Kanchanaphisek ring road 25 years later to mark HM the King's 50th anniversary of his accession to the throne.

Through royal initiatives, roads in Bangkok were linked into connected webs. New bridges were built and linked to industrial ring roads to enable people to commute across the Chao Phraya River without having to go through the heart of the city. To tackle traffic emergency, a special unit was created with the King's personal money so traffic officers can be dispatched to problem areas promptly.

A ham radio enthusiast, His Majesty had real time information not only about the traffic but also other problems in the city, especially flash floods after rain storms. Thanks to his expertise in maps and real-time information throughout the years, it could be said that the King knows Bangkok's typography more than anyone else in the country. Yet, he always checked his information with local residents not only to check accuracy but also to ensure the royally initiated projects answer the people's real needs.

Thanks to his innovation, the so-called monkey-cheek water reservoir becomes an effective tool to ease inundation not only in Bangkok but also the rest of the country. The cost-effective Chaipattana water purifier machines invented by the King has also rescued many severely polluted canals from sewage.





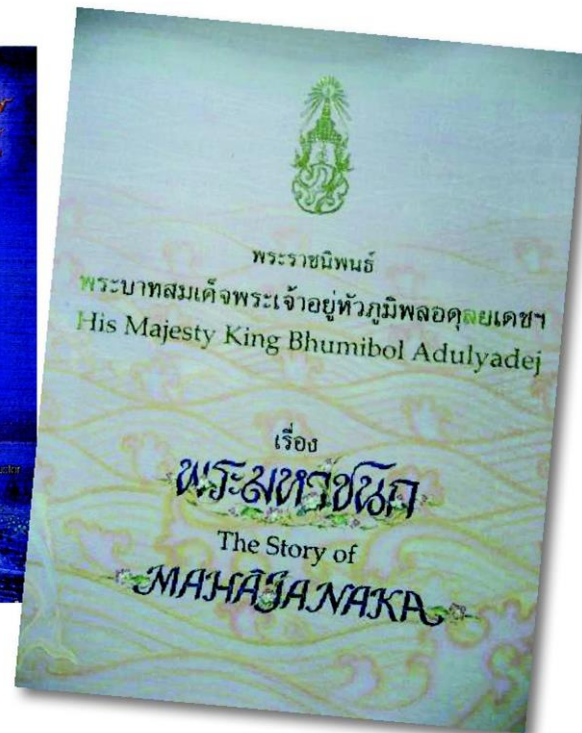
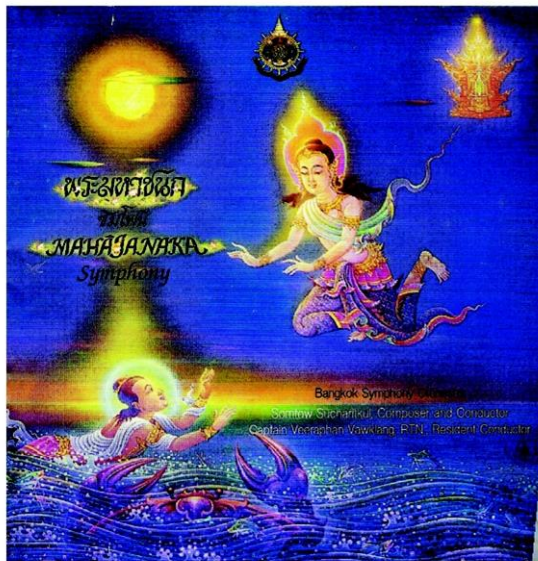
No cities and communities are sustainable without water, stressed the King in several occasions. Urban and rural well-being are also inseparable. That is why more than one-third of the royally-initiated projects are about developing water sources in rural areas. Apart from conserving rain-catchment forests through small dams made of rocks to ensure steady water supply to rivers downstream, the royal projects on reservoirs, irrigation, and clean drinking water have not only made communities sustainable, but also saved people from hunger and poverty.

Moderation and careful use of resources are His Majesty's key messages in all his royal efforts. Sustainability is impossible if excessive exploitation of natural resources continue. Despite decades of royal efforts to reverse the trend, the King has expressed concerns that they might not be sufficient to catch up with untamed urban growth. The king has shown the way, there is still a chance to make cities sustainable if policy makers and people follow his footsteps.





## Responsible consumption, production: Ensure sustainable consumption and production patterns



### Royal Quote

*"I ask all of you to aim for moderation and peace, and work to achieve this goal. We do not have to be extremely prosperous... If we can maintain this moderation, then we can be excellent..."*

– 4 December 1974

**H**M the King's sufficiency economy philosophy extolls the principle of moderation to tackle the crux of unsustainable development – excessive consumption and exploitation of scarce natural resources.

Since the poor suffer most from unsustainable development, the King's New Theory farming focuses on how to provide small-scale farmers with food security. Under HM the King's model of agricultural land management, a farmer should at least have 15 rai of land to cultivate – a radical idea when millions of farmers are struggling with landlessness. He suggests the plot of land be divided for an individual household reservoir, a paddy field, and mixed gardens for both consumption and extra cash. Any efforts to increase farm production should also pay heed to cost effectiveness and self-reliance.

The sufficiency philosophy economy does not focus only on the farming sector. In his royal speech, the King urged the well-to-do to cut down on their consumption while encouraging the industrial sector to be mindful of sustainable production by using local materials for local consumption more. By cutting transportation and transportation costs, the products are cheaper and the world safer from greenhouse emissions from less use of fossil fuel.