

Royal Activities
and International Cooperation

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and International Cooperation

Foreword

"...the well-being and happiness of the people are a benefit that is difficult to be measured in terms of money."

Royal Speech on the occasion of the Royal Birthday Anniversary (1991)

As the Kingdom of Thailand celebrates the auspicious occasion of His Majesty King Bhumibol Adulyadej's eighty-fourth birthday anniversary in 2011, the National Identity Foundation takes great pride in presenting this exclusive publication in honour of our beloved King and members of our royal family.

The world's longest-serving monarch, His Majesty is now in the sixty-fifth year of a remarkable and noteworthy reign. From the beginning, our King has worked unceasingly to bring comfort and relief to disadvantaged people in rural Thailand. This selfless dedication, and that of other members of Thailand's royal family, has improved the lives of the country's poor and needy and, benefitted other countries in the world. To date, over four thousand royal development projects have been initiated; all of which aspire to improve the livelihood and lifestyle of the people of Thailand.

From our experience at the foundation, often through overseas lectures in Europe, Australia and other parts of the world, we have encountered an element of surprise on the part of many people not previously aware of the humanitarian activities of Thailand's monarch and members of the royal family.

This exceptional publication, which portrays nine activities and development projects illustrating the humanitarian aspects of work undertaken by Thailand's royal family over a long period of time, has been compiled from experiences recounted by scholars, practitioners and experts all of whom have taken great pride in serving alongside our King and other members of our royal family.

It is our wish that you, as a valued, overseas friend of our country, will find this portrayal of royal activities enlightening, educational and inspirational; sufficient, at least, to allow us the pleasure of welcoming you back to the Kingdom of Thailand.

Dr Suvit Yodmani
Bangkok, Thailand, 2011

Royal Activities
and International Cooperation

Note from the Editor

Compassion is the deep concern shown to less fortunate people through humanitarian acts of selflessness inspired by a desire to tackle poverty and alleviate human suffering. In Thailand, such actions are exemplified by His Majesty King Bhumibol Adulyadej

Thailand's royal institution, which has prevailed for almost eight hundred years, endures under the aegis of the Royal House of Chakri and the stalwart guardianship of His Majesty King Bhumibol Adulyadej.

A significant turning point in the country's recent history occurred in 1932 when a bloodless coup d'etat transformed the Kingdom of Siam – renamed Thailand in 1939 – from an absolute monarchy to a constitutional monarchy, leaving the ruling monarch as a titular head of state.

By chance, constitutional reform presented a unique opportunity for the youthful King Bhumibol to interact closely with the people of Thailand. His Majesty embraced the opportunity with patience and understanding, taking great care not to impede or hinder the business of government. In due course the King earned the love and respect of both the people and government officials.

Subsequent excursions to the remotest parts of the kingdom enabled the Thai monarch to learn firsthand of the plight of marginalised people, particularly ethnic minorities. Desolate villagers, hooked and dependent on the opium trade, were eking out a living on the hillsides of northern Thailand. Indiscriminate slash-and-burn farming methods were turning large tracts of forested land into endless fields of poppies. To the farmers, poppy cultivation was essential to fulfil longstanding trade deals with unscrupulous traders – and to feed the farmers' addiction to opium. Driven by poverty, this appeared to be their only survival option. But opium became both a means of survival and an instrument of destruction for the hill people and their environment.

Confronted by what seemed an impossible task, the King resolved to tackle poverty as the fundamental source of the hill people's hardship and, at the same time, lower their dependence on poppy cultivation. Acting with the farmers' implicit cooperation, and with help from government agencies, His Majesty set out to forge an alternative, sustainable lifestyle that could be adopted by impoverished villagers.

This initiative was the start of a series of royal development projects beginning with the King's Royal Project in the northern hills of Chiang Mai and surrounding provinces. Over time, villagers were given the means to lead an alternative and legitimate livelihood growing fruits and vegetables for personal consumption and sale. It was a project of vital importance; the King's intervention almost certainly prevented a humanitarian and environmental disaster in rural Thailand.

Today, more than four thousand royal development projects, enacted over many years under the principles and spirit of humanitarianism, are well documented, thoroughly understood and greatly appreciated by everyone living in the Kingdom of Thailand. Yet they are less well-known outside the country.

Royal Activities and International Cooperation, released in celebration of His Majesty King Bhumibol Adulyadej's eighty-fourth birthday in 2011, portrays some of the projects inspired and nurtured by Thailand's royal family. By embarking on a journey through the pages of this unique publication, readers may gain a useful insight into the origin of these projects and the way they have impacted the livelihood and lifestyle of many people in Thailand and even in the international arena.

Nowadays, royal development projects are administered by appointed managers and teams determined to uphold the humanitarian principles established and practised by His Majesty from the beginning of his reign. The overriding objective in each undertaking is to improve the quality of life of people so they have enough to meet their needs, with additional opportunities to earn a reasonable income for their families.

Throughout his noble reign, HM King Bhumibol Adulyadej has conscientiously elevated the interests of the Thai nation above personal interests. It is not surprising therefore that the citizens of the Kingdom of Thailand believe their country's most redeeming characteristics are embodied in the altruism, concern and compassion shown over many years by Their Majesties the King and Queen and other members of Thailand's royal family. The monarchy stands as a revered institution whose nationwide respect and admiration has been earned as a result of tireless efforts spent improving the health and well-being of Thai people.

The small sample of royal development projects in this publication, all initiated and nurtured by members of Thailand's royal family, are presented out of heartfelt concern for the less fortunate and with infinite respect for the future of mankind.

Frank W. Skilbeck, Editor
Bangkok, Thailand, 2011

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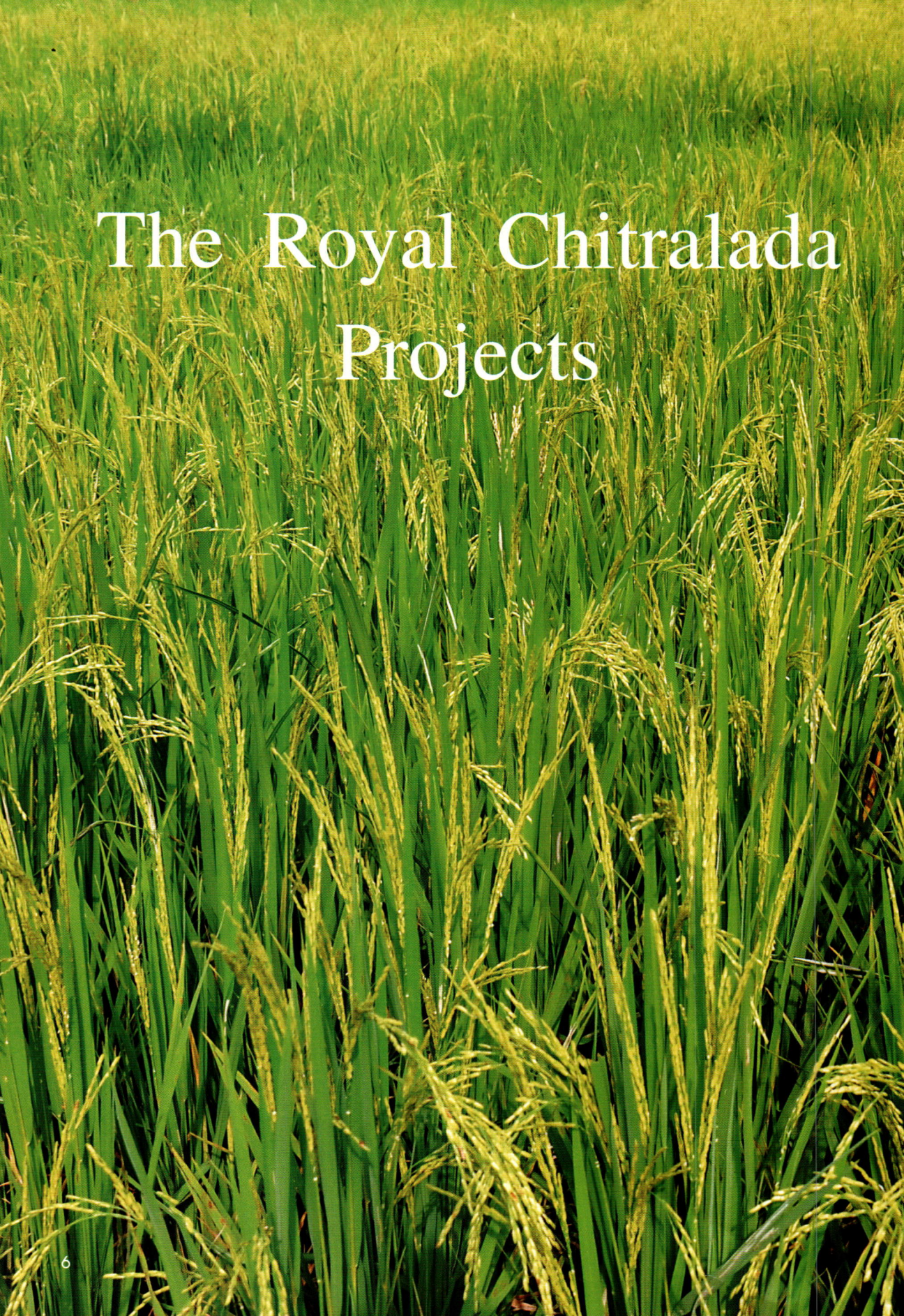
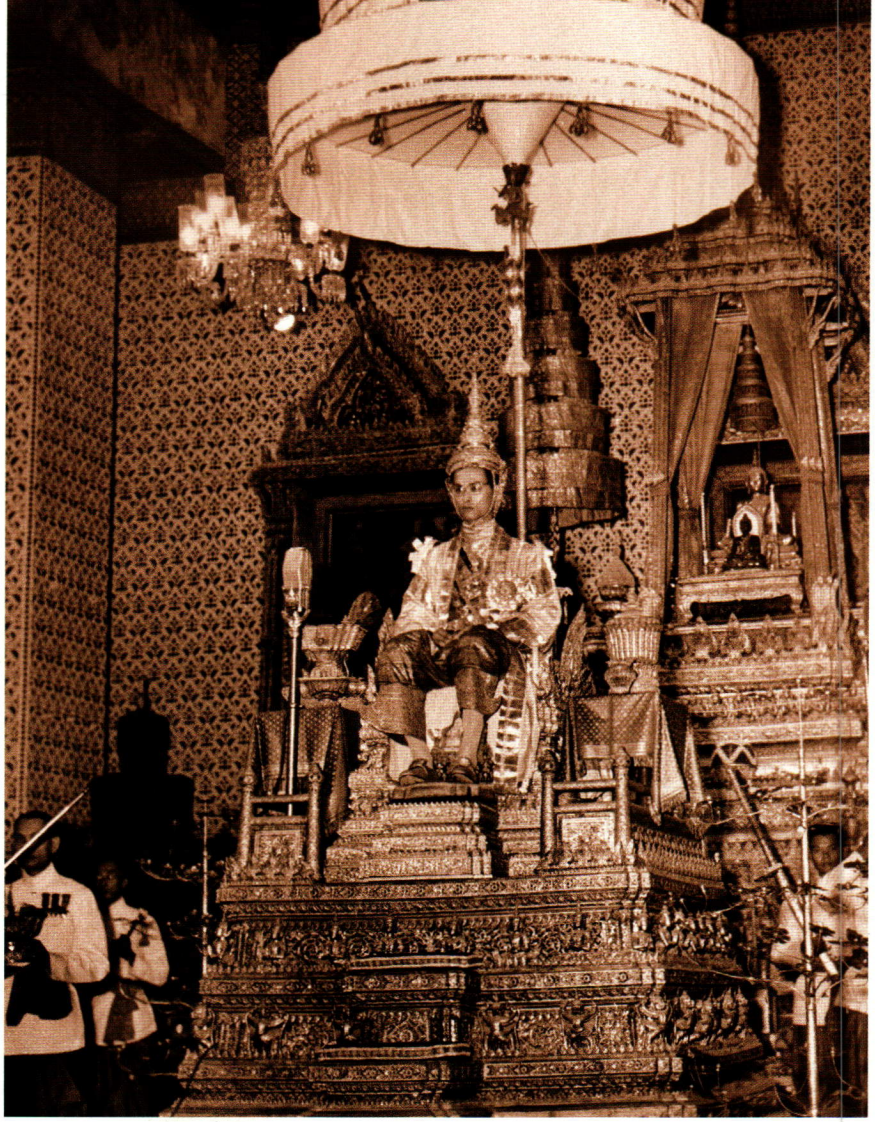


The Royal Chitralada Projects



Experimental rice field at Chitralada Villa in the heart of Bangkok



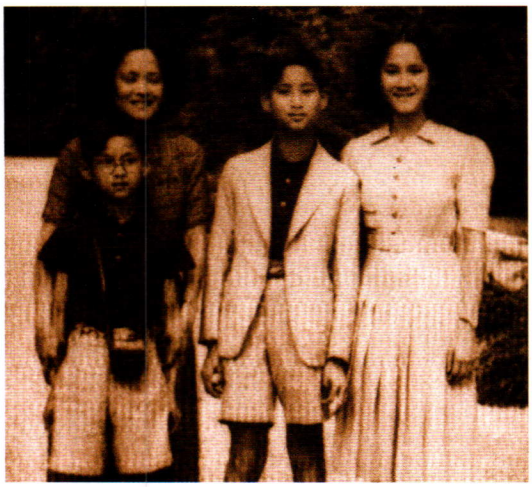
His Majesty King Bhumibol Adulyadej's coronation May 5, 1950

The Royal Chitralada Projects

When nineteen-year-old Prince Bhumibol Adulyadej was involuntarily thrust into kingship in 1946 the world was still reeling from six years of global war that had altered the political and socioeconomic landscape.

In the Kingdom of Siam (Thailand from 1939), citizens were still adjusting to life under a constitutional monarchy and the successor to the throne was engrossed in studies at Switzerland's University of Lausanne. Wisely, the young Prince Bhumibol sought to broaden his scope of study to include law and political science in preparation for future life as a monarch.

His Majesty King Bhumibol Adulyadej (Rama IX) was officially crowned on May 5, 1950 in an auspicious ceremony that took place just one week after his marriage to MR Sirikit who, on Coronation Day, was granted the royal title of Her Majesty Queen Sirikit.



HM King Bhumibol, HRH the Princess Mother, HM King Ananda (Rama VII) and HRH Princess Galyani



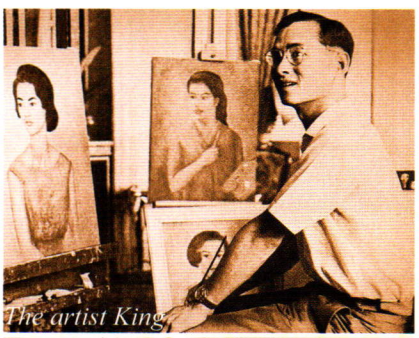


His Majesty as a young sportsman and musician

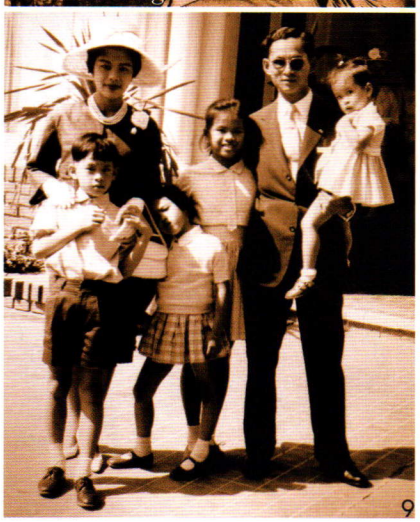
At the time of His Majesty's coronation, the people of Thailand were in no doubt that their emergent King would be suited for high office from their awareness of the young monarch's royal birthright: His father Prince Mahidol of Songkhla was the son of a king (Rama V) as was his father before him (Rama IV); both monarchs held in high esteem for having furthered their country's standing in the world. Moreover, the young King's mother, a generous, thoughtful and practical person born of humble parents and orphaned at the age of nine, had schooled her three children to be caring and charitable individuals much like herself.

Many scholars of Thai history are inclined to agree that the young King carried in his genes the fundamental, humanitarian qualities of compassion and altruism. These enduring characteristics would blend with the young monarch's love for the performing arts, competitive sports and leisure activities, and an intrinsic respect for the environment – qualities inherited from his parents.

In his earlier years, His Majesty King Bhumibol Adulyadej emulated his parents' love for life and thirst for knowledge. He excelled in sporting pursuits such as sailing, waterskiing and badminton; in photography and cinematography (inspired by his mother); in painting whether realism, expressionism or abstractionism, and as a multi-instrumentalist, music composer and arranger. Such diverse art and leisure activities provided a counterweight as the King worked unceasingly for the poor and needy people of Thailand. Today, His Majesty's selfless efforts can be measured in over four thousand royal development projects undertaken for the benefit and happiness of the Thai people.



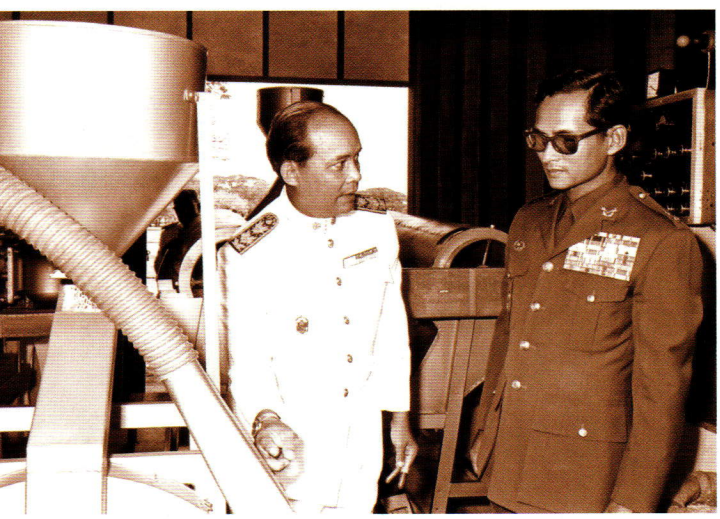
The artist King



A family man

Agricultural experimental plots

Soon after acceding to the throne, and frequently accompanied by HM the Queen, the King made visits to remote parts of Thailand talking and listening to the people – mostly farmers struggling to make a living off the land. These visits marked the beginning of many years of important field trips.



Although quite young and with limited practical experience, His Majesty was astute enough to realise that the people's problems should not be addressed by showering them with money in acts of charity. On the contrary, the King wanted something much more far-reaching and long-lasting. Subsequently, following the humanitarian principles embraced by his parents, the young King Bhumibol resolved to find a way to empower the poor and marginalised people of Thailand to solve their own problems. This

meant equipping them with greater knowledge, combating health problems, teaching appropriate skills and offering employment opportunities. The King was about to embark on a lifelong journey that would help less fortunate people emerge from poverty and become self-reliant.

Starting from 1961, His Majesty gradually transformed an extensive area of palace land at Chitralada Villa (Their Majesties' Bangkok residence) into experimental plots from where the King would seek solutions to a variety of agricultural problems affecting farmers.

Looking back over the past fifty years, great progress has been made studying agriculture, aquaculture, animal husbandry and a whole host of interrelated subjects including, more recently, experiments in alternative energy. It is clear to anyone who goes there that Chitralada Villa is still a vibrant "work in progress" as new projects are added, each one aimed at improving people's livelihood both at home and abroad.



The cheese plant at Chitralada Villa uses equipment presented to the King by the government and people of the Netherlands



Non-commercial and semi-commercial projects

From the very beginning His Majesty has adhered to the principle of making available to members of the public valuable knowledge and experience accumulated from development projects in the grounds of Chitralada Villa. While the projects did not set out to be profit-orientated, they were either non-commercial or semi-commercial by their very nature.

Non-commercial projects initiated by the King are geared towards improving agricultural productivity that can bring about long-term improvements to the livelihood and lifestyle of farmers and help them become self-sufficient while conserving Thailand's natural resources. Such projects receive support and guidance from government agencies and private sector business entities.

Conversely, semi-commercial projects requiring studies and experiments to find suitable methods for processing agricultural products do result in the finished products being sold. In all cases, however, any surplus funds from the sale of products are ploughed into further development.

Profits from the sale of products are invested in future developments





His Majesty and the Crown Prince sowing rice in an experimental field of the Royal Chitralada Projects, July 16, 1961

Rice for food and energy

Rice was one of the first agricultural crops studied at Chitralada Villa to find the best cultivation methods to recommend to farming communities. In preparation, His Majesty requested that different strains of seed be gathered from all over Thailand for testing.

Each May, prior to the rainy season, the best strains are used in the Royal Ploughing Ceremony which is a Brahman ritual originating in the Sukhothai Era (1238-1438) when it was believed the ceremony guaranteed a plentiful harvest. It was discontinued in the early part of the 20th century and revived by His Majesty in 1960 at a time when more than eighty percent of the population worked in Thailand's agricultural sector.





The Royal Ploughing Ceremony takes place each May at Sanam Luang

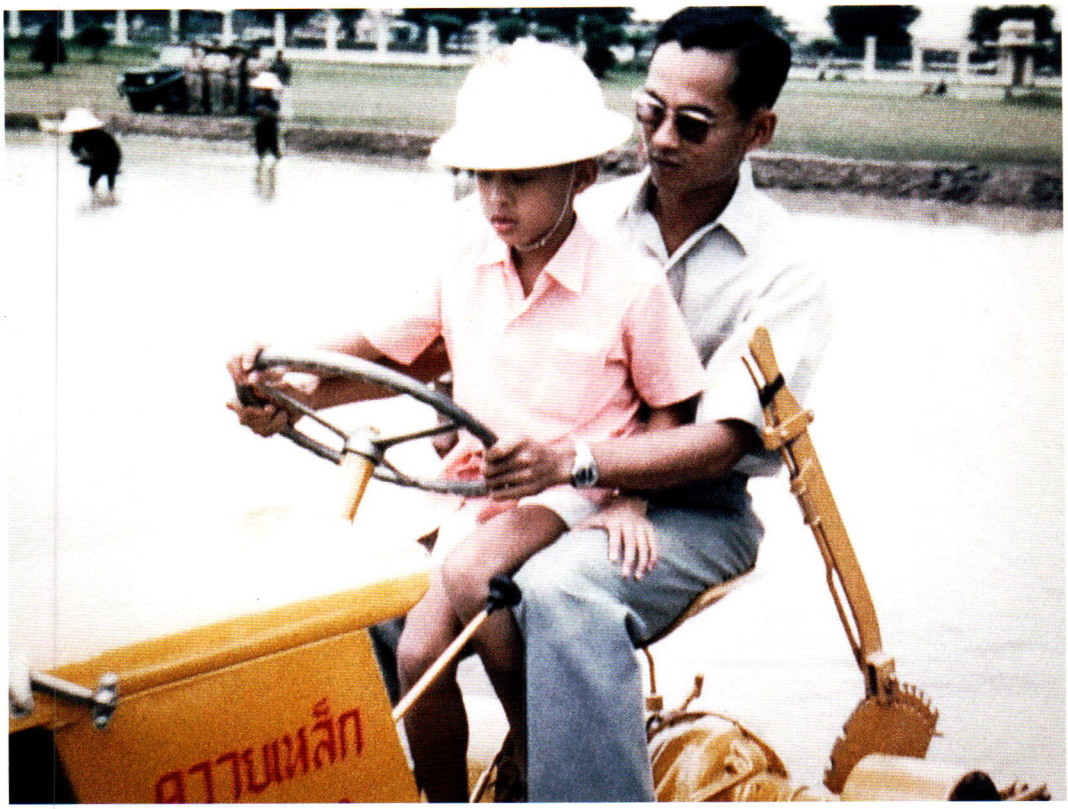
His Majesty normally presides over the Royal Ploughing Ceremony



Even today, with half of Thailand's population still dependent on farming for a living, the Royal Ploughing Ceremony carries great significance nationwide. It not only inspires farming communities to work for an abundant harvest but also reinforces the bond between HM the King, the Royal Thai Government, and the farmers whose efforts help sustain the country.

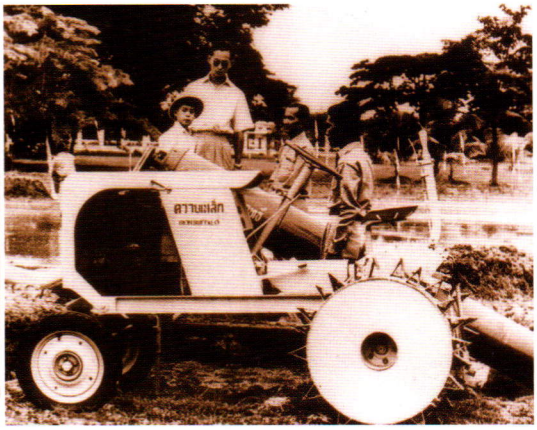
Normally presided over by HM the King, the Royal Ploughing Ceremony takes place at Sanam Luang, a public square in front of Wat Phra Kaew and the Grand Palace in Bangkok. The rice seeds cultivated at Chitralada Villa are brought to Sanam Luang and sown into a furrow ploughed by two oxen hitched to a wooden plough. At the completion of the ceremony farmers will go to great lengths to obtain samples of the rice seeds cultivated at Chitralada Villa which they consider the best seeds available for their own use.

Rice is the country's staple food and Thailand is the world's leading rice-exporting country. Hence, a good harvest ensures



His Majesty and the Crown Prince driving the "iron buffalo" in a demonstration field at Chitralada Villa





sufficient rice for domestic consumption, improves export prospects, and provides adequate reserves for humanitarian aid in countries that encounter natural disasters. In the early part of 2010, for example, Thailand was able to assist earthquake survivors in the Caribbean country of Haiti by donating twenty thousand tonnes of Jasmine rice. In keeping with the King's "waste not, want not", approach to life, a number of methods have been studied over the years to make the best use of rice as a staple food and to exploit any by-products to minimise waste. For example the grinding plant at Chitralada Villa compresses and heats rice husks into briquettes that can be used as



Different strains of rice in experimental fields at Chitralada Villa in the heart of Bangkok

an alternative source of energy in industrial plants and factories.

Doctor Rosarin Smithabhindu, deputy director of the Royal Chitralada Projects who has spent over thirty years at Chitralada Villa spoke about rice production. "We have forty-nine different varieties of rice in the grounds for experimentation purposes. About half of the crop is used as rice seeds for human consumption but another twenty percent, mainly the husks, are compressed into bricks and sold to factories for three baht a kilo."

After a second round of heat-treatment, Dr. Rosarin explained, the husks are further compacted into charcoal for factory use, another energy by-product replacing the need to fell trees for firewood purposes. "As you can see, rice is more than just food – it's also an energy source. Incidentally, His Majesty has a preference for brown rice because of its high quotient of vitamin B."







Rice cultivated for food and energy purposes

Working in conjunction with the Electricity Generating Authority of Thailand, the country's main utility providing electric power, and the Fund for the Promotion of Energy Conservation, another Chitralada project captures heat generated by burning rice husks to produce hot water that is converted through an absorption system into chilled water used to operate the air-conditioning units at the visitors' reception hall in Chitralada Villa. Chilled water is also recycled for the study of cold-climate mushroom culture.







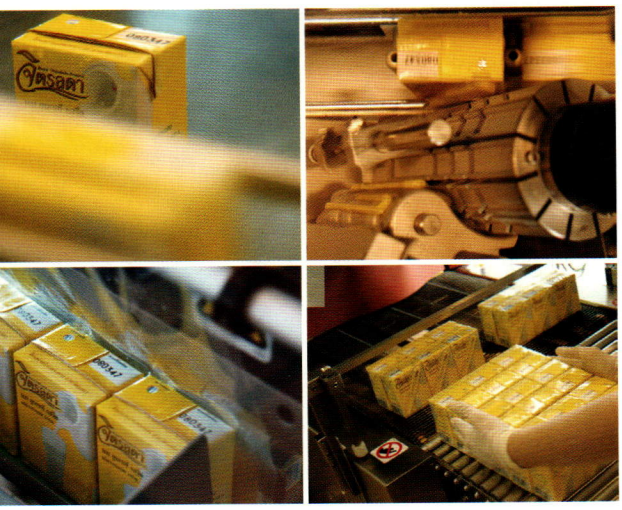


His Majesty and HRH Princess Maha Chakri Sirindhorn inspecting Suan Dusit Milk Powder Plant

Milk and its many by-products

Doctor Rosarin said Chitralada Dairy Farm marked the start of semi-commercial projects after the King was presented with a few head of cattle in 1962. "His Majesty also invested his personal funds and even sold a book he wrote on music to raise additional funding for a dairy herd of around forty cows for demonstration purposes. The herd produced between two hundred and three hundred litres of milk a day."

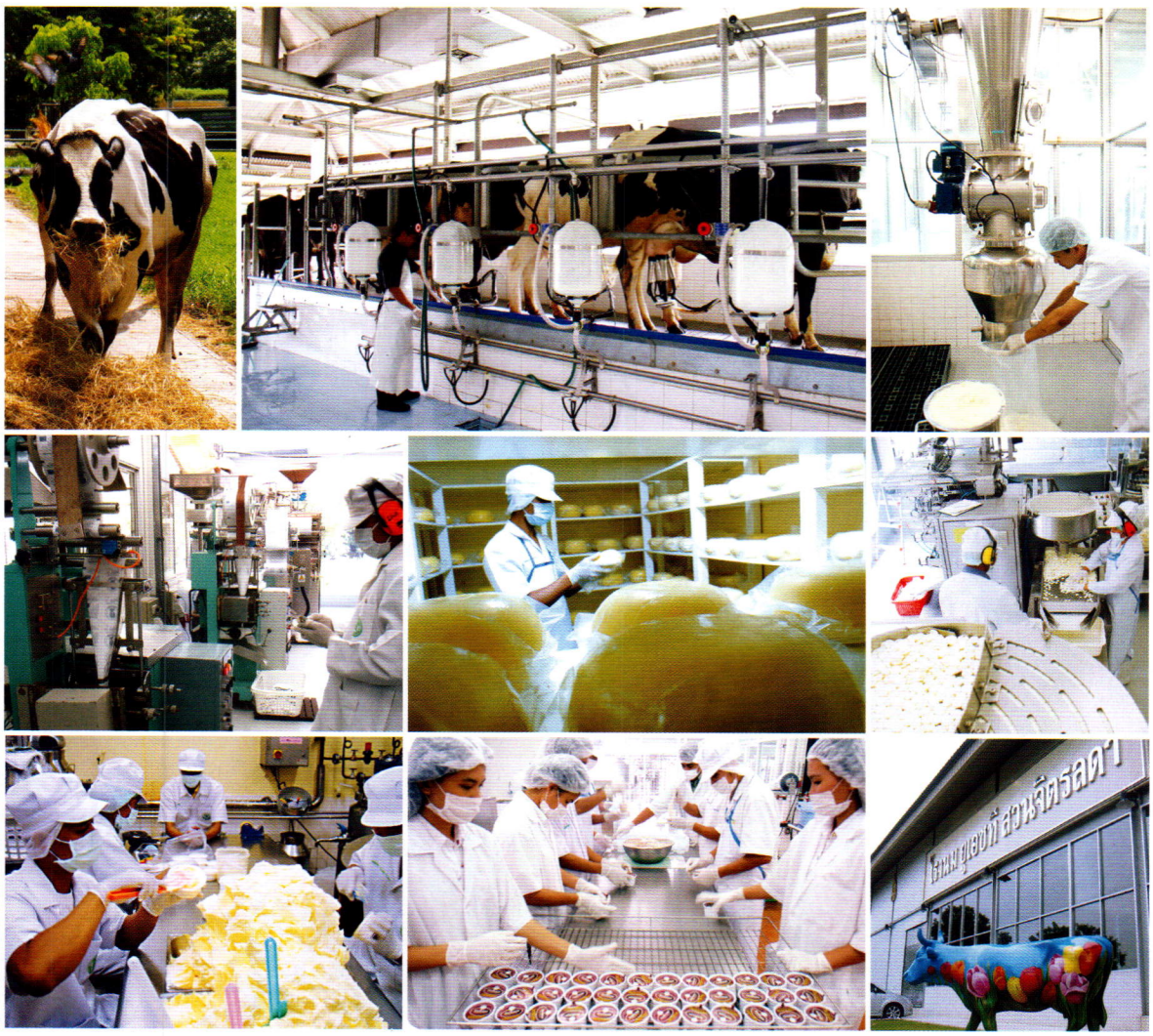
Similar to the rice development project, Dr. Rosarin said His Majesty was concerned that there should be no wastage from milk production. "There were surpluses in the milk market in 1969 and His Majesty asked for studies to turn fresh milk into powdered milk that could be stored for long periods of time." This resulted in Thailand's first milk powder factory, designed and constructed entirely by Thais and given the name "Suan Dusit Milk Powder Plant" by the King.



"That wasn't the end of it," Dr. Rosarin said, "milk tablets were produced from milk powder...any broken tablets were gathered, recycled and given to people's pet animals." Apart from this, the pure condensate obtained through the process of evaporation can be converted for use as distilled water in car batteries.

Coinciding with His Majesty the King's sixtieth birthday in 1987 a cheese plant was established at Chitralada Villa using cheese production equipment presented to the King by the Royal Netherlands Embassy on behalf of the government and people of the Netherlands. Apart from producing "Maha Mongkol Cheese", the name given to the product by HRH Princess Maha Chakri Sirindhorn, the cheese plant turns out ice cream, low-fat drinking yogurt, butter and sweetened condensed milk.

There was another period of milk surpluses in the market at the end of 2002 prompting the Royal Chitralada Projects team to set up a UHT milk plant. "This was to help dairy farmers as well as demonstrate the process of manufacturing from fresh milk because UHT milk can be stored for a long time without refrigeration," Dr. Rosarin explained. Long-life milk is also sold to the general public, and schools that participate in the Royal Thai Government's school milk project.



The cheese plant also produces ice-cream, yogurt, butter and condensed milk





Their Majesties and the Crown Prince nurturing dipterocarp seedlings transplanted at Chitralada Palace



Demonstration forest

His Majesty also decided to introduce a demonstration forest at Chitralada Villa to study tree species after observing a large number of dipterocarp trees being felled for timber during the course of a visit to Klai Kangwol Palace on the Gulf of Thailand. Aware of the need to preserve these giant trees because of their ecological importance to rainforests, the King planted dipterocarp seeds at Klai Kangwol Palace and later had the saplings transferred to Chitralada Villa. Other tree species from different parts of the country were planted along with the original saplings.

When Thailand celebrates HM the King's eighty-fourth birthday anniversary in 2011 this demonstration forest of over one thousand saplings will mark fifty years as a thriving forest with its own localised climate that induces rainfall over Chitralada Villa.

A thriving forest in the midst of Bangkok







River Nile fish raised by His Majesty at Chitralada Villa to provide farmers with a high-quality, low-cost source of protein

Fish farming

Following a visit to Thailand in 1968 by Japan's Emperor Akihito (Crown Prince Akihito at the time) His Majesty found a way to address concerns that poor families – mainly farmers – were not able to enjoy high protein diets. During his stay in Thailand, Emperor Akihito had presented the King with fifty fingerlings of Tilapia nilotica (River Nile fish) which His Majesty raised at Chitralada Villa and subsequently offered to farmers for breeding and consumption. Today Nil fish, the name given by the King, constitutes an important source of good-quality protein. Later on, the Department of Fisheries conducted studies aimed at improving the strain of Nil fish which, after its third phase of improvements, is now regarded as the "Chitralada strain".







HM Queen Fabiola of Belgium was guided by HM the King during a tour of Chitralada Villa

Overseas visitors

From time to time, often due to economic concerns over, say, oil shortages or a fall in the price of sugar cane, the Royal Chitralada Projects team will respond by expanding the scope of its studies and demonstration sites.

The 1970s saw the introduction of an experimental rice mill, a windmill at the nil fish pond, and a rice-husk grinding plant. Concerned about future oil shortages and the prospect of the falling price of sugar cane, His Majesty initiated a self-financed study in 1985 to establish the cost of producing alcohol from sugar cane as an alternative energy source. The Royal Chitralada Projects team used alcohol obtained from agricultural products, or waste, to produce gasohol and diesohol by blending alcohol with gasoline or diesel oil respectively. Subsequently, the high cost of producing diesohol for diesel engines inspired the team to research the production of biodiesel from vegetable oil or animal oil leftovers from commercial use.

Throughout the 1980s work continued with experimental, alternative fuel production schemes, fruit juice and dried fruit production, a drinking water plant, cheese plant and a plant for mushroom culture. In the 1990s a honey production plant was established along with a cannery for fruit juice, a sa paper factory, and a solar energy house and cold water production plant using heat



HRH Princess Maha Chakri Sirindhorn discussing milk products with Their Royal Highnesses Crown Princess Mette-Marit and Crown Prince Haakon of Norway, 2006

generated from rice husks. Since 2001 further work has resulted in the establishment of the Suan Chitralada UHT plant, biodiesel production, a solar-powered water pumping station, and a wind-powered electricity generator.

Visitors to The Royal Chitralada Projects can obtain permission to tour the facilities which can take two to three hours for a cursory study of the entire complex.

In the first nine months of 2010, forty-nine different groups of visitors comprising some one thousand three hundred people from all walks of life received permission to tour the facilities at Chitralada Villa. Visitors included law students, exchange students, graduates and even teachers from universities specialising in agriculture. But there were many overseas visitors made up of diplomats and other personnel from ministries and embassies concerned with agriculture, aquaculture, and forestry management in their own countries who were eager to learn from the work carried out at Chitralada Villa. In some cases, for example in the Kingdom



HM King Mswati III of Swaziland visited the Royal Chitralada Projects, 2006





Each year, scores of international visitors visit the Royal Chitralada Projects

of Lesotho and Lao PDR, similar study centres were set up in their own countries to conduct agricultural experiments along the lines of those carried out by the Royal Chitralada Projects team in Thailand.

Lessons learned from experimental work in the grounds of Chitralada Villa, from studies at six royal development study centres that were established in different locations in Thailand in the late 1970s and early 1980s, and from the many projects enacted by His Majesty and members of the royal family, today continue to play a leading role in bringing improvements to the daily lives of Thailand's less fortunate people.

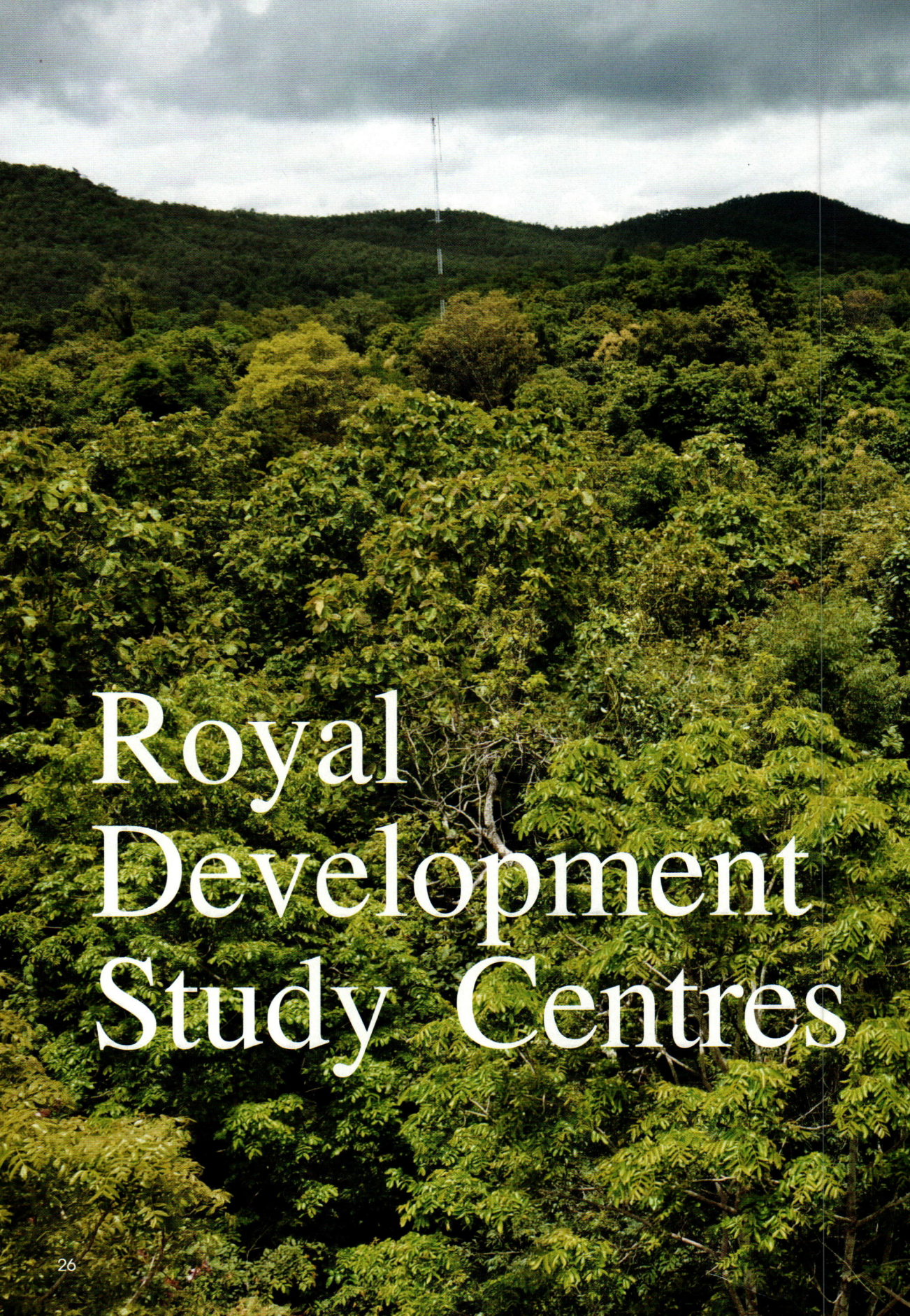




In the cooperative spirit of sharing knowledge and exchanging information with friends around the world, the following Chapters in this publication offer a small sample of royal development projects and other activities that have played an important part in establishing the Kingdom of Thailand's Royal Family alongside others who champion humanitarian causes.



His Majesty the King with HRH Crown Prince Maha Vajiralongkorn



Royal Development Study Centres





His Majesty, often accompanied by HRH Princess Maha Chakri Sirindhorn, relied greatly on field trips to collect firsthand knowledge prior to initiating a new project

Royal Development Study Centres

Throughout the six-decade reign of His Majesty King Bhumibol Adulyadej (Rama IX), the King has dedicated much personal effort accumulating knowledge and committing personal resources to advance the well-being of the people of Thailand, in particular those living in isolated areas. His Majesty's aim, industriously applied over the years, has been to focus on helping people to help themselves to become self-supportive.

More than four thousand royal development projects have been instigated in line with His Majesty's philosophy of self sufficiency by addressing socioeconomic development and through the preservation of natural resources and environmental conservation. It is both poignant and significant that throughout the decades these projects have served to underpin the King's pledge given in the traditional Oath of Accession delivered at His Majesty's coronation on May 5, 1950: *"We shall reign with righteousness for the benefits and happiness of the Siamese people".*



Royal initiatives support self-sufficiency

From the very start of His Majesty's reign, the King advocated a structured approach to collect and record detailed information from documented research, field studies, and during firsthand conversational exchanges with local people, community leaders and on-site government officials prior to turning any royal initiative into a development project. The King always went to great lengths to explain the likely impact on the livelihood of different groups of people before starting any project. This meant that work never began until the people involved were receptive and prepared to embrace change.

In a speech given by His Majesty on July 18, 1974 to graduates of Kasetsart University, an educational institute in Thailand that emphasises agricultural science, the King stressed that *"...Development of the nation must be carried out in stages, starting with the laying of the foundation by ensuring the majority of the people have their basic necessities through the use of economical means and*







Working with interrelated government departments was part of His Majesty's step by step approach

equipment in accordance with theoretical principles. Once a reasonably firm foundation has been laid and in effect, higher levels of economic growth and development should next be promoted..."

Later that year, on the eve of His Majesty's birthday, the King addressed the nation from Dusidalai Throne Hall, Chitralada Villa, Bangkok and spoke of the importance of taking a step-by-step approach to development on the basis of self reliance. *"...no matter what others say – whether they will accuse Thailand of being old-fashioned or obscurantist. So long as we have enough to live on and to live for – and this should be the wish and determination of all of us – without aiming for the apex of prosperity, we shall already be considered as the top in comparison with other countries in the present world..."*



The King listened to villagers and explained the likely impact of projects before they were started



His Majesty's philosophy of a "sufficiency economy" follows a middle-path for co-existence in an increasingly globalized world

The concept of a sufficiency economy

Twenty-five years prior to Thailand experiencing a serious economic downturn in 1996-8 – a contagious episode that had global ramifications – His Majesty had urged Thai people to practise what the King later described as a "sufficiency economy".

The philosophy of a "sufficiency economy", His Majesty made clear in many speeches, is not aimed solely at the poor and needy. It advocates that families, communities and government officials follow a middle-path on how to live and behave in developing and administering the country in order to coexist in an increasingly globalised world. Sufficiency, in this case, means exercising moderation and reasonableness while developing an "immune system" to mitigate the impact of change, both internal and external.

Years later, at a ministerial conference on Alternative Development: Sufficiency Economy, held in Thailand in November 2004, the Office of the Royal Development Projects Board made reference to the royal speeches that advocated self-reliance, stating that *"...by having enough to live and to eat, moderation, reasonableness and self-immunity...the king's royal statement significantly raised consciousness among Thai people to be prudent, to realise steps of development which are academically correct, and to adhere to morals for every conduct of life. These all are known as 'Sufficiency Economy'."*

Step-by-step approach

Adopting and pursuing a structured approach that was both simple and logical became the hallmark of His Majesty's work whenever a new project was initiated.

Tackling public health was His Majesty's first priority because medical services lagged behind public needs, especially in remote areas. A healthy body and mind, the King always maintained, were essential in making a difference to a person's life.

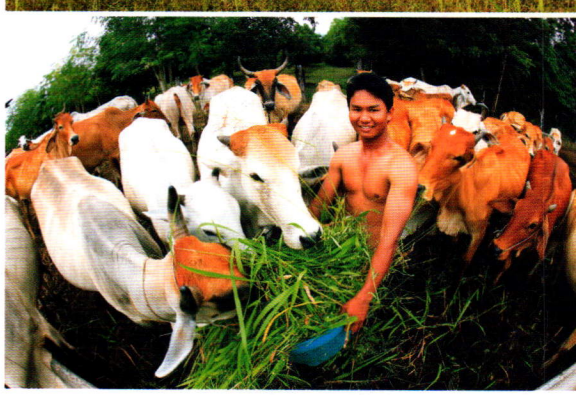
Subsequently, basic public works issues were addressed, principally in aid of the country's farmers who, at the time, constituted the majority of the population. Water sources were identified and developed for farming purposes and domestic consumption. Also, in the early days, paved roads had to be built to help farmers get their produce to markets.

Over the years, royal initiatives have been translated into a wide variety of projects ranging from, for example, the royal rainmaking project to the construction of reservoirs and dams. All royal development projects are conducted in a coordinated manner and in line with His Majesty's humanitarian concern for families and communities through the pursuit of socioeconomic development, the preservation of natural resources, and environmental conservation and protection.

In tandem with the development projects, the King urged government agencies to provide educational opportunities for people living in largely inaccessible rural areas. Meanwhile, His Majesty revived the tradition of awarding the King's Scholarship to allow greater access to higher education overseas for Thailand's brightest students. The King's Scholarship was instigated in 1897 by HM King Chulalongkorn (Rama V) to provide opportunities for students to acquire international skills and knowledge appropriate for the development of the Kingdom of Siam (later Thailand). It was one among many initiatives that spurred the country towards modernisation.









Royal development projects empower people to become self-supportive





Experimental plots at Chitralada Villa studied agriculture and aquaculture

Experiments in agriculture

As long ago as 1952 parts of the grounds of Chitralada Villa in Bangkok, the residential home of Their Majesties the King and Queen of Thailand, were turned into plots to study agriculture and aquaculture. Although small in scale, these experimental plots for growing rice, animal husbandry, and fish farming, served a vital purpose by demonstrating to individuals and communities how to approach farming as an occupation.

From repeated and extensive visits to rural parts of Thailand, His Majesty gained knowledge and built up a comprehensive understanding of the geographical profile and diversity of the land. Armed with this increased knowledge and expertise, the King pressed government agencies that held agriculture-related responsibilities to conduct more experiments on the land – particularly during farming's pre- and post-harvest phases.



Experimental work embraced a wide-range of studies to assess various types of soil, identify appropriate types of plants for cultivation, determine produce quality and market demand, and introduce basic accounting and agribusiness skills to place farmers on a path to self-reliance.

His Majesty was aware that his approach to agricultural development had to be both practical and economical. For example, the King wanted to ensure that farmers made the most of what Mother Nature had to offer to achieve optimal and sustainable benefits. Other, similar initiatives geared towards managing natural resources were also introduced to

encourage farming as an occupation among the majority of people.

As royal development projects grew in number, so too did the benefits. Growth also brought logistical problems: many of the projects were managed by different government departments whose personnel were obliged to travel extensively to keep up with the growing number of project sites being set up around the country. Also, travelling became a costly and time-consuming exercise for people visiting sites to consider their occupational options.

After a while, it became increasingly apparent that the experimental plots in the grounds of Chitralada Villa could not satisfactorily accommodate the growing number of agricultural-related questions arising from different soil conditions in different parts of Thailand. The country's geographical diversity ranges from temperate climates in hilly regions in the north; hot, dry plains that are desert-like in parts of the northeast, and swamplands in the south. To address these various aspects, the country required regional centres to conduct research and experimentation where issues or concerns arising from Thailand's geographical diversity could be addressed in situ. Subsequently, from the late 1970's to the early 1980's six royal development study centres were established in Thailand's four disparate regions: the North, Northeast, Central and South.



Each study centre set out to be a "model of success" where farmers could learn how to become self-supportive





Royal Development Study Centres

Central Region

Khao Hin Son RDSC, Phanom Sarakham District, Chachoengsao Province

Huai Sai RDSC, Cha-am District, Phetchaburi Province

Kung Krabaen Bay RDSC, Tha Mai District, Chanthaburi Province

North-eastern Region

Phupan RDSC, Muang District, Sakon Nakhon Province

Northern Region

Huai Hong Khrai RDSC, Doi Saket District, Chiang Mai Province

Southern Region

Pikun Thong RDSC, Muang District, Narathiwat Province



Phupan RDSC, Muang District, Sakon Nakhon Province



Objectives of the Royal Development Study Centres

It was a fundamental part of His Majesty the King's vision that each of the royal development study centres (RDSCs) when established would become a "model of success" where farmers, and other members of the public who were interested, could learn, through example and guidance, how to become self-reliant in a sustainable way. To ensure conformity and continuity nationwide, each RDSC applied five fundamental criteria:



- Conducting studies, research and experiments to determine guidelines and development methods suited to the different land conditions of each area or region. This is the prototype or, as the King called it, a "model of success" for people in other areas to follow;
- Facilitating an exchange of information among academics, development workers and the public by compiling successful outcomes from studies, research and experiments and integrating technical knowledge with practical theories. This creates a source of knowledge to pass on to the general public. Each centre is also a venue for officials to study and conduct

work experiments and, simultaneously, promote an exchange of experience and understanding. It is also a focal point for drawing-up guidelines for problem-solving among the three groups most involved: academics, development promotion officials, and the public;

- Carrying out integrated development activities, serving as a model and good example of development work suited to different areas, by emphasising the optimum use of resources. The development strategy focuses on using as many fields of knowledge as possible because one field supports and complements the development of other fields. This represents a systematic integration of knowledge, operating techniques and management;
- Facilitating coordination within the government sector on project planning and management in various government agencies and departments to provide optimum benefits. Each RDSC stresses the importance of interdepartmental management within the civil service;
- Functioning as a one-stop service facility that gathers results of studies, experiments and demonstrations that have proven to be successful whether in the fields of agriculture, water resources, livestock, fisheries or social and occupational development presented in the form of a "living natural museum". Interested parties can see everything in one place and, at their convenience, assimilate knowledge that will enable them to carry out development work to maximise benefits.









Royal development study centres are one-stop service facilities

Locations and topographical features of the RDSCs

Following His Majesty's proposals, six RDSCs were formed from 1979 through to 1983. In practice, the implementation of royal development projects always take into account the topographical and sociological conditions relative to each local area, all of which differ in various aspects. In the course of serving as focal points for studies, research and agricultural experiments to establish development guidelines for each area, the RDSCs also take into account the occupations and lifestyle of local people.

Study centre locations were normally chosen after inspection by the King





Outlining the various sites chosen as royal development study centres, the secretary general of the Chaipattana Foundation, Dr. Sumet Tantivejkul, said the centre at Khao Hin Son in Chachoengsao Province, to give an example, got started in 1979 when His Majesty the King made a visit there.

"The local people wanted to give His Majesty a plot of land. At that time they wanted the King to build a summer palace in the province hoping he would spend more time there."

Doctor Sumet, who also serves as senior advisor to the Office of the Royal Development Project Board, said His Majesty inspected

the land and found it to be sandy and barren and probably unsuitable for crop cultivation.

"His Majesty said he was grateful for the offer but to build a royal residence there would not be in the best interests of local people. The King asked the donor if he would mind if a study centre was created on the land instead. The man said he would be pleased just to see it put to good use."

Subsequently, His Majesty asked officials of Phanom Sarakham District and government agencies involved to use the land to establish an agricultural and vocational study centre which the King named Khao Hin Son Royal Development Study Centre in 1980.

Doctor Sumet said the King's prime concern was not for himself but for the people, "...yet, in a way, the residents got their wish because the King already had a small residence in the area and, it wasn't long before His Majesty made further visits to ask for more land to enlarge the study centre for the benefit of local people."



His Majesty's main concern was to ensure donated land was used to benefit the people

Khao Hin Son RDSC, Phanom Sarakham District, Chachoengsao Province





Khao Hin Son, the first royal development study centre, was once plagued by serious deforestation

Khao Hin Son RDSC

Khao Hin Son Royal Development Study Centre, the first RDSC, was considered an appropriate location for a study centre because the area was once plagued with illegal logging that led to serious deforestation. The soil had deteriorated to such an extent that cassava was the only arable crop farmers could grow. Subsequent erosion of surface soil encouraged the centre to conduct development-related studies, gather research and carry out experiments to help restore the environmental balance of nature and encourage soil rehabilitation. Afterwards, suitable crops were identified for cultivation to improve the earning potential of farmers.





The centre's role has been to progressively disseminate knowledge concerning agricultural development; to serve as a centre for technology transfer on occupational development for farmers, and to act as a training centre for farmers concerning agricultural technology and handicraft skills. The training covers a wide spectrum of activities including land development, agricultural education, agricultural extension, forestry, livestock development, fisheries management, community



Development work has improved the livelihood of farmers and increased the value of their land



Khao Hin Son is a successful training centre teaching agricultural technology and handicraft skills







development and cooperative promotion.

Over a period of time, development work carried out at Khao Hin Son brought forth a significant increase in crop productivity, which not only translated into improved financial returns for farmers, but also stimulated land prices. Land values increased such that farmers and villagers were less willing to sell their land, preferring instead to recognise its potential for improving their livelihood.

In an address given by His Majesty the King from Sam Chao Pavilion, Khao Hin Son, on April 23, 1997, commenting upon the improved livelihood of villagers and farmers, the King announced, *"...Many parties have been working together in close cooperation in the development of Khao Hin Son. Through this collective effort, consistently sustained over a period of fifteen years, the Khao Hin Son Royal Development Study Centre has become a practical demonstration model from which farmers are able to observe, learn and gain knowledge. Perseverance is an important quality. Through perseverance, results are achieved, which, in turn, leads to a better and more comfortable existence for the people. Nothing brings me greater peace and joy than to know that the people are leading better lives".*











Demonstration site at Huai Sai RDSC showing how vetiver grass penetrates hardpan soil

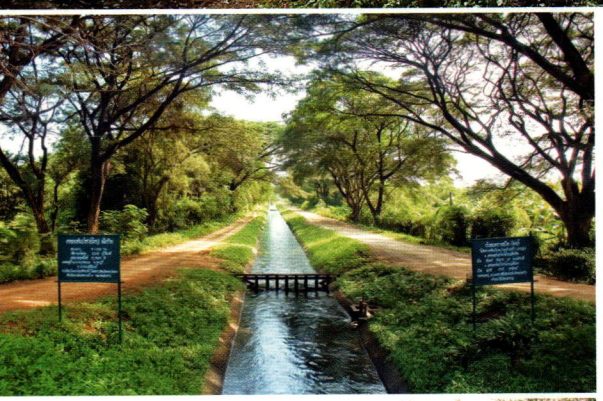
Huai Sai RDSC



The study centre is located in Thailand's lower central region in the district of Cha-am, Phetchaburi Province on the west coast of the Gulf of Thailand.

Sandy soil, resulting from inappropriate farming techniques and an overzealous use of pesticides in a once richly forested area, made soil rehabilitation an imperative. Over a period of forty years, the forest had become so seriously degraded that rainfall became unseasonal. Soil fertility declined upsetting the balance of nature and, in turn, denuding the ground of topsoil. Further damage was done by the repetitive cultivation of pineapples by the local populace; pineapple is a fruit that extracts many nutrients from the soil.







This land, at one time described by His Majesty as "desert-like", was transformed into an area rich in crops

Speaking in 1983 about the problems associated with Cha-am District, His Majesty the King concluded *"...This and the nearby areas used to be very fertile. There was plenty of water in the waterfall and water courses all year round. However, the degradation of forest causes the dry spells and unpredictable rainfall patterns. It can be predicted that the place may eventually become a desert".*

The objective of Huai Sai RDSC, which was established in April 1983 and covers an area of approximately two thousand five hundred hectares, was to act as the centre of development of forestry for multipurpose use. Farmers in the area were encouraged to participate in reforestation efforts and conservation. Wet fire-breaks were created and water sources developed to provide moisture to the area, which then became the subject of studies to determine the best approach for agricultural development. Farmers involved in the reforestation and agricultural processes have since enjoyed increased incomes and all-round benefits both from the forest and from various soil improvement activities.



The study centre works with government agencies to ensure a coordinated approach towards community development

Huai Sai RDSC carries out its work in tandem with government entities to ensure everyone proceeds in a coordinated manner to achieve maximum effectiveness in terms of water resources and soil development, forestry development, community development, quality of life and environmental development. Results are collated and disseminated to interested parties, including neighbouring countries in a spirit of cooperation. Today, communities in the area of the Huai Sai RDSC enjoy self-sufficiency.

A demonstration site set aside at Huai Sai provides a graphic illustration to farmers and other visitors of the beneficial effects of using vetiver grass – sometimes referred to as miracle grass – to penetrate hardpan soil as well as using it to encircle ponds and streams to conserve water. Visitors to the centre can inspect the basic hand drills and mallets used to crack the caked surface which













Rehabilitated soil and lakes in Huai Sai and surrounding areas has given farmers a future in agriculture, aquaculture and animal husbandry

resembles concrete. This is followed by drilling hardpan soil to a depth of ten centimetres or so and then packing the holes with compost and fertiliser to take the vetiver plants. The drilled holes are set some fifteen centimetres apart and "fed" with piped water and air to oxygenate the subsoil. Over time, it has been possible to reconstitute the soil in the area and prevent it from returning to desert-like conditions. Strategically placed check dams ensure water is conserved for as long as possible giving more time to penetrate the soil and provide moisture for surrounding areas. After repeating the process for some years, hard and compacted soil in the Hua Sai area has been rehabilitated as forested land. Today, one section of reconstituted land at Huai Sai boasts a thriving herbal garden with fifty different varieties of herbs.



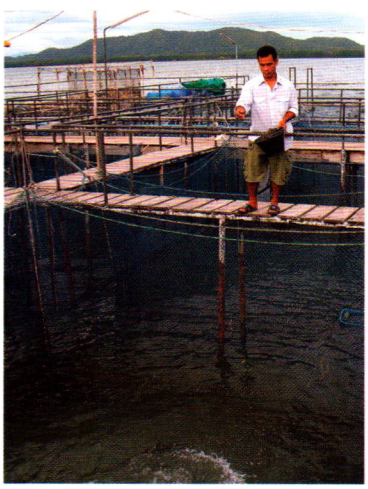






Monetary gifts donated to His Majesty were used as a start-up fund for Kung Krabaen Bay RDSC in 1981

Kung Krabaen Bay RDSC



Also in the central region of Thailand, Kung Krabaen Bay RDSC can be found in Tha Mai District of the eastern province of Chanthaburi.

During a visit to the province in December 1981 to dedicate the King Taksin Monument, His Majesty asked the provincial governor to "please consider locating a degraded forest in a national preserve to be the site of a development study centre, like that at Khao Hin Son, where coastal development can be studied." The King decided that monetary gifts that people had donated to him during his visit should be used as part of the start-up fund for the centre.

Destruction to coastal mangrove forests had resulted in depleted fish stocks





His Majesty initiated the centre in December 1981 after many visits to the area listening to and learning from local people about the problems they faced. Of major concern was the coastal strip that suffered from large-scale destruction of mangrove forests, a decline in coastal fish stocks, and saline water intrusion into agricultural land. Mangroves had suffered so much destruction it was difficult for local people to continue making a living in the fisheries industry.

The centre, whose focus inclines towards environmental conservation, made a study of the problem and explored the potential for rehabilitating and managing coastal resources. Demonstrations aimed at restoring coastal fishery were held in line with the introduction of integrated agriculture to maintain an ecological balance, higher productivity, and long-term self-development.



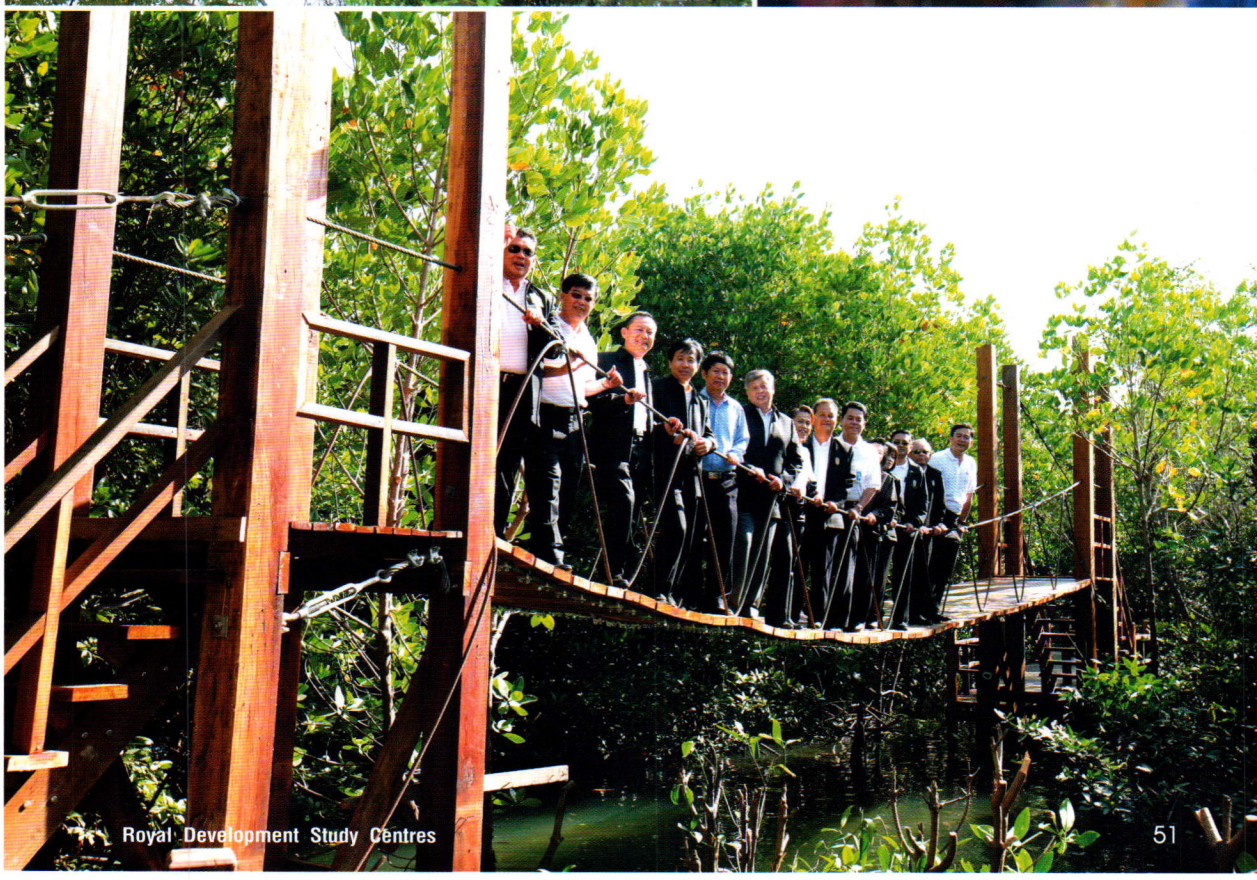
Regaining and maintaining an ecological balance led to higher productivity and a reconstitution of coastal fish stocks













The region once suffered from substandard soil conditions caused by indiscriminate deforestation







Phupan RDSC

The Phupan Royal Development Study Centre was established in November 1982 with the Royal Irrigation Department as the administrative body. The centre is in Thailand's north-eastern region in the province of Sakon Nakhon, a farming area that suffered from substandard soil conditions.

The list of problems encountered there included insufficient sources of natural water; indiscriminate clearing of forested land for farming which,



Phupan RDSC helped restore the ecological balance of the area enabling farmers to cultivate cash crops



over time, destroyed the ecological balance of the area, and concerns about local people who lacked occupational know-how. This cluster of interlinked problems was addressed by Phupan RDSC, beginning by studying and developing suitable agricultural models for farmers to emulate. Forests were reconstituted through irrigation and then cash crops introduced to drive up farmers' incomes.

Today, integrated experiments give farmers the opportunity to increase their incomes from field crops other than rice by cultivating, for example, hybrid baby corn that can be grown concurrently with cassava. Also, silk worms can be raised in people's back gardens. Today, cottage industries and animal husbandry offer farmers more than just rice as a means of earning a living.





Cottage industries and animal husbandry offer farmers more than just rice as a means of earning a living















Phupan RDSC, north-east Thailand



Huai Hong Khrai RDSC was established to combat drought and forest fires inspired by large scale forest poaching in the Pa Khun Mae Kuang National Park

Huai Hong Khrai RDSC

Located in Thailand's northern region in Doi Saket District in Chiang Mai Province, Huai Hong Khrai RDSC was established in 1982 under His Majesty the King's initiative and driven largely as a result of droughts and forest fires caused by extensive forest poaching. The centre is in the Pa Khun Mae Kuang National Park, a mountainous and forested region heavily degraded in the central and southern portions where the study centre is located.















The study centre worked to make farmers self-supportive without destroying their natural surroundings

Studies at the centre encompass watershed development as an appropriate model with forested areas designated for planting triple-type, triple-use forests made up of commercially valuable trees, fruit trees, and general use trees, all of which, if found to be in short supply, can be replaced without difficulty.

Water supplies come from three sources: from hill irrigation systems, rainfall, and from water collected in small check dams built to preserve moisture in the area. Other studies have examined agro-forestry development, watershed sources, forest ecology, wet firebreaks, the breeding of wild animals in watershed source forests, soil development, conservation management, as well as studying different aspects of







Research examined livestock breeding, dairy cattle, poultry and industrial agriculture





agricultural development. Further research examined livestock breeding, dairy cattle, poultry, and industrial agriculture.

The centre experimented with a phased development pattern to make farmers self-supportive without destroying their natural surroundings.

Since the 1980s Huai Hong Khrai RDSC has received a steady stream of high profile visitors including members of foreign royal families, presidents and prime ministers. As far back as 1987, HE Sir Ninian Stephen, the twentieth Governor-General of Australia paid a visit to the centre. Two years later, Sir Ninian became Australia's first Ambassador for the Environment.

Other visitors in the 1980s and 1990s included Britain's heir to the throne HRH the Prince of Wales, the King and Queen of Malaysia, Emperor Akihito of Japan and the prime ministers of Lao PDR, India and Cambodia.

Since the start of the new millennium, further visits have been made by the King of Buganda, King Letsie III of Lesotho, the President of Singapore, and the Crown Prince of Tonga who visited the centre in 2010.

Once inundated with stagnant water, this peatland became acidic when drained and unsuitable for cultivation; a problem addressed by Pikun Thong RDSC

Pikun Thong RDSC

In 1981 when Their Majesties the King and Queen and Their Royal Highnesses Princess Maha Chakri Sirindhorn and Princess Chulabhorn stayed at Daksin Palace in Narathiwat Province, they visited several localities where land was inundated with stagnant water. This was a year-round phenomenon affecting a little under forty-two thousand hectares of peatland that became acidic when drained making it unsuitable for cultivation.



His Majesty suggested to the provincial governor that there ought to be a development study centre in this southern province to study the problems associated with peat soil and make recommendations to benefit the local people. Consequently, Pikun Thong Royal Development Study Centre was established in January 1982 to find a means to render acidic peat soil suitable for cultivation.





His Majesty advocated "klaeng din" (teasing the soil) to flush out acidity through repeated bouts of flooding, draining and drying and suggested planting rice to test the soil's arability

The King had spoken on several occasions about *klaeng din* (in English, tricking or teasing the soil), an idea to flush out acidity through a repetitive programme of flooding, draining and drying of plots of soil over an extended period. "…Conduct experiments as to make the soil extremely acidic by draining the water out and letting it dry, and study the ways to improve acidic soil and bring the results of the study to help the people in Narathiwat who face the problem of acidic soil by setting up a two-year experimental project; the plant to be experimented on should be rice. As for the 'aggravating the soil' project that I have been talking about for some years, it is quite effective here."

Pikun Thong RDSC took charge of the "Klaeng Din" project and studied the naturally-occurring process of acidification caused by deeply-layered pyrite in peat swamps that released sulphuric acid when exposed to oxygen. Alternately, plots of soil were repeatedly dried and flooded to accelerate the reaction of pyrite, to the point where the soil became extremely acidic and crops could not be grown productively. The next step, based on His Majesty's idea, was to search for countermeasures to reduce acidity.









Doctor Sumet Tantivejkul said His Majesty's original idea in addressing this particular problem was to increase the acidity of the soil…make it worse…then find out how to make it better. "His Majesty compared it to the cleaning cycle of a washing machine which first agitates, then repeatedly cleans and flushes clothes with clean water…but in this case the cycle is repeated over a couple of years to deacidify soil to make it suitable for cultivation."

Specific projects undertaken at Pikun Thong RDSC have included developing acidic soils, using fresh water blended with lime dust to deacidify the soil, and testing the viability of fish culture in formerly acidic water that became brackish.

One aim was to rejuvenate the land to cultivate para rubber and palm oil into a fully-integrated cottage industry. Another innovation was to promote animal husbandry, especially with animals that could adapt to watery conditions such as poultry, goats, sheep and cattle. Success rested on management techniques: knowing what was possible within prevailing conditions and then managing to achieve that end. Concurrently, local people were encouraged to participate in conservation efforts to maintain a balanced ecological system to ensure lasting fertility which is essential for self-supportive farming.

The study centre aimed to rejuvenate the land to cultivate para rubber and palm oil into a fully-integrated cottage industry




















Another innovation was to promote animal husbandry, particularly poultry, goats, sheep and cattle able to adapt to watery conditions



All royal development projects follow His Majesty's philosophy advocating a Sufficiency Economy

Operating philosophy of the RDSCs

The royal development projects are based on His Majesty's Sufficiency Economy philosophy. Each of the six royal development study centres adheres to that principle in every step of their operation starting from an integrated management that brings together officials from interrelated government agencies to plan and work in a collective manner. The goal of each centre is to extend the benefits obtained from studies, research and experimentation for greater public use based initially on the concept of "sufficiency" and "moderation", while recognising an individual's abilities. As a result, cost-effectiveness is at the core of the management approach at all six RDSCs, which explains their compact size.

Additionally, His Majesty recommended using simple and appropriate technology among local farmers in conjunction with "local wisdom". Instead of adopting complicated, state-of-the-art technology, the King preferred they turn to natural resources or raw materials closer to home and practise "moderation" to make the most of the resources for long-term benefits. As an example, many soil erosion problems can be addressed, relatively easily, by using vetiver grass to conserve soil and water thereby supporting natural reforestation along with other basic approaches. This form of solution is long-term and constitutes a commonsense approach that contributes to the survival of families and communities with the minimum of help from imported technology – better still, by sidestepping it entirely.

Adopting a three-phase approach

Each of the six RDSCs employed a three-phase approach in conducting their respective operations.

The first phase, in the early days, was devoted to establishing vital infrastructure such as reservoirs, roads, electricity supplies and office buildings needed for the experiments in the second phase when efforts turned to studies and research by different teams of designated government officials who could coordinate well with one another. Farmers domiciled in the vicinity of centres were also employed during this second phase.



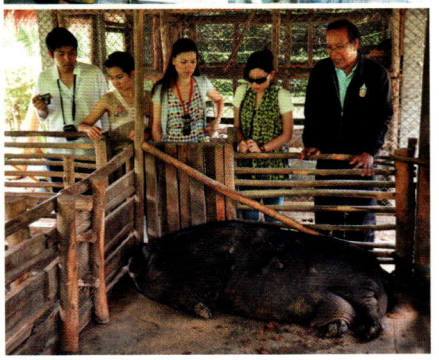
During visits to Royal Development Study Centres, His Majesty was often accompanied by HRH Princess Maha Chakri Sirindhorn

The third phase took place in 1987 built on results from the earlier phases. At this juncture, farmers were encouraged to put into daily practice the lessons learned after conducting successful studies and experiments at the aptly described "living natural museums". After learning from the centres, farmers became "model farmers" or "models of success" for others to follow in different parts of the country as foreseen by the King.

Farmers visiting a centre are able to observe other activities including animal husbandry, fishery, water management, handicrafts and food-processing. In effect, centres functioned as a one-stop service facility. In addition to farmers, anyone with an interest could visit a centre, select a topic of interest, assimilate the associated knowledge, or know-how, and apply it according to their own livelihood, resources (land, capital and labour) and the geographical variances.







Personnel at the royal development study centres not only offered farmers training and advice but also encouraged them to keep abreast of agricultural developments

Learning new farming techniques

Not surprisingly perhaps, people living close to the centres were among the first to benefit because many were employed at centres during the early stages of development. As "hired" farmers, for example, they learnt how to redevelop, cultivate and maintain land – farming techniques they could readily apply in conducting their own agricultural activities. Inevitably, results from successful experiments filtered through to neighbouring villages (the RDSCs primary targets) along with support in ways that complemented individual social and cultural conditions.

While farmers took stock of the advice given by the centres' personnel, who visited them regularly, they were also invited to make return visits to a centre. This gave personnel an opportunity to keep a check on progress and encourage farmers to enrol in a wider range of training courses including soil improvement, plant cultivation and propagation, dairy and poultry farming, integrated agriculture, the New Theory[1], fishery, organic plantations, handicrafts, herb processing techniques, mushroom farming, value-added processed vegetables, and forest conservation.





Training courses on His Majesty's New Theory assists farmers make the best use of their land through better management techniques

New Theory[1]

His Majesty the King's New Theory advocates dividing a farmer's land in the ratio 30:30:30:10 such that thirty percent forms a reservoir to provide year-round water; thirty percent is set aside for agricultural land, probably paddy rice; thirty percent is used for field crops or fruit trees, and the remaining ten percent is for residential purposes, roads, dykes, drainage, as well as for family gardening and animal husbandry.

This was the first step covering smallholdings which allowed farmers to be self-sufficient while creating unity and fostering harmony within their communities. The second step was to encourage farmers to form cooperatives that extended to marketing their (surplus) products, and provide welfare, education and social activities with help from government departments and foundations. The third step broadened the scale of work so that communities were able to secure funding from banks to establish and operate a community mill; set up a cooperative store, source investment capital for expansion purposes and develop a better standard of living for families.



Training courses at the centres, which ran for up to thirty days depending on course content for the chosen subject, were open to anyone expressing an interest. People, who joined training courses on the environment and learnt how to optimise the use of natural resources,

found the training both educational and entertaining. Most importantly, they were able to learn how to become self-sufficient and live in harmony with nature which, in turn, led to sustainable development. As efforts in villages surrounding the centres began to bear fruit (literally), the villages became developmental role models that could be studied and emulated by farmers from more distant areas, in effect building upon the centres' successful results.

As envisaged by His Majesty the King, the six royal development study centres were geographically representative of each region, but each had its own minute details with specific features requiring further study. Consequently, "centre branches" were established to study individual aspects whose outcomes could be adopted by farmers.

From the inception of the RDSCs, up to their evolvement as "living natural museums", and through active promotion, visitors to the centres have grown in number with more than one hundred delegations comprising some one hundred thousand people made up of farmers, community leaders, student leaders and civil servants (both at the operational and management levels) undertaking training courses, or merely making an annual visit to one or more of the centres.

Regarded as "living natural museums" study centres have been visited by tens of thousands of people including farmers, student leaders and civil servants





Lao PDR's president, HE Mr. Kaisone Phomvihan took an interest in Thailand's RDSCs which led to the establishment of Huai Sonn and Huai Soie Agricultural Development and Service Centre in Vientiane

Domestic and international cooperation

Although most visitors to the centres are local people from different parts of Thailand, foreign visitors do figure prominently, in particular guests of Thailand's royal family. Some are national leaders, for example HE Mr. Kaisone Phomvihan, the president of Lao PDR, who sought and received royal approval from His Majesty the King to have similar initiatives established in his own country. This took place after numerous visits had been made to study centres in Thailand.

Cooperation led to the establishment in 1993 of Huai Sonn and Huai Soie Agricultural Development and Service Centre in Vientiane. The location was chosen because of the geographical similarities between north-eastern Thailand and Vientiane. Akin to Phupan RDSC in Thailand's Sakon Nakhon Province, the Laotian centre offers agricultural demonstrations and services but does not conduct its own studies and research. The centre's demonstration and experimental plots include rice, fruit orchards, integrated agriculture, animal husbandry and fishery. The Vientiane Agricultural Development Centre made it possible for Laotians to observe and receive training relevant to their livelihood. Up till now, it has proved to be a huge success in the Lao People's Democratic Republic.





His Majesty's vision of self-sufficiency has developed in a sustainable manner to preserve our fragile resources and protect the environment

Sufficiency Economy philosophy

Increasingly widely recognised, the Sufficiency Economy model attracted the attention of a number of countries that decided to adopt it for their own use. Indeed the Sufficiency Economy philosophy has proven to be effective particularly during demanding times such as 1996-8 when much of the world, including Thailand, was in the grip of a major economic crisis. The Sufficiency Economy model was widely adopted at the time not only by people in the agricultural sector but also by small, medium, and large corporations. To their surprise (and delight) agro-industrialists found they could adopt the Sufficiency Economy model in their private lives as well as using it for pilot projects before expanding on a larger scale.

By establishing the six royal development study centres in Thailand, His Majesty turned his Sufficiency Economy philosophy into something tangible. As a result, the centres welcome an endless influx of visitors from all walks of life. Many are world leaders, some are academics, others trainees attending courses at the Asian Institute of Technology (AIT), plus foreign dignitaries and students.

Typically, visitors receive an overview of the royal development projects and a lecture on His Majesty's approach to project development before proceeding to areas of specific interest. But it is always the royal development study centres that capture the interest of each delegation as study centre records testify.

Overseas visitors to Thailand's RDSCs

As already implied, visitors to the royal development study centres have not been solely from neighbouring countries. As far back as the 1980s visitors from Europe made a point of visiting the centres including European heads of state such as HM the King of Sweden and HM the King of Spain.

A twenty-four-member delegation from Lao PDR, Cambodia, Vietnam, Myanmar, southern China (Yunnan Province) and Thailand made a study tour of Huai Hong Khrai RDSC in Thailand's northern province of Chiang Mai in 2005. Their main interest was in restoring watershed forests but the delegation also visited "model farmers'" plots.

A year later, twenty-five government officials representing regions in Africa, South Asia and Southeast Asia took part in a three-day study tour of three RDSCs: Khao Hin Son in Chachoengsao Province, Kung Krabaen Bay and Huai Sai in Chanthaburi and Phetchaburi provinces respectively. Another group of twenty-five mid-level officials from international cooperation agencies in fourteen African countries and eleven Middle East countries followed up with a visit to Kung Krabaen Bay RDSC.



HM King Letsié III of Lesotho and HM Queen Masenate Mohato Seeiso visited Huai Hong Khrai RDSC in Chiang Mai

Royal development study centres drew a great deal of attention at the time celebrations took place for the sixtieth anniversary of His Majesty the King's accession to the throne in 2006. For example, after expressing interest in His Majesty's Sufficiency Economy philosophy, arrangements were made for Their Majesties King Letsié III and Queen Masenate Mohato Seeiso of the Kingdom of Lesotho to pay a visit to Huai Hong Khrai RDSC in Chiang Mai. The King of Lesotho was so impressed with the work of the centre he decided to have similar facilities set up in Lesotho, a landlocked enclave surrounded entirely by the Republic of South Africa.







Visitors from Lesotho undergoing training at Huai Hong Khrai RDSC

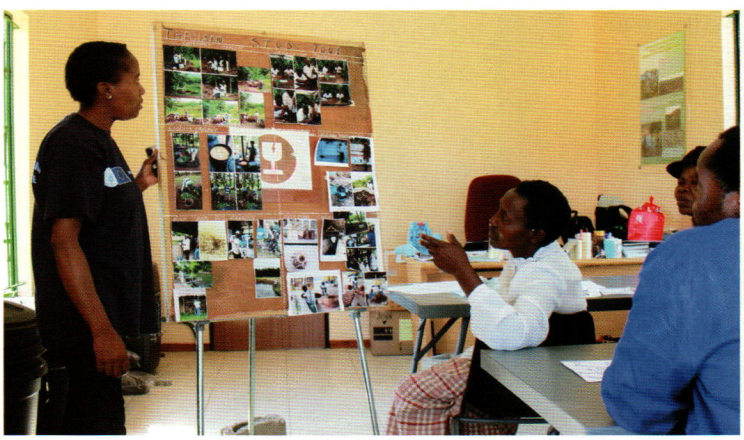
During this first visit, King Letsié sought to identify appropriate agricultural methods that Basotho farmers – and farmers across southern Africa – could adopt to improve their livelihood. Through the study centres, Thailand was able to render technical expertise as a starting point.

Later, Lesotho despatched a five-member delegation to Thailand to study the plantations and agricultural techniques at Huai Hong Khrai RDSC, the Wat Mongkol Chaipattana Royal Development Project in Sara Buri Province and the New Theory farming practice within the confines of the Chaipattana Foundation in Nakhon Nayok Province. The study tour also included a visit to the Royal Project in Chiang Mai Province.

The visit forged an initiative between the kingdoms of Lesotho and Thailand to promote technical cooperation in support of sustainable agricultural development resulting in yet another high-level delegation making a study tour of royal development projects in 2008.

Responding to Lesotho's enthusiasm, Thailand drew together teams of specialists from the centres to work with Basotho officials in Lesotho for short periods – and even on a continuous basis in some cases.

Meanwhile, five Basotho nationals undergoing training at Huai Hong Khrai RDSC made study tours of Wat Mongkol Chaipattana Royal Development Project and the New Theory farming practice at the Chaipattana Foundation in Nakhon Nayok Province. At the end of their study tours, they returned to Lesotho entrusted with the role of drawing up training plans for farming communities in their own country.





Specialists from Thailand trained Lesotho's officials



Again, at the time of celebrations for the sixtieth anniversary of His Majesty's accession to the throne, Thailand's Ministry of Foreign Affairs played host to several countries by organising study tours to sites providing lectures and demonstrating Sufficiency Economy projects.

More visits took place in 2006 comprising delegations from Asia, Africa and Latin America making study tours to Huai Hong Khrai RDSC in Chiang Mai Province and Kung Krabaen Bay RDSC in Chanthaburi Province.

In the years following the celebrations for the sixtieth anniversary of His Majesty's accession to the throne, visits to royal development study centres steadily increased.

As executive chairperson of the Chaipattana Foundation, HRH Princess Maha Chakri Sirindhorn pays regular visits to study centres, on some occasions escorting visitors. Delegations from the International Award Committee of the Prince Mahidol Award Foundation under Royal Patronage were guided by Her Royal Highness on a study tour of Phupan RDSC as well as the Royal Sufficiency Economy Learning Centre, Huai Pu reservoir, and the Royal Nong Mak Thao Model Dairy Farm in Sakon Nakhon Province. That visit, in 2008, followed a previous visit by the same group a year before to Huai Sai RDSC in Phetchaburi Province.



HRH Princess Maha Chakri Sirindhorn graciously escorted a Prince Mahidol Award delegation who were special guests at Pikun Thong RDSC in Narathiwat Province



During the time delegates from Cambodia, Lao PDR, Vietnam, China, Thailand and Myanmar were in Thailand for the 5th GMS (Greater Mekong Sub-region) Forum discussing "Promotion of the Sufficiency Economy Philosophy and the Integrated Use of Land", a study tour of Phupan RDSC in Sakon Nakhon Province was arranged under the auspices of the Buakaew Roundtable International Project.

On this occasion, the delegates were from South Asia, Africa, Latin America, the Middle East and Western Europe. Next stop on their agenda was a study tour of soil-related improvement initiatives including techniques for using vetiver grass, soil improvement for cultivation purposes, and the mixed agricultural plots at Huai Sai RDSC in Phetchaburi Province. Delegates were able to learn the principles of Sufficiency Economy firsthand as they toured and viewed agricultural plots managed by farmers in areas surrounding the centre. Of particular interest was the integrated farming approach that optimises soil resources with an effective water management system for agricultural use.



Visitors from Asia, Africa and South America observed
New Theory-based farms close to Huai Sai RDSC in Phetchaburi Province

On another occasion, government officials from member-countries of the Association of Southeast Asian Nations (ASEAN), including Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore and Thailand, participated in another study tour organised under the auspices of the Buakaew Roundtable International Project. After attending a lecture and receiving an overview of royal development projects, the delegation visited Huai Sai RDSC in Phetchaburi Province. They were able to observe the farmers' New Theory-based farms in the areas surrounding the centre and, in particular, to study pesticide-free farming techniques. At the end of the study tour delegates spoke positively

about the Sufficiency Economy approach, confident they would be able to apply the principles in their own countries.



A few days prior to the 15th Annual ASEAN Summit that was held in Thailand in 2009, Thailand's consul-general to Hong Kong led a large delegation of foreign consuls-general and honorary consuls-general, along with their spouses, government and media representatives from Hong Kong and Macao, to Kung Krabaen Bay RDSC in Chanthaburi Province. There they discovered how a community had prospered by following a sustainable and environmentally friendly lifestyle.

During the time when a party of twenty Bhutanese nationals were in Thailand attending a training course on "Sustainable Land Management" the Office of Extension and Training at Kasetsart University took the group to Huai Sai RDSC in Phetchaburi Province following a lecture at the Office of the Royal Development Project Board giving an overview of His Majesty's projects.

The same centre was visited by students from the Asian Institute of Technology (AIT) to be briefed on the causes of hardpan (compacted soil) and rehabilitation methods required to transform it into arable land. They also reviewed incentives given to farmers to persuade them to turn from cultivating pineapples exclusively and take up integrated farming. The students reviewed successful results achieved by farmers by adopting the New Theory approach to farming.

The New Theory approach to farming was also scrutinised by a delegation of seventeen envoys from South Asia, the Middle East, Africa and Latin America during a study tour of Khao Hin Son RDSC in Chachoengsao Province. Among other things they were able to observe the New Theory-based mushroom farming, vetiver grass-growing techniques and the cultivation of herbal gardens.

Overseas visitors observing mushroom farming, vetiver grass-growing techniques and herbal gardens at Khao Hin Son RDSC in Chachoengsao Province







Problems affecting soil conditions are similar in all parts of the world which is why His Majesty has always responded to overseas requests for assistance

Requests for assistance

Through the royal development study centres and also through the Chaipattana Foundation, of which the King is honorary president and HRH Princess Maha Chakri Sirindhorn executive chairperson, many requests for assistance are received from around the world. Doctor Sumet explained that some requests come through Thailand's Ministry of Foreign Affairs, from as far away as Africa and even from neighbouring countries. "In the case of Lao PDR, for example, the Laotian president wrote a letter directly to His Majesty asking for assistance. To us, it doesn't matter where the requests originate...we try to help. The principle [of the problem] is the same and that's why we are happy to share knowledge and experience."



Where humanitarian aid and international cooperation are concerned, Dr. Sumet insists that everyone, whatever their location, faces the same problems when talking about soil conditions – therefore the solutions are the same or similar. Whenever a letter is received



requesting help, Dr. Sumet said a study centre or the Chaipattana Foundation prepares Thai staff to work with the foreign country concerned to offer technical advice and also train local people.

Although the expression "Sufficiency Economy" came at the time when Thailand's "bubble economy" burst in the mid 1990's, Dr. Sumet said His Majesty had coined the expression long before.

"His Majesty spoke of self-sufficiency at the beginning of his reign but it wasn't declared as such. As everyone must know by now, the King of Thailand is, first and foremost, a practitioner of humanitarianism and is well aware that you cannot separate humanitarian issues from other aspects of life."

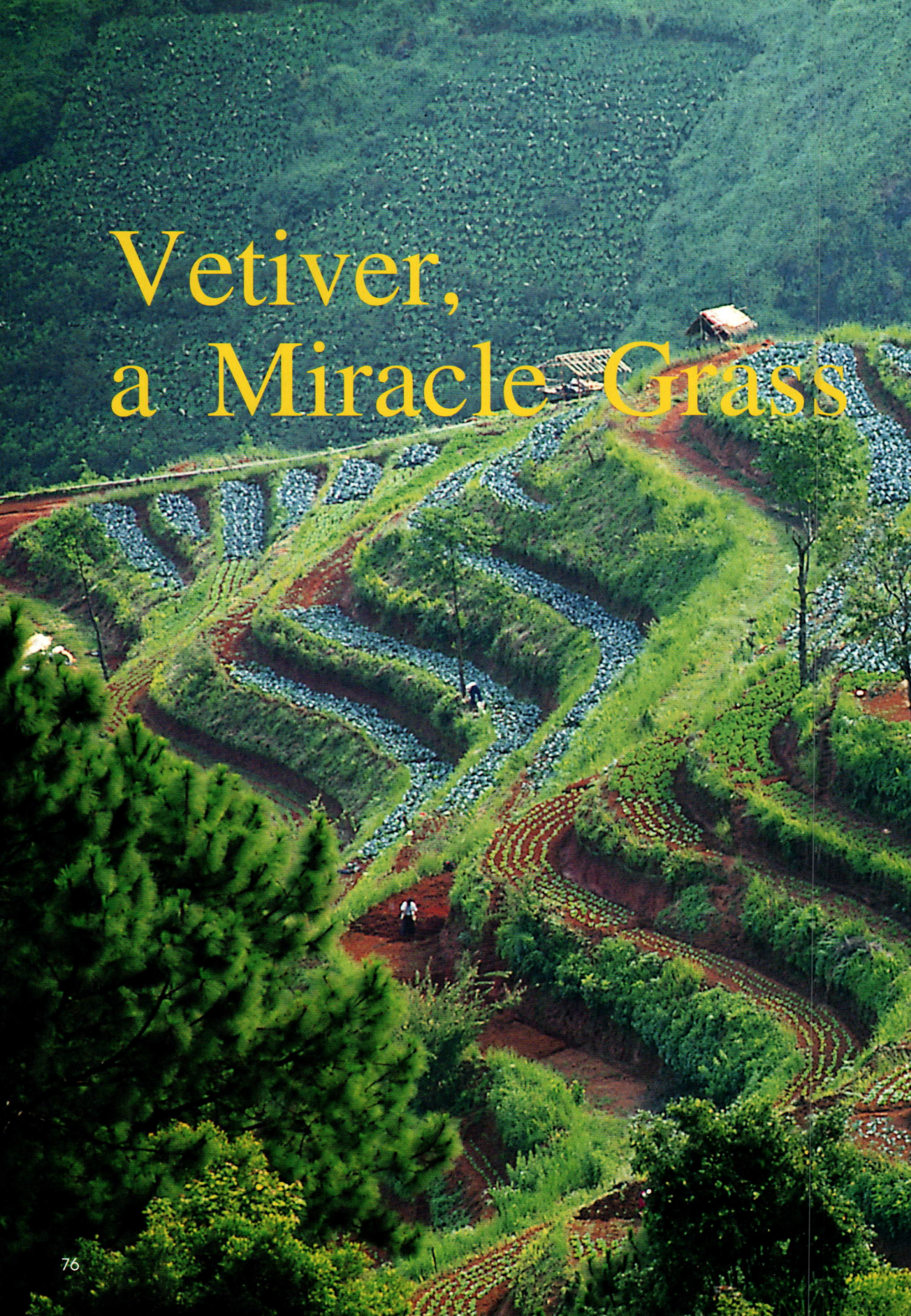
According to Dr. Sumet, all of the projects that stemmed from His Majesty's initiative form part of an evolutionary chain that started at the beginning of the king's reign and prevail to the present day.

"It is also clear that His Majesty's intention through the many projects he has initiated is to preserve our fragile resources…to live and develop in a sustainable way. Of course His Majesty's concept does not relate solely to Thailand, it applies to the entire world."

On the path to self-sufficiency



Vetiver, a Miracle Grass







His Majesty the King and HRH Princess Maha Chakri Sirindhorn inspect a hedge of vetiver grass

Nature's defensive barrier

Initially held in disdain by farmers, and often dismissed as nothing but a weed – until His Majesty the King of Thailand sensed its agricultural potential – vetiver grass *(Vetiveria zizanioides (L.)* Nash) at one time enjoyed a long life of relative anonymity. However, after the King became aware of its natural properties and studied its agricultural relevance, vetiver was, and still is, referred to as "miracle grass".

A perennial plant, native to India, its contemporary name was assigned by American taxonomist George Valentine Nash of The New York Botanical Garden: Vetiver is a Tamil word meaning a "root that is dug up"; *zizaniodes* means "by the riverside," which is where vetiver is most commonly found.

Over the years His Majesty King Bhumibol studied soil concentration and soil rehabilitation. Thailand's monarch was acutely aware of the problems associated with soil resource deterioration and initiated studies to find a solution. Naturally curious as to how local resources could be applied to solve problems (always keeping in mind that Thailand's farmers were too poor to afford "imported" solutions) His Majesty resolved to find out more about vetiver grass.



His Majesty the King shows how to plant vetiver at
Huai Hong Khrai Royal Development Study Centre, 1995



Vetiver from a variety of localities demonstrated at Huai Sai Royal Development Study Centre, Cha-am District, Phetchaburi Province

After a great deal of study, the King came to the conclusion that vetiver grass was strategically important in the plant world and could be put to good use in Thailand. His Majesty proposed that local scientists should combine with government agencies to conduct research into whether vetiver grass could be used for soil and water conservation.



After extensive research, the plant was found to be extremely hardy; its brownish-purple flowers growing in dense, protective culms. The extraordinarily long roots of vetiver grow almost exclusively downwards two-to-three metres into the soil – establishing a strong foundation underground. The narrow leaves grow straight and stand erect, reaching up to seventy-five centimetres. Together, roots and leaves form a defensive barrier below and above ground. It seemed vetiver could play a defensive role in Thailand's battle for soil and water conservation. Expressed in military jargon, the plants could well be soldiers in the King's army for national development.

"Use nature to protect the nation!" was how Prof. Dr. Santhad Rojanasoonthon, director of research of the Royal Project Foundation explained His Majesty's concept. Thailand's farming community was about to learn more of the strategic, agricultural value of this "root found by the riverside" as an effective hedge against soil erosion.

Properties of vetiver

The royal-initiated research programme discovered that vetiver could be grown in long rows, in effect forming a living barrier capable of resisting silts, retarding runoff, and allowing the soil to absorb water slowly.

Vetiver grass can be used for preserving and conserving natural resources, for example along the banks of irrigation canals, reservoirs or ponds, and along road shoulders and the approaches to bridges. The plant's roots mature into tightly-knit nets that hold the soil together, effectively forming an underground "wall" to retard water flow allowing it to seep into the soil. The root system helps prevent gully erosion and vetiver hedgerows can stop erosion at the bottom of hills where earth embankments prove inadequate.



Vetiver planted alongside a canal helps prevent soil erosion





These vetiver roots reach to depths of three metres: Doi Tung, Chiang Rai Province



Klai Kangwol Palace, Hua Hin, 2009

Early research

Research work identified indigenous ecotypes: subgroups with species named after districts or provinces where they are found such as Mae Hong Son, Mae La Noi, Pang Mapha. There were also some imported varieties like Phra Ratchatan, which can be translated as "the gift of His Majesty the King".

His Majesty was quick to act, and began by outlining to a group of experts in 1991 an appropriate course to follow. The King requested the royal development study centres, and other locations familiar with local topography, to conduct studies and carry out experimentation on vetiver grasses. Study centres were established around the country in the Eighties to act as live demonstration locations for local people to learn agricultural innovations and techniques.

His Majesty attended some of the centres and personally instructed several people. In 1991, the King also encouraged the director of one centre to plant vetiver culms around the edges of gullies and in cashew nut plantations on sloping land. It was important, His Majesty had instructed, to take photographic evidence "before" and "after" to prove the effectiveness of vetiver. Later, in 1992, during a visit to another centre, His Majesty suggested trials should be conducted on different strains of vetiver so that they could be used in extension programmes.

Vetiver grass used to arrest soil erosion on newly-cut slopes at the Queen Sirikit Botanic Garden, Chiang Mai Province. Above in 1997; below in 1998





Their Majesties the King and Queen and HRH the Princess Mother inspecting vetiver roots

Recalling the earlier days of research that began in June 1991, Thailand's Dr. Weerachai Nanakorn, an expert in vetiver cultivation, explained that His Majesty was not the only member of the royal family with an interest in the beneficial effects of vetiver. Her Royal Highness, the late Princess Mother, whose own sustainable development project was located in Doi Tung in northern Thailand's Chiang Rai Province, also expressed a keen interest in the King's initiative. "At Doi Tung, the Princess Mother began to teach and conduct experiments on vetiver grass cultivation," Dr. Weerachai said. "Eventually, the first million bags of vetiver were provided at Doi Tung."

The first million bags of vetiver were provided at Doi Tung, Chiang Rai Province



Administering the Royal Initiative

To comply with His Majesty's 1991 initiative a committee was set up to provide administrative support. It was known as the Committee on the Development and Promotion of the Utilization of Vetiver, or, CODPUV, and placed under the direct management of the Office of the Royal Development Projects Board in 1992. To understand the workings of this committee it is necessary to understand the purpose of the royal initiative: His Majesty's main objective in cultivating vetiver grass was to conserve soil (and thereby water) particularly on steep slopes such as in the hills of northern Thailand where the King had many projects in progress from the 1970s.



HRH the Princess Mother planting vetiver grass



HRH Princess Chulabhorn in a field of vetiver at the Queen Sirikit Botanic Garden, Chiang Mai



His Majesty the King planting vetiver grass saplings

Hedgerows of vetiver

In his usual, disciplined manner, His Majesty kept track of results, periodically guiding those implementing the royally-initiated projects. Although self-educated on the uses of vetiver, His Majesty's research material was thorough enough to be able to instruct others in a precise and clear manner. In conversation in 1993 with Dr. Sumet Tantivejkul, a leading member of His Majesty's projects, principally the Chaipattana Foundation, the King suggested planting seedlings no more than fifteen centimetres apart. His Majesty explained that if the spacing between plants could be reduced to two-to-three centimetres the gaps along the narrow hedgerows could be filled more quickly.

The cultivation of vetiver hedgerows was a strong recommendation on His Majesty's part because hedgerows can effectively retard runoff along natural watercourses and steep-sloping areas. Vetiver hedgerows are capable of retarding and preserving large quantities of water that runs through them. As the soil becomes more fertile, crops and plants are able to flourish.



Studying root properties of various ecotypes of vetiver at Huai Sai Royal Development Study Centre

Vetiver is adaptable

An important discovery on the part of His Majesty the King's research initiative was that vetiver grass can be found growing everywhere in Thailand; from the highlands to the lowlands and in a variety of soil conditions. It is found in inundated areas such as basins, natural waterways and swamps. Cultivation experts discovered that some species of vetiver can be grown almost anywhere and under adverse conditions. In Thailand it grows near sea level and on mountains at altitudes as high as one thousand metres. It can even grow in many, critical soil conditions. Kasetsart University at one time investigated the recovery of salty soil in eastern parts of Thailand using vetiver to build up the quality of the soil.



A field of vetiver grass in its natural habitat, Phayao Province, 2010



Vetiver being tested for salt tolerance in north-eastern Thailand





Vetiver used to prevent soil erosion on newly-developed slopes at the Queen Sirikit Botanic Garden, Chiang Mai. Left in 1997; right in 1998

Tackling soil erosion



Hill tribe villagers in Mae Sa Mai village, Chiang Mai Province, planted vetiver hedgerows to secure steep hillsides from soil erosion

His Majesty the King was the first in Thailand to recognize the potential of vetiver as a practical, economical and efficient management and conservation tool to tackle soil erosion. In simple terms, soil erosion means soil that has been swept away. What is left is a nutrient-deficient subsoil, unable to support agriculture so the land becomes barren. At one time, that was the King's principal concern. Today, this appears to be a distant problem; but for Thailand, at the time, it was a significant step forward. In 1991 the majority of people were rural villagers and they were wholly dependent upon the land to sustain their livelihoods.

In the future, soil erosion could become an even greater issue as population growth expands and land resources become scarcer. More erosion means more land loss. It means reduced soil fertility, greater rainfall runoff, and lower groundwater recharge. It also means more sediment flowing into rivers, more contaminants in water, lower quality drinking water, increased flooding along with fewer economic benefits but increased hardships to both rural and urban populations.

The importance of vetiver in this scenario cannot be overstated. The binding abilities and tensile strength of vetiver grass roots means the physical elements of soil can be maintained. Once planted on slopes it acts like an underground wall reducing erosion by up to ninety percent. It reduces and conserves rainfall runoff by as much as seventy percent; improves groundwater recharge, removes pollutants from water and reduces the risk of flooding, altogether vastly improving the economic benefits of communities.



Protector of fruit trees

"The King said we must grow other things along with vetiver to provide an income," recollected Dr. Santhad Rojanasoonthon, chairman of the research section of the Royal Project Foundation. His Majesty's remarks were made in connection with the use of vetiver at the Royal Project's activities in the hills of Chiang Mai Province.

Also, in conversation in 1996 with Dr. Sumet Tantivejkul, the King specifically mentioned that the use of vetiver to conserve soil moisture could be problematical. His Majesty was referring to the use of vetiver grasses in strips encircling fruit trees and other perennial crops, cautioning that the root system of vetiver grass is so extensive it could absorb nutrients from the trees thereby stunting growth. To overcome this, His Majesty suggested making a semicircular hedgerow at the down-side of the trees. In this way, the King noted, vetiver would perform its function of effectively conserving soil moisture for the trees. Later, in 1997, His Majesty explained to an interested audience of experts that in order to trap moisture a semicircle of vetiver should be planted to protect the trees.







After just nine months the roots of this vetiver plant in Doi Tung, Chiang Rai Province, had reached over four metres

Dealing with "hardpan"

In addition to sprouting new shoots, vetiver roots also expand to penetrate the ground vertically, and bind the soil together. In some agricultural areas, however, soil can be impenetrable, more like concrete. In such conditions, farmers are unable to till land surfaces without sturdy machines capable of breaking the hardened topsoil.

His Majesty was able to solve the problem of hard soil, or "hardpan" as it is known in agricultural communities without using expensive machinery. The King was aware that the roots of vetiver were long and extended vertically, reaching great depths. One specimen at the Doi Tung Development Project in Chiang Rai province reached a depth of 5.2 metres – a world record for vetiver roots.

In discussing the hardpan problem with Dr. Sumet in 1996 His Majesty instructed that deep holes should be drilled down into the ground as far as the lateritic soil level (stone-like subsoil) as an experiment. Always conscious of the inability of poor farmers to invest in such a project, His Majesty specified the drills

should be hand-operated. The plan was to drill down and fill the holes with compost followed by vetiver. Planting vetiver in this way, the King explained, would trap moisture to break the soil and make the ground arable again.

In the course of a speech given on the occasion of His Majesty's birthday in 1997, the King described the dramatic effect that vetiver had on hardpan in an area of Cha-am in Phetchaburi province, central Thailand. His Majesty said it was like walking on a hard surface like stone, because years of erosion had removed the top soil. The King explained that vetiver grass was able to "explode" the hardpan bringing about an increase in arable land for farming after just one or two years.





Public and private participation

It was not long before the King's initiative reached the ears of business executives in public and private entities in Thailand. Many companies found a use for vetiver in their organizations. For example, PTT plc, Thailand's energy giant, found that vetiver helped considerably in ground reparation work and in beautifying disturbed land areas along its gas pipelines. Also, vetiver used along the Yadana Gas Pipeline Project, in Thong Pha Phum district of Thailand's Kanchanaburi Province, played a significant role in erosion control and slope stabilization. Moreover, vetiver cultivation helped to prevent landslips and subsidence alongside the Thong Pha Phum-Ban E-Tong road at more than fifty known landslip points.



Schoolchildren carry vetiver seedlings to plant at their school.



Vetiver grass handcrafted into high quality, low cost articles

Economic uses of vetiver

Despite His Majesty's efforts, many observers were surprised that some farmers remained reluctant to accept that vetiver had any "added value": In their estimation, cultivation of the plant in agricultural areas did not appear to produce tangible benefits in terms of increased revenue. That view was dispelled after research initiated by the King discovered that vetiver leaves and roots both had multipurpose uses that could yield financial benefits to farmers.



It was found that the vetiver species *Vetiveria zizanioides* Nash, with ecotypes classified as Sri Lanka, Kamphaeng Phet 2, Surat Thani and Songkhla 3, has long, waxy leaves that become soft and pliable when wet, suitable for producing high quality handicrafts. Conversely, well-dried leaves can be fashioned into wreaths, artificial flowers or for woven products like ropes, mats, hats, or baskets. The roots of vetiver can be fashioned into screens, blinds, fans and handbags.

For many years, Her Majesty Queen Sirikit promoted handicrafts as a supplementary occupation for farmers. Handicrafts made from vetiver grass were produced in the 1990s and, up to the present time, it is still possible to attend handicraft training courses in vetiver uses at very low cost.

Vetiver grass can bring aesthetic and environmental improvements

Beautification of urban areas

Vetiver has other properties besides being useful for fashioning handicrafts. This simple grass can help in landscaping modern, urban areas bringing about aesthetic and environmental improvements. Unsightly building sites, even established gardens, can be improved visually with perennial green vetiver grasses; attractive, ornamental plants that can be grown in the ground or in pots. Apart from landscaping, vetiver is used to delineate borders on paths and roads, and to beautify the edges of lakes and streams. When used in landscaping, vetiver facilitates slope stabilization, aids erosion control and helps in decontaminating toxic materials leading to improved habitat and pest control. From a maintenance point of view, these many virtues help reduce cost while beautifying roadsides and central dividers. Another important fact is that vetiver grass stays green when less robust plants wither and die.





Pollution control

Apart from its uses in agriculture, handicraft products, and for beautifying land areas, vetiver is a welcome ally in the fight against pollution. Closely following the initiative of His Majesty the King, researchers found that vetiver grass can tolerate high levels of nitrates, phosphates, heavy metals and agricultural chemicals that can be toxic at high levels. Experiments are underway to see if the filtering effects of vetiver could help wastewater treatment or the rehabilitation of mine tailings, or for stabilizing landfills and ordinary rubbish dumps.



Vetiver used to stabilise the slopes of landfill rubbish dumps. Guangzhou, PRC, 2003



HRH Princess Maha Chakri Sirindhorn observes an experiment to trap heavy metals using vetiver grass during wastewater treatment. Guangzhou, PRC, 2003

Scientific recognition and international contributions



The impact of His Majesty's vetiver initiative attracted the interest of scientists and agriculturists from around the world. Increased demand to learn more stimulated the public and private sectors to stage a forum at which results from the project could be examined by an international group of experts and information gained by His Majesty's researchers disseminated globally.

Thailand hosted two international conferences on vetiver grass: The first conference (IVC1), in February 1996, entitled "Vetiver: A Miracle Grass", was held at Doi Tung Development Project in Chiang Rai utilising huge field exhibition plots. Co-organized by the Chaipattana Foundation and the Princess Mother's Mae Fah Luang Foundation, with the collaboration of the World Bank and the FAO, the conference is still recalled today as a great success and the first step in introducing to the international community the results His Majesty had achieved through research and experimentation.



The Second International Vetiver Conference (IVC2) under the theme "Vetiver and the Environment" was first planned to be held in Latin America but was moved to Thailand in January 2000, coinciding with His Majesty the King's 70th birthday. Her Royal Highness Princess Maha Chakri Sirindhorn presided over the opening ceremonies and attended the lectures. Pursuing His Majesty's initiative, Princess Sirindhorn in 2000 became patron of The Vetiver Network International (TVNI). A keen conservationist, Her Royal Highness is deeply committed to the research and development of the Vetiver System (VS) in Thailand and elsewhere in the world.

Both conferences served as global forums to discuss His Majesty the King's work concerning vetiver grass. Thirty countries were represented: Australia, Bangladesh, Cameroon, Costa Rica, Denmark, El Salvador, Ethiopia, Fiji Islands, India, Indonesia, Kenya, Madagascar, Malawi, Malaysia, Nepal, the Netherlands, New Zealand, Papua New Guinea, the Philippines, Portugal, China, South Africa, Sri Lanka, Taiwan, Uganda, USA, Venezuela, Vietnam, Zimbabwe and Thailand. There were four hundred participants overall.



HRH Princess Maha Chakri Sirindhorn chaired the seminar on Latin America Vetiver held in Chile in October 2010

After the second conference, Madagascar requested cooperation from Thailand's Office of the Royal Development Projects Board to send Thai experts to give advice on cultivation of vetiver to restore the Fianarantsoa Côte Est (FCE) railway line damaged by two cyclones. The success of the royal-initiated vetiver project induced Thailand to set-up vetiver training and field trips for nationals from fifteen countries around the world. A special interest in vetiver operations was also registered by the Ministry of Environment and Natural Resources of the Philippines, Zambia's Ministry of Agriculture, Food and Fisheries, and the United States Department of Agriculture.

Vetiver handicrafts on sale in Caracas, Venezuela





HRH Princess Maha Chakri Sirindhorn attended the fourth ICV4 conference in Caracas, Venezuela in 2006

Two more conferences have since been held, both of them outside of Thailand. The third conference (ICV3) took place in Guangzhou, China, in 2003 under the theme "Vetiver and Water", which was also attended by TVNI patron HRH Princess Maha Chakri Sirindhorn. The fourth conference (ICV4) "Vetiver and People" was held in Caracas, Venezuela in 2006. Previously, Venezuela had sent officials to Thailand to observe and train in the use of vetiver. Upon their return to Caracas, they discussed their observations with a private sector company producing drinking water. They found their experiences so useful that Venezuela volunteered to host the fourth conference (ITV4) to learn more about vetiver and its potential uses for solving soil erosion and enhancing water retention in coastal and mountain areas of Venezuela.





Participants, planting vetiver to stabilize steep slopes, Caracas, Venezuella.



Vetiver used to stabilise slopes near Caracas, Venezuela

International implementation

Sharing vital information about vetiver with the international community became possible thanks to research conducted under the King's guidance and advice. The international conferences recognized the Vetiver System (VS) as a tool for soil and water conservation and many countries adopted its use in a variety of ways.

In the Central America country of El Salvador, for example, vetiver was used alongside roads to give protection from the impact of Hurricane Mitch in 1998. In Madagascar, vetiver helped protect a key railway line from damage from annual cyclones that in previous years had shut down the railway for months on end. In Vietnam vetiver helped protect sea dykes from the worst effects of typhoons, and to stabilize highways in China, Malaysia and Vietnam.

China's government went a step further in demonstrating that the work championed by His Majesty the King in Thailand worked well in the People's Republic of China. Vetiver has arrested erosion at landfills and helped beautify highways in places like Guangzhou Province in southern China. Similarly, Nanchang City, the capital of Jiangxi Province in south-eastern China, introduced vetiver in 1998 to stabilize sand dunes affected by desertification. Vetiver was planted in hedgerows and though the sands lacked plant nutrients, over ninety percent of planted vetiver survived and flourished. Vetiver even stimulated other plants to grow with the result that sandy dunes were again covered with vegetation. Doctor Weerachai Nanakorn noted that China considered the best type of vetiver for their use to be the type introduced by Thai researchers.



Vetiver improves the aesthetics alongside highways, Guangzhou, PRC

In Bangladesh, a tropical riverine country in South Asia, the World Bank took the royal initiative even further by using vetiver to fix soil erosion. A similar project was implemented in Myanmar by the UN Food and Agriculture Organization (FAO).

On the African continent, in Zimbabwe, vetiver is used extensively on large sugarcane estates, similar to those in South Africa. Vetiver has played a crucial role in stabilising farm roads, in controlling erosion in sugarcane fields and, in particular, in drainage ditches and irrigation channels. In the Kingdom of Morocco, vetiver is used to encircle banana plantations along the coast as a windbreak to protect them from strong Atlantic winds.

South Africa introduced vetiver to protect a number of crops including beans, bananas and chillies, but the two crops that benefited most from vetiver use were coffee and sugarcane. At the Sarabica Coffee Estate, vetiver hedges planted between rows of coffee trees have replaced contour banks as standard soil conservation measures. The hedges have reduced maintenance costs, facilitated traffic, and provided mulch for weed control in addition to aiding soil and water conservation.

The South America country of Venezuela sent ten women to Thailand to learn how to make handicrafts from vetiver. After returning to their home country they spread the word: vetiver is now used as a raw material for fashioning handicrafts. In Indonesia and Mali some handicrafts made from vetiver roots are marketed internationally.





Schoolchildren had fun planting vetiver grass on steep slopes at Queen Sirikit Botanic Garden, Chiang Mai Province

King of Thailand Vetiver Award

His Majesty the King was well aware that apart from studies into vetiver under royal purview the possibility must exist for others to apply their own talents as potential contributors. With this in mind, the King sought to extend interest in the study of vetiver by granting the equivalent of ten thousand dollars from the Privy Purse to establish the King of Thailand Vetiver Award. This award, first bestowed in 1992 and again on the occasion of the Second International Vetiver Conference (IVC2) in Thailand, is given to persons deemed to have conducted outstanding work in researching and promoting the use of vetiver



In 1993, His Majesty the King received the International Merit Award from the International Erosion Control Association

Recognition of His Majesty's Initiative

His Majesty not only paved the way for others to receive awards for outstanding work in the research and promotion of vetiver use, but was also a recipient of two prestigious, international rewards. The International Merit Award was presented to His Majesty in 1993 by the International Erosion Control Association (IECA) in recognition of the King's contribution to the use of vetiver for soil conservation and environmental improvement.

The second award was presented in October 1993 by Mr. Richard G. Grimshaw, Chief of Agriculture Division, Asia Technical Department, World Bank. A vetiver expert himself, Mr. Grimshaw presented His Majesty with a specially-commissioned bronze sculpture of a vetiver plant together with a certificate as the Award of Recognition "for technical and development accomplishment in the promotion of the vetiver technology internationally".

Thanks to the initiative of His Majesty the King vetiver has become well-known and accepted around the world for it properties and benefits that contribute not only to soil and water conservation but also in helping to tackle problems caused by global warming.





The Royal Project





Opium-based drug habits

Billed in 1969 as "The Woodstock Music and Art Fair: An Aquarian Exposition", generally referred to as "Woodstock", the organisers of this now famous counterculture concert originally hoped for a turnout of fifty thousand people. They were taken aback when an unexpected, five hundred thousand young souls converged on Max Yasgur's thousand-acre farm near Bethel in upstate New York, USA to participate in an event that was tantalisingly advertised as "Three Days of Peace and Music". The police turned a blind eye as young people "turned on, tuned in, and dropped out" on this iconic occasion, which proved to be a prelude to change around the world: Many in attendance used the event to expound far-out, contemporary ideals and principles that challenged the power structure of the United States of America. The concert went off peacefully, but not before the attention of the world was drawn to the growing use of drugs.

Towards the end of the 1960s, and by the time of Woodstock, the United States could account for around three hundred and fifty thousand heroin addicts in the country. Outside the United States, it seemed few were aware that opium-based drug habits were often fuelled unwittingly by hill tribe farmers in northern Thailand; poor and needy villagers, often on the point of starvation, struggling to make ends meet. This northern location covered almost one million square kilometres overlapping the mountains of Myanmar, Lao PDR, Vietnam, and Thailand. Commonly referred to as the Golden Triangle, it was once one of the world's main sources of heroin poppy production.

Opium poppy cultivation

Early evidence of opium poppy cultivation points to the Sumerians some five thousand years ago, spreading outwards to Egypt and as far as the European Alps some three thousand years ago. Poppies first arrived in East Asia and the Golden Triangle as a result of demand created by the British in the late 19th Century. About one hundred years ago, hill farmers in China's Yunnan highlands began cultivating opium poppies. As the habit spread, opium was imported into Thailand.

World opium production saw a shift in the early 1950s when Iran and Turkey withdrew from the market. After 1949, Mao Zedong suppressed the cultivation of opium poppies in China forcing many hill tribe families to migrate, usually straight to the mountainous region referred to as the Golden Triangle. Through suppression, the communists effectively ended the habit of smoking opium in China, but a steady supply continued to go to the burgeoning markets in the West.

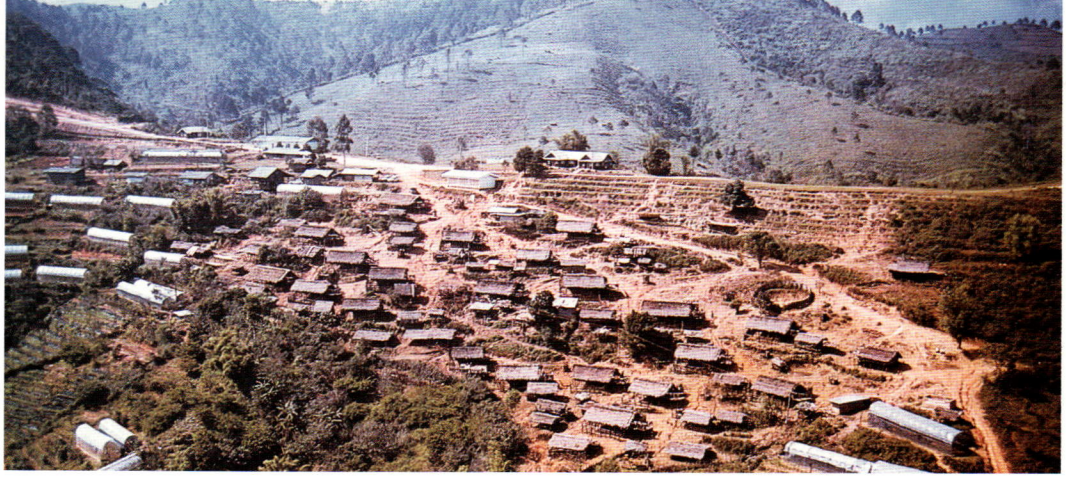


In Thailand, opium use ended in 1959 after it was declared illegal by the government of the day under premiership of Field Marshal Sarit Thanarat. Nevertheless, sales of opium – and its derivative heroin – continued to soar as a result of increased demand in the United States and Europe – and protagonists in the protracted war in Indochina.

The vast quantity of opium poppies that once thrived in northern Thailand covered a land area of seventeen million hectares, similar in size to the South American country of Uruguay. In fact, nine million hectares, found five hundred metres above sea level, occupied a land area the size of Portugal. In terms of forested areas, northern Thailand's provinces of Chiang Mai, Chiang Rai, Lamphun, Phayao and Mae Hong Son account for around one quarter of the entire country's forests. It is no surprise, therefore, that this is where the majority of hill tribes were found including the Hmong, Yao, Lahu, Karen, Akha, Lisu, Lua and Chinese Haw.



The use of opium was outlawed in Thailand in 1959



Slash-and-burn farming triggered large-scale destruction on hillsides

Early farming methods

With the exception of the Karen and Lua, Thailand's hill tribe communities adopted swidden farming years ago on sloping land in the northern highlands at heights above one thousand metres. Sometimes referred to as "slash and burn", swidden farming was the most common farming method undertaken. The steep-sided hills, with no flat ground in between, were unsuitable for conventional farming as practised in other parts of the world across flat fields at ground level. And, as latecomers to the area, most Hmong had to be content with high-lying land left over after other tribes had established themselves on the lowlands.



To farm on sloping land at such dizzying heights they burnt down trees to make ash for fertiliser. The farmers viewed this as a low cost method for rejuvenating the soil because, to them, the fertiliser came free of charge. The area was irrigated by the hand of nature, fed by water run-off from the steep slopes that easily drained and never became waterlogged. After the harvest, the farmers left the land fallow and moved their families to farm new slopes. This farming method was followed for years by generations of hill tribe farmers.

While swiddening may have been appropriate a hundred years ago, because it left land fallow after each harvest and allowed a couple of years for it to recover, it was bound to create problems later as hill tribe families grew in number. Inevitably, the population boom among tribal folk occupying the same land area forced them to farm the same piece of land more frequently than before in order to feed their families. By 1969, fifty-five thousand Hmong, and two hundred and seventy-five thousand villagers in total, fended for themselves on a fixed area of land that was becoming increasingly overworked.



Lack of infrastructure made life difficult for villagers trying to get their goods to market

Compelling reasons for growing opium

Poor road infrastructure in the past meant that some hill tribe villages were a six-hour drive from Chiang Mai. Transporting farm produce to market was not only difficult, but expensive because goods damaged in transit fetched a lower price.

On the other hand, opium buyers were quite willing to trek to hill tribe villages to buy at source saving the opium farmers having to make long journeys. This led to devious and shrewd buyers often setting-up impromptu gambling dens next to buildings where they bought the opium. Farmers were encouraged to gamble away their earnings minutes after being paid, with the unfortunate outcome that poverty continued unabated. On average, a farmer's income from opium was around seven thousand seven hundred baht a year. Had they been able to get their lettuces to market in good condition, using this as an example, they could have earned as much as one hundred and eighty thousand baht a year.

Opium, a traditional painkiller used in the hills, was generally used to ward off hunger pangs. Up to the 1970s, these tribes were subsistence farmers that suffered from protein deficiency and malnutrition was endemic.

Associated Press bureau chief in Thailand, Denis Gray, witnessed the conditions that spawned a demand for opium in the North: "With no doctors on hand, opium became their preferred painkiller and it wasn't long before the drug became their master and their tormentor."



His Majesty the King supported national development as a means to help alleviate poverty

Communist insurgency slows development

In the Sixties and early Seventies, Thailand experienced a communist insurgency that hampered government officials trying to do their work in thirty-five out of seventy-one provinces. A major reason the communists were able to make headway was their appealing promise of social restructuring to help alleviate poverty among the local people. His Majesty King Bhumibol Adulyadej, however, was one among few who realized that national development was a more desirable option.

Subsequently, a small reforestation project was set up by Mr. Thiam Komkris, dean of forestry. It was located just outside of Chiang Mai near Bhubing Palace, the royal winter residence located on a mountain called Doi Buak Ha, strategically located one thousand metres above sea level. Professor Pavin Punsri, a plant scientist at Kasetsart University, responsible for introducing commercial grape cultivation to Thailand, believed it was possible to reforest the hills with income-generating orchards. But by 1969 a lack of funds threatened to shut down the Kasetsart project: At that juncture, destiny and coincidence collided.



The King trekked to remote areas to consult with hill tribes

Early activities to investigate crop substitution

Throughout the 1950s, His Majesty the King made frequent trips upcountry. The near-inaccessible hill tribe villages in the mountains were difficult to get to because of their remote locations many hours from a paved road. Today, it is difficult to imagine anywhere in Thailand being inaccessible. His Majesty recalled experiencing what he termed "disco roads", referring to the shaking and bouncing suffered by occupants of the King's car as it navigated unpaved roads deep in the countryside.

In 1968, the King might well have been more than intrigued to learn of the existence of a Hmong hill tribe village at Doi Pui not fifteen minutes from his Chiang Mai residence. As Dennis Grey recalled, "Information on the hill tribes was sketchy. The only way to truly assess their situation was to travel to the mountainous regions and gather research first-hand. Thailand's King Bhumibol did just that."

His Majesty trekked to one village along with some staff and began asking questions, later visiting more villages to ask more questions. No one would have been surprised if these poor, neglected villagers had paid scant attention to their royal visitor, but this was not the case. This particular royal visitor was able to gain their attention because His Majesty neither acted in a superior manner, "nor even much like a king."



The financial reward from cultivating opium or peaches was similar

His Serene Highness Prince Bhisadej Rajani, the Royal Project's chairman, was able to witness this first hand: "The way His Majesty spoke to them…they were very friendly. The King took a keen interest in their lives. They were very frank with His Majesty. (One) particular day," recalled the prince, "His Majesty asked the Hmong what was their source of income apart from opium. They said peaches – the small local peach – and they told the King that the income from opium and from peaches was about the same."

It was a crucially important revelation: His Majesty knew the opium fields would be consigned to history if farmers could be persuaded to grow peaches in place of poppies – for a similar or superior income. The King requested Kasetsart University to earnestly explore the potential, at the same time donating two hundred thousand baht (around $10,000 at the time) from private funds to set in motion in 1969 the Royal Hill Tribe Assistance Project. In 1980 this was renamed the Royal Project and later, in 1992, the Royal Project Foundation.

His Majesty the King and other members of the royal family began making frequent visits to hill tribe locations which entailed a lot of climbing. One story tells of His Majesty walking through a jungle and up a mountain because the King had heard about someone who had grafted three peach trees. Those around had questioned why His Majesty would want to view three peach trees. "Everyone said it was very tough on the King to walk for an hour to see three plants," Prince Bhisadej said. "But His Majesty knew that by going there it



His Majesty, often accompanied by HRH Princess Maha Chakri Sirindhorn, was meticulous in ensuring surveys were specific, detailed and focused

would demonstrate a keen interest. And that was good promotion for the plants."

The King was unconcerned about personal comfort. "There was a meeting arranged with some villagers," Prince Bhisadej recalled. "And they came along and sat on the floor. In front of them were chairs. They were for us to sit in, which is normal. But His Majesty would not sit in the chairs; he sat on the ground with the villagers."

Australian photographer John Everingham accompanied the royal family on some visits. "The interesting part," he recollected, "was the approach His Majesty took; very often working right alongside the poppy fields, teaching people how to do things to make more money than from opium but not going on campaigns to cut it all down. Some governments have done that and upset and angered the people."

Denis Gray recalled the intense concentration displayed by the King on each visit. "The King was extremely focused on the details. As we all know, His Majesty always carries a map: so the first thing to do was to unroll the map and find out the exact location…where the opium fields were…or where a dam was going to be. From there, His Majesty went into precise details about facts and figures – things that an engineer or a social science researcher would want to know."

From his own observations Denis Gray noted that His Majesty was "…not just a politician or a king coming in and breezing through. This (survey) was very, very specific; very, very detailed, and intensely focused."



HM the King greeted by hill tribes villagers

One quirky tradition performed by the hill tribes when His Majesty came to visit at a later time puzzled some of the international visitors accompanying the King. People wanted to know why the villagers put a cloth on the ground for the King to walk on. Many thought it was some kind of superstitious practice, but Prince Bhisadej said they simply wanted to capture His Majesty's footprints, "It was like getting his autograph!" he said.

Prince Bhisadej becomes Royal Project Director

In due course His Majesty asked Prince Bhisadej to be the director of the project. Although the Prince had visited hill tribes on past occasions, and accompanied His Majesty on regular fact-finding tours, he started his own serious exploration of the highlands. The Prince trekked to many villages for days on end carrying a sleeping bag and other essentials in a backpack. Travelling with his frequent companion, Professor Pavin Punsri from Kasetsart University, Prince Bhisadej was able to learn the hill tribes' problems first-hand. "We didn't have much money and we had to act at their level...we could not behave in a superior manner. When I went out I carried my own pack, sleeping bag, boots...and I slept on their verandas."

Oddly, and without raising any suspicion, the tribes-people appeared to accept the many intrusions and questions. "They knew we were working for the King and they accepted us quite well," commented Prince Bhisadej. "They also knew we were not government officials who would try to stop them from growing opium or something..."

In one location, around Doi Inthanon (Thailand's highest mountain) Prince Bhisadej found Hmong tribal members that had been sent to Hanoi by communists for training. "During the day it was okay," Prince Bhisadej recalled. "The forestry people would pull out before dusk and go down the mountain fearing they might be killed. Quite a few people were killed – forestry people and the like. Because the government couldn't go and help these people they became very poor... (So) we went up."





Prince Bhisadej, the Royal Project Director (left) among the hill tribe villagers



Early experiments with strawberries

Strawberry cultivation was the chosen crop for tribes in the Doi Inthanon region because farmers could expect a return on investment three months after planting the crop. The three Hmong men selected to attempt growing strawberries accepted the proposition because they knew it was part of the King's project and that His Majesty wanted to help them improve their incomes.

"From the very beginning money from the harvest went into their pockets straight away," said Prince Bhisadej. "We took the produce to market for them and they got the money. The three men accepted the idea to grow strawberries because it was the King's project. The next season a lot more people wanted to grow strawberries."

By 1988, those who had mastered strawberry cultivation were earning the Thai baht equivalent of two thousand dollars a year – double the average income in Thailand. Others, growing Japanese apricots, earned one thousand dollars from one-hectare orchards.



Hill tribe villagers earned substantial revenues growing strawberries



Ang Khang valley is ideal for cultivating temperate-climate fruit trees

Work commences at Ang Khang

Located in the northwest of Chiang Mai province, close to the border with Myanmar, Ang Khang valley is five kilometres long and rises one thousand four hundred metres. Enclosed by even higher, limestone peaks, this remote area mirrors scenes from the novel "Lost Horizon"; best remembered as the origin of the mythical Shangri-La. The pristine slopes were once covered with poppies amidst a profusion of wild apples, local peaches and other fruits. But it was the temperate climate that first attracted the Royal Project team to the area; they considered it eminently suited for cultivating temperate-climate fruit trees. Enthusiastically, Royal Project members acquired European text books to learn how to grow temperate-clime trees only to come up against a new problem: "Our temperate fruit textbooks couldn't be used in Thailand because the micro-climate isn't the same," explained Dr. Santhad Rojanasoonthon, chairman of the research section of the Royal Project Foundation.







The project yields a wide-variety of temperate-clime fruits

Introduction of peach trees

Subsequently hill tribe communities were provided with some "introduced" peach tree varieties for cultivation that earned the farmers an average price of around thirty Thai baht per kilogram, depending on the size of the fruit. Apart from peaches, the project team considered cultivating highland staple food crops like rice, wheat, maize, beans and potatoes. Today, the project produces a wide variety of temperate-clime fruits including Chinese peaches, Chinese pears, persimmon, plums, grapes, Japanese apricots, strawberries, passion fruit, and figs. Other fruits, like kiwi, pomegranates, raspberries and blueberries, are undergoing research.

A team surveyed hill tribe farmers to see whether they would be willing to grow site-specific fruits, nuts, or vegetables. Afterwards, they supplied the farmers with plants or seeds and supervised the first planting followed by a period of monitoring. This was not intended as a free service: His Majesty was aware that nothing of value was ever given away free; there was always a small charge for everything. This approach served to impress upon the hill tribes the real value of the work being done under the Royal Project.

Social assistance

Not all villagers are domiciled in highland areas; some are at quite low elevations deemed unsuitable for growing temperate-clime fruits and vegetables. To compensate, additional support is offered by development centres and government agencies through schools, medical care, sanitation and hygiene, social development and the opportunity to develop alternative incomes from non-farming jobs.

Though hill tribes adhere to a male-dominated culture, women have to undertake a disproportionate amount of work in tandem with bringing up their children. The Royal Project Foundation arranges for young girls to learn about children's rights and teaches female empowerment. Its youth vocational development programme offers supplementary occupations and a way of earning a living in non-agricultural jobs. The programme has the added benefit of assisting young people to steer clear of becoming victims of human trafficking and prostitution.

Agricultural extension programmes are a typical example of how to raise the capability of hill tribe farmers; one aim being to make the crop safe. This ensures the products achieve an acceptable standard in terms of quality. The project helps farmers achieve Good Agricultural Practice (GAP) certification for their crops, verifying that products are free from unsafe levels of chemicals. By satisfying customers about food safety, they can also compete with imported foodstuffs.



Hill tribe women undertake a disproportionate amount of work

To aid reforestation, the Royal Forestry Department introduced new, fast-growing trees

Deforestation and reforestation

Years of indiscriminate swidden farming resulted in large-scale deforestation in the mountains. Concerned about this, His Majesty offered to provide compensation to hill tribes for crops grown on tracts of land used in research work under the Royal Project. This was seen as an unconventional approach bearing in mind that the hill tribes were living illegally in a watershed area. "His Majesty said that they were here first," recalled Dr. Santhad. Officials were advised by the King to let the tribes stay rather than go elsewhere where they would possibly destroy other tracts of land.

To reforest the hills and rehabilitate the Ang Khang watershed, the Royal Forestry Department introduced new, fast-growing acacias, pines, and cedars. The King also suggested introducing three types of wood for four types of use, one of His Majesty's sustainable development theories.



His Majesty explained: "Growing three types of forests yields four benefits: Apart from the obvious gains of fruits, timber and firewood, there is the important, fourth benefit of soil and watershed conservation."

The practical benefits of this campaign ensured a sufficient supply of wood for material needs so it was not necessary to fell more trees for domestic use. Reforested areas were preserved more efficiently than simply banning people from cutting down any trees at all.

The Royal Project's forestry project was conducted in partnership with Taiwan. A demonstration plot with a seedling nursery built at Doi Ang Khang yielded 1.2 million seedlings between 1982 and 1994. The saplings helped preserve the forests. Fruit trees played a major role in reforestation because they are almost never removed, or burnt accidentally, as they are planted as an orchard.

One demonstration plot yielded 1.2 million seedlings between 1982 and 1994













The Rural Development Highway Department laid paved roads to help villagers get their produce to market

Road infrastructure

In the early days of the project, paved roads in the mountains were few in number. Everyone involved was aware of the urgent need for a practical solution to get the farmers' produce to market. The hard work and effort put into the planting phase would not bring in any income if fruit and flowers were overripe, bruised or shrivelled before reaching market.

Consequently, the project team sought the assistance of the Rural Development Highway Department to construct a twenty-two kilometre road from the valley to the lowlands giving access to the markets. Prior to that, everything had to be carried on the backs of pack animals or in helicopters. Even the basic roads built in the early days of the project tended to become waterlogged after torrential downpours. As Dr. Santhad recalled, "We had to use chains on the wheels to drive through the mud."









National and international cooperation

Domestic and overseas co-operation proved invaluable in furthering the objectives of the Royal Project.

The Royal Pang Da, Inthanon, Ang Khang, and Mae Lod research stations together with thirty-eight Royal Project Development Centres, all house researchers and volunteers from several Thai universities and government agencies. They work as volunteers in the name of His Majesty. Most of the research is actually done by universities, technically working under the Royal Project only because work in watershed and protected areas is strictly controlled.

A successful outcome could never have been achieved without the participation of national institutes and agencies unified by a sense of purpose inspired by His Majesty the King. Some of the contributing organisations involved include Chiang Mai University, Kasetsart University, Maejo University, Ministry of Agriculture and Cooperatives, Department of Industrial Promotion, Ministry of Industry, the Border Patrol Police as well as direct assistance from the Royal Thai government. Strategically, considerable research assistance came also from the Thailand Institute of Scientific and Technological Research of the Ministry of Science and Technology.

On the international scene, His Majesty had already developed strong ties with overseas countries as a result of his many visits abroad in the Sixties. When His Majesty mentioned to members of the diplomatic corps the new Royal Project to develop the North, the king received enthusiastic and immediate support from embassies in the form of donations of temperate and semi-temperate fruit trees. Counted among the donor countries were Australia, France, Indonesia, Iran, Israel, Italy, Lebanon, New Zealand, the UK, and Germany.

Doctor Shen Chang-huan, ambassador to Thailand for what was then Chinese-Taipei, when made aware of the new Royal Project, notified his government of Thailand's need for fruit saplings, vegetable seeds, and expert assistance to develop mountain agriculture. His request met with a positive response. For many years the Vocational Assistance Commission for Retired Servicemen (VACRS) – Kuomintang army veterans – had developed temperate-zone fruit plantations in Taiwan's own central highlands. VACRS chose Mr. Soong Ching-yun, deputy director of one of the farms, to visit Thailand to conduct a first hand assessment of the situation.

Early in 1971, "Papa Soong", as he is still fondly referred to by local folk, began planting saplings flown in from Taiwan. The results were positive. Later, Taiwan was instrumental in setting up the Royal Agricultural Station at Ang Khang and a Taiwanese team agreed to stay in Ang Khang indefinitely to establish a cooperative relationship with the Royal Project.



The Royal Project attracts visitors from all around Asia, and further afield



Profits from coffee, fruits and vegetables were up to three times higher than from opium cultivation

In the spirit of international co-operation, Australia provided one thousand five hundred samplings along with rust-resistant varieties of Arabica coffee developed in Papua New Guinea. Later, Prince Bhisadej commented that a start had been made: "We have introduced the Arabica coffee bean. Before, it was planted in a research station but was not grown commercially…"

Led by Kasetsart-trained experts, small teams of young, Thai graduates went into hill tribe villages to introduce coffee and other crops like kidney beans. Thai scientists in the programme pioneered a technique to introduce successful research into villages. It was discovered that profits from coffee surpassed those from fruit and vegetables. The project's poverty elimination campaign saw other hill farmers growing coffee, fruits and garden vegetables that yielded profits two to three times higher than opium. The drive to introduce substitution crops was fast becoming a one-way street of accomplishments!

The project also attracted the attention of the United Nations Development Programme (UNDP) and the United Nations Fund for Drug Abuse Control (UNFDAC) which established a fund to finance by 1988 some seventy research programmes connected with the Royal Project's research centres. UNFDAC set up an office in Chiang Mai.

One day, while visiting UNFDAC, Prince Bhisadej met four representatives of the Agricultural Research Service (ARS), a division of the U.S. Department of Agriculture (USDA).

"The ARS funds research work only. They came to Thailand scouting for government agencies interested in finding replacement crops for opium," Dr. Santhad explained.

Prince Bhisadej remembered the occasion: "So, the USDA-ARS came along trying to find people to give money to. They were just about to leave Thailand when I met them. I asked them to come to my house for dinner and I asked Professor Pavin – the fruit man – and some other people along. So we had a talk and we got a lot of money from them. There were separate projects like fruit, flowers and so on.

"I proposed cultivating flowers to the USDA people and they thought it would not work because flowers are very delicate things and the hill tribes are very rough people! Well, we suggested they compare it to opium; the opium flower needs a lot of delicate work and you have to look after the plant very well and have a lot of patience."

The cultivation of flowers was suggested as a substitute for opium poppies





The USDA gave The Royal Project three million Thai baht to start a flower project

Finally, the USDA gave three million baht to the Royal Project to start a flower project free from any overriding conditions thanks largely to the trust engendered by His Majesty and the respect gained through the King's work.

The additional financial support resulted in a substantial expansion of the Royal Project. Research was conducted into the practicability of raising strawberries, potatoes, onions, silkworms, dye plants, mushrooms, and a variety of chrysanthemum called pyrethrum used in making insecticides. Altogether, eighty-four projects were funded by the USDA between 1973 and 1987. Doctor Santhad recalled with some humour that the USDA-ARS imposed a strict discipline on Thai researchers: "The ARS really forced everyone to write long and detailed reports!"

In time, USDA funding was phased out but the project still received around one-third of its annual budget of seventy-two million Thai baht from external sources. Another third continues to this day to come directly from the Privy Purse and the final third from the Royal Thai Government. The United States, the UN Food and Agriculture Organization, UNDP, and Taiwan continue to provide substantial financial backing for work undertaken by the project.

"More, and regular, government funding came when the Royal Project became a foundation," Dr. Santhad observed. The government, he explained, was able to set aside funds annually for a foundation, whereas support for a private entity was less regular.

Research at Suan Song Saen

An experimental station for temperate zone fruit trees was established by the Royal Project at Suan Song Saen, Doi Pui, on the outskirts of Chiang Mai, some one thousand, two hundred and twenty metres above sea level. A team of plant specialists from Kasetsart University began work grafting Australian peaches to local root stock. They tested other, temperate-clime fruits for suitability at that altitude. Researchers learned that Australian peaches, at that time, were not suitable for local cultivation because they need a longer period of chill than could be provided in the northern Thai climate at Suan Song Saen.

Royal Pang Da Research Station

Further research work was conducted at Royal Pang Da Research Station some forty-seven kilometres north-east of Chiang Mai. This station was originally set up as a plant propagation site for temperate trees. However, the station's convenient location, and its easier access to water from a nearby dam site after the station was expanded, meant work could be expanded to cover a greater variety of plants catering for all thirty-eight Royal Development Centres. Various methods of propagation are performed here including layering, grafting by stem cutting, bud cutting and cutting with local rootstocks.

Many of the Royal Development Centres are below one thousand metres above sea level. As this research station is only seven hundred metres above sea level more research work has been performed there on semi-tropical plants such as strawberries, avocados, papayas, mangos and lychees as well as flowers including roses and chrysanthemums.

The Royal Pang Da Research Station, therefore, is one of the main research stations for propagating plants used to substitute for opium cultivation. Other crops cultivated at this station, such as fruit trees, help to rehabilitate and sustain the local environment.



The Royal Pang Da Research Station propagates plants to substitute for opium poppies







Fruit trees provide environmental protection

Inevitably, the question arose as to why deciduous fruit trees were chosen for Thailand's northern region: They take a long time to reach maturation to produce fruit and they require constant attention. Whilst that is true, it is also a fact that deciduous fruit trees are well-suited to heights above one thousand metres; heights where opium poppies are cultivated. Moreover, they are a long-term investment and the Royal Project was focused on creating long-term enterprises. With care, the time invested in fruit tree cultivation could achieve this objective.

At high altitudes, and on hillsides sloping greater than thirty degrees, these fruit trees grow into natural, productive forests that help bind the soil, trap nutrients and slow-down water run-off to lower areas. Later, His Majesty also introduced vetiver grass known for its dense root system as an efficient binder of sloping land. Subsequently, the North became a centre for royal investigations into the properties of vetiver in preventing soil erosion and topsoil degradation.

Fruit trees take four to five years to become productive. In the interim, farmers have to cultivate faster-growing cash-crops like vegetables and flowers. Over fifty different kinds of vegetables are grown in the Royal Project area including Brussels sprouts, leeks, celery, zucchini, turnips, Japanese cucumber, parsley, Chinese cabbage, potatoes, radishes, fennel and endives. By integrating deciduous fruit tree cultivation with vegetables, farmers were able to enhance food security and, in time, they were bound more closely to their land. Eventually, this ended the farmers' itinerant way of life that had supported indiscriminate methods of opium poppy cultivation largely responsible for the destruction of around four thousand hectares of forest by 1987. This crucially important point led to the Royal Project placing great emphasis on fruit tree cultivation.

The North became a centre for studying vetiver grass as a means to prevent soil erosion and topsoil degradation







Villagers also formed community forestry groups to preserve forested areas and to educate others of the need to conserve and prevent soil erosion. The Villager Forest project educated villagers to fell trees for timber or firewood in selected and approved areas, and informed them where not to fell trees. In return for permission to cut down some trees, villagers were asked to plant tree saplings in other locations to help the process of reforestation.



Self-help through self-management

The Royal Project team was faced with a philosophical dichotomy: should the project be a "provider" or should the team teach villagers to practice self-help? Theoretically, the Royal Project could continue to help villagers indefinitely; or teach self-sufficiency so villagers could stand on their own two feet. Give a man a fish and you feed him for a day; teach him how to fish and you feed him for life. The project chose to teach self-help through self-management.

As a matter of policy, hill tribes in the project area are encouraged to form self-help entities, particularly rice banks, production groups, and cooperatives. Cooperatives are a well-known starting point for self-management of a community and form a part of His Majesty the King's "New Theory" of development.



Poor farmers lack the capital needed to launch a business, or to keep a business going through difficult times. This problem was addressed by the Royal Project by providing credit to finance agricultural development or maintain rice and food banks. The Bank of Agriculture and Cooperatives provides credit to some centres to ensure farms survive. Over the years, this form of cooperation with the bank has continued to grow.

No one wants to see the return of hunger pangs forcing people back to cultivating opium poppies. For convenience, rice banks have been set up in several villages where rice can be borrowed for immediate consumption against the next harvest. At the end of the season, borrowers replace the "borrowed" rice so there is always a reserve of "food capital" available for the next person or family.

Some villages have their own "rice banks"





Health care and drug addiction

Those engaged in the Royal Project were quick to realise that close attention had to be given to the physical wellbeing of villagers. In the earlier days, a large number of hill tribe people were malnourished and prone to the kind of diseases the developed world could only gasp at in amazement. Subsequently, villagers in need of health care, nutritional advice, guidance on family planning and so forth were visited by doctors and nurses from Chiang Mai University Hospital. Medical teams complemented vaccinations for common childhood illnesses such as polio and rubella by concentrating on virulent, Asian-oriented illnesses like Japanese encephalitis B. Government clinics in development areas provided assistance in terms of general medical care.

In a region that for years had been afflicted by uncontrolled opium cultivation, drug addiction was an important but totally unacceptable spin-off that had to be addressed and eliminated. Without able-bodied farmers, the Royal Project's crop research programme could never be implemented by the target group. In 1983 the foundation's treatment programme was expanded when it became obvious that treatment centres in Chiang Mai would not be able to cope with the problem.

The physical wellbeing of villagers is essential in the fight against poppy cultivation



"It is a habit, like smoking," commented Prince Bhisadej. "But these hill tribes…they smoke opium not tobacco. It is also medicinal. If you've got a bad stomach, you smoke opium. It is used as a medicine and also if you work hard and it's cold you smoke opium and it's very relaxing."

The detoxification programme includes classroom education and support groups. Surprisingly, many addicts want to break the habit; they want a better life, and see the Royal Project's campaigns in an attractive light because the campaigns are not coercive even with the active support of the police and paramilitary Border Patrol Police. Generally, police try to prevent drugs from entering each community and help to rehabilitate users. But they are tough on dealers. Everyone, it can be said, plays by the King's rules.

Nong Hoi, one of the project's key villages, conducts regular detox campaigns. The village headman explained why the Royal Project's detoxification and education campaign were important: "We started the project because we could see the waste. The Royal Project would not get anywhere if the people involved were addicted to narcotics."

Addicted villagers felt it was time to stop. Forty-year-old Mr. Neng, an addict for twenty years explained: "The Border Patrol Police informed me of this programme under the Royal Project. I joined because I wanted to stop. They are stopping it everywhere these days…I have nowhere left to go."





Providing essential health care for villagers

Formal education in villages

The Royal Project Foundation works not only with local authorities to provide basic education to hill tribe villagers but also to teach agriculture and forestry. Children are also instructed to stay clear of opium and the undesirable aspects of drug abuse. Schools can be found in areas where few teachers would be prepared to live. Instead, it is left to Border Patrol Police to provide education in conjunction with primary education authorities.

To meet this requirement, primary education schools are established in some villages or within walking distance of a village, and run by the government following a standard curriculum. The foundation provides scholarships for some children to continue their secondary education in Chiang Mai or Chiang Rai.

Children are schooled to understand the undesirable effects of drug abuse





The Royal Project buys products directly from farmers for marketing throughout Thailand









Marketing and sales

Introducing new cash-crops to farmers was essential but that alone was not enough; the farmers' produce had to be marketed and sold. In 1985 the Royal Project established a marketing arm with project staffers and volunteers who bought fruit, vegetables and other products directly from the farmers at the prevailing market price less twenty percent to cover expenses.

"We have marketing both here [Chiang Mai] and in Bangkok; cold transport and lorries," explained Prince Bhisadej. "Our market is mostly Thailand, but we have one food processing unit here at Chiang Mai University. I think they are doing guava juice now. There is one at Mae Chan in Chiang Rai. They export frozen strawberries and baby corn."

In effect, the marketing team buys around one third of the produce to sell on to urban areas. The rest is sold locally and to visiting tourists. Project volunteers grade, package and sell the produce. The project earns annual revenue of around thirteen million dollars from highland farmers.

As part of the project, three, small-scale canning plants were set up at Ban Yang in Chiang Mai, Mae Chan in Chiang Rai, and one at Chiang Mai University (mainly for research) to process the hill tribes' and lowlanders' agricultural products. It took time to get fruit to market with the result some was ripe or overripe before it could be sold. Food canning plants address this problem.

"The King's idea was not to throw ripe peaches away but to have them canned instead," explained Dr. Santhad.

The first food-processing plant was set up in Ban Yang in 1972; the other one in Mae Chan was set up in 1975 and was very successful. Today it is called the Doi Kham Food Processing factory producing over one hundred different products. The earlier factory in Ban Yang, Chiang Mai processed canned products for thirty years before being turned into a museum set up under the auspices of HRH Princess Maha Chakri Sirindhorn. However, the original food processing plant is still in operation even though a new plant has been opened.





Canning factories ensure surplus produce is not wasted

Product branding and distribution

In due course the foundation developed product branding and distribution in Thailand to support the agricultural produce grown under the auspices of the Royal Project. In Chiang Mai, Chiang Rai and Bangkok, hill-grown products like tomato juice, lychee fruit, bamboo shoots, baby corn are processed into jams or canned goods for local distribution and for export. Products sold within Thailand carry the brand name Doi Kham (or Golden Mountain), instantly recognised nationally as the logo of His Majesty the King's project. Fresh produce, on the other hand, is stamped with the "Royal Project" brand and distributed nationwide through many outlets including the large, international supermarket chain Tesco-Lotus.

Royal Project brand

Royal Project produce also enjoys international exposure on routes flown by Thai Airways International one of the foundation's largest and most important customers. Each day, the catering department of Thailand's national airline prepares around seventy-five thousand in-flight meals for forty-eight different airlines serving Bangkok international airport. By supporting the Royal Project, THAI's catering department plays a major role towards improving the quality of life of hill tribe people in addition to bringing high quality products to the attention of the airline's domestic and international customers.









Working in conjunction with the foundation, THAI complies with international standards for product specification. EurepGAP (GAP being an acronym for Good Agricultural Practices) is a common standard for farm management practices created in the late 1990s by several European supermarket chains and their major suppliers. The aim was to introduce conformity among different retailers' supply standards, which had hitherto created problems for farmers. Today, it is the worlds' most widely implemented farm certification scheme initially used in Europe. Following improvements, it developed into a worldwide standard known as GLOBALG.A.P. Today, these standards encourage farmers to develop high quality fruits, vegetables and other agricultural products.



Mandarin Oriental Bangkok executive chef Norbert Kostner, an advisor to the Royal Project Board, evaluates produce with Prince Bhisadej the prime contributor to the success of the Royal Project

In Bangkok, several well-known, five-star luxury hotels carry Royal Project products because of the proven quality and freshness of each item. One of the better-known (and a long-standing customer) is the renowned Mandarin Oriental Bangkok. The hotel's long-serving executive chef, Norbert Kostner, an advisor to the Royal Project board since 1993, gives advice on just about everything from the ideal, fully-grown size of a cabbage to the preferred size of a rainbow trout! There are subtle reasons for such idiosyncrasies: Whereas most Asians prefer to share a fish meal among friends (the bigger the fish the better) a restaurant in an upscale hotel must serve a fish that fits the plate of a single guest.

Mr. Kostner's advice was supplemented by practical assistance: "I went to Italy and brought back a lot of seeds, but more like the kitchen-garden varieties. They started growing these under the auspices of the foundation…and they grew beautifully…from basil to rosemary to sage."

The Royal Project gradually expanded to the point where it was no longer just producing and marketing fruits, vegetables and flowers: In a valley next to Doi Inthanon, Hmong and Karen hill tribe farmers successfully produce around eighteen thousand kilograms of rainbow trout each year to be sold in city restaurants.

Assistance to foreign countries

As the Royal Project grew more successful, requests for assistance poured in from neighbouring countries, with Myanmar, Yunnan province in southern China, and Lao PDR among the first.

Today, Myanmar is second only to Afghanistan as the world's largest source of opium and they are most anxious to find a practical solution. In time, the foundation was contacted by other countries, including Columbia, Peru, Bolivia, Mexico and Pakistan, all seeking assistance to address their own drug crop problems

In Afghanistan, in 2008, around one hundred and fifty-seven thousand hectares had been given over to opium poppies according to the United Nations Office on Drugs and Crime (UNODC) which has an office in Bangkok and offices in other affected countries. The director of UNODC in Afghanistan, Antonio Maria Costa, estimated the Taliban earned some one hundred million dollars from the opium trade in 2007 alone.

Gary Lewis of the UNDOC in Bangkok said, "There's a lot to be learnt from what we have achieved here. What we need to do is to try to stabilize the situation (in Afghanistan)...and in such a way that we can establish an environment for the kind of interventions that have proved successful in Thailand."

Dr. Santhad is less sanguine, believing it is perhaps unrealistic to emulate the success of the Royal Project in countries like Afghanistan "...until they cease fighting."



Afghanistan is seeking a practical solution to address its opium problems



His Majesty King Bhumibol Adulyadej, the world's "Development King"

Reasons for success

Asked to comment on why the Royal Project has enjoyed such success, project director, Prince Bhisadej summed it up succinctly: "...through the money getting into the pockets of the hill tribes...they are driving cars!"

Apart from its tangible success, the Royal Project has received recognition of another kind by winning the Ramon Magsaysay Award in 1988 for International Understanding; and later the Colombo Plan Award in 2003 which identified it as the world's most outstanding opium-replacement project, and the only scheme to successfully eradicate opium poppy cultivation through positive measures.

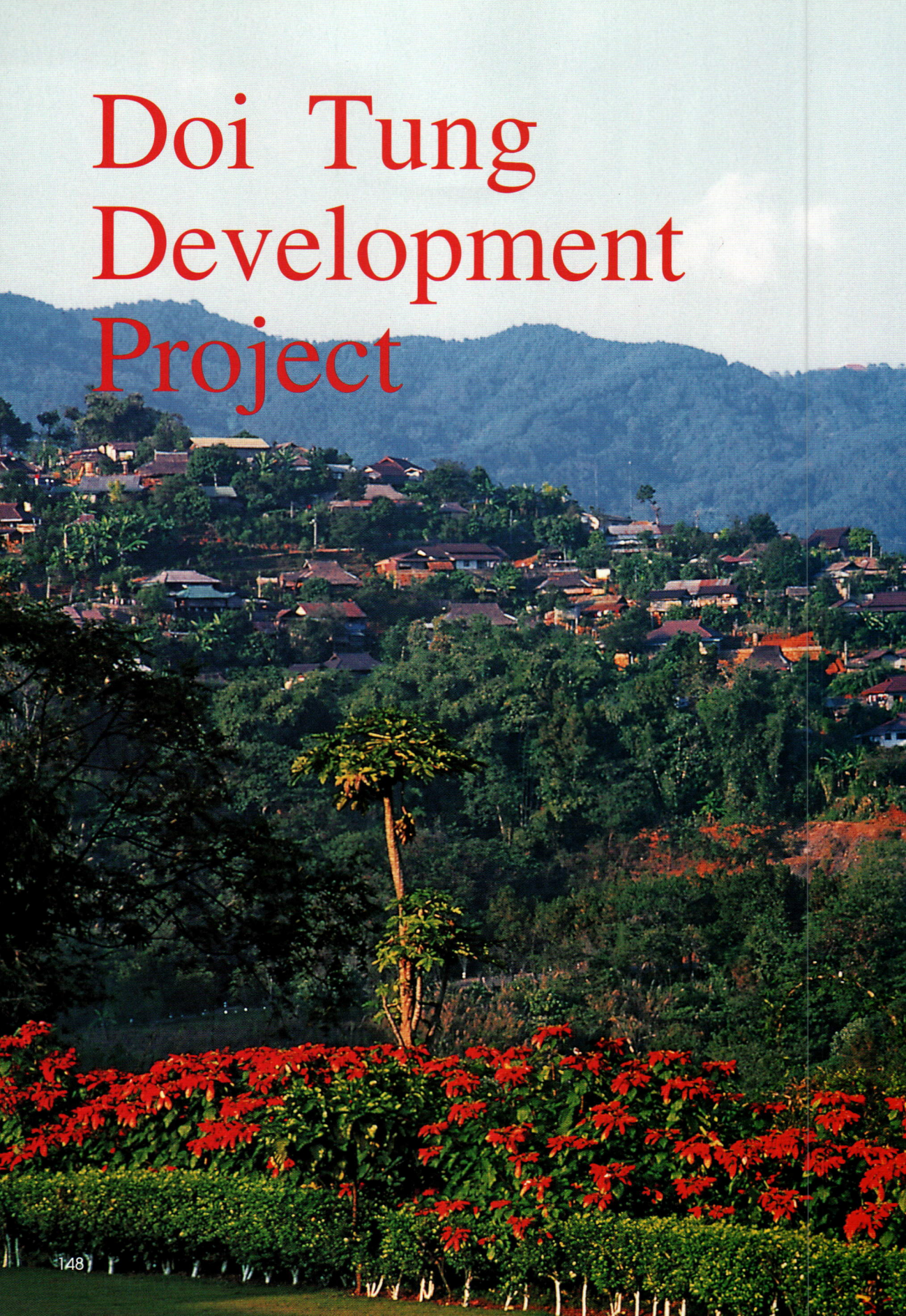


His Majesty the King's empathy with the plight of one of the poorest segments of society has made Thailand's king one of the most respected development scientists in the world. The United Nations Development Programme (UNDP) in 2006 presented His Majesty with its first-ever Lifetime Achievement Award in recognition of the King's work. As he personally bestowed the award on His Majesty, UN Secretary-General Kofi Anan said:



"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 – listened to their problems, and empowered them to take their lives in their own hands."

Doi Tung Development Project







HRH the Princess Mother was determined to raise the quality of life among villagers and reforest barren hillsides

Deforestation in northern Thailand

As far back as the 1960s, Her Royal Highness Princess Srinagarindra, the late Princess Mother, saw first hand the cause and effect of swiddening (slash-and-burn) farming to clear forested hillsides in northern Thailand to grow poppies. For generations, opium poppy cultivation had provided hill tribes with a means of earning a meagre living but the price was high, paid in terms of human suffering and environmental degradation - an untenable and wholly unacceptable outcome.





Out of humanitarian concern, the Princess Mother vowed to not only reforest the barren hillsides but, more fundamentally, to elevate the quality of life of local people by eliminating the cause of their predicament – poverty and lack of opportunity. Poor and needy villagers, Her Royal Highness maintained, had to have access to education, health and welfare programmes to enable them to earn a wage without having to resort to indiscriminate farming techniques that was turning their environment into a barren wilderness. It was a lofty goal that became a cause célèbre not only for the Princess Mother, but also the many people who rallied to the cause.



The Princess Mother's granddaughter, HRH Princess Sirindhorn, and the Princess Mother's daughter, HRH Princess Galyani also travelled to remote areas

It was to be a long, but worthwhile journey with much of the Princess Mother's vision-for-change enshrined in the successful outcome of many projects that had their roots in the Sixties, culminating with the Doi Tung Development Project, which saw the reforestation of once barren hillsides on Doi Tung Mountain and its surrounds. This was, and still is, a holistic and integrated Sustainable Alternative Livelihood Development initiative that today enjoys international acclaim.

Although the Doi Tung Development Project has several years to run to complete its thirty year time frame, the management and staff of the Mae Fah Luang Development Foundation (MFLF), who oversee the project, have responded positively to calls to help communities in neighbouring countries such as Myanmar and Indonesia and even Afghanistan.

Celebrating the centenary anniversary of the late Princess Mother in 2000, UNESCO Secretary General Koichiro Matsuura said Her Royal Highness had shown the world how individuals can contribute to development. By starting small, with determination and commitment, the Secretary General said, the Princess Mother had shown how to reach one's goals.

Scenic view of Doi Tung Royal Villa





The Princess Mother as a teenager

HRH Princess Srinagarindra, the Princess Mother of Thailand

Born on October 21, 1900 into a goldsmith's family in Thailand's Nonthaburi Province, Sangwan Chukramol (destined to be mother to two kings) was the third child in a family of four. She endured a tragic start to life when her elder brother and sister both died while they were quite young. And by the time Sangwan Chukramol was nine she had also lost both parents and had but one remaining sibling. Her aunt, Suay, who earned a living making sweets, became Sangwan's guardian.

From these humble beginnings, the young Sangwan, who became an avid reader (particularly Thai classics) was despatched to live with another relative who was nanny to Princess Valaya Alongkorn, the Princess of Phetchaburi, daughter of King Chulalongkorn (Rama V) and Queen Savang Vadhana. Sangwan soon found herself presented before the royal court in the manner deemed proper for young Thai girls. At that time, her only duty was to be present at a twice-daily audience with the Princess. Occasionally, she would be asked to join the Princess' entourage on visits to Queen Savang Vadhana at Suan Hongsa Royal Villa in the grounds of Dusit Palace in Bangkok.

Later, she attended school while living with Huan Hongsakul, the nanny of Prince Mahidol Adulyadej, Prince of Songkla, the younger brother of Princess Valaya Alongkorn.

Sangwan the student nurse

An accident with a sewing needle heralded the start of young Sangwan's nursing career. Fortuitously, her injury was attended to by the court physician, Phraya Damrong Baedyakhun, in whose house she stayed while continuing her schooling. Sensing that Sangwan seemed rather lethargic and despondent, the doctor felt compelled to try to improve her demeanour. Would she be interested, he enquired, in studying nursing? Indeed she would, she replied without hesitation.



At just thirteen years of age, in 1913, Sangwan was enrolled as a student at Siriraj School for Midwifery and Nursing. As a scholarship student, and with just fifteen Thai baht a month for expenses, she agreed to work for the hospital for three years. After graduating in 1916 she joined the hospital's nursing team. In the following year, Prince Rangsit Prayursakdi, director of the Royal Medical College of Siriraj Hospital designated two doctors and two

nurses (one being Sangwan) to further their studies in the United States of America. The medical scholarships were provided and funded by Prince Mahidol Adulyadej (in later years renowned as the Father of Modern Medicine and Public Health of Thailand). Prince Mahidol's mother, Queen Savang Vadhana, sponsored the nursing courses.

Before Sangwan could travel she had to acquire a passport. For that she needed a surname, which, for people, was not common practice in Thailand until 1913. With no father, Sangwan decided to take the surname of Lee Talabhat, who, at that time, was in the service of Prince Mahidol Adulyadej.

Life and work in America

Sangwan Talabhat left Bangkok in 1917 with around twenty other Thai students. A year later, they joined eight more Thai students and travelled to Boston, Massachusetts. Prince Mahidol was waiting at the Boston railway station to meet them although, at the time, Sangwan had no idea who he was, or even that her very presence had already made a favourable impression on the young prince.



Sangwan Talabhat (3rd left) with friends in Berkeley, California

Romance ensued, and in a private ceremony in 1919 Prince Mahidol Adulyadej the Prince of Songkla Nagarindra took Sangwan Talabhat to be his wife. After their marriage, Sangwan became known as Mom Sangwan Mahidol na Ayudhya, but in Boston they were simply Mr. and Mrs. Mahidol Songkla living in a two-bedroom apartment, getting on with their studies. Apart from pursuing their studies, they would also cook and serve meals to other Thai students: Mrs. Mahidol Songkla cooked and her husband washed the dishes.

Theirs was a simple life, but tragedy lurked around the corner. The Prince graduated with honours from Harvard Medical School but by then his health had deteriorated; immediately after his finals Prince Mahidol suffered acute appendicitis that required urgent surgery.



Prince Mahidol with future wife Sangwan (left) and Sangwan's school friend Ubol



Passport photograph of HRH and her children

Accession to the throne

Sadly, Prince Mahidol passed away in 1929 when Mom Sangwan Mahidol na Ayudhya was just twenty-nine years old with three young children to care for. Her daughter was six, and her two sons four years, and one-year-and-nine months. Princess Galyani Vadhana, the Princess of Naradhiwas Rajanagarindra was the first born. The boys, Prince Ananda Mahidol and Prince Bhumibol Adulyadej, would both accede to the throne of Thailand as King Ananda Mahidol, Rama VIII, and King Bhumibol Adulyadej, Rama IX, respectively. As soon as they were old enough, the children started school in Thailand.

The coup d'etat in 1932 ended absolute monarchy in Thailand and raised the possibility that King Prajadhipok (Rama VII) might abdicate. Concerned about Prince Ananda Mahidol's safety as a likely heir to the throne, his grandmother Queen Savang Vadhana accepted advice that the Mahidol family should move to Lausanne, Switzerland. It was a decision that Mom Sangwan approved of because of its mild climate, beautiful scenery and hospitable people. They left in 1933 and Prince Ananda Mahidol spent most of his youth there.

It was in 1934 just one year after Mom Sangwan and her three children arrived in Switzerland they learnt that King Prajadhipok had abdicated. As anticipated the next in line to the throne was her son,

His Royal Highness Prince Ananda Mahidol, who was declared the eighth monarch of the Chakri Dynasty. He was nine years old. Until the young prince came of age, parliament appointed two Regents to oversee affairs of state.

After acceding to the throne, the young King Ananda Mahidol returned to Thailand at which time Mom Sangwan was elevated to the ranks of royalty with the title "Her Royal Highness".

World War II



Family snapshot taken in Switzerland

When war erupted in Europe in 1939, the Mahidol family, just like everyone else, felt the repercussions. Along with other families in Switzerland they relied upon ration coupons for food and other daily necessities. The young king travelled to and from school by bicycle. The Princess Mother supplemented food stocks by making jams from fruits from her own garden. Though times were harsh, she never neglected the Thai students who came round for meals on Saturdays, even extending her largesse by lending (or giving) them money to help them if their funds were late arriving from Thailand. The family lived in Switzerland until all the children graduated; they then prepared to return to Thailand.

Back in Thailand

A throng of Thai people gazed in awe, admiration and great respect as the Princess Mother posed for photographs with her two sons upon their return to Thailand in 1945 at the end of the war. Now forty-five years old, Her Royal Highness had successfully directed the formative years of her children and was now delivering them to the Thai people as responsible and intelligent adults. King Ananda Mahidol was ready to take on the huge burden placed on his shoulders and, as he had grown up in Europe, there was much to learn about his own country and its culture; questions the Princess Mother was prepared for and able to answer.



Young King Ananda (Rama VIII) meeting the people of Thailand for the first time



Coronation of HM King Bhumibol Adulyadej (Rama IX), May 5, 1950

Prince Bhumibol Adulyadej's accession to the throne

Planning to return to Switzerland to continue his studies, King Ananda Mahidol was requested by the Royal Thai government to postpone his date of return in order to present the new Constitution to the nation in May 1946 and to open Parliament on June 1. The king rescheduled his return to Switzerland for June 13, but three days before the date an unforeseen calamity befell the nation when His Majesty King Ananda Mahidol (Rama VIII) met with a tragic and untimely death. On that same day, Prince Bhumibol Adulyadej, the Princess Mother's second son, acceded to the throne as King Bhumibol Adulyadej (Rama IX) of Thailand, the ninth monarch of the Chakri Dynasty.



Villa Vadhana, Lausanne, Switzerland

Return to Switzerland

The Princess Mother accompanied the new king back to Switzerland to enable His Majesty to resume his studies at the University of Lausanne, while the Princess Mother resumed her role as "housekeeper" of the Villa Vadhana residence.

Preferring to undertake routine tasks herself, the Princess Mother would drive her own car on shopping rounds. Apart from attending lectures at the University of Lausanne on topics that interested her, she spent much time in her garden cultivating flower beds, pruning bushes and sweeping up fallen leaves. Even on trips around the countryside of Switzerland with the young King Bhumibol, the Princess Mother would stop by the road to pick wild flowers to take home. It was this innate love of nature and respect for the environment that began to influence Her Royal Highness' interest in conservation.



The Princess Mother picked wild flowers to make cards and bookmarks

The Princess Mother's passion for flowers, her sensitivity and concern for the world around her, dominated her life as a youth and into later years. It was more than just an artistic or visual interest; the Princess Mother was driven by a desire to nurture seedlings and young plants into full bloom with the same enthusiasm and attention to detail that she applied in her role as a royal mother.

Collecting wild flowers was not simply for pleasure and decorative purposes: As with most of the Princess Mother's other activities, it became an educational process, not only for her own edification but for the tutoring of others. Meticulously, she arranged the pressed flowers into an album, indicating the names in both French and Latin, also documenting the location where they were picked, the altitude and date.

Serving the Kingdom of Thailand

The Princess Mother served Thailand throughout her long life not only by providing full support to her family, but also by engaging in activities of great social concern to her as a caring and compassionate mother.

Her Royal Highness travelled between Switzerland and Thailand from 1952 to 1963 to attend significant functions and events, such as the birth of her grandchildren. She would stay for one or two months at a time or for extended periods when the occasion demanded. One such occasion was when Their Majesties the King and Queen undertook a state visit to fourteen European countries and the United States in 1960. At that time, the Princess Mother remained in Thailand for six months acting as Regent in Their Majesties' absence.





It was in the early Sixties and during a trip to northern Thailand in 1964 in particular that the Princess Mother had an enlightening experience that prompted her to introduce changes to her normal routine. Her Royal Highness was invited by His Majesty the King to visit Bhubing Palace in the northern province of Chiang Mai. During long walks through the woods behind the palace (replicating her practice of taking long treks while in Switzerland) the Princess Mother was able to enjoy the flora and fauna of the area, stopping to talk to people in small villages along the way. It was clear that abject poverty, a lack of schools, inadequate health services, and personnel, were critical social challenges facing the poor villagers. Even the border patrol police, who acted as guards for the Princess Mother, were poorly paid.



Visiting the Border Patrol Police accompanied by Princess Galyani

The precariously unstable socioeconomic situation the Princess Mother encountered in rural areas prompted repeat visits to the remoter parts of the Kingdom. Extremely fit for a sixty-four-year-old, the Princess Mother made a point, among other things, to visit each patrol station on her travels to lend moral support to the police and soldiers.

These visits to outlying areas of northern Thailand were the beginnings of what would become a series of humanitarian projects aimed at alleviating the hardship suffered by marginalised people. Her Royal Highness was determined to improve their quality of life and the way forward would be through education, health care and respect for the environment.

Social welfare initiatives

Social welfare projects initiated by the Princess Mother and still in vogue today serve to unify people living in remote areas. Her Royal Highness always approached each and every challenge from a humanitarian standpoint and out of a sense of duty – in much the same way she cared for her three children when she was still quite young with no husband to support her.



While doctors examined the sick, the Princess Mother handed out toys and uniforms

The Princess Mother had shown by example that Thai housewives could contribute to society by making good use of their time. In 1932, after the children started school, Her Royal Highness started an American-style "sewing circle", inviting close acquaintances to join the group. They started by making their own clothes but later they made clothes for poor children in hospitals.

Soon it became a standard procedure for the Princess Mother to use her own funds to buy necessities for poor villagers during her increasingly frequent trips to rural parts of Thailand. The gifts consisted of shirts, towels, multipurpose pha khao ma cloth, stationery for teachers and schoolchildren, school uniforms, sarongs, needles and thread, medicines, tinned food and dried foodstuffs. Small children would receive toys applicable to their age group. Personal funds were also used for setting up foundations, notably the Border Patrol Police Support Foundation, and the New Life Foundation for patients who had recovered from leprosy or mental illness. The Princess Mother's capacity for altruism appeared to be without bounds.

Education and scholarships

Her Royal Highness' love for education fuelled a desire to encourage her own children, and those of people she met during her travels, to further their studies to the best of their abilities. Towards this goal, the Princess Mother offered support wherever and whenever she could, particularly in the more inaccessible parts of the country beyond easy reach of the central government.

Formerly a scholarship student herself, the Princess Mother provided scholarships for others as far back as 1920, not long after her marriage to Prince Mahidol. The Princess Mother's own studies, under the direction of Prince Mahidol, had included algebra, English, Latin and French, as well as her courses in nursing and public health, and tutorials in psychology, cooking and nutrition.

As a well-educated and well-rounded individual, and through the influence of her royal husband, the Princess Mother remained conscious of her responsibility to return to Thailand to help the nation - a sense of purpose she instilled into the hearts and minds of her three children from the time they were very young.

The importance the Princess Mother attached to education could not be overemphasised. Frequent trips to out-of-the-way parts of the kingdom where she learnt of extreme poverty among villagers, especially hill tribes, prompted Her Royal Highness to initiate the Border Patrol Police School project. A school was established by the Border Patrol Police Region 5 in the Mae Rim District of Chiang Mai Province that provided education for children in this remote region. The result was hill tribe children had a chance to learn the Thai language and culture and become inculcated with a sense of being Thai.

Schools were provided for children living in remote areas



This concept aligned with the Princess Mother's belief that education was fundamental to improve human resources, a vital tool for any form of development particularly in the remoter parts of Thailand. With this in mind, she decided in 1964 to take the school under her royal patronage, at the same time donating funds to the Border Patrol Police to set up similar schools in remote areas. The idea was embraced by Thailand's private sector and companies contributed funding towards new schools subsequently named after donors. In time, there were one hundred and eighty-five schools with power classrooms and appropriate residential quarters for teachers. The Princess Mother opened each one of these schools donating symbolic items to promote a sense of Thai identity, including a Buddha image to symbolize religion, a portrait of the King or Queen as an emblem of monarchy, and a flag to represent the nation. Each school had a radio link to stay abreast of news, and a map of Thailand to give students a sense of belonging irrespective of where they were located in the country.

In addition to providing scholarships, the Princess Mother worked untiringly to further nursing in Thailand. As founder and board member of The Nurses' Association of Thailand, she used her personal funds in 1960 to stage the first national nursing convention ever held in the country. Later, hospital buildings and nursing schools were built under the royal patronage of Her Royal Highness.



The Princess Mother often used her own funds to help poor villagers



Public health improvements essential for development

Of prime concern to the Princess Mother was the health and wellbeing of the people. If they were able to enjoy good health, she reasoned, they would be able to earn a living and contribute to the development of the country. This view echoed the philosophy espoused by her late husband Prince Mahidol Adulyadej who had injected financial support to further a personal goal to improve public health in Thailand.

The sad passing of Prince Mahidol, a great personal tragedy to Her Royal Highness, did not prevent the Princess Mother from remaining focused and engaged with plans to improve the nation's public health. Her Royal Highness knew from Prince Mahidol's dedication to medicine and public health that such would have been his desire. Accordingly, she provided medical students with scholarships so their studies were not interrupted. And on their return to work, she supplemented the students' salaries if they were lower than the set rate. The Princess Mother went even further by establishing a revolving fund of five hundred thousand Thai baht for Chulalongkorn University over twenty-five years; interest from the investment to be used to send students overseas for postgraduate studies. When the twenty-five years were up, the fund in its entirety was transferred to the Faculty of Medicine at Siriraj Hospital.

Conscious at all times of the need to help her country, the Princess Mother, alert to the needs of Thai people, remembered to bring back from Europe the drug PAS (for treating tuberculosis) when she accompanied her elder son, King Ananda Mahidol back to Thailand in 1945.



Air transport was often the only way to access remote areas

Volunteer medical team

During the early 1960s, the Princess Mother regarded trips to remote areas to visit villages and army personnel as a part of her routine. Although saddened by the sight of people plagued with health problems, the Princess Mother remained determined to tackle them. In remote areas where medical facilities were inadequate, normally treatable diseases such as gastrointestinal infections, tape worms, skin diseases and even malaria, often resulted in death.

To address the problem at source, the Princess Mother in 1969 established the first medical volunteer mobile unit in Chiang Mai Province. Volunteer doctors, dentists, pharmacists, nurses and health officers contributed their time and service skills at weekends to respond to calls for help. They would travel by car or helicopter to treat the sick and offer consultation services free-of-charge. The venture was not cost-free but it was subsidised by the Princess Mother who often accompanied the medical response team to help fill out prescriptions and provide advice to the sick. Those patients deemed to be critically hill were sent to local hospitals.

As the service became established, the Princess Mother (at first as an experiment) used radio consultation between hospital doctors and patients waiting in health centres in remote areas similar to the system adopted by the Royal Flying Doctor Service of Australia. The experiment was a huge success: Within a few years four hundred and forty-six radio centres had been established in twenty-five Thai provinces. Over a million patients benefited from this service whose operations centre was at Sra Pathum Palace where Her Royal Highness and Prince Mahidol were married, and where Prince Mahidol would spend his last days.



Concern for the poor and marginalised kept HRH going despite her advancing age

Preserving the environment



Picking wild flowers, a great passion of the Princess Mother

In her early life, the Princess Mother exhibited an innate interest in the wonders of nature. During time spent in Switzerland, she enjoyed skiing the alpine slopes during winter. But summer would be spent trekking around the hillsides, gathering and identifying wild flowers to decorate the house.

In 1964, aged sixty-four, the Princess Mother hiked to the top of Doi Inthanon, Thailand's highest peak located in the northern province of Chiang Mai. On local walks she was usually accompanied by Border Patrol Police and her personal physicians. Now, the Princess Mother wanted to extend her walks from the vicinity of Bhubing Palace where she was staying, and Doi Inthanon was visible from the palace windows. Conquering it became a growing priority.

In the early Sixties, there were no access roads leading to the peak. The Princess Mother had to spend two nights camping on the mountain: the first night prior to the ascent at Pang Somdet, and the next night at Ban Pha Mon. Her Royal Highness found herself surrounded by a large crowd of hill tribe villagers. It was a welcome sight, but the general state of their health and a lack of access to medical care was cause for great concern.

When the Princess Mother returned by helicopter to the same place a year later she brought with her two doctors. Subsequent visits to these remote locations earned her the title "Mae Fah Luang" among hill tribes, meaning Royal Mother from the sky in reference to her helicopter descent from the skies with doctors, nurses, medical equipment, food and clothing.

After multiple visits to the hill tribes, the Princess Mother saw that the slash-and-burn techniques they used to clear the land for cultivation had hastened the destruction of the area's watershed forests. Moving from place to place, the villagers had left behind a trail of destruction and barren patches on the hillsides.

Her Royal Highness could see that addressing environmental degradation and tackling education and health care challenges were interlinked. From this assessment and with advice from others, she initiated the Doi Tung Development Project.



On local walks, the Princess Mother was often accompanied by Border Patrol Police and her personal physicians

Mae Fah Luang Foundation

Although distressed at the personal plight of hill tribe villagers, the Princess Mother found through frequent visits to remote areas that some were able craftsmen. With the right kind of help, she felt they could make their own living and become responsible members in their own communities.

With one hundred thousand Thai baht of seed money from her own resources, the Princess Mother established the Thai Hill Crafts Foundation in 1972. It was a successful initiative; ethnic minorities were given help to package and market their handicrafts and these soon proved popular overseas as well as in Thailand.

By 1985, the foundation had expanded its activities to cover youth development and the conservation of Lanna (northern Thailand) art and culture. With its new role came the new name Mae Fah Luang Foundation under the Royal Patronage of HRH Princess Srinagarindra.

A year later, the Royal Forest Department called upon the Mae Fah Luang Foundation to help solve problems of deforestation and discourage local people (who were struggling for survival) from encroaching further onto the remaining watershed forests of Doi Tung Mountain in Thailand's hilly northern province of Chiang Rai that borders Myanmar.

Doi Tung Royal Villa with kalae roof decoration typifying northern-style architecture



In order to devote adequate time for the reforestation project, the Princess Mother accepted the proposal from her Private Secretary, Mom Rajawongse (MR) Disnadda Diskul, to build a house at Doi Tung. From there, Her Royal Highness had a convenient base to use for both reforestation and development projects directly related to

health, education and livelihood development across a vast area.

MR Disnadda Diskul, who is Secretary General of the Mae Fah Luang Foundation, probably knows more about the late Princess Mother than anyone alive, "...apart from her son His Majesty the King," MR Disnadda was quick to point out during a discussion concerning the Doi Tung Development Project and Her Royal Highness' lifelong commitment.

"The Princess Mother may have been small in stature," he said, "but she had a huge heart and was a most compassionate lady who led by example." By way of illustration, the Secretary General related an incident when the Princess Mother was walking towards a man smoking a cigarette. "The man threw it on to the ground and stubbed it out with his foot. Without a word, the Princess Mother walked over, picked up the cigarette butt, and later deposited it in a rubbish bin."

The Secretary General explained how the Princess Mother had raised her three children to understand the value of money. "The Princess Mother believed you should not receive money for doing nothing; you had to earn it." MR Disnadda related an occasion when the Princess Mother asked her son (His Majesty King Bhumibol) how he came to obtain money from his nanny. "His Majesty was able to inform his mother that he had earned it repairing a sowing machine!"



Doi Tung Royal Villa, residence of the Princess Mother

The Princess Mother had a huge appetite for education. "She was always searching for knowledge...eager to learn, and became even more scholarly when she met up with Prince Mahidol," MR Disnadda recalled.

The Princess Mother adhered to the same principles throughout her entire life, irrespective of where she directed her efforts. "With regard to driving the Doi Tung project," MR Disnadda said, "I would say that the Princess Mother was the jockey, and I was the horse! It was a real privilege to gain experience from knowing her...to witness her compassion."

All the projects, the Secretary General explained, were about helping people. "Just as His Majesty did not care for populist policies, the Princess Mother did not believe in giving away money to solve problems. His Majesty's philosophy is to give people the weapons – knowledge, education – to fight against poverty. Everything the King has done shows that this philosophy works; the whole approach is to help others to help themselves."

Asked how the Doi Tung project initiated by the Princess Mother differed from the Royal Project initiated by His Majesty the

King, the Secretary General said there were no major differences. "The Princess Mother studied His Majesty's project in Chiang Mai," explained MR Disnadda, "then she asked me to study His Majesty's experimental projects at Chitralada Villa in Bangkok."

In 1987 the Lord Chamberlain showed MR Disnadda to every project at Chitralada Villa. "When I reported back to the Princess Mother on what I'd learnt, she advised me to start cultivating mushrooms, mulberry trees for sa paper…and tissue culture. Her Royal Highness said 'we can make money with these!'"



In terms of initiating projects, the Secretary General said the Princess Mother had learnt from her son, His Majesty the King. MR Disnadda noted that later on, the Princess Mother asked her daughter, Princess Galyani, to go to the Huai Hong Khrai Royal Development Study Centre in Thailand's northern province of Chiang Mai to see how His Majesty's projects were developed.

"This was the first stage…the beginning," MR Disnadda said. "The second part was to understand the co-existence of man and nature. Fortunately for all of us, the Princess Mother was so practical and took a simple and logical approach to all matters."

Asked where Her Royal Highness drew her inspiration, the Secretary General said she was encouraged by her husband the late Prince Mahidol. "While he was studying to be a doctor, the Prince became aware that to be a good doctor he had to love to help people…to be caring and compassionate…and he was. In my view this led to the Princess Mother drawing much of her inspiration from her husband.

"At the foundation, we try to follow the Princess Mother's example: As we go about our business, nobody asks 'what's in it for me?'" MR Disnadda said. "The self-contentment and satisfaction we draw from doing this is something money can't buy!"

The Mae Fah Luang Foundation learnt from The Royal Project initiated by HM the King







The DTDP covers a land area of 15,000 hectares

Doi Tung Development Project

Asked if the main objective of the Doi Tung Development Project was reforestation, MR Disnadda explained reforestation was simply the "vehicle" to transport change. Reforestation had to be undertaken because the land was denuded. "You can see from recent events in Thailand that people talk of the urgent need to address inequality. But inequality is a symptom and comes last. First we have to address the causes: poverty and lack of opportunity. Drugs [in the context of Doi Tung] were not and are not the root cause; people turned to them because of poverty; people will do anything to survive."

The Doi Tung Development Project (DTDP) started in 1988 as a Sustainable Alternative Livelihood Development (SALD) project to address the drug problem from the supply side by tackling the root causes of poverty and lack of opportunity. Doi Tung wasn't chosen because it is the highest mountain in the range; that distinction goes to Doi Chang Moob at one thousand five hundred and nine metres.

"At one time Doi Chang Moob was the best place in the world to grow opium," the Secretary General said, recalling the start of the Project. "The hillsides, you see, face northeast away from the hot afternoon sun, so it was good for growing opium."



Denuded hillsides had to be reforested, but not before tackling poverty among villagers

MR Disnadda explained that Doi Chang Moob, also part of the project, was one of the Princess Mother's favourite places. "Her Royal Highness loved red rhododendrons, so we got a hundred from Myanmar to plant on Doi Chang Moob." The Secretary General said they also brought in four thousand more from Kunming, China "...by boat down the Mekong then across the country and up the mountainside in thirty-five, ten-wheeler trucks. This was in 1993. And when the rhododendrons were in full bloom Princess Sirindhorn took a photograph of the hillside for the Princess Mother. She kept it next to her bed always."

The SALD model, mirroring the Princess Mother's development principles, has evolved over more than twenty years. Its purpose is to empower people irrespective of gender, religion, ethnicity or political orientation, to help themselves and others and, eventually, to continue to develop unaided. The aim is to enable people to live with dignity and in harmony with nature as good, self-sufficient and capable members of society.



Once a secluded place in the north of Thailand bordering Myanmar at the heart of the infamous Golden Triangle, the Doi Tung Development Project spans around fifteen thousand hectares of land. Twenty-nine villages and eleven thousand people occupy the area.

Complex problems had to be addressed in the early days: the watershed became denuded by overzealous slash-and-burn cultivation, exacerbated by opium poppy cultivation on a commercial scale. Most of the six ethnic groups living in the area did not hold Thai citizenship, so received little attention from government officials. There were armed groups claiming ownership of the area that made it even more difficult for government officials to assist the local people. These were massive challenges to overcome, and would form part of a thirty-year development programme broken down into three separate phases.





Jobs and skills training were provided on site

Phase I "Bridging the Gap between Doi Tung and the Outside World" was carried out between 1988 and 1993. Basic infrastructure was developed; opium growers were paid daily wages to become forestry workers. The fundamental necessities of life were provided; jobs and skills training initiated. Economic forests were planted and nurtured to create short, medium and long-term economic benefits for the local residents.

In Phase II "Livelihood Development", carried out between 1994 and 2002, the focus was on income generation, a first step towards sustainability. Economically viable local resources and plants were identified and the foundation introduced a value-added approach to optimize the value of local resources.







The project has four business units: foodstuffs, handicrafts, tourism and horticulture

The third phase "Sustainability and Exit" will continue until 2017 by which time the four business units (foods, handicrafts, tourism and horticulture) will be strengthened to be profitable as well as self-sustaining.

The Mae Fah Luang Foundation (MFLF) has been financially self-sustained since 2001 with income from its four business units paying for the salaries and wages of some one thousand seven hundred employees as well as supporting social and development activities in the project area.

The plan is for the MFLF to phase itself out of the development and management of the Doi Tung Development Project and turn the social enterprises over to a new generation of local leaders.

Today, the Doi Tung Development Project is a holistic and integrated Sustainable Alternative Livelihood Development (SALD) initiative that constitutes the culmination of the Princess Mother's lifelong dedication to help the less fortunate.



The project is a holistic and SALD initiative of the Princess Mother

The reforestation project

In 1988 almost fifteen thousand hectares of land in the districts of Mae Chan, Mae Sai and Mae Fah Luang in Chiang Rai Province were targeted for reforestation and a sustainable development programme to improve the quality of life of local villagers. The approach taken by the Princess Mother was in three parts: Human development, economic development, and environmental development – together the ingredients for Sustainable Alternative Livelihood Development.

The energetic Princess Mother would play an active role in the early days of the Doi Tung Development Project nurturing the saplings and then replanting denuded forest, later to benefit from additional support from the Royal Thai Government and the country's private sector. Soon, experimental plots were set out to test temperate crops such as Arabica coffee beans from Brazil and Costa Rica, macadamia nuts and chestnuts. Later, and to the present day, new plant-nursery technology is constantly introduced to propagate such plants as asparagus, bananas, orchids and strawberries. After successful trials, the local villagers are trained in plant husbandry and given procedures to follow that lead them towards a sustained lifestyle and increased incomes.

Doi Tung underwent great change: Land previously used to cultivate opium poppies gave way to fruit and vegetables. Even human casualties, in the form of drug addicts, were provided with treatment and vocational training at a Drug Rehabilitation Centre. Among the crops they were encouraged to cultivate are Mulberry trees whose fibre is used to make sa paper which has many by-products.



Sustainable crops include Arabica coffee beans, macadamia nuts and chestnuts

Land previously used to cultivate opium poppies today supports fruit and vegetables





Sixteen hectares reforested with pine, mountain ebony and teak trees

The reforestation project was launched in earnest in 1990 on the anniversary of Her Royal Highness's 90th birthday. Using public sector contributions, ninety-nine plots, comprising sixteen hectares on Doi Tung more than seven hundred metres above sea level were planted with nearly one million seedlings of varieties of pine and mountain ebony trees. Teak was planted below that level. In time, the project expanded to four neighbouring hills that were selected to be watershed forests and to provide an income for local people living in the area. It was a good beginning to be followed in time by more innovative ideas supporting human, economic and environmental development.

Drug Rehabilitation Centre

Two years later, in February 1992, the Drug Rehabilitation Centre was established in the Mae Sai district of Chiang Rai Province. The centre offered services to four hundred and sixty-nine drug addicts from twenty-seven villages. More were directed to the centre whenever a village committee decided they would not allow addicts to reside there unless they agreed to undergo treatment. It was a successful ploy. Treatment and rehabilitation normally takes one thousand days, and the centre has a success rate close to one hundred percent. The aim is to put patients through physical and mental therapy, including vocational training, so they can become self-sufficient once they are pronounced fit and well.

Paper from mulberry bark



The Mae Fah Luang Foundation in association with the Department of Agricultural Extension began to offer paper-mulberry seedlings to villagers for cultivation purposes to make a living and as part of the overall vision to reforest the near-barren slopes of Doi Tung and adjacent hillsides. To ensure success, the MFLF bought-back paper-mulberry bark at a guaranteed price to encourage villagers to grow the trees. To become pliable, paper mulberry bark has first to be dried, boiled and then rolled on to racks to dry as sa paper. Hill tribe villagers, with cooperation from the Doi Tung Handicraft Promotion Centre of the Ministry of Industry, are quite adept at producing fine handicrafts from sa paper such as kites, flowers, greeting cards, dolls, drawing paper and notebooks which they sell to tourists as souvenirs. The scheme drew out the best in hill tribe villagers as artisans (a trait detected years before by the Princess Mother) allowing them to forge a living using their own creative skills.



Sa paper is a multi-use product from mulberry bark

Vetiver Grass Research and Development Centre at Huai Hong Khrai

A significant obstacle to overcome in the early days of the Doi Tung Development Project was related to soil erosion and landslides, some of which were caused by accelerated road construction. Something had to be done to stabilise the soil and contain water runoff, which was draining away soil nutrients crucial for cultivating crops.

In 1992 His Majesty the King learnt of this problem during one of his visits to the region. Always anxious to help solve environmental problems, the King suggested to the Princess Mother that vetiver grass should be introduced for soil and water conservation purposes, explaining how vetiver had been used successfully in various other projects under His Majesty's purview.



Similar to HM the King's Royal Project, vetiver grass was used at Doi Tung to stabilise hillsides

As the King's study groups had discovered, vetiver grass is a highly versatile plant. If planted and encouraged to grow on the contours of mountain slopes, vetiver traps sediments and prevent soil nutrients from being washed into the valleys and rivers below. Its wide-ranging properties led to it being described as "miracle grass" by farmers and the scientific community.

That same year, cooperation was sought from several government entities that undertook to collect vetiver clones from a number of provinces for multiplication in an area of eight hectares at Huai Hong Khrai at the foot of Doi Tung. Eight months later, ten thousand vetiver plants had proliferated to an astonishing total of twelve million.

Subsequently, the Huai Hong Khrai Royal Development Study Centre was established in Chiang Mai Province to cultivate vetiver multiplication plots in paddy fields where more suckers could be produced than when grown in compact, plastic bags. It was also discovered that soybean planted in vetiver fields acts as a natural fertilizer for vetiver. Today, this "miracle grass" is propagated for domestic use and also for sale overseas.



Mae Fah Luang Garden: winner of the PATA Award for Tourism Site development 1993

Domestic and international tourism

After taking up residence at Doi Tung Royal Villa in November 1990, Her Royal Highness said; "This is my home!" It was indeed a true and accurate statement as other locations occupied by the Princess Mother were officially classed as "royal residences". Doi Tung proved to be the Princess Mother's first and, sadly, last home in Thailand.

The transformation that took place on Doi Tung under the Princess Mother's stewardship in the space of one decade was nothing short of miraculous. Hillsides were replenished with dense, watershed forests, commercial forested areas and botanical gardens. At first the site was little more than an experimental agricultural project to inspire local people to help replant deforested areas and regenerate the environment. Today, Doi Tung is a thriving business enterprise and a leading tourism destination in Thailand.



Doi Tung Royal Villa surrounded by temperate blooms

With time, patience and a sense of purpose, disturbed areas on the hillsides of Doi Tung and adjacent peaks were transformed to produce an array of economic crops. And unlike other, similar cases in northern Thailand where local villagers had to be coerced into accepting change – from opium poppy production for example – the hill tribe villagers at Doi Tung seized upon the opportunity to improve their livelihood by producing alternative crops and today are understandably proud of all they have achieved.

The Princess Mother's approach to Doi Tung followed much of His Majesty the King's work in the Royal Project at Chiang Mai (see the Royal Project chapter). One significant difference was that at Doi Tung local hill tribe villagers were hired (and paid) to plant trees and crops whereas a grassroots agreement had first to be established under the Royal Project after patiently demonstrating to sceptical community leaders how their hillsides could be improved through crop substitution.

Visitors from all over Thailand and from overseas can not only spend time touring and inspecting Doi Tung they can stay overnight in comfortable accommodation provided either at Doi Tung Lodge or Greater Mekong Lodge. There is much to see, absorb and understand about the creative work of the late Princess Mother, which cannot be achieved in a short space of time.



Picturesque gardens encircle the royal villa







Doi Tung Lodge, a source of employment for local folk

Doi Tung Lodge

During the earlier days of the Doi Tung Development Project, Her Royal Highness spent months at a time at Doi Tung Royal Villa. Its location, in an area that once served as the office and accommodation of the 31st Watershed Conservation Unit of the Royal Forest Department, was perfect for the Princess Mother to oversee the operation of the project.

From time to time, His Majesty the King and other members of the royal family would pay her a visit. A new villa was built in the area to accommodate the royal entourage and employees of the project but, unfortunately, it was only completed in 1997, after the Princess Mother had passed away. Subsequently, it was turned into lodgings for tourists with the gracious permission of Her Royal Highness Princess Maha Chakri Sirindhorn who was assigned by His Majesty the King to become chairperson of the Mae Fah Luang Foundation after the passing of the Princess Mother. Proceeds from the lodge help to pay for its maintenance and other amenities.





In keeping with the vision of the late Princess Mother, Doi Tung Lodge is another source of employment for local people who can learn the functions of tourism. For example they learn how to welcome guests at the reception area, provide services such as food and beverage and assume management responsibilities. In effect, the lodge offers local folk alternative work prospects that they would otherwise have to find by leaving their birthplace. Instead, they are able to stay in their own locality and earn a good income and enjoy stable employment.







The lodge is a tourism attraction with spectacular views over the River Mekong

Greater Mekong Lodge

Similar to Doi Tung Lodge, Greater Mekong Lodge offers accommodation and other facilities for visiting tourists from Thailand and overseas. Located around ten kilometres north-west of Chiang Saen in Chiang Rai Province, the lodge offers stunning views over the River Mekong. Also staffed by local people, many from Doi Tung, the lodge provides an opportunity for people to earn a stable income without having to seek work elsewhere.

Traditional food served in restaurants

Restaurants supporting the Doi Tung Development Project are situated on Doi Tung Mountain and at the Greater Mekong Lodge. Both have opted to use fresh, toxin-free vegetables supplied by the project along with some from local farms in the area. Again, this offers local people alternative sources of employment and income. Traditional northern Thailand dishes with ethnic specialities are included in the menus which are constantly updated by locally-recruited chefs. Service personnel, including people from different ethnic minorities, take great pride in their work and are always ready to welcome domestic and international visitors.





Ethnic specialities are served at Greater Mekong Lodge









"Continuity": sculpture at the centre of Mae Fah Luang Garden

Mae Fah Luang Garden

The garden is located on land originally the site of the Akha hill tribe village of Pa Kluay, which was once an important route for opium caravans trafficking in heroin and weapons. The Akha lived in a dense settlement in a deep gorge with little room for expansion to facilitate hygiene needs, trash or wastewater management. Following a request from the Mae Fah Luang Foundation, villagers agreed to vacate their village for a new site just five hundred metres away. The new site had expansion opportunities, running water, electricity and a paved road to the village.

In accordance with the Princess Mother's desire to offer Thai people an opportunity to enjoy a temperate flower garden (knowing that some Thais may have never travelled outside of Thailand) four hectares of the vacated land were turned into a garden of temperate flowers.

At the centre of the garden a sculpture entitled "Continuity" by the late Misiem Yip-In-Soi draws attention to the fact that continuity is at the centre of success in any endeavour. The garden is hugely successful partly because the decorative flowers there are grown and nurtured by local villagers. Mae Fah Luang Garden brings in a substantial income to the area both in job opportunities and in terms of income from tourists. Its success was acknowledged in 1993 when the Pacific Asia Tourism Association (PATA) named Mae Fah Luang Garden the winner of the PATA Award for Tourism Site Development.





Temperate flowers in bloom at Mae Fah Luang Garden

Mae Fah Luang Art & Cultural Park

Originally known as Rai Mae Fah Luang, today's Mae Fah Luang Art and Cultural Park started off as the office of the Thai Hill Crafts Foundation. By purchasing and marketing handicrafts on behalf of ethnic minorities, the Thai Hill Crafts Foundation helped preserve the hill tribes' traditional skills and support their livelihood.

Her Royal Highness went even further by establishing the Youth Leadership Project, and Rai Mae Fah Luang became a "home" to hundreds of youths from remote areas who, hitherto, had only limited access to schooling. The area offered lodgings for ethnic minority youths seeking an education and who were also eager to learn about life in urban areas, apart from other aspects of modern life in Thailand. The young people were from the immediate vicinity of Doi Tung and neighbouring areas such as Payao Province.





Preserving Lanna culture in northern Thailand

In addition to classroom education, Her Royal Highness believed that students should acquire knowledge from personal experience to learn how to develop social skills and live as a part of a community. With shared responsibilities they learnt to care for younger folk; they also learnt about time management; worked in shifts to clean up their lodgings; farmed, gardened, and tended vegetable plots. The goal was to help students develop and grow into dedicated, hardworking, ethical leaders in their communities.





Sculpture by Misiem Yip-In-Soi of HRH the Princess Mother in the uniform of a colonel



Students living in villages in the area had easier access to schools once the Doi Tung Development Project became established, effectively supplanting the role of Rai Mae Fah Luang as an educational institute for ethnic minority youths.

The transition to the name "Mae Fah Luang" (Royal Mother from the sky) came from hill tribes out of respect for the Princess Mother in reference to her "descent from the skies", by helicopter, with doctors, nurses, medical equipment, food and clothing for the villagers – a service she often performed. It was little wonder, therefore, that the Princess Mother was held in such high esteem by ethnic minorities in the hills of Chiang Rai Province.

After years of dedicated development, the Mae Fah Luang Art and Cultural Park today offers the largest collection of art from Lanna culture or Tai culture (minorities in northern Thailand, Yunnan in China's south-western region, eastern Myanmar or the Shan States, north-western Vietnam and western Lao).

The park, which welcomes tourists from around Thailand and all over the world, not only features artefacts but also exquisite Lanna architecture. A fine example is Haw Kham (Golden Pavilion) built by the people of Chiang Rai Province and presented as a gift to HRH the Princess Mother to celebrate her 84th birthday. Haw Kaew is another attraction that features a permanent exhibition on teakwood along with year-round, revolving exhibitions and a botanical collection of indigenous plants from the northern region of Thailand.

Haw Kham is a fine example of Lanna architecture



Doi Tung Lifestyle Shops

A variety of products skilfully crafted by ethnic minorities working in the Doi Tung Development Project are sold in Doi Tung Lifestyle Shops in various parts of the country. Many of these products are unique to the project and include, for example, hand-woven apparel, accessories and home décor items; hand-tufted carpets, ceramics ware and mulberry (sa) paper products. Many countries recognize the Doi Tung Development Project for its success in following sustainable alternative livelihood development (SALD) to combat illicit crop cultivation. In recognition of its success, Doi Tung is permitted by the United Nations Office on Drugs and Crime (UNODC) to use the "UNODC" seal of approval on all its products.

Doi Tung Lifestyle Shops are expanding around the country and can be found today at the international airports in Bangkok, Chiang Mai and Chiang Rai, and in well-known markets including Bon Marché and J.J. Market in Bangkok and Hua Hin Market. A cross-section of Doi Tung products include home ware (carpets, floor coverings and ceramics); fashion (ready-to-wear clothing and accessories); mulberry paper products (sa boxes, sa notebooks and sa paper); coffee and macadamia nut products; plants and orchids (including pot plants and cut flowers) and landscape design services for special occasions such as company anniversaries.



Doi Tung products include homeware, fashion wear, sa paper, coffee, nuts, pot plants and flowers



High-quality Arabica coffee is available in supermarkets and at Café Doi Tung outlets in Thailand

Café Doi Tung

The project is particularly proud of its coffee, which, for local people, has been a successful replacement crop for opium poppy cultivation. Café Doi Tung outlets use only high-quality Arabica coffee beans harvested from Doi Tung hillsides one thousand metres above sea level. The coffee beans are handpicked and graded before being roasted and ground. It is a meticulous process that lends every cup of coffee its individual taste.



Macadamia nuts are another cash crop that has replaced opium poppy cultivation. The nuts are roasted and packaged in various flavours and sold through Café Doi Tung outlets.



This Lanna-style flag procession contrasts with the cultivated hillsides of Doi Tung

Domestic assistance and international cooperation

Experience gathered by the project management in transforming former opium fields on the slopes of Doi Tung into reforested slopes for cultivating fruits and vegetables was communicated by Doi Tung Development Project Secretary General MR Disnadda Diskul to attendees of the 1st World Action Against Drugs conference held in Sweden in September 2008.

This first, important conference was billed as a gathering of people from around the world engaged in combating drugs at the grassroots level; men and women from all walks of life who were passionate about reducing drug abuse and illegal drug trafficking.

In his conference address, MR Disnadda Diskul referred to the Mae Fah Luang Foundation established by the late Princess Mother as a "practitioner" of Sustainable Alternative Livelihood Development, or S-A-L-D. "SALD," he explained to attendees "is 'people-centric' – designed to help people help themselves."

Outlining the task facing Thailand twenty years earlier, he recounted the work undertaken under the auspices of the Doi Tung Development Project at the very heart of the infamous Golden Triangle: "In the past, ethnic hill tribe minorities used to grow opium because it was their SINGULAR means of survival.

"We worked to improve health, create employment and provide access to formal education for the roughly eleven thousand people at



Sharing expertise is an important function of the DTDP

Doi Tung – ex-growers, traffickers and recovering addicts alike."

The Secretary General went on to explain that over time the people of Doi Tung were given choices: "...a choice to work on the project's macadamia economic forests, or in coffee-roasting plants. They have the choice to work at our tourist destinations, guest houses, and gardens."

MR Disnadda said the staff can tell their own, personal stories to customers at Doi Tung cafes and lifestyle shops scattered throughout the country. "Daughters who had been sold to work in the sex industry," he told delegates, "now work in tissue culture facilities in the horticulture industry, and in sales and many other alternatives."

Giving further examples of the "people-centric" qualities of SALD as practised at Doi Tung, MR Disnadda spoke of how grandmothers can choose to work in the handicraft centre alongside their children, creating a world-class fashion line; how ex-addicts have helped reforest barren hillsides, casualties of slash-and-burn farming, and how ex-opium growers learnt landscape design.

"These local people," he said, praising their efforts, "have made Doi Tung a signature Thai brand. Opium is all but a thing of the past. Most of all, the people have regained their pride and dignity, which money can't buy. They dare to dream of a brighter future for their children."

Thailand offered assistance through its "SALD experiences" to Myanmar, Indonesia and Afghanistan as a gesture of goodwill and to share examples of "best practices and lessons" Thailand learnt in its



Overseas visitors are welcome at the DTDP



The DTDP is a successful business model shared with other countries

fight against drugs.

The Doi Tung Development Project was envisaged as a thirty-year plan under which disadvantaged and impoverished communities would first be equipped with health services followed by the development of sustainable and environmentally-friendly economic opportunities. That way, the quality of life of villagers could be improved progressively as a community's capacity developed.

The SALD approach, undertaken as part of the vision of the late Princess Mother, today ensures appropriate education and training for new opportunities, and allows for full economic and social integration. Community ownership is an integral part of the approach. The overall objective is to hand-back economically-viable businesses to local communities when local people have the capacity to manage them on their own. Doi Tung is a successful business model that has not gone unnoticed by the international community.

Reaching out to the international community

Yong Kha Development Project, Shan State, Myanmar 2002-2004

The success of the SALD model instigated under the Doi Tung Development Project prompted a request from the governments of Thailand and Myanmar to reach out to Myanmar's Shan State area and a village of six thousand ethnic minorities whose lives were at one time supported by opium cultivation.

The foundation shared its experiences and expertise in SALD to address the severe local conditions encountered on arrival in Myanmar. People were dying almost daily from malaria, tuberculosis and other diseases. Food supplies were inadequate; children were dying from malnutrition. Six thousand people were victims of a vicious cycle of sickness, poverty and ignorance. Their overriding concern was simply to survive.

MR Disnadda said the people were living a hand-to-mouth existence similar to the people of Doi Tung twenty-two years earlier. "Opium was traded openly in the market right next to rice sellers," the Secretary General explained.

Engaging in a "quick hit" programme, after overcoming resistance from local people who were at first sceptical, the foundation set up a mobile medical unit to provide a cure for immediate health problems. This earned the trust of the local community and soon a sixteen-bed hospital and school for five hundred students followed, both constructed under the empowerment program introduced by the Mae Fah Luang Foundation (MFLF).

On the economic front, the foundation's surveyors assisted local folk to construct a thirty kilometre irrigation canal to enable them to grow crops three times a year.

"The villagers voluntarily dug the canal by hand in ten days," MR Disnadda said, "without using any machines or a single drop of oil. If we used tractors or water pumps the canal would cost a lot more with the money going to corporations and not the people."

The MFLF did not just build a school but also designed a practical skills curriculum to complement formal education. Students were able to learn agricultural skills in the school's vegetable plot, chicken coop and fish pond all of which provided a source of food for school lunches.

In three years, the local community became self-reliant in food and earned the equivalent of seven hundred thousand dollars in cash and kind. The entire three-year investment amounted to six hundred and forty thousand dollars – about ten cents per person per day.

Sheep development programme, Afghanistan (2006 – ongoing)

In 2002, the United Kingdom government, mindful of the foundation's contribution to suppress opium poppy cultivation in the Golden Triangle, invited the MFLF to share its Doi Tung experience with Afghanistan. Following a conference in Kabul, Afghan delegations made study visits to Doi Tung and attended development-training programmes.

Four years later, the government of Belgium requested the MFLF to work with them and the Afghan government in a bid to launch a SALD project in Afghanistan. Subsequently, the Balkh Livestock and Rural Enterprise Development Project, also known as A4 Sheep Bank (A4SB), was launched in November 2006 as a measure to counteract opium cultivation. After the 2001 invasion of Afghanistan, the country acquired the dubious distinction of being the largest producer and exporter of illegal opium and opiates in the world.

"The Afghans had already been through so much fighting and would never trust us enough to work with us if we adopted a shoot-first-and-ask later approach," MR Disnadda explained. "So our approach was to convert the warlords and drug lords into legitimate businessmen."

The project was based upon sheep because of their importance as an asset in the rural Afghan economy. Also, there is a great deal of potential for adding value through sheep-derived products like yarn, carpets, food products, skins and hides. The A4SB programme began with a "quick hit" to address the health of sheep and to replenish dwindling stocks caused by years of conflict and drought.

"When we arrived, we found that the sheep population had been reduced by almost ninety percent through decades of war," the Secretary General recalled, "so our first step was to reduce mortality and increase fertility rates. Our mobile vet programme brought down the sheep mortality rate from over ten percent to just two percent in the first six months."

The scheme works through a subscription-based veterinary service provided by trained Afghan paraveterinarians. As a quid pro quo, sheep owners who opt to participate in the veterinary service have to pay the "sheep bank" a percentage of their newborn, female lambs each year. Lambs "deposited" in this way are "loaned" to economically vulnerable families identified by local communities. By November 2008, two years after starting the project, A4SB had made an enormous impact. The mortality rate for flocks within the programme dropped in two years to under three percent. In monetary terms, each registered sheep owner increased his total asset value by some six hundred and forty dollars a year.

More is being done to introduce value-added activities to enhance off-farm income. For example, local sheep owners will be able to utilise wool processing, tanning, and carpet weaving activities that have a higher value development potential.



Reforested hillsides of northern Thailand



Other countries wishing to emulate the success of the DTDP are reaching out to the Mae Fah Luang Foundation



Sustainable Alternative Livelihood Development, Indonesia (2007-ongoing)

The catastrophic 2004 Indian Ocean tsunami that devastated Indonesia's Aceh Province also destroyed the livelihood of thousands of people. Left intact, however, were hillsides of cannabis, which, in former times, had been used as currency to purchase weapons to conduct civil conflict.

In 2005, Indonesia's government, accepting a recommendation from the UNODC, called upon the MFLF to share its experience in addressing the problem of poverty and interrelated cannabis cultivation in Aceh. Based on the provincial governor's vision, the MFLF set out to increase per capita income from one dollar a day to two dollars a day for one and a half million impoverished Acehnese. This vision will be fulfilled by 2012.

While in Aceh Province, the MFLF introduced a "holistic malaria preparedness programme" for Mukim Lamteuba a village cluster of almost five thousand people. At first the local villagers were wary of MFLF (similar to Myanmar and Afghanistan). However, team members were able to show through words and deeds that they carried no hidden agenda and were committed to improving the people's wellbeing so that one day the villagers would be capable of driving their own development.

Local representatives were trained to fight malaria. Within three months the disease was almost totally eradicated from Lamteuba. The programme will be extended throughout Aceh and, eventually, the Indonesia government will introduce it to other provinces. In conjunction with the Sambinoe Foundation, the MFLF also worked with grassroots communities on "sustainable rural development programmes" for Aceh Province.

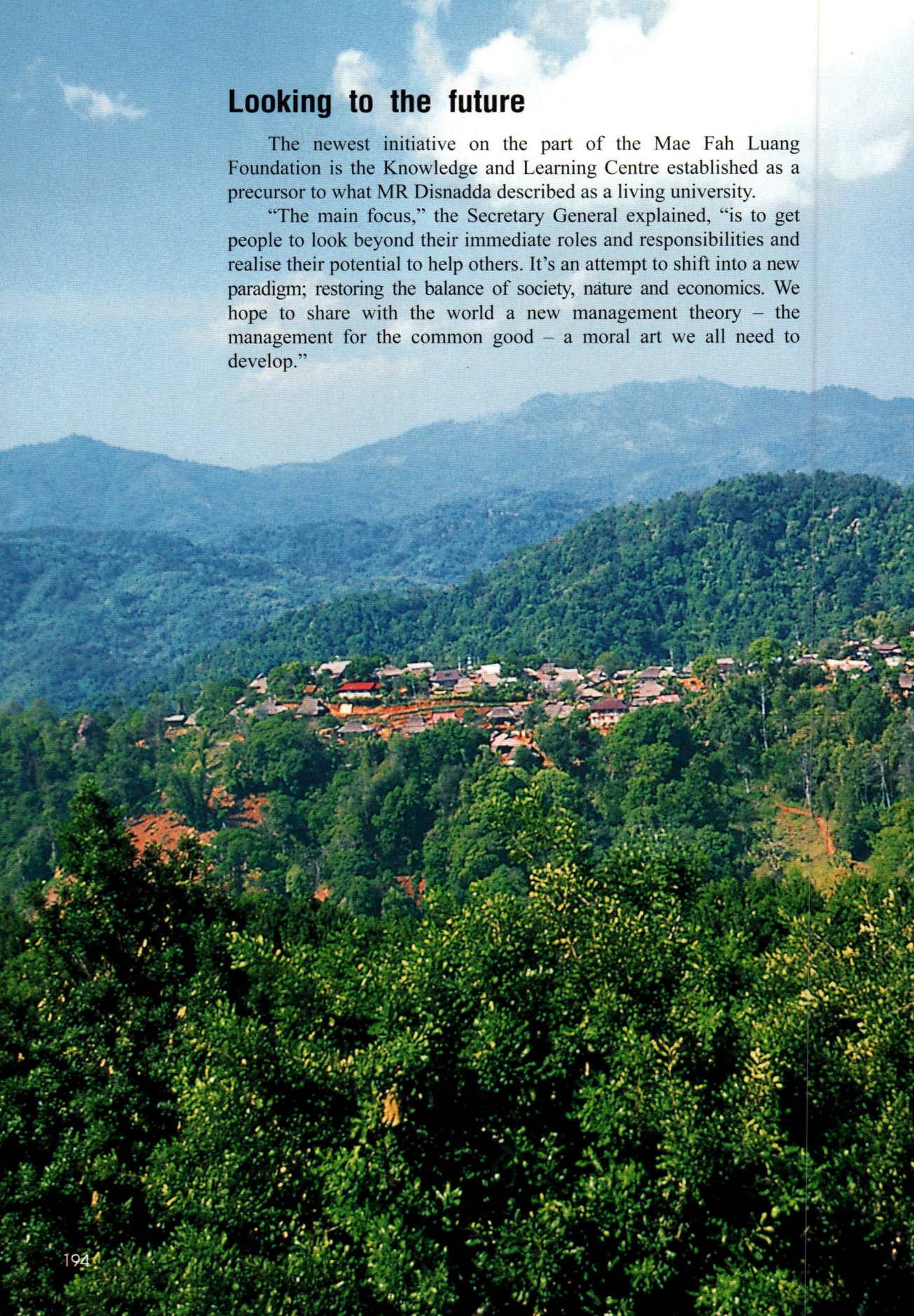
A core objective of the "Aceh-SALD" initiative is to revive the traditional "gotong royong" (collaborative events) in a spirit of co-operation and unity in local communities, empowering them to improve their own livelihoods.

For its efforts, the MFLF received an "Anti-Drug Award" from His Excellency Susilo Bambang Yudhyono, President of Indonesia for its contribution to the project in Lamteuba. Today, the Sustainable Rural Development Centre in Maheng-Lamcot is a learning centre for other areas in Aceh welcoming over a hundred visits a year from national and provincial government officials, private sector individuals and international donors.

Looking to the future

The newest initiative on the part of the Mae Fah Luang Foundation is the Knowledge and Learning Centre established as a precursor to what MR Disnadda described as a living university.

"The main focus," the Secretary General explained, "is to get people to look beyond their immediate roles and responsibilities and realise their potential to help others. It's an attempt to shift into a new paradigm; restoring the balance of society, nature and economics. We hope to share with the world a new management theory – the management for the common good – a moral art we all need to develop."

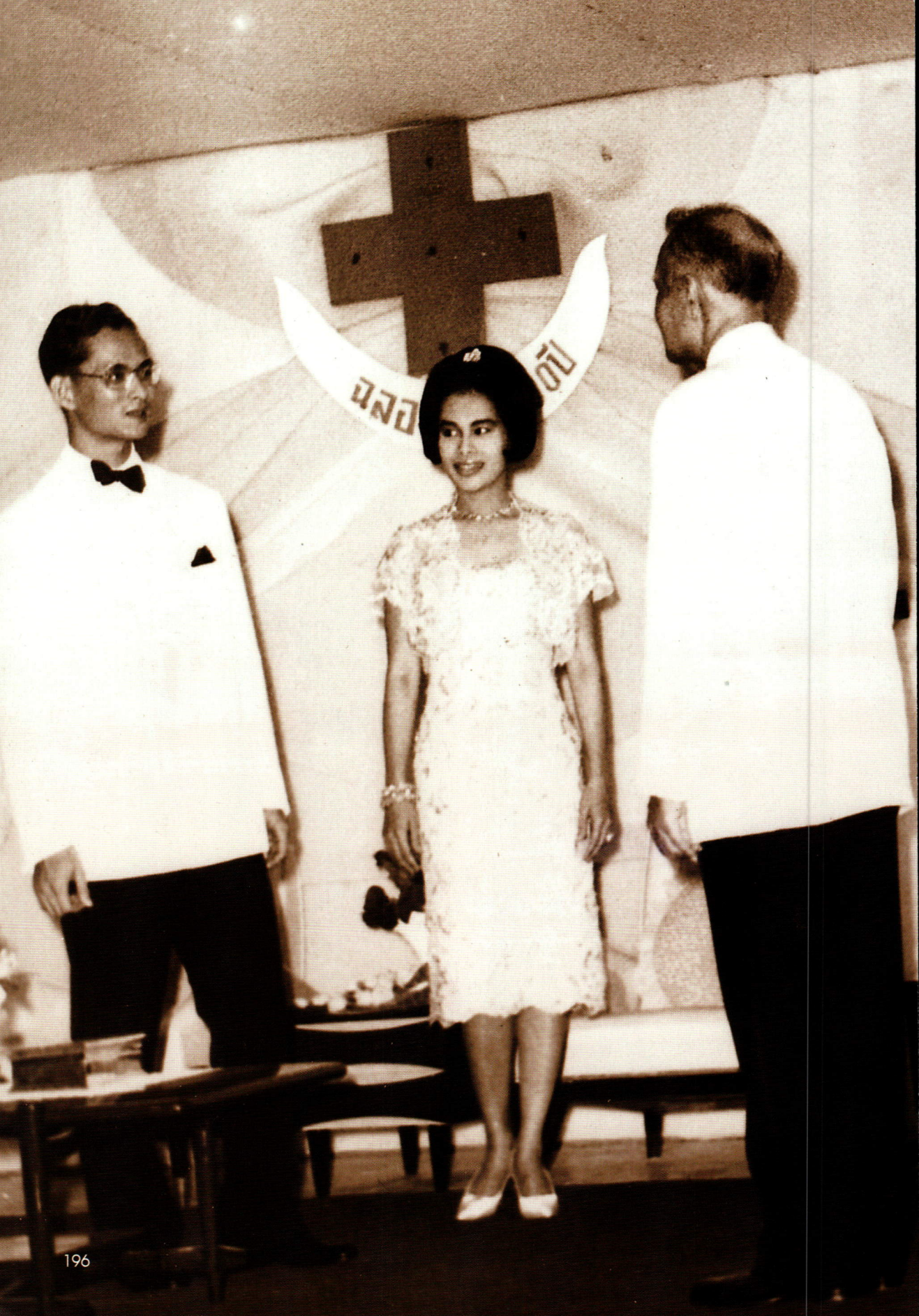


Given the same degree of energy and sense of commitment devoted by the foundation to the Doi Tung Development Project in Chiang Rai Province, this is not an implausible concept.

Since its introduction less than thirty years ago, the Doi Tung Development project has pioneered the transformation of once barren hillsides, almost bereft of forest resources after years of indiscriminate slash-and-burn farming, into productive orchards providing communities with a sustainable livelihood. After decades of development work, the Mae Fah Luang Foundation has amassed a tried-and-tested set of best practices based on the evolving SALD model in Doi Tung that has crossed international borders and captured the attention, and admiration, of countries around the world.



Barren hillsides were transformed into productive orchards in less than thirty years





The Thai Red Cross Society



The Thai Red Cross Society is Thailand's foremost humanitarian organization

สภากาชาดไทย
The Thai Red Cross Society

The Thai Red Cross Society

The Thai Red Cross Society, founded in 1893 and one of the oldest society's in the region, is the main humanitarian entity in Thailand providing public services as an integral part of the International Federation of Red Cross and Red Crescent Movement (IFRC). The movement constitutes the world's largest humanitarian organization with one hundred and eighty-six members.

The IFRC enshrines an international humanitarian mission that relies on the support of some ninety-seven million volunteers around the world. Its ideals, which are universal, are to protect human life and health; to ensure respect for the human being, and to prevent and alleviate human suffering, without any discrimination based on nationality, race, gender, religious beliefs, class or political opinions.

In common with the IFRC, the Thai Red Cross Society (TRCS) upholds the seven fundamental principles of humanity, impartiality, neutrality, independence, voluntary service, unity and universality.

In times of war and peace, conflicts and disasters, the Thai Red Cross Society provides humanitarian aid and relief services through its thirteen bureaux and seven specialised agencies.

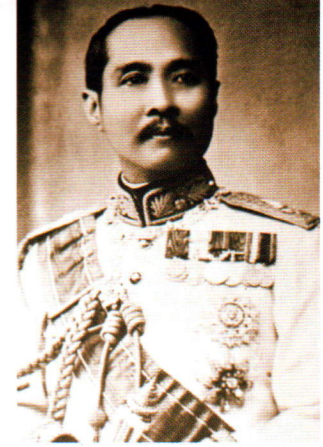
A society born out of armed conflict

It is said that necessity is the mother of invention: If we absolutely need to do something that has never been done before, we will find a way to do it! So it was with the Red Unalom Society of Siam.

In 1893, a territorial dispute between the Kingdom of Siam and France over the left bank of the River Mekong erupted into armed conflict resulting in deaths and injuries on the Thai side. From this dispute arose urgent need to extend humanitarian assistance to those injured in the conflict. Something had to be done in the aftermath of war.

This led to a concerned group of charitable ladies, led by Thanpuying Plian Pasakornravongs, to seek an audience with HM Queen Savang Vadhana to obtain approval from HM King Chulalongkorn (Rama V) to establish the Red Unalom Society of Siam to provide relief and assistance to injured soldiers and war victims. Considering it a commendable idea, the King gave his consent, at the same time granting royal patronage to the society from when it came into existence in April 1893.

King Chulalongkorn also encouraged a drive to raise public donations that resulted in a start-up fund of over four hundred thousand Thai baht – a huge sum in those days. His Majesty appointed Queen Savang Vadhana as the "Founding Mother" of the Society; Queen Saovabha Phongsri as president, and Thanpuying Plian Pasakoravongs as secretary general of the Red Unalom Society of Siam. Thirty years prior to this, Henry Dunant had founded the International Committee of the Red Cross (ICRC) in Geneva, Switzerland.



Inauguration of the Red Unalom Society of Siam was approved by HM King Chulalongkorn (Rama V) to aid casualties of war



HM Queen Savang Vadhana



HM Queen Savang Vadhana (seated centre) with high-ranking officials of the Red Unalom Society of Siam – later renamed the Thai Red Cross Society

On his return to Thailand, via Japan, after studying in the United Kingdom, HRH Crown Prince Vajiravudh (later King Rama VI) paid a visit to a Japanese Red Cross hospital and was most impressed by what he saw.

Following the death of King Chulalongkorn, the Crown Prince acceded to the throne as King Vajiravudh (Rama VI). Still carrying with him impressions of the Japanese Red Cross hospital he had visited, one of the King's early duties was to persuade his younger brothers and sisters to pool funds with the Red Unalom Society to build a hospital on the King's private property. The hospital was named King Chulalongkorn Memorial Hospital in commemoration of the late King and was placed under the supervision of the Red Unalom Society also known, from 1914, as the Red Cross Society of Siam. The name changed again in 1939 when "The Kingdom of Siam" became "The Kingdom of Thailand".

Following royal decrees in 1918 and 1920 it was renamed the Siam Red Cross Society (SRCS), recognised by the ICRS in 1920 and as a member of the International Federation in 1921. A year later, the society hosted the first Oriental Red Cross Conference convened by the League of Red Cross Societies in Bangkok. The Thai Red Cross is one of a few societies in the world operating its own hospitals.

As relief work is one of the mandates of the Red Cross and Red Crescent throughout the world, the Relief and Community Health Bureau was established in 1920 and has been active ever since.

In 1922, the Queen Saovabha Memorial Institute was inaugurated and given the responsibility of researching and producing vaccines and sera. Later the Snake Farm was established to produce antivenom sera – the second farm of its type in the world.

A number of other significant developments followed including the inauguration of the Junior Red Cross Division (1922), which underwent a name change to Red Cross Youth; first Red Cross Fair (1925); establishment of the Thai Red Cross Volunteers Division (1940), and that of Red Cross Provincial Chapters throughout the country in 1962.



Meanwhile, the Queen Savang Vadhana Memorial Hospital in Si Racha, Chon Buri Province, founded in 1902, was transferred to the Thai Red Cross Society in 1928; the first floating clinic, the *Vejapah,* came into service using a barge graciously donated by His Majesty King Bhumibol Adulyadej in 1955. The Thai Red Cross Rehabilitation Centre was set up in 1962; the Eye Bank of the Thai Red Cross for cornea transplants came into operation in 1965, and the National Blood Centre was established in 1969.

Under the Royal Patronage

Since its inception, the Thai Red Cross Society has enjoyed the close involvement and continuous support of Thailand's royal family and, up to the present day, remains under the royal patronage.

Early in the present reign of King Bhumibol Adulyadej (Rama IX), HM Queen Savang Vadhana, the Royal Grandmother, served as president of the Thai Red Cross Society. In 1954, HM Queen Sirikit accepted a special membership in the Thai Junior Red Cross under Her Majesty's royal patronage and Her Majesty was appointed by the King to take over the presidency of the Thai Red Cross Society in 1956 after the demise of Queen Savang Vadhana in 1955. Later, HRH Princess Maha Chakri Sirindhorn assumed the role of executive vice president of the society's council.



Up to the present day, the Thai Red Cross Society remains under royal patronage

For more than a century, under the royal family of Thailand's guidance and assiduous support, the Thai Red Cross Society has expanded in size and scope, reaching out to those in need whether within or outside the Kingdom.

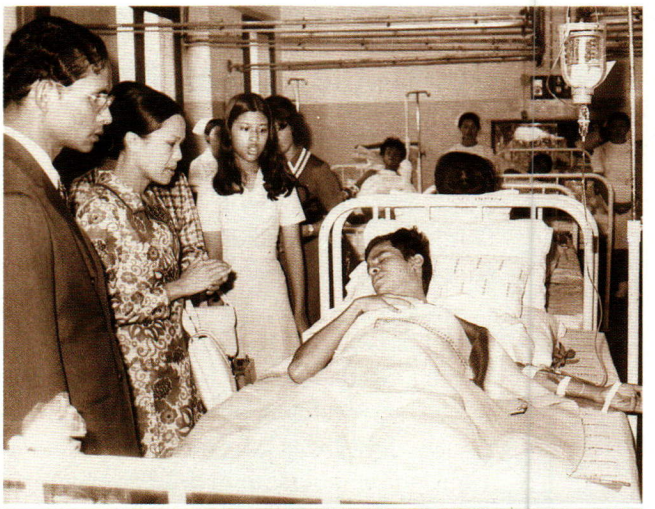
By remaining true to its mission to alleviate human suffering and provide health services to the most vulnerable, including children, women, the elderly and the physically and mentally challenged, the society's humanitarian concern aptly complements the ideals and principles of the Royal House of Chakri.





The Society has expanded in size and scope with guidance from Thailand's Royal Family













Royal activities undertaken by the president of the Thai Red Cross Society



Her Majesty Queen Sirikit visited refugee camps in Thailand's border areas

The society's main activities

In pursuit of its mission to alleviate human suffering and provide health services to the most vulnerable, the Thai Red Cross Society directs its efforts in four core areas: medical and health care services, disaster preparedness and response, blood transfusion services, and the promotion of the quality of life of vulnerable people. All four areas respond to the humanitarian needs of society that form the underlying work of the Thai Red Cross under the seven fundamental principles of humanity, impartiality, neutrality, independence, voluntary service, unity and universality.

The work of the Thai Red Cross Society is not restricted to Thailand alone: its efforts extend into neighbouring countries such as Myanmar, Lao PDR and Cambodia. A spokesperson at the Thai Red Cross Society headquarters in Henry Dunant Road, Bangkok, touched upon the "sensitivities" of helping other countries. He said the society "...wants to offer assistance, but just can't go in with offers of help...we prefer them to approach us first."

This is an area, he explained, where HM Queen Sirikit and HRH Princess Sirindhorn are able to help by dealing with any delicate or sensitive issues "...because neighbouring countries hold great affection for Her Majesty and Her Royal Highness with whom they feel comfortable in discussing their own country's humanitarian needs."







The King Chulalongkorn Memorial Hospital is a leader in many fields including neurosurgery, eye surgery and cardiac surgery

Medical and health care

In Thailand, two general hospitals under the supervision of the Thai Red Cross Society provide medical and health care services: the King Chulalongkorn Memorial Hospital in Bangkok and the Queen Savang Vadhana Memorial Hospital at Si Racha on Thailand's eastern seaboard. The Red Cross Rehabilitation Centre in Samut Prakan Province, which is close to Bangkok, also provides physical treatment and rehabilitation services for long-term patients. Various other health care and specialized units, such as the Eye Bank, Organ Donation Centre, and AIDS Research Centre were established at different times.

The King Chulalongkorn Memorial Hospital deals with primary to tertiary or referral cases for inpatients and outpatients and provides training facilities for medical students of the Faculty of Medicine, Chulalongkorn University and for nursing students of the Thai Red Cross College of Nursing. It has been the mainstay of the Thai Red Cross in times of peace and in times of disasters. The hospital was recognised in 2002 for its highly professional standards with the Award of the Hospital Accreditation Certificate by the Institute of Hospital Quality Improvement and Accreditation of Thailand. A leader in many fields, including neurosurgery, eye surgery and cardiac surgery, for example, the hospital registered several "firsts" in medical history: first cornea transplant in 1962; first kidney transplant in 1972, and first bone-marrow transplant in 1991. Thailand's first test-tube baby was born there in 1987.

The hospital provides training for nursing students of the Thai Red Cross College of Nursing













The Queen Savang Vadhana Memorial Hospital is located on the Gulf of Thailand in Chon Buri Province

The Queen Savang Vadhana Memorial Hospital in Si Racha, Chon Buri Province provides a complete range of medical services with specialised clinics in urology, eye ailments, ENT problems, diabetes, allergies and much more.

The hospital has a mobile blood donation service and personnel skills are constantly developed to stay abreast with changes in medical science and technology.

Formerly known as the Pasteur Institute, the Queen Saovabha Memorial Institute, established in 1922, undertakes research and produces vaccines and snake sera. A year later, Thailand established the Snake Farm to produce antivenom sera for snake-bite victims milking highly venomous snakes on a daily basis to make antidotes for snake bites.

This delicate operation can be observed by members of the public at venom-milking and snake-handling demonstrations at the institute which also gives visitors comprehensive information on herpetology and toxicology. Located on Henry Dunant Road in Bangkok, the Snake Farm has also become a popular tourist attraction.



At the Snake Farm venomous snakes are milked daily to make antidotes for victims of snake bites



HRH Princess Maha Chakri Sirindhorn chairs conferences of the society's council

Disaster preparedness and response

Right from the beginning, the Thai Red Cross Society has provided relief in times of disasters and national emergencies – not just in Thailand but in the region and internationally through its Relief and Community Health Bureau working in conjunction with other groups. Through its response to a series of disasters and emergencies (during peacetime and times of conflict) the bureau has synchronised its operations for disaster preparedness and response gaining recognition for the Thai Red Cross – and Thailand – in all corners of the world.

Alert and prepared under a twenty-four-hour state of readiness, the Disaster Operations Centre responds to tragedies and emergencies in line with national and provincial plans for disaster preparedness, response and rehabilitation. It coordinates information on epidemics and disasters, appropriate care and assistance, and on the availability of resources at all sites to evaluate needs and issue proper directives. The aim is to respond in good time to ensure relief materials and medical supplies are sourced and prepared for distribution to meet each developing circumstance.



The Disaster Operations Centre operates under a twenty-four-hour state of readiness

The bureau, which began operations in December 1920 as the "relief section" of the Siam Red Cross Society, also

provides the public with first aid training courses as part of disaster preparedness.

In the context of regional disasters, the catastrophic tsunami in the Indian Ocean in December 2004, following a major, offshore earthquake near Sumatra, Indonesia, galvanised the Thai Red Cross Society into emergency relief action as well as short- and long-term recovery programmes.

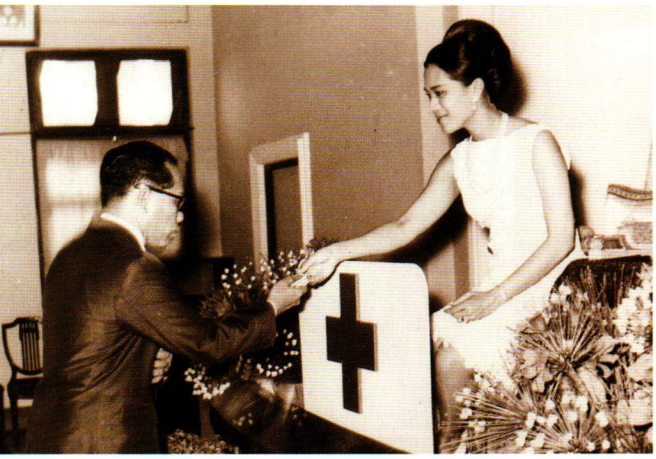
In recent times, Thailand's borders have strained under the weight of hundreds of thousands of displaced persons escaping from armed conflicts, for example, in Cambodia and Myanmar. At such times, the Thai Red Cross Society was on hand with relief supplies and offered assistance programmes providing food, clothing and other items. Timely action by the society has averted major human tragedies in the wake of horrendous conflicts; in particular unspeakably cruel acts of genocide against Cambodian citizens who fled across the Thai border to safety.

The Thai Red Cross was also quick to respond with relief efforts when a devastating tropical cyclone (Cyclone Nargis) came ashore in Myanmar's Ayeyarwaddy Division causing over one hundred thousand deaths and many more injured and displaced people. And in January 2010, the magnitude 7.0M_W* earthquake that struck the Caribbean nation of Haiti affected an estimated three million people prompting one of the greatest responses in the one-hundred-and-fifty-year history of the International Red Cross and Red Crescent Movement. The Thai Red Cross Society contributed donations totalling 3.69m U.S. dollars to support relief efforts. At the time, Bekele Geleta, secretary general of the International Federation of Red Cross and Red Crescent Societies (IFRC) expressed his appreciation and extended his profound admiration and pride in the Thai Red Cross Society's initiative. Acknowledging the generosity of all Thai people, Thai Red Cross staff and volunteer workers, Mr. Geleta said it demonstrated great commitment and solidarity towards helping alleviate human suffering in Haiti's devastated communities.



Wherever needed, the Thai Red Cross Society responds with relief supplies, food and clothing

**The moment magnitude scale (abbreviated as MMS; denoted as M_w) is used by seimologists to measure the size of earthquakes in terms of the energy released. The scale was developed in the 1970s to succeed the 1930s-era Richter magnitude scale (M_L). Even though the formulae are different, the new scale retains the familiar continuum of magnitude values defined by the older one. The MMS is now the scale used to estimate magnitudes for all modern large earthquakes by the United States Geological Survey.*



Regular blood donors are honoured with certificates presented by HM the Queen

Blood transfusion services

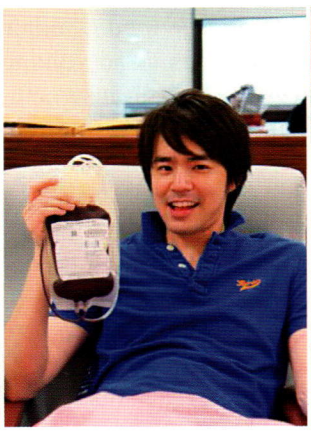
Blood, "the fluid of life", especially in the context of life-saving transfusions, is under the jurisdiction of the Thai Red Cross Society's National Blood Centre (previously Office of the Blood Service Unit) graciously inaugurated by Their Majesties the King and Queen of Thailand in 1953. It is entrusted with procuring and storing adequate, safe supplies of blood for the whole of Thailand. Over the years, blood donors have increased in number since the first group of ten donors gave blood following the example of HRH Prince Paribatra Sukhumbhand who, at the time, was executive vice president of the Thai Red Cross Society.

Donor recruitment drives take place in Thailand on a year-round basis with special campaigns organised to coincide with auspicious occasions in the lives of Thailand's royal family. Regular blood donors are honoured with pins and certificates often presented by HM the Queen (president of the society), HRH Princess Maha Chakri Sirindhorn executive vice president of the Thai Red Cross Society, and HRH Princess Soamsawali.



The centre was appointed WHO Collaborating Centre for Training in Blood Transfusion Medicine (2004-2007), and has cooperated with the Japanese Red Cross since 1995 in organising the Red Cross and Red Crescent Symposium on Blood Programmes in the Asian Region, Securing Safe Blood. Also, in conjunction with the Thai Society of Haematology, the Thai Red Cross hosted the XVI Regional Congress Asia of the International Society of Blood Transfusion in Bangkok from November 12 to 15, 2005.











The Princess Sirindhorn Eye Surgery Unit started in 1995

Community health and quality of life promotion

The Thai Red Cross Society operates twelve Red Cross Health Stations around Thailand with each one directed towards improving the wellbeing of people through health and welfare education to home visits and blood donation campaigns. These stations also serve as relief centres in times of disaster. One unit of particular interest at health stations is the Princess Sirindhorn Eye Surgery Unit started in 1995 to coincide with the Princess' fortieth birthday anniversary.

More remote areas, and areas populated by disadvantaged citizens, receive medical and dental services from mobile units including a floating clinic aboard the barge *Vejapah* donated by His Majesty the King in 1955. The floating clinic offers medical and dental care to residents living alongside the Chao Phraya River and canals in central Thailand.

Since the very beginning, the Thai Red Cross Society has expanded its organization and increased its services to serve the people in keeping with the Red Cross spirit and with help and support from all sectors of society in particular Thailand's royal family which has been the inspiration of the movement since it began.



The floating clinic on the barge Vejapah provides medical and dental care to riverside residents





Role and involvement of Thailand's Royal Family

At all stages in the development of the Thai Red Cross Society, members of Thailand's royal family have played an important, guiding role. His Majesty King Bhumibol Adulyadej is patron of the society and HM Queen Sirikit serves as president with HRH Princess Maha Chakri Sirindhorn as executive vice president also chairing the Thai Red Cross Council. Other key personnel include Mr Phan Wannamethee, who is secretary general of the Thai Red Cross Society.

When it was established in 1893, the society was known as the Red Unalom Society of Siam formed with private funding from the royal family. It was renamed the Siam Red Cross Society in 1920 with Queen Saovabha Phongsri as its president. A year later, the society joined the ranks of the International Federation of the Red Cross and Red Crescent Societies.

The society's close association with the nation's royal family is not just a time-honoured tradition; support from the royal family constitutes a driving force behind the organization's great success and prestigious status in the world. With Her Majesty the Queen at the helm, the latent power of Thai womanhood has been harnessed, as can be seen from the strong network of volunteers formed by wives of provincial governors and other high-profile ladies who eagerly support the diverse activities of the Red Cross.



The Queen inspired a network of volunteers to support the society

Early in the present reign, the Queen graciously accepted a special membership of the Thai Junior Red Cross taking the unit under Her Majesty's royal patronage. After HM Queen's Savang Vadhana the Royal Grandmother passed away in 1955, His Majesty the King conferred upon HM Queen Sirikit the presidency of the Thai Red Cross on the Queen's birthday on August 12, 1956. This marked the beginning of a whole new era for the Thai Red Cross Society benefiting the poor and underprivileged, not only in Thailand but around the world.

Her Majesty's poise and composure, great compassion and kindness, combined with firsthand experience gained during extensive royal visits accompanying His Majesty the King to remote rural areas of the country, inspired her to embrace wholeheartedly the Red Cross operation and take it to new heights.





Thai Red Cross activities have expanded under the gracious leadership of HM the Queen

Under the gracious leadership of Her Majesty, Thai Red Cross activities expanded by leaps and bounds with the establishment of the Thai Red Cross Provincial Chapters throughout the country in 1962. The Thai Red Cross Rehabilitation Centre in Samut Prakan Province came into operation in the same year; the Eye Bank for cornea transplants in 1965; the National Blood Centre in 1969; the Thai Red Cross Children's Home in 1981, and the opening of the Thai Red Cross Programme on AIDS in 1991 – today known as the Thai Red Cross AIDS Research Centre.







More health care and relief service centres followed: The Organ Donation Centre was established in 1994; the Cardiac Centre in the King Chulalongkorn Memorial Hospital in 1995; the Princess Sirindhorn Eye Surgery Mobile Unit in 2001 and the First Aid and Health Care Training Centre and the Craniofacial Centre in the King Chulalongkorn Memorial Hospital. In 2005, the Queen Sirikit Centre for Breast Cancer was established also in the King Chulalongkorn Memorial Hospital. Today, the Thai Red Cross Society forms a major network of health care and relief services and is by far the biggest humanitarian organization in Thailand.



Today, the Thai Red Cross Society constitutes a major network of health care and relief services



Provincial chapters and district branches

Performing under the jurisdiction of the Thai Red Cross Society (TRCS), provincial Red Cross chapters were established in 1962 in each of Thailand's seventy-five provinces. Each provincial chapter has its own district branches carrying out the work of the TRCS at district level across the entire country. Staffed mainly on a volunteer basis, the work covers the society's four main areas of interest: disaster relief, blood donation services, quality of life promotion, and social welfare services.

Red Cross chapters in seventy-five provinces of the country are staffed mainly on a volunteer basis

Working with the society for over twenty years (with the early part spent in Betong District in the southern province of Yala at the border with Malaysia) Mrs. Prissana Pongtadsirikul, who is director general of the Office of Contemporary Art and Culture, spoke of her role as chairman of the Thai Red Cross provincial chapter in the province of Chachoengsao in Thailand's central region.



"For the past six years I have worked with the Chachoengsao chapter helping with projects initiated by Her Majesty the Queen and by Her Royal Highness Princess Maha Chakri Sirindhorn," she said speaking of the holistic centres



initiated by the Princess for people of advancing age in the eleven districts of Chachoengsao Province.

"Apart from providing help for the elderly, Her Royal Highness also focuses on the requirements of young people particularly their education. Today, every provincial chapter helps to take care of students under Her Royal Highness' patronage from elementary school until receiving a bachelor degree, if they have the ability."

Much of the work carried out by the chapter, Mrs. Prissana explained, entails visiting students at their homes to see how they live, and then discussing with teachers what more is required to help them further. "We report back to Her Royal Highness who makes certain each chapter is able to support the students with money, uniforms, books...even reading glasses if required. Funding comes directly from Her Royal Highness' foundation into students' accounts."



Each Red Cross chapter works closely with hospitals and personnel from the Ministry of Public Health

Explaining how the chapters work with representatives from government departments, Mrs. Prissana said. "We never work alone. We try to integrate with government agencies. For example each province has a human security and welfare office under the Ministry of Social Development and Human Security and we work with them in helping to develop the quality of people's lives."

Where patients are concerned, the chapters work closely with hospitals and personnel from the Ministry of Public Health. Volunteers involved with blood donors liaise with provincial hospitals and, for disaster and relief work, with the Ministry of Interior.

"A few years ago I worked in Sa Kaew Province that borders with Cambodia," Mrs. Prissana said. "We had a close working relationship with a Cambodia Red Cross chapter. We even helped Cambodians gain access to hospitals in the province for minor surgery with transportation provided by a Red Cross mobile unit that used to journey to Sa Kaew from Bangkok."

Fundraising is an essential part of the Thai Red Cross Society and each chapter focuses on this important aspect on a year-round basis. "Our big event in Chachoengsao is our annual charity fair to raise money," Mrs. Prissana said. "We also have people coming to us to donate money on their birthdays...strange as it may seem, some people even like to donate money after attending a funeral service."



Civil war in Cambodia fully tested the Thai Red Cross Society's humanitarian response

Refugees at the border

One of Thailand's eastern neighbours, Cambodia, tested the state of readiness of Thai Red Cross facilities in 1979 after the country was invaded by the Vietnamese army along with allies from the Kampuchean United Front for National Salvation (KUFNS). Pol Pot's Khmer Rouge forces retreated towards the Thai border but, by that time, Cambodians had already endured four years of cruel war and genocide perpetrated by the Khmer Rouge, acts that impelled thousands of frightened citizens to mass along the Thai border.

Civil war broke out with the foreign-backed troops involved in a battle for control of the country, which resulted in tens of thousands of displaced Cambodians – starving, desolate and terrified – fleeing into Thailand's Trat province to an area known as Khao Lan.

The numbers of refugees continued to grow causing great concern for Thailand's security. This led Prime Minister General Kriengsak Chomanan to order that the border be closed.

Doctor Suvit Yodmani, Thailand's government spokesman at the time, recalled that some forty thousand refugees were amassing at the Thai border. "For security purposes, the Royal Thai government tried to seal the border between Thailand and Cambodia." The situation, he explained, was extremely dangerous with much fighting going on; refugees seeking sanctuary were blocked from entering and many were turned back only to be shot at by military waiting on the other side.



The Queen intervened in the developing crisis on the Thai-Cambodian border

"Without wishing to take sides in relating the actual events that took place, I can say there was a tremendous amount of death, suffering, disease and famine. So, somehow, the Thai government had to come to a decision on what to do after sealing the borders to ensure security."

Her Majesty Queen Sirikit, in her capacity as president of the Thai Red Cross Society (by far the largest humanitarian organization in the country) called for a solution after receiving details of the developing crisis on the border.

Doctor Suvit explained: "Her Majesty reacted very strongly after receiving a report from Prof. Dr. M.L. Kashetra Snidvongs, at that time secretary general of the Thai Red Cross Society, expressing grave concern for what was turning into a humanitarian crisis. Prime Minister Kriengsak was in charge of the Thai government at the time – a brilliant strategist by the way – and he realized it was essential for Thailand to provide humanitarian assistance."





However, before reopening the border, the prime minister ordered the relocation of some villagers to safer areas; then, with the assistance of the UNHCR, camps were established for the refugees. "This was accomplished, and in late October 1979 the PM inspected the border areas and publicly declared the border open," Dr. Suvit added.




Her Majesty flew to border areas to obtain a firsthand assessment of conditions in refugee camps

The present secretary general of the Thai Red Cross, Mr. Phan Wannamethee, also spoke of HM Queen Sirikit's personal intervention during these tense days on Thailand's border: "Her Majesty sought to provide shelter for these people under the emblem of the Thai Red Cross." Subsequently, the secretary general explained, the Queen took care of the refugees for over five years until they were transferred to proper refugee camps. "This showed Her Majesty's compassion towards the Cambodian people…and it was purely her own initiative."

Her Majesty flew to the camps to see the situation firsthand and was greeted by sights that shocked her deeply. The Queen was appalled by scenes of hunger, illness and sheer exhaustion on the part of many refugees. Representatives from the United Nations High Commissioner for Refugees (UNHCR) also arrived at the border to survey the situation.



Under the direction of Her Majesty, the Khao Lan Thai Red Cross Centre was established to oversee the border camps that provided shelter, food and medical care to desperate refugees, most of whom were poor families with small children.

The Queen was not without support from her



own children during visits to these desolate scenes along the Thai border. His Royal Highness Crown Prince Maha Vajiralongkorn, at the time a young military officer, worked to establish security at the camps. Her Majesty's second daughter, Princess Maha Chakri Sirindhorn was also on hand to oversee the opening of schools in the camps so children could be taught self-help and life skills to help prepare them for the future. Today, the Princess serves as executive vice president of the Thai Red Cross and is a champion of children's rights.

When the border reopened, Thailand was faced with a steady stream of refugees that proved an enormous challenge for the Thai Red Cross. To assist, other camps were set up in Thailand to cope with the growing number of refugees. The most well-known of these was Khao Idang Holding Centre a huge compound of bamboo and thatched houses located close to Aranyaprathet in Thailand's Sa Kaeo Province.

Recalling the Cambodia refugee crisis of 1979, UNHCR regional director Kitty McKinsey said: "It was a huge turning point in the history of the UNHCR. It was the first real emergency we really were active in, anywhere in the world." The UNHCR had to set up camps all along the border to take care of hundreds of thousands of refugees pouring into Thailand. By 1980, the population of the camp had grown to one hundred and sixty thousand.

"What was very clear," the regional director explained, "was that by opening the door to the Cambodian refugees many lives were saved. We do know that Her Majesty the Queen was instrumental in taking care of many children. We know that she personally flew to the site to see the Cambodian refugees and set up the Khao Lan Thai Red Cross Centre for the children."



HRH Princess Maha Chakri Sirindhorn, was on hand to oversee the opening of schools in the refugee camps

According to the UNHCR, Her Majesty was responsible for taking care of at least five thousand orphans and unaccompanied refugee children. The regional director said that the Queen's personal interest in the fate of the children was invaluable to the UNHCR because it demonstrated to the Thai public and to the government the importance of taking care of refugees. It also illustrated the importance of protecting refugees which made it easier for the UNHCR to operate.

By 1986 the border camps at Khao Lan had closed but memories of how HM Queen Sirikit, the Thai Red Cross Society's president, had allowed sanctuary for some three hundred and fifty thousand refugees from a neighbouring country over a period of twenty years, remain undiminished. Today, the "Royal Compassion Museum" stands on the site of Khao Lan's former campsite to ensure no-one ever forgets what happened on the Thai-Cambodian border.

Even today, unfortunate victims of conflicts in neighbouring countries continue to view Thailand as a safe sanctuary; a land where they can harbour hopes of a better life, their care entrusted to the Thai Red Cross Society.

In 1991, Her Majesty Queen Sirikit received recognition in Washington D.C. when she was presented with an International Humanitarian Award as "...an individual of international stature who has made an outstanding contribution to improvement in the quality of life and the uplifting of large numbers of people."





The Princess serves as executive vice president of the society and is a champion of children's rights







Under guidance from HRH Princess Maha Chakri Sirindhorn the Thai Red Cross Society sent supplies to China and Myanmar when disaster struck in 2008

Assisting victims of earthquakes and cyclones

As befits her royal parentage, HRH Princess Maha Chakri Sirindhorn looks beyond Thailand's borders to help those in need.

When a 7.8M_w earthquake struck China's south-western province of Sichuan in May 2008, the Thai Red Cross immediately donated two hundred thousand U.S. dollars to its Chinese counterpart, along with two hundred and fifty tents and cooking utensils.

That same year, tropical cyclone Nargis, the worst natural disaster in Myanmar's recorded history, took close to one hundred and fifty thousand lives and caused large-scale damage that completely wiped out many people's livelihood. The Thai Red Cross Society, under guidance from Princess Sirindhorn, despatched thirty tonnes of survival equipment including medicines, generators, snake antivenom and twelve tonnes of food, along with a team of twenty doctors and nurses. In the aftermath of this large-scale tragedy, and as part of the recovery programme, the Thai Red Cross built a small hospital, a health care station, and renovated a blood bank in Yangon, Myanmar's former capital.

Speaking about the aftermath, Myanmar schoolteacher Tan Ku-Mar-Ree said his house was completely destroyed. "We felt helpless. We prayed even though we were terrified to speak. We had lost everything."





Today, an estimated one hundred and forty thousand Myanmar refugees live in camps along the Thai-Myanmar border, and a further 1.5 million live in Thailand as economic migrants.

Another massive earthquake disaster occurred in Pakistan in 2005 when eighty thousand lives were lost after a 7.6M_w earthquake struck Pakistan-administered Kashmir. Response from the Thai Red Cross was swift, and Thai Airways, the national carrier, assisted in flying five tonnes of relief goods to Islamabad for distribution. His Royal Highness Crown Prince Maha Vajiralongkorn also donated private funds to assist relief efforts.



Relief effort distribution in Pakistan

The catastrophic 7.0M_w earthquake in the Caribbean nation of Haiti in January 2010 prompted the Thai Red Cross Society to launch an appeal for public donations to help victims. The generous response from the Thai people meant that the Red Cross could make several, large donations. A transfer of over one million dollars was made to the account of the IFRC in January 2010 to support relief operations.

Expressing appreciation to Thailand for contributions when they grew to 1.2 million dollars, the IFRC secretary general, Mr Bekele Geleta, spoke of his profound admiration and pride at the Thai Red Cross Society's initiative that demonstrated great commitment and solidarity to help alleviate human suffering in the devastated communities in Haiti. The secretary general also expressed his sincere thanks to all Thai people as well as the Thai Red Cross staff and volunteers who were actively involved in fund-raising campaigns. Response to the Haiti earthquake was one of the biggest in the one hundred and fifty year history of the IFRC movement. But even more help was to come from Thailand.

On February 9, 2010, the Thai Red Cross Society made another donation to the IFRC societies amounting to one million dollars for relief and recovery efforts in Haiti. In all, 3.69 million dollars came from Thailand made up of fifty thousand dollars from the Thai Red Cross Society and 3.19 million dollars from public donations made through the Thai Red Cross Society.





Leadership and support from the royal family

Thailand's royal family have a long history of being among the first to respond to local disasters affecting people's lives and livelihood. One of the worst natural disasters in modern times, and still fresh in everyone's mind, was the 2004 Indian Ocean tsunami, triggered by an undersea, 9.1M_w earthquake off the west coast of Sumatra, Indonesia, which took the lives of over two hundred thousand people and left tens of thousands more injured, homeless and desolate.





In Thailand, entire families were wiped out by the huge waves generated by the tsunami. Even foreign visitors, holidaying in provinces bordering the Andaman Sea were affected. It was Thailand's peak holiday season and hundreds of visitors were among the dead and missing. Some managed to survive to tell of their ordeal.

British citizen Mr. Aaron le Boutillier, a tsunami survivor who was living and working on Phi Phi Island related his terrifying experience: "My ordeal started off in my room. It was ten in the morning and I heard everyone screaming and by the time I got to my balcony the tsunami had hit the street and water was rushing through the balcony of my bedroom." After surviving to tell the tale, Aaron decided to write about his experiences, and of others, in a personal odyssey "*And Then One Morning*", royalties for which have been channelled to those still traumatised from the tsunami and to several, supportive foundations in southern Thailand. For many people, writing

and talking about their brush with death was a vital step in the healing process.

Among those first on the scene in Thailand was the Thai Red Cross mobile medical team. With an estimated ten million people homeless, Thailand's royal family immediately took a leading role in relief efforts.

As news of the tragedy broke, HRH Crown Prince Maha Vajiralongkorn coordinated Thailand's military and police response, adopting a major role in providing emergency housing for orphaned children, and sourcing new boats for fishing communities. Simultaneously, HRH Princess Maha Chakri Sirindhorn established a base at the Thai Red Cross headquarters to oversee the distribution of relief supplies to disaster-hit areas. The Princess also coordinated much-needed blood donations for relief efforts and remained on hand to render assistance throughout the entire ordeal.





The Thai Red Cross Society distributed relief supplies to areas affected by the Indian Ocean tsunami

In the eyes of victims of the tsunami, particularly impoverished fishing communities who lost their loved ones and their livelihoods, Princess Sirindhorn stood as a beacon of hope. Even after the tsunami, Her Royal Highness asked Mrs. Pittraporn Sangkasaba, a former classmate, to oversee a special project in southern Thailand working with the Thai Red Cross to ensure poor families living in remote coastal and inland villages received medical supplies and support funds.

Speaking as a member of Princess Sirindhorn's "special task force", Mrs. Pittraporn said she worked with the Red Cross from the first day of the tsunami. "In order to learn of people's problems, the princess formed a group called 'Hippo' to coordinate with the Red Cross. All cash donations and goods handed to the Red Cross were given directly to the people in need.

"Three months after the Hippo group was formed," Mrs. Pittraporn explained, "Her Royal Highness formed the Sirindhorn special unit to continue the group's work to ensure continuity."







HRH Princess Soamsawali and her daughter HRH Princess Bajrakitiyabha responded to calls for help when Bangkok was inundated with floodwater in 1995

Flooding is another form of disaster well known in much of Thailand. Flash floods in several parts of Thailand prompted a special, coordinated effort on the part of HRH Princess Bajrakitiyabha (the Crown Prince's daughter, also known as Princess "Pa") to establish the Princess Pa Foundation, Thai Red Cross Society. The foundation, which originated from the Voluntary Project of Princess Pa, Thai Red Cross Society during the period of disastrous flooding in Bangkok in 1995, has enjoyed unprecedented support from Princess Bajrakitiyabha's mother HRH Princess Soamsawali.

Offering financial support for the "decision-supporting system for flood warnings" as proposed by the Thai Meteorological Department, the foundation's main objective is to provide humanitarian support. It also seeks to complement government efforts and those of the private sector in relief missions for citizens affected by severe floods; to help those less-affected people to help the more-affected, and for those who are stronger to help the weaker by concentrating on survival and rehabilitation efforts.











The Thai Red Cross Society has also taken a leading role in Thailand and around the Southeast Asia region in the fight against HIV-AIDS, in research as well as disease prevention, counselling and treatment. In 1991, a clinic for testing for HIV and counselling was established in Bangkok offering HIV testing and counselling on a discrete basis. More than one thousand people go to the clinic each month including foreigners wishing to take advantage of the clinic's "non-disclosure" policy.

Thailand's royal family also take a prominent role in addressing HIV-AIDS, particularly HRH Princess Soamsawali who, in addition to being a vigorous campaigner for the Princess Pa Foundation, is a driving force behind Thailand's HIV and AIDS awareness programmes. It is not unusual to see the princess among AIDS-infected patients – especially babies – in her drive for increased government funding to supplement the Thai Red Cross Society's efforts to fight the disease.





Princess Soamsawali is a vigorous campaigner for the Princess Pa Foundation and champions HIV and AIDS awareness programmes

Commenting on Her Royal Highness' initiative, Dr. Prapan Panupak of the Thai Red Cross AIDS Research Centre said Princess Soamsawali is very interested and genuinely keen to help with HIV work. "Her Royal Highness contributed her own funds to set up a project called Preventing Mother-to-Child Transmission."

Princess Soamsawali's initiative has helped safeguard the future of thousands of unborn babies. Her fundraising efforts ensure that AZT is available to administer to HIV-positive pregnant women to protect their children from being infected.

In almost every facet of human tragedy, the Thai Red Cross Society plays a major role drawing on the strength of Thailand's royal family whose own ideals share a common goal with the principles and spirit of the Red Cross.





The Thai Red Cross Society's Red Cross Fair is a major fundraising event normally presided over by Their Majesties the King and Queen

Fund raising

To support its work as a major humanitarian network, the Thai Red Cross Society relies on contributions whether in cash or in kind. A great deal of funding is needed to finance its operations and raising money is a major function of the society. The Thai Red Cross Society's Red Cross Fair, launched during the reign of King Vajiravudh (Rama VI) and held on an annual basis, is a major fundraising event.

The first Red Cross Fair of Siam took place in 1924. An eight-member committee, chaired by HRH Prince Paribatra, was entrusted to organise the event. The objective was to publicise the activities of the Red Cross Society of Siam and to persuade members of the public to join the Society as "citizen members" and as an annual, fun-filled event for members who subscribed one Thai baht a year.



Held on the ceremonial ground at Sanam Luang in Bangkok, the first Red Cross Fair was presided over by HM King Vajiravudh in person. Members of the royal family, high-ranking officials, societies,

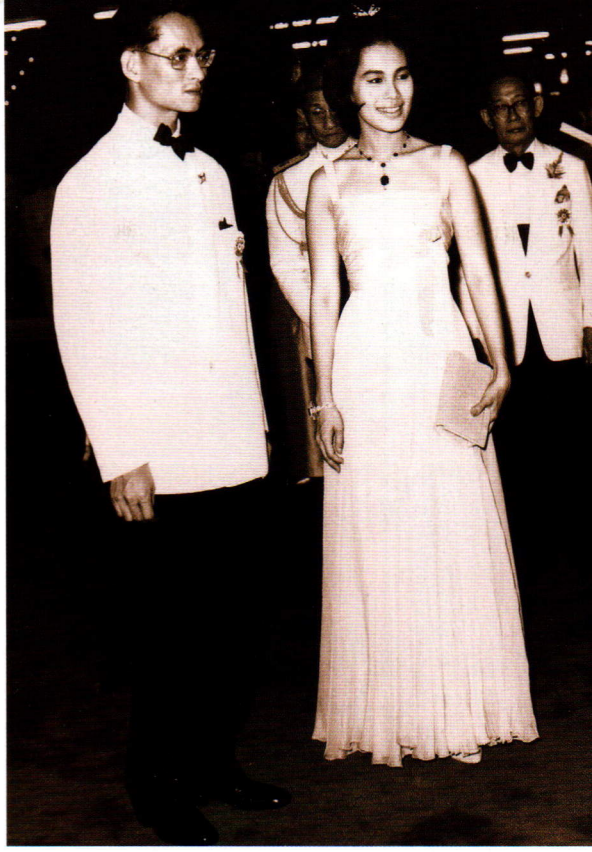
associations and companies were all invited to enter street floats and join a procession that wound along various roads in Sanam Luang. The process was watched by huge crowds while officials, junior members, students and scouts went among the crowd persuading onlookers to become citizen members of the society. In its first year, over thirteen thousand new members were recruited.

The Red Cross Fair of Siam held in 1925 was presided over by HM Queen Savang Vadhana in her capacity as president. The Queen opened the fair with an added attraction of a fancy kite display and kite contest that first started in April 1924.

This event raised over three thousand four hundred baht of which three thousand baht went to purchase a hospital bed inscribed *"The Kite Contest Event at Sanam Luang B.E. 2467 (1924)"*, with the remaining amount channelled to the Red Cross Society of Siam.

The following year the kite contest raised over five thousand baht for the society, which that year had asked the League of Red Cross in Geneva, Switzerland to procure Red Cross balloons for sale at the fair. It resulted in a great deal of additional funding.

During the present reign of HM King Bhumibol Adulyadej (Rama IX), the Red Cross Fair was moved to Ambara Garden in the Dusit Palace, Bangkok, extending to the Royal Plaza and Sanam Suea Pa. A great deal of activity takes place at the fair with support from government ministries and departments, institutions, government agencies, associations, and private companies some of which set up booths to sell donated merchandise to the public to raise funds.



Their Majesties the King and Queen often attended gala dinner charity events to help raise funds for the Thai Red Cross Society



This Red Cross kite was flown by the young Crown Prince at a Red Cross Fair

The Red Cross Society publicizes all activities and provides health services and blood donor-drives at the fair, the opening of which is invariably presided over by Their Majesties the King and Queen with other members of the royal family supporting the event each day.

The annual Red Cross Fair, normally held over nine days from the end of March into the first week of April, has become a very





The Red Cross Concert, performed by the Royal Thai Navy orchestra since 1964, is an important source of funding

popular event keenly anticipated by people from all walks of life. It coincides with a number of provincial activities around the country raising funds for the Thai Red Cross Society under the common concept of "Red Cross helps us, we help the Red Cross".

Another, major annual event is the Diplomatic Red Cross Bazaar that has been organised by the diplomatic corps in Bangkok since 1967. Countries with diplomatic missions in Thailand unite in offering for sale a variety of their own countries' products including handicrafts and delicacies.

An important source of funding for the Thai Red Cross Society comes from the Red Cross Concert that has been performed by the Royal Thai Navy orchestra since 1964. An artistic aspect was added in 1999 when a group of volunteer amateur artists contributed paintings to be exhibited and sold to raise funds.

Anyone who wishes to contribute to the Thai Red Cross Society may do so via the society's website at www.redcross.or.th which gives details of how to make online contributions or conduct bank transfers. A senior official at the society's headquarters in Henry Dunant Road, Bangkok described how some people choose to donate their inheritances to the Thai Red Cross Society.

"Because of the reputation of the Thai Red Cross and its association with Thailand's royal family, many families without heirs donate their entire inheritance to the society." The official also stated that some donations are sent directly to HRH Princess Maha Chakri Sirindhorn who directs them on to the Thai Red Cross.

"People are also living longer," the official explained, "therefore we have to ensure we also use donated funds to provide facilities to train doctors and other medical staff to take care of elderly patients with specific requirements." To meet the many challenges of an aging population, the Thai Red Cross is constructing new facilities where senior citizens can go for specialised treatment for age-related illnesses and, later, receive specialist care during periods of convalescence.

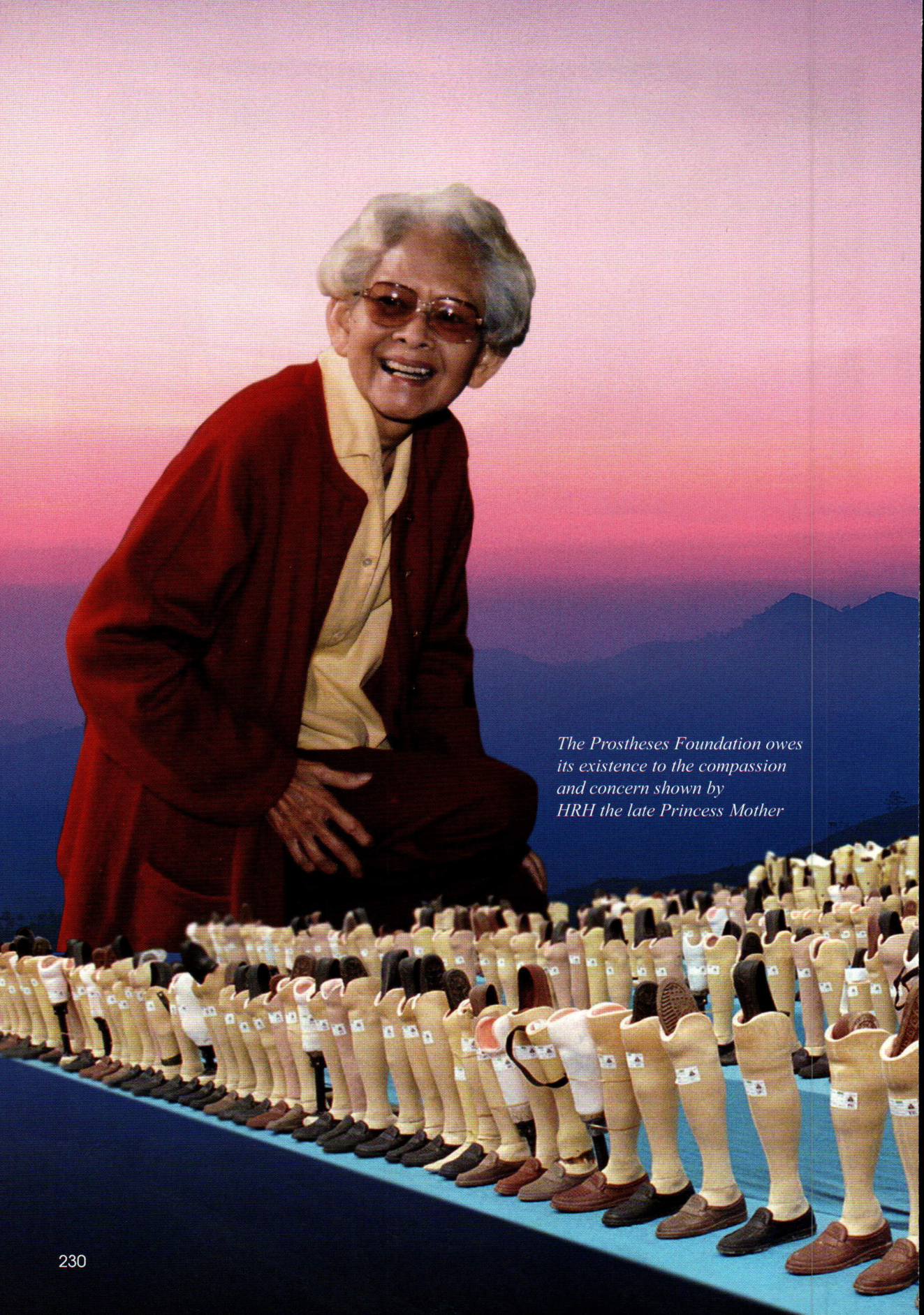






On behalf of the Thai Red Cross Society, HM the Queen graciously accepted donations from the Diplomatic Red Cross Bazaar





The Prostheses Foundation owes its existence to the compassion and concern shown by HRH the late Princess Mother

Prostheses Foundation of HRH the Princess Mother





HRH the Princess Mother visiting a mobile unit offering prosthetics support; near Doi Tung, Chiang Rai Province

Prostheses Foundation of HRH the Princess Mother

Sanam Luang, a vast open field and public square in front of Wat Phra Kaew and the Grand Palace, constitutes the historic centre of Bangkok, capital city of the Kingdom of Thailand. This is the traditional setting for celebrating public events such as New Year's Day, Thailand's Constitution Day, and the birthday anniversaries of Their Majesties the King and Queen. On October 1, 2000 it was also the site chosen to erect a prominent, albeit provisional, building with a sign indicating that the Prostheses Foundation of HRH the Princess Mother was ready and able to provide free prosthetic limbs to poor and needy amputees.

Inside the building, more than one hundred amputees had already registered for prostheses that would be ready to be picked up in six days. Aside from eager amputees, the building was also packed with prosthetic materials and equipment – sturdy, lightweight and practical innovations for which the foundation remains justly proud. Also assembled were a large number of foundation-based doctors, staff members and volunteer prosthetists from every part of Thailand, sharing a common purpose: to pool their skills in memory of HRH the late Princess Mother, founder of the Prostheses Foundation and its first, honorary president in commemoration of the anniversary of Her Royal Highness's centennial birthday.

The Prostheses Foundation exists today because of the compassion and concern shown by the late Princess Mother. After learning of the plight of poor and needy amputees, who found it difficult to access prosthetic services, the Princess Mother began thinking of a practical solution to their problems. It did not take long for Her Royal Highness to realise that by providing easy access to prosthetics, willing amputees would be able to find work to support themselves and their families and get on with their lives as valuable members of society.

The Prostheses Foundation, a name chosen by the Princess Mother's daughter, the late Princess Galyani Vadhana, was established in Thailand's northern province of Chiang Mai, partly through the Princess Mother's initial donation of half-a-million Thai baht about $20,000 in 1992 along with additional funds raised from the sale of a private car willingly donated by HRH Princess Galyani Vadhana. Added to this were cash donations (in yen) from the Japanese public to help people in Thailand who had lost legs after stepping on landmines. With total seed money of approximately two million baht ($80,000) – available on condition that the interest alone was drawn down for constructing prosthetic limbs – the foundation was registered as a not-for-profit charity on August 17, 1992.



HRH Princess Galyani Vadhana and orthopaedic surgeon Dr. Direk Israngkul inspect prosthetic limb manufacturing at Sanam Luang







"Homemade" prosthetic limbs!

It is a sad fact of life that people lose limbs for a variety of tragic reasons such as diabetes, chronic ulcers, vehicle accidents and landmines from former conflicts. Even today, landmines remain dotted around Thailand's border areas. In some cases people are born impaired; others suffer amputations following snake bites. Formerly, these victims used improvised wooden supports and other locally-acquired raw materials to help them get about, as official assistance was rarely available, if not totally inaccessible, to many.

In 1980, twelve years before the launch of the Prostheses Foundation, the only agency able to provide the necessary assistance was the Foundation for the Handicapped under the royal patronage of the Princess Mother. However, filing a request for an artificial leg was a protracted procedure frustrated by complicated rules and a long wait. Moreover, the quality of artificial legs, when available, left room for improvement. In contrast, the new foundation required only physical evidence for an amputee to get his or her artificial leg at no charge to the recipient.

The Prostheses Foundation of HRH the Princess Mother was founded primarily to help poor and needy amputees in Thailand's remote, rural areas; those citizens who, because of their farming background, needed help to survive and make a living for themselves and their families. This led to a mobile workshop being established that could fashion prostheses on the spot, along with attendant personnel including physicians, technicians and volunteers. Kitted





This "farmer" prosthetic leg is an innovation of the Prostheses Foundation



Hill tribe villagers take home their new artificial legs; Mae Salong, Chiang Rai Province

out with supplies essential for manufacturing prosthetics, the mobile workshop truck travels around Thailand working to a prearranged schedule based upon orders and requests submitted by individual provinces. In general, it makes five to eight journeys a year, each time providing up to two hundred prosthetic legs to help ease the hardship of amputees and the burden on government. Because of its growing popularity and increasing demand on the mobile unit, the Prostheses Foundation was obliged to consistently enhance its prosthetic equipment to ensure ease of use and effectiveness. In time its reputation transcended national borders: Neighbouring countries including Lao PDR, Malaysia and Myanmar began filing requests for assistance. Fittingly, this led to the foundation being recognised in both the Malaysian Book of Records and the Guinness Book of World Records – records that helped give the foundation an international presence.

At the start, however, the operation could hardly be described as smooth, given that part of the foundation's essential workforce – skilled technicians – was volunteer-based. To deal with this challenge, alternative methods had to be identified, based solely on the availability of the foundation's raw materials and related equipment. This led to "BK" (below the knee) and "AK" (above the knee) models of prosthetics being prepared for use as training aids for non-prosthetists. Volunteers were able to follow theoretical and practical training replicating those who were professionally trained. Ironically, those who were once beneficiaries of the foundation now served as an excellent source of volunteer recruits.



These vehicles contain everything necessary to support a mobile workshop for manufacturing prosthetic limbs



Professionally trained volunteers



Some volunteers are themselves amputees

The training devices turned out to be of great use. Personnel certified as prosthetists with the mobile workshop could now replace those who found it difficult to fulfil their commitment as volunteers due to professional pressures. Moreover, the volunteers, through their own ability, could earn a living and support their families. On a psychological level, they tend to have a genuine understanding for those with whom they share a similar plight and take pride in the fact that their tangible contribution has made them valuable and eminent members of society. Similarly attributed personnel now serve the foundation in the mobile unit.

As a further service to amputees, the foundation is setting up small-scale workshops at community hospitals mostly at Thai border locations that can carry out repairs or provide replacement prosthetics. Such workshops help cut both costs and waiting time amputees face seeking help elsewhere. The foundation has readily available resources to equip twenty-two such workshops for the benefit of local amputees and help ease the burden on government departments.



Prosthetics workshop at a community hospital





Workshop training for volunteers from Aceh Province, Indonesia





The success of the Prostheses Foundation, and its ability to be self-supportive, attracted the attention of Thailand's Ministry of Foreign Affairs. In the days following the disastrous 2004 Indian Ocean tsunami, the ministry approached Indonesia's government suggesting it send a team of eight volunteers to undergo training at the foundation to enable them to provide prosthetic aids to a large number of needy people in Aceh, Sumatra affected by the tsunami. Aside from training, all necessary materials and equipment were dispatched to Aceh free of charge to ensure those in need had access to artificial limbs consistent with the abilities and skills of their compatriots who trained at the foundation. Similar training is being provided to one physician and eight soldiers from the landlocked African country of Burundi. After they complete their training, they, too, will receive prosthetic-related materials and equipment for them to be ready at an instant's notice to provide help.

Yet again, the Prostheses Foundation found itself sharing its expertise at an international level with a neighbouring country this time in the heart of the African continent.



Papua New Guinea also sent volunteers for training



HRH the Princess Mother, HRH Princess Galyani Vadhana, and HRH Princess Maha Chakri Sirindhorn chairperson of the Prostheses Foundation

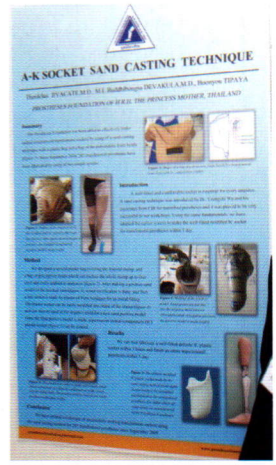
The one-of-a-kind prostheses charity left behind by the late Princess Mother and her daughter HRH the late Princess Galyani Vadhana has gone through several phases of technological development since its inception in 1992. Functioning as a not-for-profit organization the foundation is ready and able to respond flexibly to the changes and obstacles commonplace in a developing country like Thailand. Much of its success is owed to its royal founders, clearly demonstrated through their good counsel and guidance, and from regular site visits.

The interest shown by the royal family is an inspiration to everyone involved in running the foundation. Even after its president HRH Princess Galyani passed away, followed by a two-month hiatus, HRH Princess Maha Chakri Sirindhorn accepted an offer from the foundation to undertake the chairmanship. Without this level of commitment from the royal family the foundation would not enjoy the success and acclaim it has won both at home and abroad to such an extent that foreign amputees make trips to Thailand specifically to receive prosthetic limbs. Its original founders may have passed away, but the foundation lives on, drawing inspiration from HRH Princess Sirindhorn.



Dr. Therdchai Jivacate explains to Princess Sirindhorn the progressive stages for manufacturing a prosthetic limb

The foundation's effectiveness in manufacturing efficient and durable prostheses at low cost did not go unnoticed in the broader world of medicine. In recognition, the Prostheses Foundation was invited by the International Society of Prosthetics and Orthotics (ISPO) to be represented at the 13th ISPO World Congress held in Leipzig, Germany in May 2010 to share with an international audience the technological improvements pioneered in Thailand. From earlier days when plaster of Paris was used in the manufacturing process, today's prosthetic devices are made using the sand-casting method to make negative and positive moulds that give a perfect fit for amputees.



Presentation by the Prostheses Foundation at ISPO World Congress, Leipzig, Germany, May 2010

Apart from meeting the needs of human beings, the Prostheses Foundation has, from time to time, been called upon to lend its expertise in the animal world, initially through a call for help from the Elephant Hospital in Lampang. At the time, a seven-month-old baby elephant was being treated for a severely injured right foreleg after she had stepped on a landmine at the Thai-Myanmar border. The poor calf, three years old when the call for help came through, had only three legs to support her, hence the need for specialised help. The foundation responded by successfully fitting a strong and durable prosthetic device using the sand-casting method normally associated with humans. Following press reports on the success of this simple, effective and speedily-applied technology, more requests poured in from private owners of elephants (and other animals and birds) seeking similar services. It was a defining moment made possible by the vision and benevolence of the foundation's royal founders.



This elephant's prosthetic limb was provided by the Prostheses Foundation

Lose a limb and lose your livelihood!

If you lose a limb, do you also lose the ability to earn a living? It may seem a rhetorical question to some, but to those amputees who have lost limbs they know only too well that life going forward will be difficult and they may even lose their livelihood or at least the opportunity to earn a reasonable living for their families. An amputee and everyone in his or her family feel the pain.

In the years following the Vietnam War and other conflicts in Thailand's neighbouring countries, and even to the present day, many people continue to lose limbs after stepping on landmines. Farmers and children living along borders littered with unseen, unexploded ordnance appear to be most at risk. This startling situation, compounded by road accidents and other maladies such as snakebites or chronic, diabetic ulcers, account for people in Thailand and surrounding countries losing one or more of their limbs.

For many Thais, buying a modern prosthetic limb is prohibitively expensive and high cost is not the only consideration: Acquiring prosthetics, which are generally available in urban centres, is difficult in remote, rural districts. Moreover, modern prosthetics are not designed for the rigours of country life confronting people on a daily basis in the hills and on the farms of Thailand.

Faced with such daunting challenges, disadvantaged people who lost limbs due to landmines, snake bites, and other forms of accidents, often, in the past, resorted to makeshift alternatives. For example, amputees would fashion their own substitute limbs from bamboo, bits of wood, leather and even plastic piping. The less fortunate were reduced to hobbling around on homemade crutches.



Waiting in line for a new prosthetic limb

Foundation established in Chiang Mai

In due course, HRH the late Princess Mother, a frequent visitor to remote parts of Thailand, became aware of the plight of poor and needy amputees and became greatly concerned. Her Royal Highness decided to intercede.

Doctor Chalermbongse Komarakul, a former physician to the Princess Mother and an active member of the Prostheses Foundation related the concerns expressed by Her Royal Highness at the time: "The Princess Mother was a frequent visitor to people in Thailand's rural areas where she witnessed the difficulties facing the poor.

"By chance," Dr. Chalermbongse explained, "Her Royal Highness became aware of Dr. Therdchai Jivacate, a young orthopaedist who practised in Chiang Mai."

A graduate from Thailand's Chulalongkorn Hospital Medical School, Dr. Therdchai had studied rehabilitation medicine at Northwestern University in the United States. Concerned about the high cost of imported prosthetics, he focused on using locally available materials as a substitute.

Fully aware that those in need would find it difficult to afford imported prostheses, which are made from polyester resin and wood and covered with plastic making them very heavy as well as expensive, Dr. Therdchai resolved to find a





HRH the Princess Mother with villagers in rural parts of Doi Tung Province



Princess Galyani visiting a mobile unit at Nakhon Pathom

way to help the poor. The doctor explained that the technology for making false legs had not changed for years, but they were cumbersome and the basic polyester-resin required for the socket and out-coating made them expensive. He wanted to find a way to make cheaper legs: "We started looking for an alternative plastic to polyester-resin. From our studies we found plastics called polystyrene that can be turned into liquid plastic using solvents from which we can make a socket."

After experimenting with different plastics, Dr. Therdchai's team found that by adding a solvent or thinner or acetone, plastic objects can be easily liquefied and worked into different shapes. He



decided to use small polystyrene bottles originally manufactured for drinking yogurt. It was found that after liquefaction, pink-coloured Yakult bottles became skin-like in colour, an interaction caused by the lettering on the bottles. The result was ideal for making prosthetics look more authentic.

After being made aware of Dr. Therdchai's discovery, Dr. Chalermbongse contacted HRH the Princess Mother: "I arranged to

Artificial limbs are manufactured from recycled polystyrene bottles and aluminium cans





call on Her Royal Highness carrying an artificial leg given to me by Dr. Therdchai. I said to Her Royal Highness, 'Dr. Therdchai has a plaything to show you!' The Princess Mother became quite interested when I showed her the prosthetic leg fashioned from recycled Yakult yogurt bottles," he added.

"Her Royal Highness asked me what the benefits were from using this kind of recycled material and I explained that the end product was both comfortable and inexpensive. The Princess Mother then asked me if there really were so many amputees and, if so, why didn't they all have access to these less expensive prosthetics?"



The Princess Mother met often with amputees before the Prostheses Foundation was established

Clearly impressed with the work carried out thus far by Dr. Therdchai and his team on low cost, locally-manufactured prostheses, the Princess Mother decided to donate funds towards the project. In conjunction with her daughter, HRH the late Princess Galyani Vadhana, the Princess Mother proposed setting up a foundation that could further the research and development of lightweight, effective and durable prostheses; in effect to manufacture artificial limbs from inexpensive, locally-sourced, recyclable materials.

"The Princess Mother asked me if five hundred thousand baht would be sufficient to establish a foundation in Chiang Mai,"



Nong Nut was fitted with her first prosthetic leg when she was one year old



confided Dr. Chalermbongse. "As it turned out," he said, "Her Royal Highness Princess Galyani, the Princess Mother's daughter, was offered several thousand baht for one of her cars." The Princess Mother and Princess Galyani raised around two million baht as seed money for the foundation including donations from the people of Japan.

Doctor Chalermbongse went on to explain that Her Royal Highness the Princess Mother, in a compassionate and caring way, demonstrated her concern and desire to help alleviate human suffering "not just for Thais but for foreigners alike, by insisting that anyone could go to the Prostheses Foundation in Chiang Mai for an artificial limb."

The doctor explained that when the Princess Mother started the foundation many remote villages were inaccessible by road; the only way in was by helicopter. "People in remote villages had no experience of modern medicine," he recalled. "If someone lost a limb, chances were they would not be able to visit a big city to seek medical attention – or be able to afford it if they could make the journey. In that respect, the Prostheses Foundation was uniquely placed to generate funds along with volunteer medical staff to help those in great need."



HRH Princess Galyani watching as an amputee tries on his prosthetic limb

Registered on August 17, 1992, the Prostheses Foundation started business using an office at Chiang Mai University, a generous offer on the part of the university's Faculty of Medicine. Their Royal Highnesses the Princess Mother and Princess Galyani officiated as honorary chairman and chairman respectively. Some years later, the Royal Thai Army stepped in to provide the foundation with 7.2 *rai* (over one hectare) of land for a permanent office building, which Princess Galyani graciously opened on October 6, 2003.

Mindful of HRH the Princess Mother's request to contain costs by using materials available in Thailand, the foundation concentrated on recycling locally sourced plastic yogurt bottles. Doctor Chalermbongse explained: "In the manufacturing process we use polyester resin that comes in liquid form. Originally, we experimented with different types of plastic until Dr. Therdchai and his team discovered that recycled Yakult yoghurt bottles provided strong and durable plastic suited to our needs," he added.

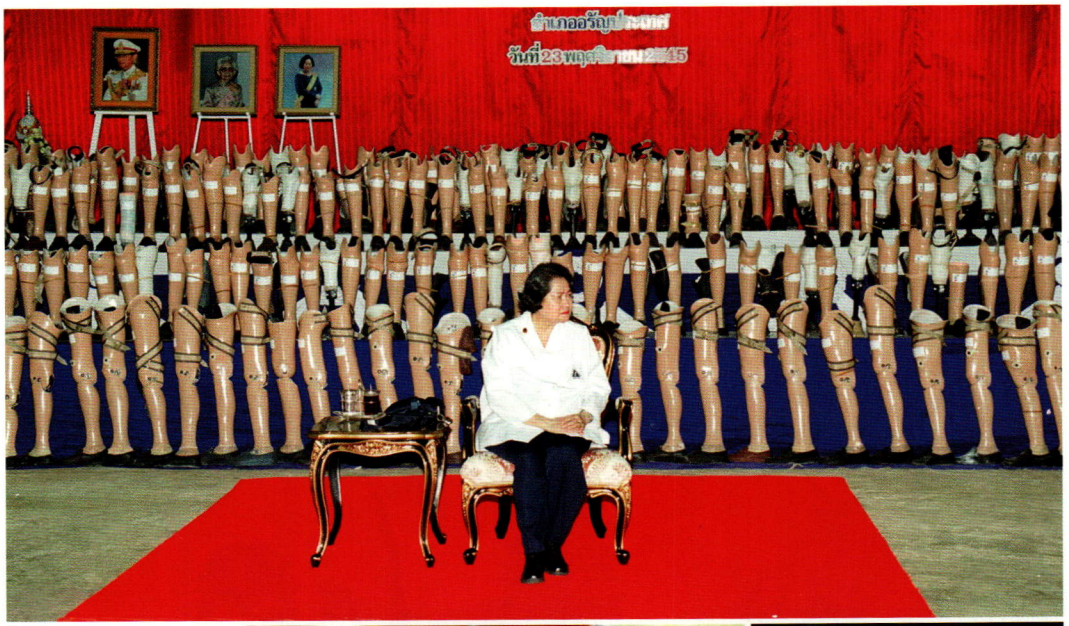
Aware of the project, and after some consideration, His Majesty the King offered the foundation some useful suggestions. Concerned that the medical staff and technicians fabricating prosthetic limbs could contract health problems after inhaling toxic fumes (even becoming addicted to the thinners being used) the King counselled against the use of solvents to liquefy the plastic. His Majesty graciously intervened by requesting Thai companies cooperating in the process of breaking-down plastics to provide the foundation with polyester resin free of charge.

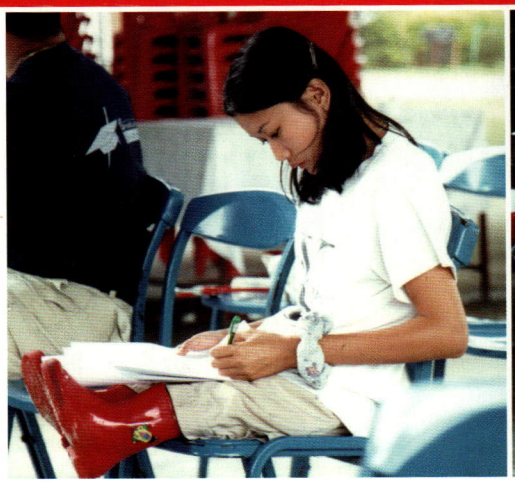


Princess Galyani visiting amputees

Constructing a prosthetic limb

Turning to the construction phase, Dr. Chalermbongse explained the process for producing the skeleton of an artificial limb. "We recycle aluminium pull-rings used on cans of drinks; not the can itself because of the paint. I can honestly say that recycling has proven to be excellent PR for the foundation." The doctor stressed the involvement of the international community in collecting aluminium. "It may not be widely known," he said, "but passengers travelling on the Cunard flagship Queen Mary 2, which docks at Thai ports during her round-the-world voyages, are helping the foundation by saving their aluminium pull-rings. In addition to helping us by separating waste into receptacles on board ship, they are also responding to global needs to recycle reusable materials."







The Prostheses Foundation relies heavily on recycled material



VIP's attended a ceremony during which four children received new prosthetic legs

Free prostheseses for the poor and needy

The Princess Mother's intention in setting up the Prostheses Foundation was to provide free prostheses for poor and needy amputees regardless of nationality or religion. Indeed, the foundation manufactures parts for prosthetic limbs for other workshops free of charge to enable them to produce and repair the same types of prostheses as the foundation. To keep abreast with scientific advancement the foundation conducts its own research and development with assistance from the public and private sectors in terms of raw materials, some of which are recycled. Contributions enable the foundation to provide aid to the physically challenged helping them to lead normal lives on a daily basis – not only prosthetic limbs but canes and walkers made from recycled materials, all offered free of charge. However, a major logistical issue that continues to challenge the foundation is the diverse spread of amputees around Thailand, a country with a land area the size of France.



These hip prostheses were fitted in four days, free of charge

Mobile workshops and volunteers

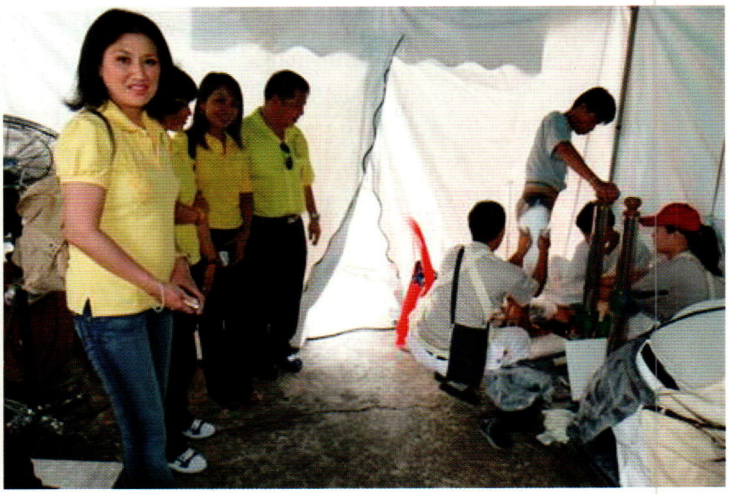
To address the problem of diversity, the foundation progressively introduced mobile workshops specifically for amputees in remote border areas of Thailand. Field clinics, staffed by volunteer teams of doctors and skilled technicians, made it possible for those in need to have access to prosthetic limbs. Originally, two trucks carried the volunteers and their equipment, "and we only required lights for working after dark," explained Dr. Chalermbongse. "We do not discriminate against those coming to us, we request little information about our patients," the doctor said. "On one occasion," he explained, "we had some poor people from the Wa hill tribe come to us and all we asked for was a first name."

On site, volunteer teams assess the needs of amputees then make casts of their stumps. They mould plastic limbs for each one and test them for alignment, comfort and gait. By the sixth day, a custom-made limb is presented to each amputee – free of charge.

In 2006, Mrs. Usa Lamsam, a Thai mother and housewife holding a Masters Degree in International Relations from the Fletcher School of Law and Diplomacy at Tufts University in the United States, became inspired to volunteer her services to the foundation. Aware, like many others, that the Princess Mother and Princess Galyani had been travelling around Thailand helping people in remote areas, she decided to make some form of charitable contribution: not a cash donation; she wanted to donate her time as a volunteer.



An amputee being attended to by a skilled technician



Volunteers are welcome at the Prostheses Foundation



Without any technical knowledge, Mrs. Usa wondered how she might help. It was Dr. Chalermbongse, she said, who "...guaranteed I would do more than I thought!" Taking his advice, she went with a mobile unit to north-eastern Thailand.

"I went to Nakhon Phanom Province close to the River Mekong with no idea at all as to what I would be doing. Doctor Chalermbongse put me in the registration section. First I had to learn a few medical terms like BK, which means below the knee, and AK, which means above the knee." Armed with the patients' other details, obtained by Mrs. Usa through interviews, the appropriate technician could be assigned to each individual case.

"This didn't just apply to local Thai people," Mrs. Usa said, "people were coming across the Mekong from Lao and receiving free prostheses from the foundation's mobile unit – with just a four-day wait."

Mrs. Usa said she had the same experience in Mae Sot on the Thai-Myanmar border after interviewing Burmese and Karen amputees. "For me it was a life-changing experience," Mrs. Usa explained. "I felt I was giving more than just money...I just had to look at the patients to see the hope reflected in their eyes once they could walk. I found myself telling my family and close-circle of friends about my experiences. After that, every time I went with the mobile unit I carried cash donations from many kind people."

These opportunities, impossible without the help of the foundation, had a profound effect on her life. She explained: "I met one old man who had never had a prosthetic leg. He tried to make his own with bamboo. Then there was a lady who had never been out of her house for sixteen years; she was fitted with a prosthetic leg and her life changed," Mrs. Usa said.

Recycled panty hose also has a use for covering amputees' stumps before making sand and plaster moulds. "I wash and take thousands of them to the foundation" Mrs. Usa said. "We can use only one panty hose per patient, but I get many from within my very large family." She said she had learned from a doctor at the foundation that Thai Airways' cabin attendants also help the Prostheses Foundation by contributing used panty hose for recycling.

Since its inception, the Prostheses Foundation has manufactured more than twenty-five thousand limbs for more than fifteen thousand people, all of whom received new limbs free of charge.

What makes a good prosthesis

The foundation considers an effective prosthesis to be one that is not only comfortable and capable of supporting the wearer's body weight but is also able to withstand the rigours of daily use in demanding circumstances such as on farms and in the hills of Thailand's rural areas.

The Princess Mother, who had first-hand experience of the rugged conditions faced by those working in the agricultural sector, and the challenges levelled at the poor and needy in rural areas of Thailand, suggested that prosthetic limbs should be sturdy in design and constructed, where possible, from locally-sourced materials to keep down costs and reduce import charges.

"In the past, some artificial limbs were made of wood," observed Dr. Chalermbongse, "and were just like peg-legs. I recall one man who attached a metal cap to the lower part of the socket to make it last longer. Today, we can make adjustable prosthetics that enable the owner to walk naturally," he added.

Practicality remains the overriding requirement, and while complying with HRH the Princess Mother's guidance to manufacture limbs available for everyone and everyday usage, a prosthetic foot was developed especially for the harsh conditions experienced in hilly, rural areas. A prosthetic foot developed by the foundation is strong, durable and provides a firm contact with the ground. Importantly, it is inexpensive, acid-and alkaline-resistant and suitable for use in water, mud, animal pens and even for climbing trees or mountains. These prosthetic aids are provided free of charge to impoverished farmers.



The foundation's prosthetic limbs are strong and durable



Applying resin to achieve a natural skin colour

The Foundation's prostheses

Five different types of prostheses are required to meet the various needs of amputees. A Syme prosthesis, for example, is used for amputations at ankle level. This entails applying a plastic covering for the stump from knee to ankle joint. For amputations just below the knee, where the knee is still intact, the stump connects to a socket that has sufficient ventilation to reduce the risk of fungal infection. Unlike some prostheses, the socket connection encloses the knee making straps unnecessary.

Unlike the custom-made prosthetic feet for farmers, a standard prosthetic foot designed by the foundation looks and feels like a real one. The heel is spongy, which helps lessen the impact when the wearer's heel strikes the ground. It also provides good "push-off" power, conserving energy and making it possible for amputees to walk further without tiring.

Other forms of prostheses provided by the foundation include knee disarticulation prostheses for those whose amputation is through the knee joint; an above-the-knee prosthesis, and hip disarticulation prostheses for amputations at the hip joint.

Development of prosthetic technology



Her Royal Highness the Princess Mother's desire to produce locally-manufactured prostheses and make them widely available at no cost to poor and deprived people placed quite a demand on the foundation. To maintain a steady supply of prostheses, the foundation had to review its manufacturing techniques to speed up the process, without impairing quality. Today, the foundation uses the sand-casting method to produce prosthetic limbs and can produce prostheses for around one hundred to three hundred clients per visit. For every visit foundation staff must make sure a prosthetic leg is a perfect fit for each amputee and that the wearer can walk free from pain. This improved process means the foundation can complete below-the-knee prostheses in a single day compared to three-to-four weeks in the past – without sacrificing quality. Team members are justly proud of their achievements and efficiency and, as Dr. Chalermbongse pointed out "we now hold the Guinness Book world record for manufacturing the highest number of prosthetic limbs in a ten-day period…six hundred and sixty-four prosthetic limbs for six hundred and forty-six people from July 16 to 26, 2006!"



Production technique

Manufacturing a prosthetic limb at the foundation begins with the socket. This entails making a mould of the stump. After placing two plastic bags over the stump the air between them is sucked out, which causes the plastic to harden into the shape of the stump. A "negative mould" is then made using sand, from which it is possible to make a "positive mould" using plaster.

The positive mould creates a plastic socket for the stump that gives a perfectly comfortable fit for the amputee. This may appear to some observers to be an art form but the manufacture of artificial limbs requires a working knowledge of anatomy, physiology, mechanics, biomechanics and material sciences. Over a period of time, poorly-made artificial limbs can cause further damage to physically challenged people. On the other hand, a properly constructed prosthesis is durable and can give the wearer many years of service. These days, maintaining prosthetics – which normally means replacing the foot or straps – can be undertaken at local hospitals.

Referring to support received from hospitals, Dr. Chalermbongse said: "At the onset, we used a lot of volunteers from hospitals but numbers gradually declined because of the hospitals' own heavy workload. So we started using handicapped volunteers; less-educated people in the main who had to memorize medical terms for different parts of the arms and legs. But nowadays," he continued, "nearly thirty percent of our volunteers are drawn from the ranks of amputees."

The cost of a prosthesis

To begin with, the foundation used Yakult bottles in the manufacturing process. But after His Majesty the King had cautioned against the use of solvents that could result in the vapour affecting both the manufacturer and wearer of the prosthetic limb, polyester-resin was substituted. This did increase the cost of a prosthetic limb from around 700 to 1,500 baht (about 47 US dollars in 2010), but was still cheaper than importing prosthetics into Thailand.

The doctor explained that each component manufactured by the foundation is suitable for wear in a tropical climate. An imported prosthesis, he said, can cost between fifteen thousand and twenty thousand baht ($470-$625). Sceptics may challenge the efficacy of a low-cost prosthesis manufactured by the foundation, perhaps claiming it is bound to wear out faster than the more expensive imported varieties. Scientific testing does not support that view. Tests conducted by the Sirindhorn National Medical Rehabilitation Centre found that a locally-constructed prosthetic foot can function for up to one million steps, which is sufficient for most people.

However, there are start-up costs associated with a project of this nature, mainly in acquiring basic equipment. For example, an infrared oven, to warm and soften plastic to make it pliable to mould and shape, costs around fifty thousand baht ($1,550). Equipment to fashion a plastic stump costs in the region of twenty-five thousand baht ($780) compared with three hundred thousand baht ($9,400) for imported equipment. And a laser alignment machine costs one thousand five hundred baht ($45) against ninety thousand baht ($2,800) for an imported machine.



Infrared ovens

Apart from artificial limbs, the foundation produces forearm crutches for amputees who do not yet have a prosthetic limb; walkers for elderly people who have never used or received prostheses, and reliable, old-fashioned walking sticks.

Doctor Chalermbongse emphasised that costs borne by the foundation are covered by public and private donations. Amputees, in all cases, receive their prosthetic limbs free of charge.

Note: $ = 32 Thai baht in 2010



Dr. Therdchai Jivacate invented this positive alignment machine





The foundation organises workshops and training for overseas visitors

International contributions

Since its inception, the foundation has, to date, held one hundred and ten mobile workshops, including some in Malaysia, Lao PDR and Myanmar. On Thai territory, bordering Myanmar, Lao and Cambodia, the foundation established permanent satellite workshops to make artificial limbs on site. In some cases, technicians trained by the foundation are themselves amputees.

Supplementary activities of the foundation have included organizing artificial-limb workshops in Aceh, Indonesia and training prostheses technicians from neighbouring countries and others further afield. For example, a request was received from the Republic of Burundi in October 2009 for the foundation to train technicians to make and repair prosthetic limbs. Even though this landlocked African country had suffered years of civil war, with many antagonists sustaining wounds and amputations, there were no skilled workers able to make prosthetic limbs locally.

By training people from other countries, the kindness and benevolence of Their Royal Highnesses the Princess Mother and Princess Galyani has benefitted all amputees without fear or favour and regardless of nationality or religion. The foundation's work on the international front clearly demonstrates the founders' desire to make prostheses available to anyone in need irrespective of their ethnicity or religious beliefs.





Another example of international co-operation on the part of the foundation concerns the case of Mr. Ian Reid, a Briton now resident in Thailand, who lost a leg in a car accident. Initially, he received a prosthetic limb from a hospital in the UK, but it proved problematical. After returning to Thailand he complained: "I was in some discomfort caused by my original prosthesis from the UK. I thought about what to do. I measured the convenience of being in Thailand against insufficient funds to return to the UK for a replacement and decided to have it replaced in Thailand," he said.



Briton Ian Reid obtained his replacement prosthetic leg from the foundation

At the time, Mr. Reid said he was not aware of the existence of the Prostheses Foundation: "A Thai friend, who was keen to help me, introduced me to the foundation. As I was in such pain with my UK prosthesis, I was willing to try any new idea," he added.

"I thought about it but I didn't go to the foundation in Chiang Mai. The foundation had an annual itinerary to visit different provinces in Thailand and I met them on one of their visits to Aranyaprathet," he explained.

"They looked into my problem and said they could make a new leg for me that would be much better and lighter," he said. "They reassured me I would soon be walking again like a normal person. At first I took this with a grain of salt because of my disappointment with my previous leg from the UK," he added.

"However, not only was my new leg excellent in every way, I had the added honour of receiving it from Princess Galyani herself. I was the only foreigner present at the event," he recalled. "The prosthetic leg was made for me on site in Aranyaprathet in less than thirty minutes. It was the first time I was able to walk 'normally' after many years. It was wonderful!"





Mr. John de Ritter with his UK-made prosthetic leg (left) and his new one from the foundation (right)

Mr. Reid explained how impressed he was with the support he received: "I was lucky to be taken care of by Dr. Direk Israngkul who I understood to be a senior medical researcher and developer in Thai prosthetics. He instilled confidence in me from our first meeting," Mr. Reid said. "Obviously he had years of experience in his field and explained many things to me personally."

In another case demonstrating the international aspects of the foundation, Mr. John de Ritter, also a British national, received a new prosthetic limb in Thailand. After consulting with Dr. Chalermbongse, Mr. de Ritter discarded his ill-fitting prosthetic from the UK for a new, comfortable prosthetic from the Prostheses Foundation.

Prosthetic limbs for animals

Mosha lost her right foreleg after stepping on a landmine

With years of experience making prostheses for people, the foundation met another challenge on July 5, 2009 when it was asked to provide an artificial leg for a baby elephant. Mosha, just seven months old at the time, lost her right foreleg after stepping on a landmine in Myanmar. The wound took two years to heal before an artificial leg could be fitted. The replacement limb was provided by a team from the foundation using the method of sand-casting a negative mould and then matching it with a conventional plaster-cast mould to create a strong, durable replacement.



Following a successful refit, Mosha could once again walk, run and play on her artificial leg after recuperating at the Elephant Hospital in Lampang province in northern Thailand.

Other animals, even birds, have since benefitted from artificial limbs provided under the auspices of the Prostheses Foundation.

Support for the foundation

The initiative displayed by HRH the Princess Mother in setting up and supporting the Prostheses Foundation under Royal Patronage was the first, important step towards alleviating the misery of many people in Thailand and people from abroad. Physically challenged people, who were born without a limb or lost one during life, were given cause for hope. With ingenuity and foresight on the part of the foundation, along with donations from the public and private sectors, prosthetic technology has advanced in Thailand to benefit thousands of people who might otherwise have been denied help. And by using locally-sourced materials, the foundation has been able to supply Thais and foreigners alike with free limbs, giving many poor and needy people a new lease in life.

Anyone and everyone is welcome to make a donation to the foundation and play an active part in supporting the vision of Their Royal Highnesses the Princess Mother and Princess Galyani that all amputees should have access to artificial legs. For more information, please visit the Prostheses Foundation website (www.prosthesesfoundation.or.th) or the National Identity Board website (www.identity.opm.go.th).

Continued, generous support from the public and private sectors of business and others in the international community, means the foundation is well-placed to expand its essential work and fulfil a worthy goal set down by HRH the late Princess Mother to make high-quality prosthetics available to everyone in need, irrespective of race or religion.









The Prince Mahidol Award





The success is not in the learning, but in its application to the benefit of mankind.
M. Songkla

Award foundation

In commemoration of the centennial birthday anniversary in 1992 of His Royal Highness Prince Mahidol of Songkla, His Majesty King Bhumibol Adulyadej granted permission to establish the Prince Mahidol Award to be administered under the auspices of the Prince Mahidol Award Foundation under the Royal Patronage.

Established in accordance with a proposal put forward by the Faculty of Medicine Siriraj Hospital, Mahidol University, the foundation honours His Royal Highness and his exceptional contribution as "The Father of Modern Medicine and Public Health of Thailand". Each year, the Prince Mahidol Award is conferred upon individuals or entities that have demonstrably contributed to the advancement of medical and public health services in the world.

Today, the offices of the foundation can still be found on the second floor of the Mahidol-Bumpen Building in Siriraj Hospital, Bangkok.



King Chulalongkorn and sons: Prince Mahidol (left), Prince Chudhadhuj (standing) and Prince Asdang, 1905

The formative years

A son of Their Majesties King Chulalongkorn (Rama V) and Queen Savang Vadhana, Prince Mahidol was born on January 1, 1892. It was customary for King Chulalongkorn to send his sons to study in Europe – usually when they were around thirteen years old and deemed to be in good health. In keeping with tradition, Prince Mahidol set off for London in 1905 accompanied by two other princes. Prince Mahidol spent a short while at the Thai embassy before staying at the family home of Mr. Colchester-Wemyss in the English countryside. It was there that Prince Mahidol and his companion Prince Chudhadhuj would refine their knowledge of the English language.

Prince Mahidol in his childhood days





Prince Mahidol of Songkla in his formative years



The Prince during the ceremony of cutting the top-knot, 1903

Prince Mahidol displayed a keen interest in art, particularly drawing and painting, with indications at just thirteen years of age that art could be his career path of choice. In a written report to King Chulalongkorn, Mr. Colchester-Wemyss spoke of Prince Mahidol's artistic talents stating "...it is more than probable that he may one day become a brilliant artist..."



HRH Prince Mahidol of Songkla saw military service

His Royal Highness went on to study at Harrow but after a year and a half he was enrolled into the Royal Prussian Military Preparatory College at Potsdam, Germany, according to the wishes of his father. He went on to the Imperial Military Academy at Groß Lichterfelde in Berlin to further his army military education remaining there until 1911.



Prince Mahidol hand-coloured these postcards sent from England to his sister Princess Valai and his mother Queen Savang, 1905



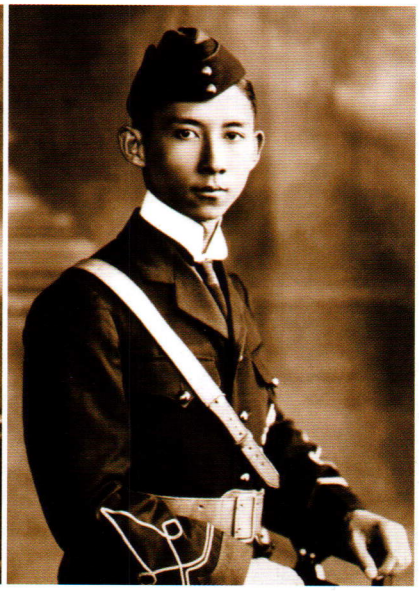
The Prince's half-brother King Vajiravudh encouraged him to enter the Mürwik Imperial German Naval Academy at Flensburg where he studied until 1914. Whilst there, the Prince won a competition in submarine design demonstrating his architectural and artistic talent.

Prince Mahidol's naval service in Germany was brief however; he was instructed by King Vajiravudh to return to Thailand at the outbreak of World War I in 1914 and became a lieutenant in the Royal Siam (now Thai) Navy. He went on to serve from 1915 to 1916 as a senior (today 1st) lieutenant.

A crucially important turning point in Prince Mahidol's early life – and that of the Thai nation – occurred when he resigned from the Royal Thai Navy (with the king's permission) to pursue a career as a civilian. The Prince's decision had a significant impact nationally: Thailand would later benefit from Prince Mahidol's enduring legacy for having advanced higher education in the Kingdom particularly in terms of science, public health, medicine, nursing, and medical research. Hence, in June 1916 His Royal Highness left Thailand for the United States, sailing via the Pacific Ocean, to study medicine. Even if he had wished or intended to take up studies in a European country at that time it was not an option; Atlantic Ocean voyages were suspended during the war.

Prince Mahidol's inherent love of arts and his dedication to education and scientific achievement, coupled with a sense of discipline gained during military service, were significant traits that would be passed on to His Royal Highness's own three children.





The Prince enrolled for army and naval service in Germany and Siam (later Thailand)

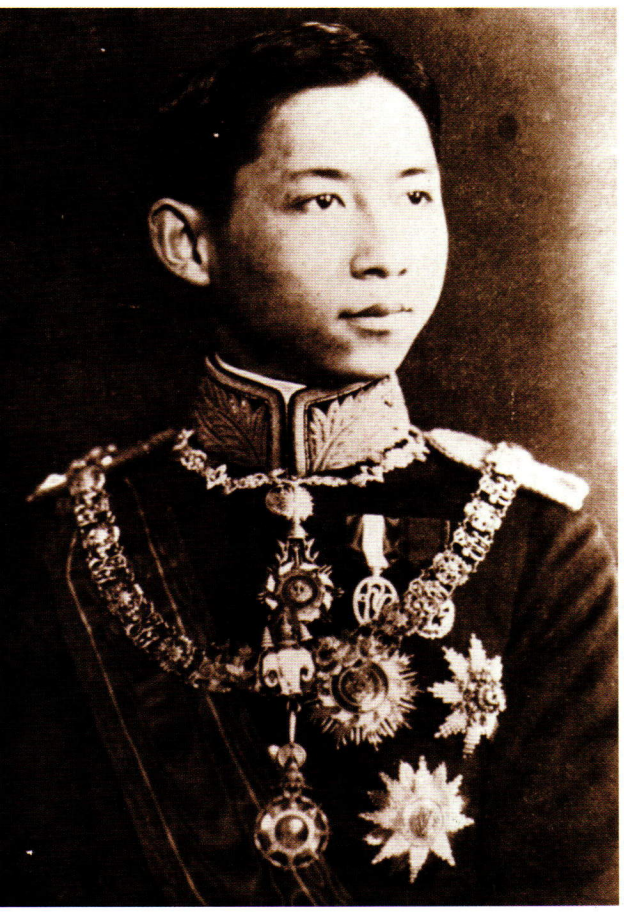
A career change to medicine and public health

It was Prince Mahidol's half-brother and childhood friend Prince Rangsit of Jainad who played an important role in Prince Mahidol's latent interest in medicine and public health.

At the time, Prince Rangsit was director of the Royal Medical College at Siriraj Hospital in Bangkok. In those days, medical and public health education in Thailand was in desperate need of attention as Prince Mahidol was about to learn. Domestic medical services lagged behind international standards. Moreover, the Royal Medical College and Siriraj Hospital were small, overcrowded facilities that lacked funding and staff, and were generally ill-equipped.

Accompanied by Prince Rangsit, Prince Mahidol took a tour of the hospital and was taken aback by what he saw. Noticing Prince Mahidol's shocked reaction Prince Rangsit was prompted to enquire if his half-brother would care to intercede in an attempt to bring about improvements. Lacking any knowledge of medicine whatsoever, Prince Mahidol was at first reluctant. But, after a few days reconsidering the state of the hospital, and the needs of the patients, he not only voiced his wholehearted support but also his intention to study medicine and public health.

Prince Mahidol received his Certificate in Public Health in the USA in 1921



Subsequently, the Prince went to the American state of Massachusetts. At first he did not enrol in medical school but studied as a public health officer. At that time, the public health course at premedical school followed the same syllabus as the first year of health officer. In the second year the Prince studied medicine at Harvard Medical School to complete a pre-clinical course in two years then reverted to public health for another year. One year stretched into two because the Prince had to take an enforced break to attend the cremation of his aunt Queen Saovabha. In 1921, Prince Mahidol received his Certificate in Public Health (CPH) from MIT and Harvard School of Public Health, today known as Harvard School of Public Health. Had he not had to return to Thailand, the Prince would have received his CPH a year earlier.



HRH Prince Mahidol of Songkla with HRH the Princess Mother

Before leaving Thailand for the United States, Prince Mahidol had requested Prince Rangsit to help him select two medical students and two nursing students to send on scholarships to the United States. The Prince announced his intention to fund the medical students, while his mother, Queen Savang Vadhana, would fund the nursing students. One of the students, Miss Sangwan Talabhat, was destined to marry Prince Mahidol.

A year or so after their marriage, Prince Mahidol Adulyadej received his CPH. Miss Sangwan was given the title Mom Sangwan Mahidol na Ayudhya and, ultimately, became HRH Princess Srinagarindra the Princess Mother.

Following his studies, and a short break in Edinburgh, Scotland, Prince Mahidol represented the Royal Thai Government in talks with the Rockefeller Foundation. At that time, the foundation was offering financial and technical support to upgrade medical and public health education in Thailand to America's standards. At first the foundation agreed to help upgrade the medical curriculum at Siriraj Hospital but it was discovered, within the first year, that existing medical facilities could not support an enhanced curriculum; medical and nursing services would also have to be upgraded. To address this, the foundation set about sourcing six professors (medical university teachers) to reconstitute the most important part of the medical curriculum. One of these foreign professors would go on to be Director of Studies, a role undertaken by Dr. A.G. Ellis who left his post as professor, head of pathology at Jefferson Medical College in Philadelphia. Subsequently, Dr. Ellis was appointed by His Majesty the King to become Dean of the Faculty of Medicine and Siriraj Hospital.



Although lacking sufficient funds, the Royal Thai Government knew that Siriraj Hospital had to be rebuilt. And, over time, new buildings were added to the hospital complex using donations given by Prince Mahidol, the Rockefeller Foundation, and other members of the royal family – each contributing thirty percent. The Royal Thai Government provided the remaining ten percent.

During the time the foreign professors attended Siriraj Hospital, a committee jointly established by the Rockefeller Foundation and the Royal Thai Government selected Thais to be trained in the United States to what might be described as "Dr. Ellis's standards". Once again, Prince Mahidol donated his personal funds, this time to send Thai students to study abroad to become teachers of basic science and medical science disciplines.



The Prince's first child, HRH Princess Galyani Vadhana, was born in London in 1923

On the domestic front, family duties ensued and Prince Mahidol and Mom Sangwan became the proud parents of three children. Their first child, Princess Galyani Vadhana, was born in London in 1923. That same year, Prince Mahidol returned to Thailand to assume the position of director-general of the University Department in the Ministry of Education. The Prince supplemented his administrative duties at the ministry by teaching pre-clinical medical students at the Faculty of Arts and Science, Chulalongkorn University. Prince Mahidol taught biology and history using course notes that he meticulously prepared before taking each class. It can be seen from the Prince Mahidol's personal notes, which contain detailed, draughtsman-like drawings of the human anatomy, that he had an innate artistic talent.



Prince Mahidol used his meticulous course notes to teach students



Prince Mahidol's sons both acceded to the throne of Thailand as King Rama VIII and King Rama IX

Before returning to his alma mater Harvard University, Prince Mahidol went to Heidelberg, Germany, in 1925 for a health check, after which doctors agreed the Prince was well enough to continue his studies at Harvard. That same year his first son Prince Ananda Mahidol was born. Two years later, the Prince's youngest son, Prince Bhumibol Adulyadej, was born in Cambridge, Massachusetts. Significantly both of Prince Mahidol's sons would later accede to the throne of Thailand as King Ananda Mahidol, Rama VIII, and King Bhumibol Adulyadej, Rama IX, respectively.

By this time, Prince Mahidol was into his fourth year of medical studies at Harvard. However, his health had begun to deteriorate. He was diagnosed with a kidney disease that caused him to be admitted to hospital for a month. After being discharged, the Prince was able to take his final exams receiving his M.D. *cum laude* six months after the birth of Prince Bhumibol Adulyadej. He was congratulated by the Dean of Harvard who said at the time that Prince Mahidol's grades contained many A's.

During the next month, Prince Mahidol made plans to return to Thailand after first writing a letter back home stating his preference to stay on in the United States for another year to study paediatrics. But it was not to be: The Prince fell ill with stomach pains and was admitted to hospital for an appendectomy. On the day his fellow students collected their degrees, Prince Mahidol was recovering from the operation.

Part of Siriraj Hospital inaugurated by King Rama VII in 1928



Extremely keen to improve medicine and public health in Thailand, one of the first things Prince Mahidol did on his return home was to establish scholarships for students in the fields of medicine, nursing and public health.

The Prince planned to return to Siriraj Hospital in 1928 as a resident in paediatrics. However, in view of his enhanced royal status, resident duties were deemed beneath his rank. Rather than insisting on having his own way, which he could have done, Prince Mahidol complied out of respect for the sensitivities involved. Undeterred, the Prince chose to work at McCormick Hospital in Chiang Mai, which was run by Presbyterian missionaries and where he laboured day and night as a resident doctor. The Prince was a popular figure: hospital patients affectionately addressed him as *Mor Chao Fa* (Doctor Prince).



The McCormick Hospital in Chiang Mai, 1926

Later, and just three weeks after Prince Mahidol started work in Chiang Mai, he was called to attend the funeral of his uncle in Bangkok. Unfortunately, Prince Mahidol's career in medicine and public health was cut short. He became ill with an amoebic liver abscess and never returned to the hospital in the North. Prince Mahidol passed away on September 24, 1929 at Sra Pathum Palace in Bangkok a few months short of his thirty-eighth birthday.



Prince Mahidol (seated second from right) was honoured with the title "Father of Modern Medicine and Public Health of Thailand"

A lasting contribution to humanity

Prince Mahidol had already contributed considerable sums from his own funds to further the cause of medicine and public health in Thailand. Under his guidance, six talented students were despatched to England to study physics, chemistry and biology. On their return, they formed the nucleus of a well-qualified teaching staff in basic sciences – something previously lacking in Thailand. Special emphasis was placed on medical education and research, public health issues and nursing. His Royal Highness's initiative and hard work made a remarkable difference to Thailand's approach to medicine and public health issues - so significant that he was subsequently honoured with the title "Father of Modern Medicine and Public Health of Thailand".

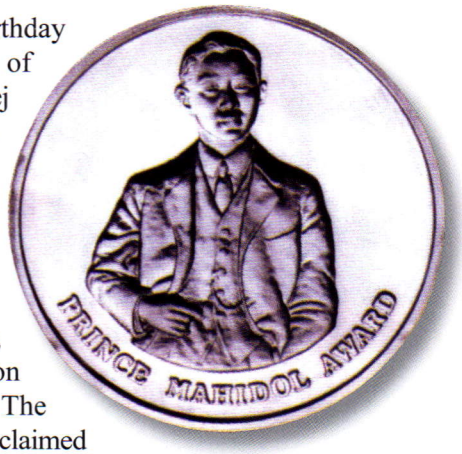
The Prince's legacy lives on in Thailand today and reaches beyond the country's borders. Many students sent overseas under scholarships became leaders in modern medicine in Thailand. Some are regarded as great teachers; others helped establish new medical schools and universities. The Royal Medical College, for example, became known as the Faculty of Medicine Siriraj Hospital and was a





key faculty of the University of Medical Sciences when it was founded in 1943 and renamed by royal decree in 1969 as Mahidol University.

Rewarding human endeavour



It was to commemorate the centennial birthday anniversary in 1992 of HRH Prince Mahidol of Songkla, that His Majesty King Bhumibol Adulyadej granted permission to establish the Prince Mahidol Award.

Acknowledging acts of humanitarianism and concern for mankind demonstrated by Prince Mahidol, the Prince Mahidol Award recognises men and women from around the world for their work in helping fellow humans. In his short life, Prince Mahidol worked hard to promote education and understanding in medicine and public health. The Prince's legacy, now embodied in an internationally acclaimed award, has helped stimulate worldwide performance in medicine for the benefit of mankind and improve the global well-being of people through improved public health, together fulfilling the vision of His Royal Highness and the objectives of The Prince Mahidol Award Foundation.

Secretary general of the foundation, Dr. Supat Vanichakarn, spoke of Prince Mahidol's desire to improve medicine and health services in Thailand: "His Royal Highness thought only about how to help his country. I recall Princess Galyani Vadhana [Prince

Mahidol's daughter and sister to His Majesty King Bhumibol] saying it was all about taking responsibility…and taking responsibility is something you should not have to think about…it should be natural, Her Royal Highness said."

In Dr. Supat's opinion, this willingness to accept responsibility is evident in many members of Thailand's royal family: "Prince Mahidol was a little bit older than his wife [HRH the Princess Mother] and she was clearly influenced – even inspired – by her husband to show compassion towards people in need. And over time, the Princess Mother instilled the same sense of responsibility in her own children."



Consideration and self-sacrifice characterised by HRH Prince Mahidol became hallmarks of HRH the Princess Mother and His Majesty King Bhumibol

The secretary general's comments echo those made by many prominent people in Thailand, in particular scholars and practitioners in the service of HRH the late Princess Mother, and those who are still actively engaged in developing and managing royal development projects. Relying on insight and observations related by some of Thailand's foremost figures, examples of which appear in each of the royal activities portrayed in this book, it is not difficult to draw a parallel between the compassion and altruism shown by HRH Prince Mahidol and HRH Princess Srinagarindra the Princess Mother, and that displayed by His Majesty the King out of concern for the well-being of the Thai people.

Even during the early stages of the young Prince Bhumibol's education in Switzerland his mother had instilled in him and his siblings the importance of being frugal. Like any concerned parent, the Princess Mother taught her three children the value of money and the value of life. At a young age, they became motivated to emulate their mother's fiscal prudency. Prince Bhumibol, along with his brother and sister, set aside a portion of their pocket money each week. At the end of each month, and after a family discussion, the accumulated amount was willingly handed over to a foundation, charity, or some other worthy cause.



HRH the Princess Mother showed great concern towards the poor and needy

Her Royal Highness raised her children in line with the same principles followed by Prince Mahidol. As HRH Princess Galyani Vadhana once remarked:



"In our family, a sense of responsibility was a given; an ingrained nature of our upbringing. The first thing we were taught was 'What could we do for the country?'"

From these early-learning days, and throughout his life, His Majesty King Bhumibol has shunned extravagance in favour of prudence. Adopting a cautious and practical approach to matters, with patience and commitment to the job at hand as a working monarch, best characterises His Majesty's approach to life.

The subsequent "career path" followed by His Majesty – a journey during which the King has excelled in the arts, in scientific endeavours, and in sporting events – points to the King's balanced and well-rounded upbringing. It was because of his mother's love of photography and cinematography, for example, that the young Prince Bhumibol was inspired to take up photography at the tender age of eight. The young prince also displayed a love of construction and, at times, could be found carving wooden glider planes, or fabricating his own electric motors.

Whether in the pursuit of photography, music, painting, sailing, water-skiing or playing badminton, the King was self-motivated to meet the high standards he set for himself. In music he excelled as a composer, arranger and musician. As a sailor he not only carpentered his own, wooden-framed sailing dinghies but went on to win a gold medal for Thailand in 1967 at the Fourth Southeast Asian Peninsular Games. At the time, His Majesty was accompanied by his daughter HRH Princess Ubol Ratana – also a gold medal winner.

Honoured by world-renowned entities for a life's work as a "developer king" and "humanitarian", His Majesty proved, through a lifetime of achievements that it is not necessary to scale the heights of academia to achieve pre-eminence. In a way, His Majesty embodies his own father's assertion that *"the success is not in the learning, but in its application to the benefit of mankind"*.

Ultimately however, it was the uninhibited compassion and concern for the poor and needy displayed by His Majesty's caring parents that left the greatest impression on Thailand's multitalented King. And it was to honour, in perpetuity, the humanitarianism of Prince Mahidol of Songkla that His Majesty granted permission to establish the Prince Mahidol Award.

Today, the Prince Mahidol Award is recognised as an international reward for human endeavour.

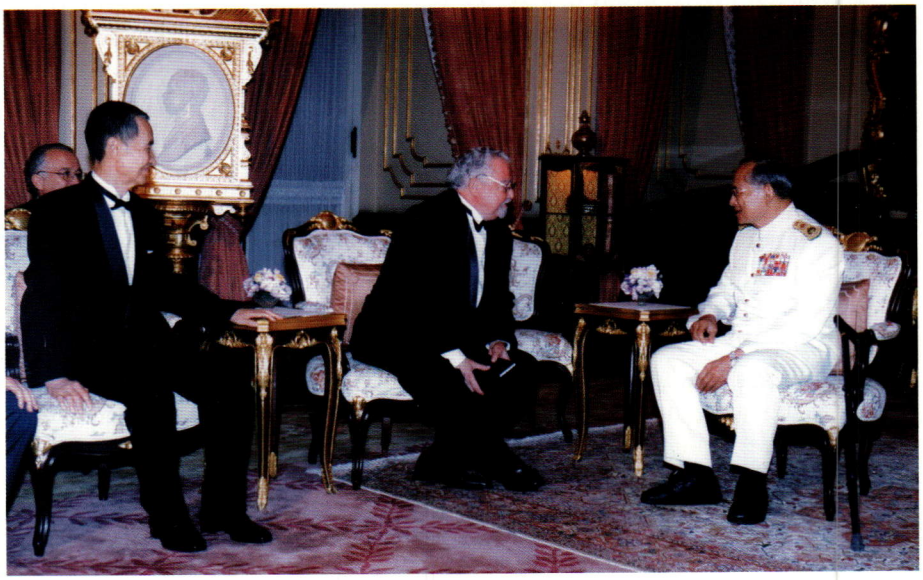


The Prince Mahidol Award recognises outstanding work in the fields of medicine for the benefit of mankind and in public health for the wellbeing of people

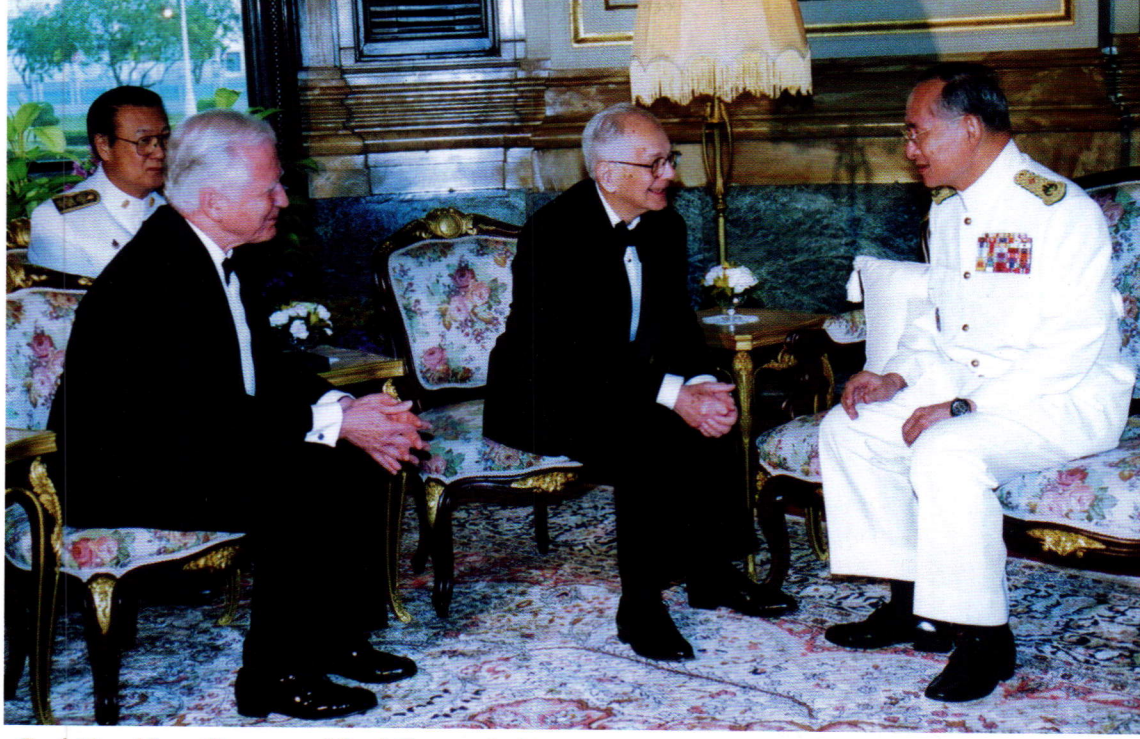
Nominations for the award

The Prince Mahidol Award is presented to individuals or institutions in one of two categories: In medicine for an outstanding performance and/or research in the field of medicine for the benefit of mankind; or in public health, for an outstanding contribution in the field of public health for the sake of the wellbeing of the people. Both categories were established in commemoration of HRH Prince Mahidol's graduation with Doctor of Medicine *(cum laude)* and Certificate of Public Health.

Explaining the nomination process, the foundation's secretary general Dr. Supat said the award consists of a medal, a certificate and a prize of fifty thousand dollars for laureates in each of two categories.



HM the King oversees award ceremonies



Prof. Harald zur Hausen and Prof. Eugene Goldwasser were honoured in 2005 for their work in public health and medicine, respectively

"The nominations, which are sent to my office in the first instance, have to be submitted before May 31 each year." Dr. Supat said nominations can be prepared by national medical or health authorities, or by individuals, or a group of individuals in a non-governmental capacity.

"First, the Scientific Advisory Committee (SAC) screens each candidate by researching an individual's work. The SAC makes a shortlist to pass along to the International Award Committee (IAC) with 'strong' candidates marked as such."

Doctor Supat said the IAC, which includes several internationally acclaimed experts in the fields of medicine and public health draws on the expertise of a cross-section of experts from each continent. The committee meets to deliberate under the chairmanship of Dr. Vicharn Panich who has served as a member of the IAC since 2002 and as committee chairman since 2004.

Doctor Vicharn explained that in recent years the SAC has not only submitted a shortlist but also given the IAC a presentation of studies supporting each "strong" candidate.

"Then our committee takes time to deliberate candidates using the 'D', 'B', 'L' principle," Dr. Vicharn said, "where 'D', means the depth or scientific importance of the discovery sequence; 'B' means the breadth or wide impact affecting large numbers of people in many countries, and 'L', or length, measures the proven impact over a length of time."

In addition to this, Dr. Vicharn said the IAC gives further consideration and further evidence for or against a proposal putting forward objective and subjective judgements from various viewpoints.

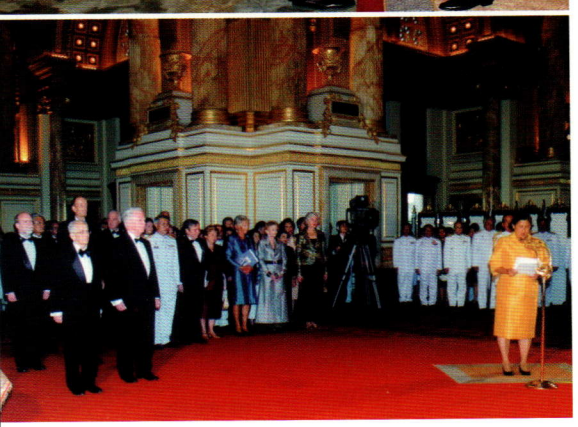
"We may even search for additional evidence through independent sources or via the internet before reaching a decision." The IAC findings are then passed to the Board of Trustees in the form of a recommendation.

Over the years, the Prince Mahidol Award has gained a great deal of international recognition in the fields of medicine and public health. "It is most gratifying to note that two Prince Mahidol Award laureates went on to receive a Nobel Prize," Dr. Vicharn said.

The final arbiter in the selection process is the Board of Trustees under the chairmanship of HRH Princess Maha Chakri Sirindhorn. The award procedure is finalised by the end of each calendar year to enable presentations to be made in January of the following year.







Doctor Supat said that each nomination is valid for three years. "Candidates nominated may not necessarily receive an award in their first year of being nominated, but may receive one later following additional information concerning progress with their work.

"Awards are not given solely for making a new discovery," said Dr. Supat, "the foundation has to be sure it is being used and of benefit to mankind – within a particular country or around the world. That is why some recipients of the Prince Mahidol Award are generally quite senior people who have spent much of their lives working on long-term projects."

As things stand today, the Prince Mahidol Award Foundation is the only entity in the world that gives an award in the field of public health in addition to medicine.

Awards history

Since its inception in 1992, and up to 2009 (awards presented in January 2010) fifty-four eminent practitioners in the fields of medicine and public health from the United States, Central and South America, Europe, Asia, Africa and Australasia have been honoured with this prestigious award. Two recipients, Australia's Professor Barry J. Marshall, M.D. (2001 in public health), and Germany's Professor Harald zur Hausen (2005 in public health) went on to receive Nobel Prizes.

The Prince Mahidol Award Foundation is the only entity in the world that gives an award in the field of public health in addition to medicine



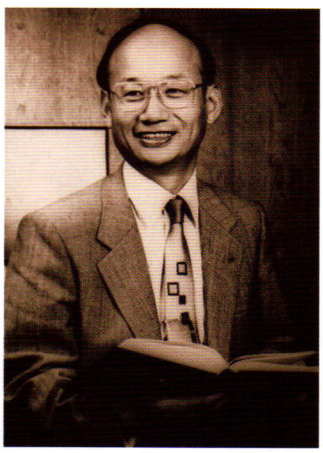
Laureates over the years

Professor Satoshi Ōmura, Ph.D. (Japan): 1997 in Medicine

A world leader in bioorganic chemistry, Prof Ōmura, in his forty-year-long career, devised many new methods for isolating, culturing and screening microorganisms, discovering more than four hundred bioactive compounds in the process. Among these, ivermectin (a derivative of avermectin) proved to be one of the world's most important animal and human medicines ever produced, and one of the foremost public health interventions ever in the developing world.

Ivermectin is a specific medicine for onchocersiasis (river blindness) a parasitic disease transmitted to humans through the bite of the Black Fly. Ivermectin kills the parasite by interfering with the nervous system and muscle function.

The number of patients exposed to this disease, mainly in sub-Saharan Africa, could be upwards of twenty million of which four hundred thousand risk blindness. With some success, the World Health Organisation has an extermination programme using ivermectin donated by Merck Co., Inc., the world's largest pharmaceutical company. It was reported that fourteen million people were assessed to have avoided contracting the disease in 1995. The discovery of this antibiotic is regarded by many as the greatest achievement in the field of medicinal biotechnology in the latter quarter of the 20th century.



Professor Ōmura is President Emeritus of the Kitasato Institute in Tokyo, Japan, and Max Tishler Professor of Chemistry at Wesleyan University, USA



Dr. Margaret F.C. Chan, M.D. (Hong Kong): 1998 in Public Health

After starting her career with the Hong Kong department of health in 1978 Dr. Chan was appointed director of health for Hong Kong in 1994. During her nine-year tenureship as director she launched new services to prevent the spread of diseases and promote better health.

In the citation accompanying Dr. Chan's award it was noted that at the outbreak of avian influenza "...she was the hands-on leader of the team. At the height of the outbreak when the gene sequencing results were not available, but on the strength of the evidence from detailed field epidemiological investigations, she recommended the culling of chickens as the preferred option to control the outbreak. This effectively stopped further outbreaks and prevented the outbreak from spreading to other countries."



Doctor Chan went on to be elected director-general of the World Health Organisation in 2006.

Prince Mahidol Award laureate Dr. Margaret F.C. Chan is director-general of the World Health Organisation



Professor Adetokunbo Oluwole Lucas, M.D. (Nigeria): 1999 in Public Health

Currently adjunct professor of international health at Harvard University in the United States, Dr. Lucas received his award in 1999 in public health for his contribution towards the development of a special programme on Tropical Disease Research (TDR). His work contributed to a world-acclaimed, highly productive and effective research into many tropical parasitic diseases including malaria, schistosomiasis, the filariases, leishmaniasis, chagas disease, African trypanosomiasis (sleeping sickness), onchocerciasis (river blindness), and leprosy that affect millions of people in tropical Africa, Asia, and South America.

Progress was made through investigative studies in several areas including strengthening research capacity in developing countries. This enabled scientists in those countries to become significant partners with scientists in industrialised countries who were seeking prevention and control of virulent tropical diseases

As the first Nigerian national to receive the Prince Mahidol Award, Dr. Lucas spoke of his personal delight to be listed alongside previous laureates including outstanding leaders in the field of public health.

"I was also very happy to see that the award recognised the Tropical Diseases Research programme that I directed; thereby recognising the tremendous contributions that scientists and institutions made."

Doctor Lucas said the award also recognised valuable new knowledge generated by the programme and the impact that the new tools have had in controlling major diseases like leprosy and river blindness.

Commenting on the Prince Mahidol Award as a mark of recognition, Dr. Lucas said the focus of the award recognises the scientific endeavours that make a difference to the health of large numbers of people. "For example, the award that recognised the development of artemisine antimalarial drugs...the group that developed and validated oral rehydration for the treatment of diarrhoea and the work on iodine deficiency...brought great benefits to large numbers of people in the world."

For the past nine years, Dr. Lucas has also served on the International Awards Committee (IAC) of the Prince Mahidol Award Foundation reviewing shortlisted candidates. He spoke of the work involved. "When the IAC reviews each candidate the committee carefully looks for evidence that a nominee has generated new knowledge which has led to the development of new, effective tools that benefit the health of large populations globally."

A recipient of numerous academic honours and lifetime achievement awards for his work in tropical medicines, Dr. Lucas was further honoured by His Majesty King Bhumibol Adulyadej when he was bestowed with the Knight Grand Cross (First Class) of the Most Admirable Order of Direkgunabhorn for devotional services to the Kingdom of Thailand.



"I was also very happy to see that the award recognised the Tropical Diseases Research programme that I directed; thereby recognising the tremendous contributions that scientists and institutions made."



Professor zur Hausen was recognised for his key role in researching cervical cancer

Professor Harald zur Hausen, M.D. (Germany): 2005 in Public Health

Professor Dr. Harald zur Hausen is a German virologist and professor emeritus who began his career studying medicine at the Universities of Bonn, Hamburg and, latterly, Dusseldorf from where he received a Doctor of Medicine degree in 1960.

When he received the Prince Mahidol Award in 2005 in the field of public health, Prof. zur Hausen was Professor Emeritus at the German Cancer Research Centre in Heidelberg, Germany. Later, in January 2006, HM King Bhumibol Adulyadej graciously granted an audience to Prof. zur Hausen at the Ananda Samakhom Throne Hall within Dusit Palace, Bangkok, followed by a banquet in honour of the 2005 laureates presided over by HRH Princess Maha Chakri Sirindhorn, president of the Prince Mahidol Award Foundation.

The citation accompanying the award highlighted Prof. zur Hausen's key role in researching cervical cancer, "…one of the major causes of death in women.

"Since the 1970s," the citation states, "Professor zur Hausen has focused entirely on human papilloma viruses (HPV), which were known to cause skin warts".

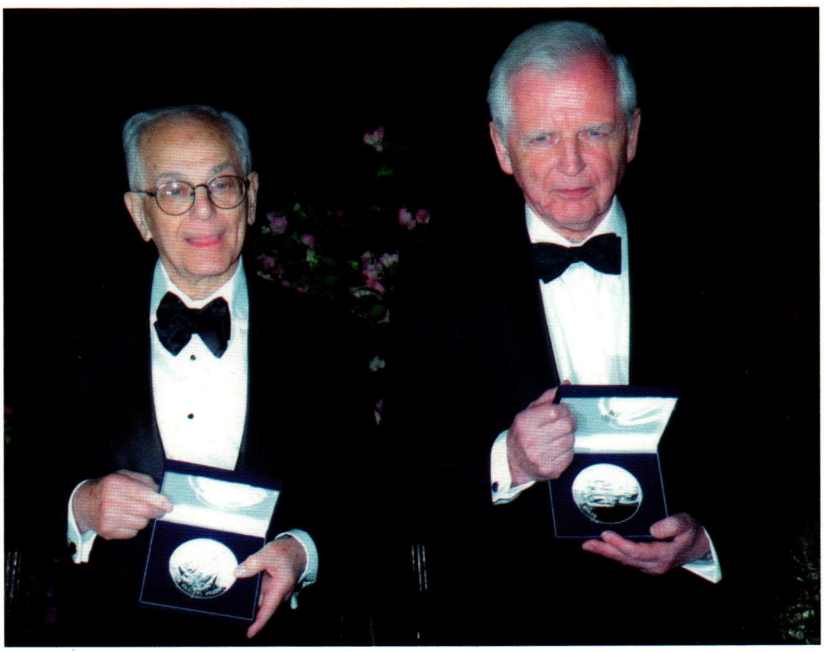
The citation states that Professor zur Hausen, as early as 1976, published the hypothesis that wart viruses play a role in the development of cervical cancer; a hypothesis proven scientifically in 1980 when Dr. zur Hausen and his co-workers isolated two previously unknown virus types, HPV 16 and HPV 18, from tumour tissue.

"Professor zur Hausen's breakthrough discovery", the citation recorded, "has had a substantial impact on the understanding of the cause of cervical cancer, leading to improvements in its prevention and treatment and, most importantly, to the development of vaccines against high-risk HPV, which, in the near future, may eradicate cervical cancer altogether and prove beneficial to the health of millions of people around the world".

Asked about his reaction after learning he had been nominated for the award, Prof. zur Hausen spoke of his delight, "...because I was already aware of the prestigious value of this prize."

Commenting upon various occasions when he has had cause to make reference to the Prince Mahidol Award in presentations to the medical community, Prof. zur Hausen said the Prince Mahidol Award signifies a mark of international recognition: "I certainly felt this personally, and I also realized that in presentations of my personal curriculum vitae, virtually everyone at an international conference made reference to the Prince Mahidol Award."

Three years after receiving the award, Prof. zur Hausen, received the 2008 Nobel Prize in Physiology or Medicine for his discovery of "human papilloma viruses causing cervical cancer".



Prof. Harald zur Hausen (right) and Prof. Eugene Goldwasser, honoured for their work in public health and medicine, respectively, received their awards from HM the King in 2005



"...The fact that the results of my research over a period of twenty years made an important impact on many people's lives, and was recognised by the Prince Mahidol Award Foundation, is still quite significant to me."

Prof. Eugene Goldwasser, Ph.D. (United States): 2005 in Medicine

Professor Goldwasser played a central role in the isolation and the characterisation of the hormone erythropoietin, which stimulates the production of red blood cells. Along with other colleagues, the professor determined the source to be in the kidneys and spent twenty years trying to purify this hormone which is present in blood in very small amounts. The breakthrough came after determining that urine from patients with aplastic anaemia had high concentrations of this hormone. Purified erythropoietin provides the basis for the cloning of its gene that led to large-scale production using recombinant DNA technology. Erythropoietin is very effective in the treatment of severe anaemia in renal diseases, kidney failure and cancers.

Professor Goldwasser expressed surprise when he learnt that he was to receive the 2005 Prince Mahidol Award in medicine: "I didn't know I had been nominated, so my reaction was one of complete surprise, pleasure and gratification that my work had been recognised internationally."

He places a great deal of significance, he said, on the Prince Mahidol Award. "My work was biochemical – not immediately or personally concerned with clinical medicine – though it was soon to be the basis for very important clinical studies. The fact that the results of my research over a period of twenty years made an important impact on may people's lives, and was recognised by the Prince Mahidol Award Foundation, is still quite significant to me."

Commenting on his visit to Bangkok to receive his award, Prof. Goldwasser said he would always remember the personal warmth and friendliness shown to him and his wife. "This was the case with His Majesty the King, Princess Maha Chakri Sirindhorn, the people from The Prince Mahidol Award Foundation, the university, and the Thai citizens with whom we interacted."



Dr. Basil Stuart Hetzel AC (Australia): 2007 in Public Health

Pioneering work by Dr. Hetzel created an understanding of the effects of iodine deficiency on brain development, and the importance of incorporating iodized salt into the diet to prevent brain damage in newborn children.

Doctor Hertzel's research team in Papua New Guinea (1964-1972) found that brain damage could be prevented by correcting iodine deficiency before pregnancy; groundbreaking research that led Dr. Hetzel to start a worldwide campaign to incorporate iodized salt into the diets of thousands of people lacking iodine.

His Majesty the King personally conferred Dr. Hetzel with the 2007 Prince Mahidol Award for his pioneering work on IDD (Iodine Deficiency Disorders) a term coined by Dr. Hetzel.

"I consider the Prince Mahidol Award to be a major recognition of my work establishing that iodine deficiency is now recognised to be the most common preventable cause of brain damage."

Speaking about his award, which he received in the Ananda Samakhom Throne Hall in Bangkok in January 2008, Dr. Hetzel said he was surprised to be nominated but delighted to receive it, "...because our work on iodine deficiency disorders had been specially focused on Asian countries such as China, Indonesia and Thailand."



Recognition of the award has been given by various organizations with which Dr. Hetzel is associated including the Public Health Association of Australia where he has been a life member since 1987.

"I consider the Prince Mahidol Award to be a major recognition of my work establishing that iodine deficiency is now recognised to be the most common preventable cause of brain damage. And it is now being progressively eliminated by a global strategy for the correction of iodine deficiency – mainly with iodized salt – in the population at risk, estimated by the World Health Organization to be in excess of two billion people in one hundred and thirty countries."



Professor Sérgio Henrique Ferreira, M.D. (Brazil): 2008 in Medicine

Professor Ferreira of Brazil was awarded the Prince Mahidol Award in 2008 in medicine for discovering the Bradykinin Potentiating Factor (BPF) which is a peptide found in the venom of a Brazilian snake. At the time he received the award, Prof. Ferreira was attached to the department of pharmacology, Faculty of Medicine of Ribeirão Preto of the University of São Paulo, Brazil.

His Majesty the King graciously consented to present Prof. Ferreira with the Prince Mahidol Award at a ceremony held in January 2009 at the Chakri Throne Hall, Grand Palace in Bangkok.

The award citation states that Prof. Ferreira's discovery "paved the way for the development of a new class of antihypertensive drugs, the angiotensin converting enzymes inhibitors (ACEI), the first of which is the drug called captopril". Widely recognised for its antihypertensive efficacy, especially in diabetic patients with inflammatory and kidney diseases, it was highly effective in reducing the number of patients who died from congestive heart failure.

"When I received the news that I had been honoured with the Prince Mahidol Award I was very pleased and happy since I knew from earlier recipients of the prize that they were very productive and important international scientists."

Professor Ferreira said that at scientific lectures he is always introduced as a recipient of the Prince Mahidol Award in medicine for 2008. "I consider this to be very important recognition as this award is one of the most important prizes for science and technology in the academic world."

Professor Ferreira's contributions to science are recognized worldwide and the inhibitors he discovered are currently among those most widely used to save the lives of millions of patients around the world.

"I consider this to be very important recognition as this award is one of the most important prizes for science and technology in the academic world."





Prince Mahidol Award 2009

The three recipients of the Prince Mahidol Award for 2009, which were announced on December 3 of that year, received their award prizes at a ceremony held on January 27, 2010 at the Chakri Throne Hall in Bangkok.

Her Royal Highness Princess Chulabhorn, representing His Majesty the King, graciously presented the awards.

Great Britain's Prof. Anne Mills received her award for outstanding contributions in the field of medicine. Two Thai nationals, Dr. Wiwat Rojanapithayakorn, and Mr. Mechai Viravaidya, received their awards for services to public health.

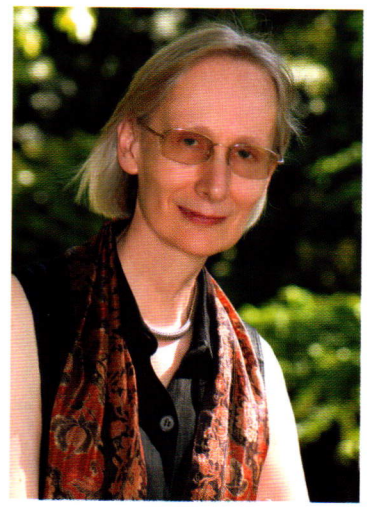
In the field of Medicine: Professor Anne Mills (United Kingdom)

Renowned for efficiently developing economic tools to improve policymaking and practice of healthcare systems in low- and middle-income countries, Prof. Mills is head of the public health and policy department and professor of health economics and policy at the London School of Hygiene & Tropical Medicine, University of London. Her efforts and dedication have resulted in a fourfold increase in public healthcare investment over the past fifteen years, benefiting health conditions of those in developing countries and considerably reducing the mortality rate of children and poor people in Asia and Africa.

In her acceptance speech, given in Bangkok in the presence of HRH Princess Maha Chakri Sirindhorn, Prof. Mills spoke of her first visit to Thailand in 1980 as a World Health Organisation (WHO) consultant with Thailand's Ministry of Public Health. Informing distinguished guests that health economics was still a very young discipline, and economics itself "a youth compared to medicine", Prof. Mills said that receiving the award was an honour in itself, but for the recipient of the award for medicine to be a health economist, "...reflects the great vision of the awarding committees."

Professor Mills, who has been honoured as Commander of the Order of the British Empire (CBE) an award bestowed upon men and women who make a notable contribution in their area of expertise, was asked what weight she gave to the Prince Mahidol Award as a mark of international recognition. "I give it enormous weight," she said, with emphasis. "The CBE is really a mark of domestic [UK] recognition, whereas the Prince Mahidol Award is international recognition at the highest level. It is also an award for research which benefits mankind – i.e. one's activities must have had visible benefit across the world."

After accepting the award, Prof. Mills received warm congratulations from some previous laureates and leading members of the international medical community including noted medical researcher, Prof. Sir Iain Chalmers, who received the Prince Mahidol Award in 2000 for public health; Prof. Sir David Weatherall (Prince Mahidol Award recipient in 2001 for medicine) Regius Professor of Medicine at the UK's University of Oxford, who is a distinguished clinician, scientist, and supporter of humanism, and Richard Horton, editor of the *Lancet* one of the world's leading medical journals.



Professor Anne Mills said that for the recipient of the award for medicine to be a health economist "...reflects the great vision of the awarding committees."



In the field of Public Health: Dr. Wiwat Rojanapithayakorn (Thailand)

Thai national Dr. Wiwat Rojanapithayakorn received the Prince Mahidol Award for services to public health. The "100% Condom Use Programme", introduced by Dr. Wiwat, persuaded sex workers to refuse service to customers who declined to use condoms. Later, it proved globally to be one of the most successful HIV/AIDS prevention tools.

Doctor Wiwat said it was important to take a structured approach for the use of condoms by getting the cooperation of everyone concerned.

"Because they work at night and sleep by day, sex workers couldn't come to us so we went to them with a mobile clinic. We chose four locations in Bangkok and met at six to seven in the evening before they started work." He said everyone had to join hands…to get involved to successfully enforce a no-condom, no-sex rule.

Asked about the reaction in other countries to Thailand's success, Dr. Wiwat said other countries thought Thailand's success rate was all down to good policing! "Not so, I told them. We simply made sure that customers had no choice. And in Cambodia, a similar, 'quiet approach' was taken – no advertising. We introduced the no-condom, no-sex 'Thai model' as a project in Sihanoukville and it worked exactly the same as in Thailand." In 1999, Cambodia's Prime Minister Hun Sen sent out a letter authorising the programme to go nationwide.

Stakeholders in the Philippines wanted the scheme to be enshrined in a Government Ordinance according to normal government practice. "Subsequently, the government approved an Ordinance and we selected four locations and started scaling up the operation."

The "Thai model" was introduced into Myanmar, Cambodia, Lao PDR, Vietnam, the Philippines, China, and Mongolia with similar rates of success. As Dr. Wiwat pointed out, the approach taken by Thailand only succeeded because stakeholders took "ownership" of the problem, "…and that's what makes it sustainable wherever we follow this inclusive approach." Doctor Wiwat said the no-condom, no-sex rule resulted in owners and sex-workers gaining more business against a decline in sexually transmitted infections. "For everyone concerned, it became a win-win situation," he said.

Asked about being a recipient of the Prince Mahidol Award, Dr. Wiwat said he was very pleased to receive recognition for this work from the Prince Mahidol Award Foundation, "…but I never seek recognition. I always work behind the scenes.

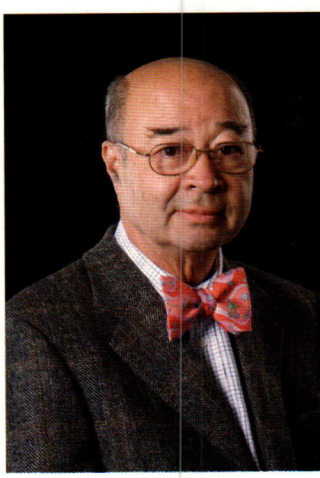
"At first I had mixed feelings when I learnt about the award: I was happy of course to receive global recognition, but surprised also."

Doctor Wiwat said he was unaware that so many people knew of his work. "For my part, the real reward is in the dramatic reduction of HIV-AIDS cases globally, which is enormously important if we are to help our fellow humans."



The "100% Condom Use Programme" started in Thailand by Dr. Wiwat was expanded into Myanmar, Cambodia, Lao PDR, Vietnam, the Philippines, China and Mongolia with similar rates of success

In the field of Public Health: Mechai Viravaidya (Thailand)



Another Thai national, who also received the Prince Mahidol Award for 2009 in the field of public health, was Mr. Mechai Viravaidya a determined advocate in preventing unwanted pregnancies by encouraging the use of condoms. His unique approach in communicating prevention campaigns, turned condoms – previously something not spoken about in Thailand – into common-use items, at the time the HIV outbreak hit Thailand and other countries in the 1980s and 1990s.

"...if the Prince had not used his own fortune to help fund Siriraj Hospital and the university, then, today, we would not have a great history and tradition in Thailand of excellence in the field of medicine."

Speaking after receiving the Prince Mahidol Award, Mr. Mechai, known in Thailand as "Mr. Condom", said: "I was surprised, honoured and delighted upon hearing I had received the award, since it has usually been for doctors and scientists from the international community."

Mister Mechai said he was personally inspired after receiving the 2009 award and spoke of how it has affected his own quest to bring help to those in need: "Another element that deserves a great deal of attention is Prince Mahidol's philanthropic contributions. If the Prince had not used his own fortune to help fund Siriraj Hospital and the university, then, today, we would not have a great history and tradition in Thailand of excellence in the field of medicine."

A humanitarian award

In granting permission to establish the Prince Mahidol Award, HM King Bhumibol Adulyadej guaranteed an international exchange of research and knowledge in the fields of medicine and public health.

Many of the laureates consider the award to be among the highest international honours they could receive as an acknowledgement for their work in medicine and/or public health. Many laureates were personally inspired after receiving their award claiming it helped them further their research into new and better ways to improve the health and well-being of people around the world.

Prince Mahidol's humanitarianism and idealism pervaded the lives of many members of the royal family including HRH the Princess Mother, HRH Princess Galyani Vadhana, Prince Mahidol's first son the former King Ananda Mahidol, and the present monarch, HM King Bhumibol Adulyadej, as well as His Majesty's family. In his own way, Prince Mahidol motivated them to be selfless and carry the belief that each of us, without distinction, has human dignity and worth. Similar to Prince Mahidol, each member of the royal family is ardently devoted to the betterment of health, happiness, and well-being of the sick, the poor, and the deprived.

In his eulogy in honour of the centennial celebration of the birth of HRH Prince Mahidol of Songkla delivered to HM the King in the Grand Palace, Bangkok on January 1, 1992, then Prime Minister HE Anand Panyarachun said, "...Prince Mahidol worked for the betterment of the medical services, the nursing service, pharmaceutical science, dentistry and fishery, as well as the development of the Royal Thai Navy, higher education and the social services".

The former prime minister said that Prince Mahidol "...stressed the importance of a firm foundation for an efficient medical service and the medical sciences. He donated his private funds as scholarships for doctors, nurses and scientists to study abroad. He



"His Royal Highness Prince Mahidol of Songkla was born a prince of the celestial order, yet the kindness which he expended to the commoners was extraordinary."

funded, as well as sought funding from other member of the royal family, for the building of classrooms and patient care facilities.

"His Royal Highness Prince Mahidol of Songkla", the eulogy maintained, "was born a prince of the celestial order, yet the kindness which he expended to the commoners was extraordinary. He gave to all classes of people in line with the following written message: 'I shall study medicine because it is enjoyable. We will have full opportunity to cure patients, both poor and rich, as well as the members of the royal family'.

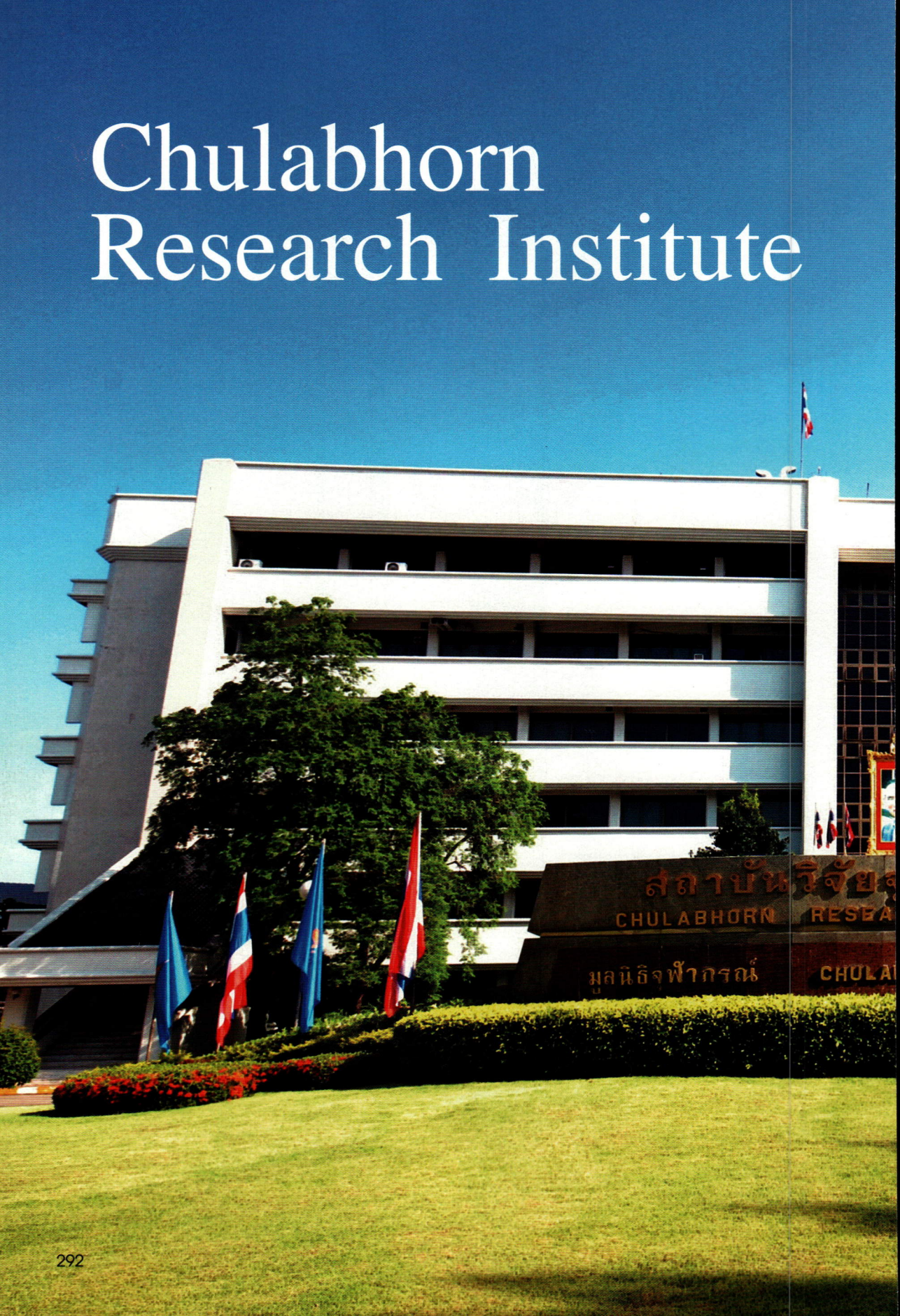
"In another message to doctors, he said: 'Regard self interest as secondary to the interest which should be given to fellow humans. Fortune, money and honour will befall upon you in due course, if you preserve the purity of your professional dharma.'

"Without His Royal Highness Prince Mahidol of Songkla, it may be assumed that the medical service and others would not have reached the present stages of development. Professor Dr. A.G. Ellis, Dean of the Faculty of Medicine and Siriraj Hospital, once said: 'The birth of His Royal Highness Prince Mahidol of Songkla has surely made this world a better place.'

"All of us, who are in Your Majesty's presence here, pledge to follow His Royal Highness Prince Mahidol of Songkla's example for the everlasting advancement of humanity".



Chulabhorn Research Institute




สถาบันวิจัยจุฬาภรณ์
INSTITUTE
FOUNDATION



HRH Princess Chulabhorn accompanying Her Majesty the Queen during an inspection a reforestation project in Chiang Mai Province

Chulabhorn Research Institute

Similar to other royal development projects initiated, implemented and nurtured by members of Thailand's royal family, the Chulabhorn Research Institute (CRI) invokes the use of science and technology to enrich the lives of less fortunate people in Thailand. It is neither surprising nor coincidental therefore that the work carried out by the CRI follows the same humanitarian principles advocated by HM King Bhumibol Adulyadej from the start of the King's reign.



The institute uses science and technology as a humanitarian aid

The youngest daughter of Their Majesties the King and Queen of Thailand, HRH Princess Chulabhorn, along with her brother and sisters, was greatly influenced by Their Majesties' concern for the poor and needy people living in remote areas of the country and the emphasis they placed on researching and studying problems to provide guidelines to solutions. Many were desperate to raise their standard of living.



Their Majesties' four children at an early age

Recognising the need to address these concerns, the Royal Thai Government established the Chulabhorn Research Institute on behalf of HRH Princess Chulabhorn. The institute was launched on the auspicious occasion of His Majesty the King's sixtieth birthday anniversary in 1987.



Princess Chulabhorn completed her PhD in Organic Chemistry

Born on July 4, 1957, HRH Princess Chulabhorn's early education took place in Thailand where she received a BSc degree in Chemistry and went on to complete her PhD in Organic Chemistry. The Princess continued her post-doctoral training in Europe and Japan and in the late 1980s was invited as a Visiting Professor to various countries including Germany, Japan and the United States. She had also been invited to lecture at universities in the USA and Canada.

As a research facility, the CRI not only serves communities in Thailand, it also plays an active part – in some cases a leading role – in the international scientific community. Since its inception, and with an increased emphasis each year, the institute has focused on





International informational exchange is an important aspect of the institute

the study and treatment of cancer. Taking a programmed approach, the institute's research work and palliative care services are enjoined in a symbiotic relationship. And to propel this successful synergy into the future, the CRI's graduate level programmes are structured to turn out a steady flow of highly-qualified scientists, including those able to qualify from abroad.





Moreover, the institute takes a proactive role by spearheading international collaboration through a series of programmes that foster informational exchange; also through regular seminars, and by delivering lectures on contemporary issues. Today, with over twenty years of operational experience, the CRI enjoys international acclaim, substantiated by eminent bodies and individuals that recognise the institute's contribution to the advancement of human health and development.

Looking back, it is clear that the Princess's decision to study science was relevant to Their Majesties' growing number of development projects focussed on the health and well-being of the Thai people with the underlying objective to help them to follow a healthier lifestyle and achieve self-sufficiency.

Ultimate goal and objectives of the CRI

In line with His Majesty's nationwide royal development projects, the Chulabhorn Research Institute makes practical use of scientific knowledge and technological developments to improve the lot of marginalised people. This was the initial philosophy and ultimate goal of the institute and it remains undiminished. Based on this fundamental, humanitarian principle, the CRI promotes basic and applied research – judged to be of national importance in Thailand – to improve people's quality of life in the domestic arena and to make a contribution to the international community.

Achieving such lofty goals has inspired the CRI to act as a focal point for the education and development of high-calibre personnel in the fields of science and technology, today accepted by the institute as an ongoing responsibility. Of equal importance, the institute acts as a catalyst for locally- and internationally-trained scientists to discuss and resolve emerging problems; promote scientific exchange, and function as a centre for international cooperation. In essence, the institute strives to identify, catalyse and mobilise resources for research and development in science and technology.

By undertaking basic and applied research the CRI helps improve people's quality of life





Core principles and activities

Since its inception more than two decades ago, the Chulabhorn Research Institute has held fast to its original goal to make a positive impact on the lives of people in need. Its success attests to the CRI's core principle of adhering to four major areas of work: research; education and training; scientific exchange, and special projects and programmes.

Cancer constitutes a considerable health problem in Thailand and the importance of cancer research cannot be overstated. In addressing the disease as a universal problem, the institute has embraced the latest technology to study the impact and mechanisms of carcinogenesis. To take one example, its research into air pollution, specifically to study the impact of prolonged exposure to traffic-related pollutants, has been published in internationally recognised, peer-reviewed journals and shared worldwide. Today, it is well documented that prospective human carcinogens are a threat to public health, particularly for traffic policeman, schoolchildren, street vendors and others exposed to vehicle emissions on a regular basis and over a long period of time.



Research into traffic-related pollutants is shared with other countries



Sharing information and training form an important part of the CRI's activities

Integrated research and specific projects

The fundamental activity of the Chulabhorn Research Institute, as its name implies, is research. However the institute's research efforts gravitate towards raising the quality of life of people in Thailand both in terms of attaining better health outcomes and in enhancing people's earning potential. For maximum effectiveness the institute focuses on four areas of discipline: natural products, medicinal chemistry and organic synthesis; environmental toxicology; biomedical research, and biotechnology. Achieving success by taking a multifaceted approach means the institute's nine laboratories are kept totally engrossed in comprehensive research activities.



Research studies of natural products for drug development entails analysing the chemical properties of products developed from native plant species to maximise benefits through synthesis. Concurrently, the institute conducts tests into the efficacy of herbal remedies to determine their various properties. In particular cases, for example the discovery of an herbal treatment for malaria, the institute will register or patent its results. To its credit, the CRI has already patented a method to synthesise a compound that arrests the growth of cancerous cells.

Under the relatively broad heading of environmental and industrial toxicology the institute concentrates on researching the effects on health caused by air pollution. This is vitally important particularly if integrated research leads to a better understanding of the health effects from long-term exposure to air pollutants. Protecting and improving people's health to bring about improvements in respect of our shared environment means studying the deleterious effects on people exposed to potentially harmful organic chemical compounds like benzene and polycyclic aromatic hydrocarbon (PAH). These feature among the major genotoxic carcinogens found in urban air pollution, primarily the result of motor vehicle emissions.



Possible Health Effects of Incense Smoke in Thailand

[1]Professor Dr. H.R.H. Princess Chulabhorn Mahidol,
[1]Mathuros Ruchirawat, [1]Panida Navasumrit, [1]Manasawee Arayasiri, [1]Jeerawan Promvijit,
[1]Netnapa. Nakngam, [1]Suppachai Choonvisase and [2]Manoon Leechawengwong

[1]Chulabhorn Research Institute, Bangkok, Thailand,
[2]Vichaiyut Hospital, Bangkok, Thailand

Introduction

Burning incense is a common practice associated with many religions and cultures in various countries in Asia including Thailand. Incense smoke may be associated with many adverse health effects including cancers. Many carcinogenic pollutants such as polycyclic aromatic hydrocarbons (PAHs), $PM_{2.5}$, volatile organic compounds (i.e benzene, styrene, 1,3-butadiene), and carcinogenic metals, have been detected in incense smoke

Among carcinogenic pollutants, benzene, 1,3-butadiene, and PAHs, are a great concern due to their carcinogenic property classified by IARC. Incense burning is one of the combustion sources that occur in the temple. Therefore, it is of interest to assess health risk of exposure to benzene, 1,3-butadiene, and PAHs in temple workers.

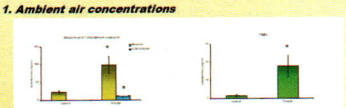
Exposure and health risk were assessed through the individual monitoring of exposure as well as though the use of biomarkers.

Biomarker of exposure : *provides information on internal dose.*

Biomarker of early biological effects: *provides information that may be indicative of health risks.*

Results

1. Ambient air concentrations



- Incense burning generates higher levels of benzene (4-fold, $P<0.01$), 1,3-butadiene (260-fold $P< 0.001$) and total PAHs (12-fold, $P< 0.01$) than control workplace.

2. Individuals exposure

Harmful organic chemical compounds are among the major genotoxic carcinogens found in urban air pollution

EXPOSURE TO GENOTOXIC AIR POLLUTANTS IN THE TRAFFIC POLICEMEN IN BANGKOK: PARTICLE ASSOCIATED POLYCYCLIC AROMATIC HYDROCARBONS AND BIOMARKERS

[1] Professor Dr. H.R.H. Princess Chulabhorn Mahidol,
[1]Mathuros Ruchirawat, [1]Chanthana Tangjarukij, [1]Siitisak Pui-ock, [1]Ormrat Kampeerawipakorn, [1]Jantamas Tuntaviroon,
[2]Herman Autrup

[1]Chulabhorn Research Institute, Bangkok, Thailand,
[2] University of Aarhaus , Aarhaus, Denmark.

Introduction

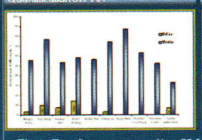
Atmospheric pollution has generally been recognized as a health hazard and substantial evidence exists for increased rates of morbidity and mortality from respiratory diseases following severe air pollution episodes. Besides, evidence of lung cancer in people living in high air pollution areas was shown in a number of epidemiological studies.

Urban air pollution mainly results from incomplete fossil combustion (e.g. energy production and transportation) which contains more than 500 different chemicals, some of which are carcinogenic in experimental animals. Among these, the carcinogenic polycyclic aromatic hydrocarbons (PAHs) form a group of structurally related compounds with two or more condensed benzene rings, some of which are considered to be carcinogenic to man. PAHs or some of their metabolic derivatives can bind to cellular macromolecules such as DNA causing DNA damage. If the repair system works unsuccessfully, it causes mutations which eventually might lead to malignancies.

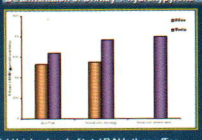
Pollution resulting from traffic congestion involves a complex mixture of genotoxic compounds such as PAHs. Therefore, evaluating the effects of exposure to these compounds especially in traffic police, is of great interest.

Results

Quantification of PAH



Determination of Urinary 1-hydroxypyrene



- The traffic police were exposed to a 20-fold higher level of total PAHs than office police (74.25 ng/m^3 vs. 3.11 ng/m^3)

- The level of 1-hydroxypyrene (1-HOP) was 0.181±0.078 μmol/mol creatinine in the traffic group and 0.173±0.151 in the office group.



During the course of research at the institute it was discovered that traffic police and roadside vendors, in particular, were at high risk. Scientific evidence gathered to support the CRI's findings have since been shared with Thailand's policymakers, decision makers and regulatory agencies to minimise health risks by reducing exposure to carcinogenic compounds. Subsequently, in 2007, the National Environment Board of Thailand, taking the CRI's findings into account, introduced revised standards to cope with the problems.

The institute's studies into biomedical research emphasise public health and the development of more advanced diagnostic methods and treatments. The CRI's past work contributed towards determining the risk to people of contracting certain diseases and toxins by working in different occupations, as well as through hereditary illnesses and cancer. The institute set up a tumour bank to access material to study molecular composition using experimental technology.

As further support for biomedical research the CRI's Institutional Animal Care and Use Committee (IACUC) oversees animal care and research activities to ensure compliance with Thailand's Ministry of





Studies into biomedical research emphasise public health

Science and Technology. During a site visit in December 2009, a team from the US-based Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International) assessed the CRI's work and, after improvements were implemented, the institute received full international accreditation.

The CRI also conducts biotechnology research using genetic engineering and molecular biology technologies to unravel the complex relationship of host-microbe interactions and the biological degradation of harmful chemicals. This will benefit agricultural and industrial businesses and allow researchers to develop protection strategies and design microbes which could break down harmful substances in emissions produced by industry and agriculture. Research in the area of orchid viral diseases could lead to treatments for various viruses in economically important orchid plants.



Biological research can benefit agricultural and industrial businesses







The ICEHT serves as a centre for international cooperation

International Centre for Environmental Health and Toxicology (ICEHT)

Formerly the International Centre for Environmental and Industrial Toxicology (ICEIT), the renamed International Centre for Environmental Health and Toxicology (ICEHT) pursues its objectives in line with the fundamental principles of the Chulabhorn Research Institute by developing human resources in the area of environmental toxicology and technology (including biotechnology); by conducting basic and applied research leading to the prevention of environmental toxicological problems and protection of human health, and by serving as a centre for international and regional cooperation in technology transfer and human resource development for developing countries, primarily in Asia and the Pacific regions.

Managing chemicals in an appropriate manner is crucial if countries are to reduce the adverse impact on human health and the environment. Chemical toxicity is of great concern worldwide and seen as a growing problem fanned by irregular patterns of economic development as countries gravitate from being an agro-based economy towards industrialisation. This transition has given rise to a shift in the pattern of economic growth and the indiscriminate use of chemicals that adversely impact the environment through the release and spread of hazardous waste resulting in a direct threat to human health.





During a visit to the WHO South East Asia Regional Office, HRH Princess Chulabhorn addressed staff on health and the environment

The centre was established to better address these emerging and worrisome issues. In 1990 it was designated the "United Nations Environment Programme, Centre of Excellence in Environmental and Industrial Toxicology". Since its establishment, continuous support has been shown by the UNDP, the Royal Thai Government's Department of Technical and Economic Cooperation, Asian Development Bank, UNEP and the ASEAN Foundation.

In due course, and as a result of collaborative efforts between the CRI and the World Health Organization in the areas of health and the environment within the region, the CRI was designated a WHO Collaborating Centre for Capacity Building and Research in Environmental Health Science and Toxicology. This prompted the ICEIT to change its name to the International Centre for Environmental Health and Toxicology (ICEHT) to better reflect the centre's expanded role.

Training seminars constitute an important and integral part of ICEHT activities and locally-staged, internationally-supported training courses on pollution control, health and environmental toxicology are always well attended by delegates from countries in the region.



Chulabhorn Hospital

Chulabhorn Hospital, formerly known as the Chulabhorn Cancer Centre, was established in 2004 and renamed Chulabhorn Hospital in 2009.

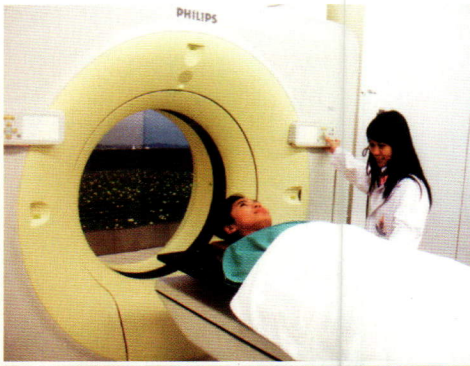
Cancer is the foremost cause of death in Thailand. It also plays a sinister, underlying role in amplifying the effects of socioeconomic problems among affected families in the country. In earlier years, treatment for cancer patients in Thailand clearly lagged behind the more modernised approach taken by some other nations. Of equally important concern, Thailand's advances in basic and clinical research in cancer were severely hampered by a shortage of qualified medical and research personnel, and adequate funding. And there still remains much misunderstanding regarding the causes of cancer and the means of treating those infected with the disease.

Overcoming these impediments meant galvanising Thailand's public and private sectors to work with a single purpose for the overall welfare of the people of Thailand. Practitioners at Chulabhorn Research Institute became aware of the stigmatisation faced by



The hospital was established in 2004



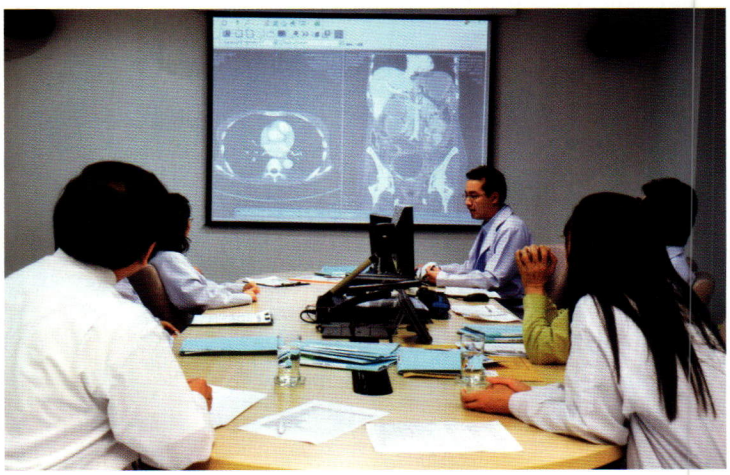




Both physical and mental health care is given to cancer patients

communities especially cancer patients and their families. This inspired the institute to help alleviate people's suffering and discomfort and led to the establishment of the first, comprehensive cancer centre in Thailand conveniently sited within the CRI complex.

Chulabhorn Hospital is structured to provide physical and mental health care to cancer patients. This includes diagnoses and staging, along with up-to-date medical services for cancer operations, radiation oncology and chemotherapy to offer palliative care. All housed within the same building complex, researchers conduct studies including translational research, clinical research and community research. The principal objective is to cure patients and improve their quality of life, as well as reduce the risk of cancer development and the overall incidence of cancer in Thailand.





A panel of experts decides the most suitable treatment for patients

Cancers of the liver, lungs, cervix and colorectal cancer formulate the hospital's major care programme. Determining the most suitable treatment and mainstream care for patients suffering from any of these afflictions is decided by a panel of experts specialising in pathology, radiation oncology, chemotherapy, surgical oncology and medical pharmacy.

A number of well-known international figures in the fields of medicine and public health have spoken favourably about Chulabhorn Hospital since its inception, including Germany's Prof. Harald zur Hausen a recipient of the 2005 Prince Mahidol Award in Public Health and the 2008 Nobel Prize in Physiology or Medicine for his discovery of human papilloma viruses causing cervical cancer: "Princess Chulabhorn clearly is a person who is very much engaged in research and she is certainly very much interested also in the clinical aspects of research which, of course, will be extremely important for the Thai people. So in a way I was impressed by the setup of the hospital which seems to function beautifully although it was not completely finished at the time I was there."

The hospital employs a patient-centric approach to health care and in the past few years it has successfully established itself as an excellent centre in the South East Asia region for cancer diagnosis, treatment and research.



Chulabhorn Graduate Institute

The main aim of the Chulabhorn Graduate Institute (CGI) is to generate a steady stream of academics to exploit developments in science and technology and help improve the lives of less fortunate people in Thailand and elsewhere.

When it was first established, the CGI received approval from Thailand's Ministry of Education to offer graduate level programmes to develop academically qualified personnel for the nation, and the region, in the fields of applied biosciences (environmental health), chemical biology and environmental toxicology. All of these scientific branches of learning are in line with national strategies for sustainable development. Clearly, it is crucial to train and develop highly-qualified personnel to satisfactorily fulfil the needs of Thailand's public and private sectors.

One particular facet considered very important by the CGI is the need to improve Thailand's ability to compete on the international stage. This means constantly scrutinising the methods used for teaching. The institute's approach is to utilise up-to-date, interactive teaching techniques, similar to those used in leading institutions around the world to develop highly-qualified personnel. In effect, the CGI trains and encourages students to be effective thinkers and leaders in their fields of expertise.



The CGI utilises up-to-date, interactive teaching techniques



Students from regional countries have been enrolled at the CGI since 2006

Today, the academic programme at Chulabhorn Graduate Institute enjoys broad support from world-renowned international experts representing leading academic and research institutions including MIT, Harvard University, Johns Hopkins University, University of Aarhus, Denmark, University of London, the UK's Imperial College of Science, Technology and Medicine, and Utrecht University in the Netherlands.

Over one hundred students enrolled at the CGI since 2006 have received diplomas, doctorates or master's degrees under programmes for Environmental Toxicology (ET), Applied Biological Sciences (CB), and Chemical Biology (CB). On a regional basis, apart from Thailand's close neighbours Malaysia, Lao PDR, Myanmar and Vietnam, students from Bhutan, Nepal, Indonesia and Sri Lanka also attended CGI programmes during the academic years from 2006 to 2010.

During the past few years, the Chulabhorn Graduate Institute has successfully turned out highly proficient personnel in the fields of science and technology. These highly-skilled scientists and technicians are destined to become a driving force in their countries' future development which will enable each nation to compete in the international arena. This academic development is consistent with the CGI's overall objective to "...become a centre of excellence in science and technology and to develop qualified personnel in these areas for the Asia Pacific region".



Princess Chulabhorn International Science Congress

The Chulabhorn Research Institute already enjoys an international reputation as a centre of excellence. Its nine, state-of-the-art laboratories are staffed by highly-qualified scientists in the areas of chemistry research, biomedical research, environmental toxicological research, and biotechnological research.

Anxious to maintain its high standards and continue to play a contributory role in the country's development, and remain internationally competitive, two important issues have to be addressed: Firstly, the need for "succession planning" to ensure a steady supply of well-trained scientists and technicians so that research work and palliative health care proceed in a smooth and uninterrupted manner. In effect, this requirement was addressed at the time the Chulabhorn Graduate Institute was established.

Stemming from this, and keen to maintain its position of pre-eminence in scientific research, it became vital to provide a forum to exchange information between members of the international scientific community concerning the most recent advances in research. This imperative gave rise to the Princess Chulabhorn Science Congress.



Their Majesties the King and Queen graciously presided over the Fifth Chulabhorn Science Congress in 2004

In its present form, the congress is a convenient forum where members of the international scientific community can come together every four or five years to discuss and review topics in science and technology.

The First Chulabhorn Science Congress, held under the theme "Natural Products", took place in Thailand from December 10 to 13, 1987 at the time of the sixtieth birthday anniversary of His Majesty King Bhumibol Adulyadej.

More science congresses were held in 1992, 1995, 1999 and 2004. The 2004 forum was staged under the theme "Evolving Genetics and its Global Impact". Delegates sought to determine the likely impact on society after the human genome was decoded, and the major contribution of genetic technology regarding health sciences and biotechnology. Experts addressed the different ways that a "revolution" in genetics and its aftermath could result in opportunities to study diseases; the interaction between genes and the environment, and the development of biotechnology.



The sixth congress was held in 2007

In commemoration of His Majesty the King's eightieth birthday anniversary, the sixth congress took place in November 2007, under the theme "The Interface of Chemistry and Biology in the 'Omics' Era". The completion of the human genome project at the turn of the century, which laid out a blueprint of humans at the molecular and cellular levels, opened up opportunities to improve people's quality of life.



The Princess Chulabhorn Gold Medal was created and first awarded in 1995 to honour and recognise individuals or entities achieving world-renowned status that had already proved to be valuable supporters of the Chulabhorn Research Institute. Indeed, the success of the institute owes much to the cooperation of other institutes, international organisations and leading scientists and academics around the world.



When selecting prospective awardees for a gold medal, three basic criteria are applied by the institute's executive committee and senior researchers: Firstly, the individual must be recognised internationally as a scientist or academic whose work has achieved international acclaim; secondly, each candidate should have made an important contribution to Chulabhorn Research Institute by participating at the international level. Thirdly, awardees should be instrumental in providing significant and sustained support for the advancement of science in developing countries.

Announcing that The Seventh Princess Chulabhorn International Science Congress would be held in 2011 during the year Thailand celebrates His Majesty the King's eighty-fourth birthday anniversary, Princess Chulabhorn has proposed that the contemporaneous theme of the congress should be: "Cancer: From Basic Research to Cure".



The Princess Chulabhorn Gold Medal recognises supporters of the Chulabhorn Research Institute



In 1986, HRH Princess Chulabhorn was awarded the Einstein Gold Medal of UNESCO

Scientific awards and international acclamation

A year before establishing the Chulabhorn Research Institute, HRH Princess Chulabhorn received the 1986 Einstein Gold Medal of UNESCO. The third person in the world to be so honoured, the award recognised the princess's scientific activities in utilising science and technology to improve people's quality of life as well as promoting scientific exchange and cooperation in the Asia Pacific region.

More awards followed recognising the institute's service to the environment through scientific and technological research and education, and for medicinal studies of cancer/toxicology, health and environmental sciences.

The International Centre for Environmental and Industrial Toxicology (ICEIT) established in 1990 (and renamed in 2005 as the International Centre for Environmental Health and Toxicology – ICEHT – as a result of collaboration between the CRI and World Health Organization) was designated a UNEP Centre of Excellence in Environmental and Industrial Toxicology.

In December 2005, the Chulabhorn Research Institute was designated by the World Health Organisation as a WHO Collaborating Centre, one of eight hundred institutions in over eighty countries that carry out activities in support of WHO programmes including occupational health, communicable diseases, chronic diseases and health technologies.



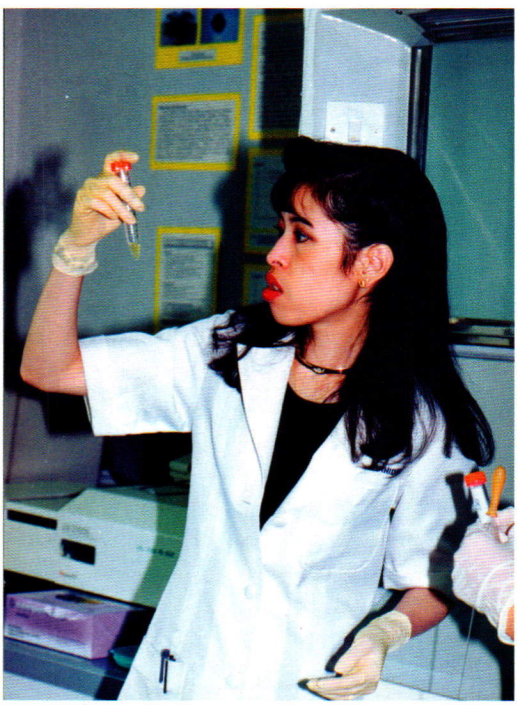
Dr. Frederick F. Becker praised the contribution made by the CRI

The overall success achieved by Chulabhorn Research Institute has not come from any single source but from an amalgamation of services embracing laboratory research, patient-centric care, succession training to ensure a supply of future practitioners, and international congresses where distinguished scientists and technicians can exchange views and opinions with one another.

Commenting from the USA on the institute's achievements over past years, Dr. Frederick F. Becker, professor of molecular pathology at the MD Anderson Cancer Centre in Houston, spoke of its international recognition.

"Through its research, publications and as a focus of informational interchange, it [the institute] has achieved remarkable importance in the fields of environmental research and population studies. In addition, its research into the derivation of medications from natural products, and in malaria, has achieved international recognition.

"As an outgrowth of excellence in science, the current initiatives in cancer treatment locally and throughout Thailand have identified this country and this centre as a role model for others to follow. The growth of its excellent efforts in clinical treatment and research into those cancers which have particular impact on its population should be a guide to those elsewhere who wish to emulate its success."



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"...the well-being and happiness of the people
are a benefit that is difficult to be measured in terms of money."