



Clean water and sanitation: Ensure availability and sustainable management of water and sanitation for all



While His Majesty the King's projects concentrated on sustainable agriculture and water management to help farmers, his royal initiatives were complemented by royal projects by other members of the royal family. Her Majesty the Queen concentrated from early days of the reign on the welfare of womenfolk, because she was aware that they were the backbone of the family, helping with the farming, and also earning additional income during the off-season for rice farming.

Her Majesty's Support Foundation offered an opportunity to the women, as well as the menfolk, to improve their skills in the traditional arts and crafts, allowing members of the Support Foundation to supplement the family income through their handicraft skills like weaving or basketry.

More recently, Her Royal Highness Princess Bajrakitiyabha, fondly known as "the Lawyer Princess," has been supporting the "Kamlangjai," or "Inspire," project to reach out to Thai women incarcerated in prisons, including pregnant inmates and those who have babies. She also works on the project called "ELFI" – "Enhancing Lives of Female Inmates" – which has proposed new rules on the treatment of female prisoners and non-custodial measures for female offenders as a supplement to the 1955 Standard Minimum Rules for the Treatment of Prisoners. In April 2009, HRH Princess Bajrakitiyabha was presented with the Medal of Recognition by the United Nations Office on Drugs and Crime (UNODC) to honour her valuable work.





Royal Quotes

"Water is life."

"When the monkeys are given bananas or rambutans, they cram them into their mouths and save them in their cheeks, hence the expression monkey cheeks. After that, they slowly swallow the fruits. It is the same with the water in the Nong Yai Monkey Cheek. The water keeps coming in and then is slowly released. As it is retained, the water will not flood the town of Chumphon. When the flow of water recedes, the retained water is released from the retention area. It is the same with the monkeys."

- Royal birthday speech, 4 December 1998

"Water levels and drainage in Bangkok should be managed according to local conditions. I suggest two plans for such management: The first is to be adopted in the monsoon to prevent flooding, while the second plan is designed to deal with water pollution in the dry season by flushing it out from the canals. Both plans should be based on the force of gravity to reduce expenses spent on the control of water levels in the canals."

Water has always been at the heart of His Majesty the King's development projects, since it is key in agriculture as well as household use. Flooding and drought wreak havoc to people's lives, and His Majesty has come up with numerous techniques and projects to combat these issues.

RAMA IX RESERVOIR PROJECT

Located in Khlong Luang District, Pathum Thani Province, this reservoir was constructed on the area of 2,800 rai (1,120 acres) to collect the water from the upper part of the low plain region. Apart from preventing flooding problems in Bangkok, the reservoir was intended to provide local residents with water supply for consumption and agriculture in the dry season.

THE MONKEY'S CHEEKS PROJECT FOR BANGKOK

The low-lying flat terrain of Bangkok causes floodwaters to drain from the area slowly. Many canals have a small downhill gradient while others are silted or filled up. Weeds and other items block the flow of water. These are some of the factors why Bangkok and the surrounding areas have been subject to heavy flooding for many years.

The water is diverted from Northern Bangkok to be stored in large canals near the sea. This canal will be filled with water like a Kaem Ling at times of high tide. When the sea level drops below that of the water in the canal, the Watergate of the canal is opened so the water can flow by gravity. Water can also be pumped out to the sea from the Kaem Ling at the lowest points of those canals. By allowing water to be flowing down these canals at all times, the level of flooding will be reduced. When the sea level rises above that of the water in the canals, the Watergates are closed to prevent water from flowing back into them. This is based on the principle of one-way flow.





WASTE WATER MANAGEMENT

One major cause of pollution is the lack of effective waste water treatment and garbage disposal systems. His Majesty has initiated several projects to treat waste water employing natural processes and inexpensive technologies. Following are selected examples of successful cases:

Waste Water Treatment via Filtration by Water Hyacinth

"Bueng Makkasan" is a small lake in the heart of Bangkok. Dug by the Royal Siamese Railway in 1931, it has been used for many years to hold flood and waste water from surrounding areas, including used lubricants from the Makkasan railway work shop. The discharge has caused the lake to silt up and become shallow and polluted.

In 1985, His Majesty asked various agencies to help improve the lake's water quality using "natural filtration". Apart from increasing the water circulation by pumping water in and out of the lake, His Majesty also advised agencies to grow water hyacinth to absorb the organic matter and heavy metals in the water. The weeds are replaced every 10 weeks before they reach the peak of their growth. The removed plants are used to make compost or fuel but not animal feed as they contain residues of heavy metals.

Lagoon Treatment and Grass Filtration

The Laem Phak Bia Environmental Research and Development Project, Phetchaburi Province, sits on a 1,135 rai (181.6 hectare) plot of public land. This waste water treatment system consists of five different ponds: one sedimentation pond, three oxidation ponds, and one polishing pond. The waste water is treated gradually as the water flows from pond to pond before being drained into mangrove forest for the next stage of treatment process.

The secondary treatment system exploits natural filtration by channelling the water through a constructed wetland system, grass fields, and finally another constructed mangrove area. Aquatic plants reduce toxins and organic matter in the water by absorption and digestion. After the treatment, the water quality has been transformed enough to meet acceptable standards.

Good Water Chases Bad

Termed by His Majesty the King, Good Water Chases Bad simply means using fresh and clean water to flush out and dilute polluted water. Water from the Chao Phraya River and elsewhere flows into Bangkok through the Bang Khen, Bang Sue, Saensaep, Thewet, Bang Lamphu or any other canals, and flows through connecting canals back out to the

Royal Quotes

"Let me talk about power supply and energy.

"Every time we have an energy crisis, the authorities concerned often advise people to turn off their televisions. Turning on televisions is in fact fine since we can always find new sources of energy to generate electricity. We have to try to find new kinds of fuels to replace the current ones that could run out in years or decades. If the current sources of fuel run out in 40 years, I will be then 118 years old.

"Palm oil seems to be a viable substitute.

The prime minister may have seen a Royal car that runs on biodiesel, 100 per cent of which is produced from palm oil. The exhaust smells good and causes no cancer.

"I have created such a substitute fuel because I may still have it to use when I am 118. Everybody must think of themselves and they must consequently try to find substitute fuels."

– Royal Birthday Speech, 5 December 2005





Affordable and clean energy: Ensure access to affordable, reliable, sustainable and modern energy for all



river further downstream. With appropriate planning of water flows to and from the city, polluted water in Bangkok is diluted and most pollutants are flushed out. This efficiently alleviates pollution in canals during the dry season.

In 1996, to commemorate the auspicious occasion of His Majesty the King's 50 years on the throne, the Thai government and the Thai people named His Majesty the "Father of Water Management".



The energy crisis over the past decades has had a serious impact on Thailand due to its need to import large amounts of oil, leading to trade deficits and the rising cost of living. Always a visionary, the King experimented with alternative energy long before the world realised its significance. In 1985, His Majesty proposed a study on the use of sugar cane to produce ethanol. Further experiments attempted to combine 10% ethanol with benzene, and gasohol is now a mainstream source of energy. Showing by example, the King also uses solar and biomass energy for his pilot projects at Chitralada, which has convinced the people to follow suit.

His Majesty the King has experimented with various forms of renewable energy, starting with wind, water and sunlight energy to be used at royal development projects. This was followed with the use of agricultural products to replace oil such as making solid fuel bars from water hyacinth, as well as using dairy cow dung to produce biogas.





Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

PALM OIL FORMULA

In 1985, His Majesty the King began to study the use of vegetable oil, such as palm oil, to replace diesel oil. He asked Prince of Songkla University to construct a small-size palm oil extract plant at Ao Luek Settlement Cooperative, Krabi province. The Rolly-Initiated Project for Improvement of Small-sized Palm Oil Industry was set up at the Pikul Thong Royal Development Study Center in Narathiwat. Then in 2000, His Majesty began conducting research and development on the use of palm oil in diesel engines at Klai Kangwon Palace in Hua Hin. Using pure refined palm oil would increase engine torque, reduce pollutants in exhaust emissions, increase lubrication making the engine last longer, save money from diesel imports, help palm farmers utilise their crops that exceed market demand.

The product was issued with a patent by the Department of Intellectual Property, Ministry of Commerce, under His Majesty's name. The patent No. 10764 - "Using Pure Refined Palm Oil as Fuel for Diesel Engine" "Palm Oil Formula" was rewarded the Gold Medal with Mention during "the Brussels Eureka 2001" held in Brussels, Belgium.

GASOHOL REFINING AND ETHANOL

HM the King initiated the Gasohol Refining project for use in the Royal Chitralada Projects, with one

gasohol service station in the palace grounds. Later, the Royal Chitralada Projects collaborated with government organisations, such as for PTT Plc and the Thailand Institute of Scientific and Technological Research, to study and develop ethanol quality for fuelling the cars. Presently, the Royal Chitralada Projects can produce ethanol with an octane level equivalent to Benzene 95, which serves to fuel cars of the Royal Chitralada Projects and also sells to the public through PTT service stations on Vibhavadi Rangsit Road.

DIESOHOL

Diesohol is derived from blending diesel oil, ethanol and emulsifier, and is used to fuel diesel engines. The Diesohol Project at Chitralada was initiated in 1998 in collaborative with PTT Plc. to experiment on blending the 95 per cent purity ethanol with diesel oil and emulsifier at a ratio of 14:85:1.

HUSK COMPRESSED CHARCOAL AND GREEN FUEL

In 1975, the Husk Compress Plant Project was established in Chitralada Royal Projects to use rice husks, by-products from the Experimental Rice Mill, to make fuel bars as well as organic fertilisers. Fuel bars were also made from water hyacinth, agricultural waste and orange peel.





As early as 1953, after visiting poverty stricken villages near his Klai Kangwon Palace in Hua Hin, His Majesty initiated occupational promotion programmes which would eventually encompass farmers all over the country. He granted an audience to local authorities at sub-district and village levels and started a fishery project, giving them Java tilapia fingerlings to be distributed to villagers in their areas. The fish breed was obtained from the Fishery Department in Penang, Malaysia, in 1949.

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Royal Quotes

"Economic development must be done step by step. It should begin with the strengthening of our economic foundation, by assuring that the majority of our population has enough to live on... Once reasonable progress has been achieved, we should then embark on the next steps, by pursuing more advanced levels of economic development."

"Being a tiger is not important. The important thing is for us to have a sufficient economy. A sufficient economy means to have enough to support ourselves...we have to take a careful step backward...each village or district must have relative self-sufficient."

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THE ROYAL PROJECT

In 1969, His Majesty the King gave an initial grant 200,000 baht to researchers at Kasetsart University to fund a study to identify a viable alternative cash crop for hill tribe people whose livelihoods were dependent on opium production.

The project, known as the Royal Project, aimed at stopping opium cultivation and slash-and-burn farming among hill tribes. Both practices had inflicted serious damage to watershed forests for nearly 30 years. Under the Royal Project Foundation hill tribe peoples produce cold climate vegetables. They now have a better standard of living and employ sustainable cultivation methods.

The Project now has four research stations and 35 Royal Project Development centres, covering 295 villages and 14,109 households comprising 85,000 people.

ROYAL DEVELOPMENT STUDY CENTRES (LIVING MUSEUMS)

An expert on rural development in his own right, His Majesty initiated the establishment of Royal Development Study Centres. Aware that there is no single formula or solution to rural poverty, the centres conduct studies, research projects and experiments with the aim of establishing guidelines and development methods appropriate to the conditions of individual areas. Dubbed "the Living Museums," farmers can observe and receive training by seeing and learning from the real-life examples. The six centres are:

- The Khao Hin Son Centre in Phanom Sarakham District, Chachoengsao
- The Huay Hong Krai Centre in Chiang Mai – The Pikul Thong Centre, Narathiwat
- The Phu Phan Centre, Sakon Nakhon
- The Kung Kraben Bay Centre, Chanthaburi
- The Huay Sai Centre, Phetchaburi