

Beautiful World, Sustainable Society

A great passion
to the bright future
for all



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to the bright future
for all



PTTEP



A Note from the CEO

For over three decades, PTT Exploration and Production Public Company Limited or PTTEP was founded upon the mission to become Thailand first company to explore, develop and produce petroleum from both domestic and oversea, and also contributed to the reduction of the country's oil imports.

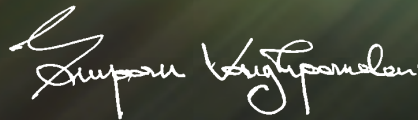
PTTEP has placed great emphasis on developing the organisation's capability through the acquisition of knowledge, along with the introduction of technological innovation and adherence to the principles of strong corporate governance in its organisational management. All these effort have laid the foundations for the Company to achieve the goal of becoming a sustainable organisation and securing energy security for the country where we operate in the long term.

On this path to sustainability, PTTEP has followed His Majesty King Bhumibol Adulyadej's philosophy of sufficiency economy. Integral to this commitment, the Company has incorporated into its management strategy the Three Pillars Philosophy: Moderation, Reasonableness, and Prudence, all of which are to be governed and implemented under Two Conditions – Knowledge and Virtue.

For every activities and projects that PTTEP puts forward, the company takes into account all impacts to its stakeholder by ensuring good balance between businesses, concern for society and preservation of the environment. All decision-making has been carried out with forethought and risks managed systematically in order to ensure a sustainable growth and competitiveness. In addition, it is crucial that PTTEP employees at all levels are committed to the corporate governance and related laws and regulations. These steps are evidence that we are striving to perform our work and conduct our business with transparency in accordance with internationally accepted standards.

"People" is the most significant factor that indicates our true commitment and willingness to reach for success. PTTEP management and employees are expected to display a continued inquisitiveness to explore for new sources of knowledge, to focus on technological developments and new innovations while at the same time remaining moral, honest and conscious of their responsibilities towards not only their duties, but also towards society in general and the environment in particular.

Throughout the entire business, our role is an explorer with emphasis on environmental protection and sustainable social development. In every operational area of PTTEP, we offers our profound loyalty to His Majesty King Bhumibol Adulyadej's guidance in our mission to provide energy security for maximum benefit of the country and sustainable growth together with society.



(Somporn Vongvuthipornchai)

President and Chief Executive Officer

PTT Exploration and Production Public Company Limited

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Beautiful World, Sustainable Society

Because no one can exist without others...

Trees, grass, small and large animals, the wind, the sea, the forest, the land – everything in the world depends on one another. The relationship between living things and non-living things in nature is called ecology. The relationship in human society is called culture, from the smallest unit of a family, to communities, organisations, countries and the world.

Today our culture continues to advance while our ecology is declining. Societies endure hardships and poverty as a result of inequality in resource distribution and access to knowledge.

For over 30 years PTT Exploration and Production Public Company Limited (PTTEP) as a core business unit overseeing petroleum exploration and production for the PTT Group has committed to ensuring energy security to drive the country's economic and social development for a sustainable future.

At the same time, we never ignore the sense of responsibility towards the world and neighbouring communities.

From a small beginning when we launched our socially responsible activities with donations of money and basic items – for example, offering scholarships and sports equipment to young people in operational areas – we have expanded our care and commitment guided by the principle “From Natural treasure to Intellectual Wisdom and Environmental Conservation” to reach beyond our operational areas. Our reforestation projects to battle global warming cover over 100,000 rai of land. We have projects in areas of national and international significance, namely the World Heritage sites of Sukhothai Historical Park and Si Satchanalai and Kamphaeng Phet, Ayutthaya Historical Park; all are part of PTTEP's “Thai Heritage, World Heritage” project. All of this are driven by ecological understanding as well as cultural and historical appreciation.

We have gained knowledge and experience from over 70 socially responsible projects to arrive at the principle of an explorer with emphasis on environmental protection and sustainable social development, reflecting our belief that every project will achieve maximum benefit when it's based on the idea of sustainability.

The implication of “sustainability” means the ability to respond to actual needs and enlist participation of the community or agency that owns the place.

An activity or a project that fails to respond to the needs of the community will hardly be accepted.

An activity or a project that doesn't build community participation will become an uphill task.

Because no project can move forward without the people's help.

Today PTTEP selects and runs its social responsibility projects based on four standardised steps of: Stakeholder Analysis, Development of Strategic Projects and Communication Plan, Implementation & Monitoring, and Evaluation for both domestic and international projects.

These steps ensure that every activity and project effectively answers the needs of all stakeholders and corresponds to PTTEP's business practices and the goal of becoming "a sustainable organisation".

Stakeholder Analysis ensures an understanding of the real needs of each area, society or country, which differs from one to another.

The development of a strategic project plan can shape guidelines and anticipate obstacles and risks in order to design a systematic management plan.

The Corporate Social Responsibility projects of PTTEP can be classified into four areas: environment, culture, education and basic needs.

Environment: Conserve and restore nature and the environment. Raise awareness and sense of ownership of natural resources in community members and society at large. For example, turning submerged battleships into underwater learning centres to help the rehabilitation of coral reefs.

Culture: Preserve cultural and historical sites. Raise awareness of the value of cultural and historical areas. Develop the potential of young athletes, such as supporting Thai yacht racing athletes to qualify for the Olympics in both men's and women's contests.

Education: Create and increase educational opportunities for young people in operational areas in Thailand as well as abroad. For example, PTTEP's Phet S1 Scholarship is given to students with outstanding academic and personal excellence.

Basic Needs: Improve the quality of life, income level and community healthcare. For example, the Community Nurse project gives opportunities to youngsters to study nursing and return to work in their communities.

Other successful projects include PTTEP Teenergy which is an extension of PTTEP's "Conserve Thai Heritage, World Heritage" project that educates children to appreciate the value of nature and inspires them to create their own natural conservation projects in their schools. One indicator of the success is the rising number of teens who apply for the programme. Another successful project is the Crab Hatchery Learning Centre, which is a collaborative effort between PTTEP and the local community in an operational area which leads to sustainable economic development as well as environmental conservation.

These projects meet the evaluation target set by PTTEP both in terms of community satisfaction (measured by level of participation) and social return on investment (measured by the community's income in relation to the cost of the project).





On top of that, PTTEP's Parasite-Free School project in Myanmar won the Bronze Award for Innovation in Community Relations at the Asia-Pacific Stevie Awards. Meanwhile PTTEP's Free Health Care Service project in Indonesia won the Best Community Programme Award at the 8th Annual Global CSR Summit and Awards 2016.

PTTEP has learned from these successes that the important factors are the community members' acceptance of and participation in each project. Building trust and creating an understanding through formal and informal meetings, with careful support at each step, will lead to a point where the community actively takes part in the project. Eventually it will reinforce the strength of other projects that PTTEP has initiated to ensure a sustainable future for communities and society.

Another factor for success is knowledge – the knowledge derived simultaneously by PTTEP and the community as they work together; the knowledge from academic and scholastic research; and the way the knowledge is passed on to the community and society. This is evident in several projects, such as the reforestation and eco-learning at Sri Nakorn Khuen Khan Park (Bang Kachao), the waste to energy, the conservation and development of Chan Palace, and the training for a network of a civilian forest protection project.

In 2015 PTTEP was honoured with a prize from the Thailand Business Council for Sustainable Development (TBCSD) for running the business while pursuing the conservation of natural resources and environment and with social responsibility.

In 2016 PTTEP was chosen as a member of Dow Jones Sustainability Indices (DJSI) in the World Oil and Gas Upstream & Integrated Industry for the third consecutive year. The company also received the highest assessment score as an Industry Leader, which reflects PTTEP's commitment to sustainable development.

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The projects and activities featured in this book "Beautiful World, Sustainable Society" are some examples of PTTEP's commitment to sharing knowledge and experience from our socially responsible programmes to communities, organisations and everyone who's interested in taking the path of sustainability.

Because no one can walk alone.

The world will be beautiful and society will be sustainable when we realise the responsibility we have to ourselves, to others and to the environment.

For the bright and happy future of everyone. 🌱



Preserve Nature & the Environment

Crabs in the zoea stage are floating like sediment, one day after hatching. This is a crucial stage that requires great attention and care to ensure a high rate of survival.





Crab Hatchery Learning Centre Project

Lessons from

the Hatchery Learning Centre,

Nursing Crabs for the Sea



A female crab lays an average of 2 million eggs. Instead of selling female crabs to restaurants, the P. Sap-anan Traditional Fishermen Group encourages villagers to separate pregnant crabs from the catch and hatch the eggs in order to increase the crab population in Songkhla Lake.



Songkhla Lake is a vital resource for communities in the area.

Thailand's largest lake covers an area of 974 square kilometres, measuring 20 kilometres from east to west and 75 kilometres from north to south. The basin around the lake covers an area of 1,040 square kilometres.

There are four parts of the lake classified by the level of salinity: Talae Noi, Talae Luang, Talae Sab Ton Klang and Talae Sab Ton Nok, which is commonly known as Songkhla Lake (Talae Sab Songkhla).

A small spot on the map of Singhanakhon district, Songkhla, may be overlooked by most people, but it is of great significance to crab fishermen.

To get there, follow highway 4146, which connects highway 4083 (Ranot-Khao Daeng) with 407 (Songkhla-Hat Yai), to Tinsulanonda Bridge, the country's longest concrete bridge.

At the intersection look for a sign that says "**Ban Hua Khao Crab Hatchery Learning Centre**", then turn left and keep following the signs. Finally you'll reach the destination at 70/16 Moo 1, Tambon Hua Khao.

Open an “Egg Account” at the “Crab Bank”

Those who had once depleted the lake of its crabs could be the ones to replenish it abundantly in a few years.

“I used to live in Ranot district. In 2000, I couldn’t earn enough so I got my family on a boat and we settled on the banks of Songkhla Lake. We had no savings, we lived hand to mouth. Without a home, we swept the ground beneath a tree. My wife, children and mother-in-law slept there while I went out to the lake all day and all night until we saved up enough to have a home.”

Anan Manil’s story inspired other villagers from Ranot to journey on their boats to Songkhla Lake to try their luck. Anan is a popular figure in the community. He was once a protest leader who campaigned for land ownership rights and protection of the anchovy or katak fish.

The fishermen shared the fishing area. Anan also took up buying the catch and reselling it to customers with a 2-baht-per-kilo profit sharing scheme. Soon the community was able to stand on its feet. Anan also bought a bigger boat to lay crab gill nets.

“Our daily catch was 200-300 kilogrammes. We save some for our own consumption and sold the rest. We share the food with families and neighbours, and the overall living conditions improved. Soon we were able to buy 20 big boats, which helped us to catch even more crabs. In 2008-2009, we caught fewer and fewer crabs – which was not surprising because there were more and more fishermen, including those from other areas who came to fish in the lake as well as big trawlers and commercial fishing boats. They came mainly for fish but they got tonnes of crabs in their nets too. In 2010 the situation was critical. Each boat caught just one basket of crabs a day, only five to 10 kilogrammes.

Today the lake is an abundant habitat of aquatic creatures, but previously the fishermen had faced a crisis when the crab population declined to a critical level.



Songkhla Lake was once renowned for the abundance of its aquatic creatures, with over 700 species of fish, shrimps, crabs and so on. The economic foundations that helped to sustain over 150 communities living around it.

Fishery statistics show that in the past decade, the number of crabs has continued to decline since overfishing didn't allow nature sufficient time to replenish itself. Rules and regulations weren't strictly enforced since crabs were an important economic catch. Ten years ago, a kilogramme of blue swimming crab cost 90 baht. Now a kilogramme bought at a fishing boat is 350 baht (three to four crabs), and the price shoots up to 500 baht-per-

“

I once opposed PTTEP's operation. But when we studied the details and became more open-minded, it led to a cooperation that benefits the land

”

Anan Manil



kilogramme at the market. It's frightening to imagine what would happen if the condition of the lake continues to worsen and the number of fish and crabs continue to diminish. Not only is the fishermen's livelihood at risk, the future of their offspring is in danger too.

That was the turning point for Anan and his friends.

"I talked to my brother about setting up a crab bank. It's one thing to feed ourselves. It's another when we have to return something to nature."

P. Sap-anan Traditional Fishermen Group was formed with 200 fishermen who relied on traditional fishing gear and who lived in Singhanakhon, Sathing Phra and Ranot districts. Anan serves as the chairman of the group.

Initially, the group used the same system as any other crab bank: Members would bring female crabs with eggs spilling out from their ovaries to the group where the eggs are "stirred". Later the group trains the members to stir the eggs by themselves and donate them to the group for hatching. The juvenile crabs will be released back into the sea.

The idea is to "deposit" natural assets with nature for them to grow. They will soon return as "interest" for the fishermen.

The Manil family: Anan (left), founder of the Crab Bank; Chamnan (middle), who developed the knowledge of hatching crabs that led to the setting up of Ban Hua Khao Crab Hatchery Learning Centre; Krasuay, the star chef in cooking crab dishes.



Nurturing Grassroots Wisdom into a Learning Centre

Why stop at the Crab Bank when the community has even greater potential?

It began as a misunderstanding between industries and communities then it became a cooperation. One of them was PTTEP who has developed a sea port and storage facility base to support the company's petroleum exploration and production projects in Singhanakhon district, Songkhla. In the beginning, Anan was a protest leader campaigning against the impact such projects would have on traditional fishermen. PTTEP was given an opportunity to come to an understanding with the community and to be acquainted with the crab nursery project initiated by P. Sap-anan Traditional Fishermen Group. In 2013, the company provided funds to build a concrete water tank and crab nursery, as well as coordinating with the National Institute of Coastal Aquaculture (NICA) and Rajamangala University of Technology Srivijaya to develop the operation of the crab bank.

> Every day there are a large number of female crabs with eggs spilling out from their ovaries. They are sent to the learning centre to be "stirred". The eggs are then stored in an oxygen-enhanced nursery tank filled with saltwater taken 10 kilometres from the shore.

Initially the villagers adapted the experience from shrimp farming to the crab nursery, such as filtering coastal water, sterilisation and hatchery. But new knowledge has greatly improved the survival rate of the crabs. The stirred eggs are now hatched in a pool of high-quality saltwater collected from the sea some 10 kilometres from the shore, with 28-34 ppt level; unlike filtered coastal water, it has no sediments. After a period in the nursery, juvenile crabs are released into the sea far from the shore where the ppt level is suitable for their adaptation. The result is a higher rate of survival, meanwhile the fishermen receive a first-hand education on the biology of the crabs during each stage in its life.

"After the process of stirring, the eggs have to be moved to rest in a hatching tank with oxygen for 10 to 15 minutes. If left longer the eggs will go to waste. The tank contains 15 litres of seawater per handful of eggs from five to six female crabs. It is a cleaning process in itself. We've had training in breeding shrimps, but crabs are a new area for us and every day there are a lot of things we have to learn and experiment," Anan says.

Chamnan Manil is Anan's brother as well as deputy chairman of the group. He is in charge



The Crab Hatchery and Nursery building is supported by PTTEP and given to local fishermen for educational and professional purposes.





Throughout the year a number of organisations ask for baby crabs to be released into the sea. Before giving them the crabs, the centre first shares the knowledge and instills a spirit of conservation among participants.

of developing the hatching process. He said that every day, fishermen who go out to sea will return with a fresh supply of seawater taken at a distance from the shore. The water will be kept in a 10-tonne pool, ready to be used in the hatchery.

Recognising the determination and early success of the project, PTTEP supported P. Sap-anan Crab Bank's development into the full-scale Ban Hua Khao Learning Centre and Crab Hatchery by building a two-storey building for the group. The upper floor houses a workshop, while the lower floor is a living exhibition space, together with a hatchery and a nursery. Visitors will learn about the process from the hatchery with living creatures.

The white building opened in 2015. Since then it has served not only as a learning centre for young visitors and staff from various organisations, but also an accommodation for visitors from other provinces. It also serves as a meeting room for the villagers.

Even on days when they have no visitors, the hatchery is still very much alive.

The facility has two 7-tonne hatching pools. At first glance, visitors will see sheets of sediment or dust on the surface. On closer inspection, they are actually tiny crabs in the zoea stage, one day after hatching, swimming around the pool as in their miniature aquarium.

Each pool has been sterilised with one litre of chlorine and left for four days before they are cleaned with fresh water. Then the supply of seawater is pumped into the pools and they are ready to receive one-day-old crabs from the hatchery. After one or two more days in the pool, the crabs will be released into the sea.

Back in their vast natural habitat, if the little crabs evade their predators, they will grow through different phases: after one to 10 days in the zoea stage, they'll enter the megalopa stage at 10 to 15 days, before growing into juvenile crabs after one month. At four months, they are ready to reproduce. If the fishermen catch female crabs at this stage, the cycle is repeated at the hatchery.

Chamnan stresses that just one night of this

**“
We run the nursery to
understand the biological
development of young
crabs. Then we spread the
knowledge to everyone**

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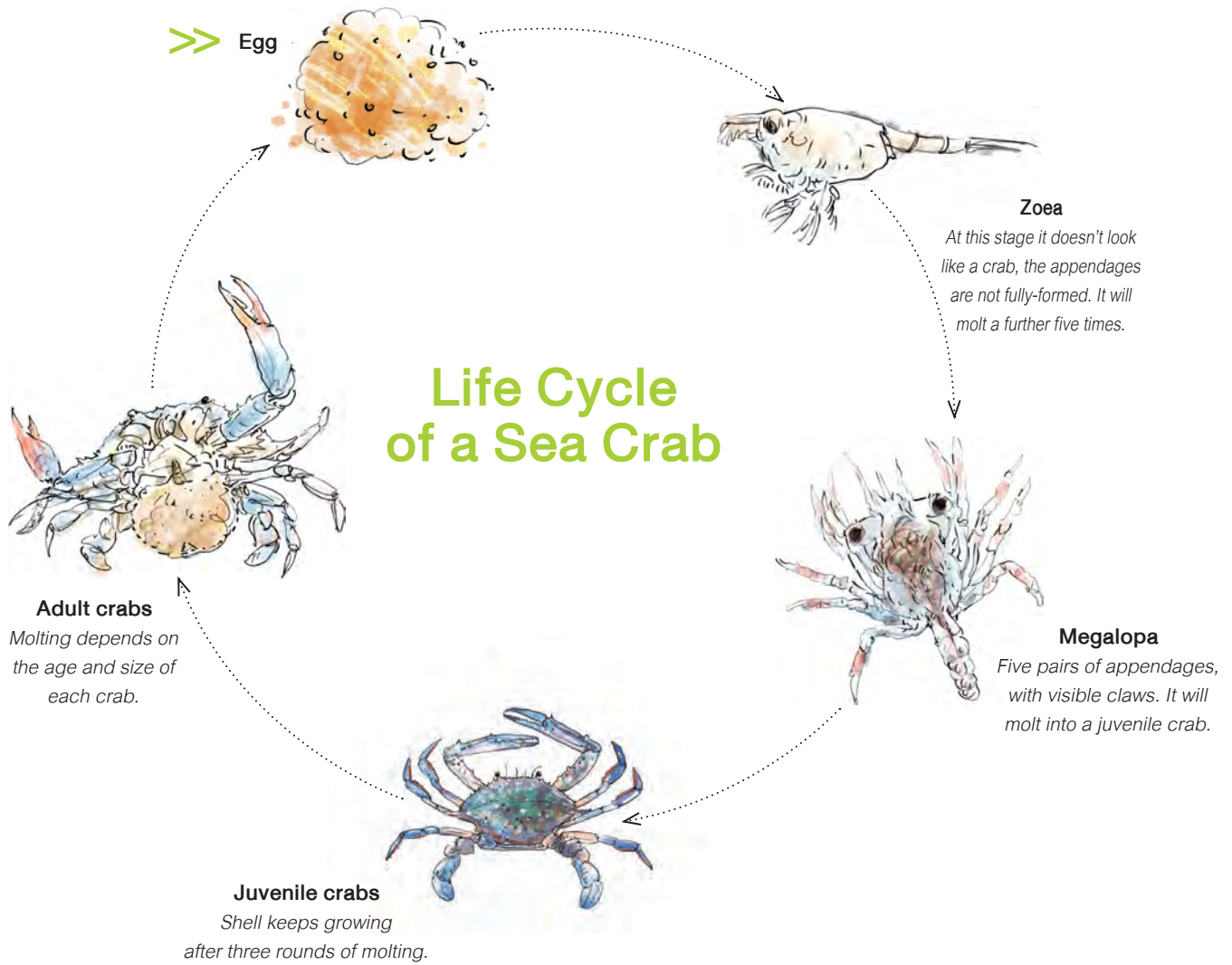
Chamnan Manil



process at a hatchery produces an enormous number of crabs. Each day the fishermen catch 10 to 50 female crabs of different species such as blue swimming crabs, musk crabs and three-spot swimming crabs. A female crab weighing 100 to 200 grammes lays 700,000 to one million eggs. The healthier the crab is, the healthier her eggs are, with the ratio of hatching at around 600,000. A female crab weighing 200 to 300 grammes lays 1.8 million eggs, with the hatching ratio of one million. This estimate is based on folk wisdom which Chamnan adapts in conjunction with academic research.

“I first estimate the numbers from what I see with my eyes. I estimate the weight and the density of the eggs in my hands, then I send them to be counted at NICA. The number I have in my head is usually more or less the same as the official count.”

This is an example of how academic knowledge facilitates the application of folk wisdom. In the future, more local expertises can be further developed in the Learning Centre.



Earn Your Interest in a Sustainable Way

Even though the Learning Centre is supported by various organisations, the villagers still need to sustain its operation by themselves.

A sizable budget is required, so they have opened a restaurant to bring in more income.

The stars of the menu, of course, are crab dishes cooked by Krasuay Manil, Anan's wife.

Besides nutritional and culinary benefits, the restaurant also aims to build a spirit of conservation

among customers. Before sitting down for a meal customers are taken on a tour of the centre to learn about the creatures' life cycle and the need for long-term preservation.

It is a small gesture, but it can contribute a great benefit in the future.

Chamnan talks about another example: Khlong Thepha is another area that once experienced a critical shortage of crabs. The villagers even challenged each other that if a single crab could be found, they would chop off their fingers. Anan did some research and found that the crabs were unable to reach the mouth of the bay and lay their

eggs because the waves were too soft to carry the crabs upstream. In the meantime, villagers kept catching whatever crabs they could find, creating a destructive cycle that only diminished the number of crabs. Anan then brought juvenile crabs from the Learning Centre and released them there. The crabs feed on plankton, which is abundant in Khlong Thepha. Soon the area was flush with crabs, and though they're not as big and as expensive as those in Songkhla Lake, they are enough to sustain the villagers. Now when the fishermen of Khlong Thepha catch female crabs, they stir the eggs and bring them to the hatchery. This brings it all to the next step: the project has inspired another community to understand the limitations of their local geography and come up with the means to adapt and preserve marine resources accordingly.

Likewise, when an organisation asks for baby crabs to be released, the Learning Centre doesn't give them unconditionally.

"If we give them out without asking for anything in return, they won't realise the value of the crabs. We're not a standard crab bank where members simply deposit female crabs in a nursery tank and let the hatching happen naturally. We run this place as a learning centre to understand the biological process and try to spread that knowledge. Each month, 10 to 20 agencies in the southern region, all the way down to Pattani, approach us and ask for juvenile crabs to be released, and each time we give as many as 500,000. But before that, we want to instill an understanding of conservation among those who are about to release the crabs, because every single juvenile crab is important."

What Chamnan means is more than protection of marine resources.

"In the past, we let the crabs reproduce naturally because there was still an equilibrium between crab fisheries and marine ecology. But now the competition is intense. Female crabs are caught before their eggs can hatch. Consumers also favour crabs with eggs without realising that each single egg means another life. Eating one mother crab means a loss of a million juvenile crabs. So if anyone wants to release our crabs, they have to learn to conserve crab eggs too."

Sacrificing a small culinary delicacy ensures the long-term future of crabs in Thai waters. This is one of the missions that the fishermen group and PTTEP are proud of.

"I once protested against PTTEP projects. But the company was ready to listen and cooperate with the villagers for the benefit of the country. My family has a better living from our efforts to replenish the abundance of the sea. When we go out to the sea, we return with crabs and bring more income. The difference is obvious. Before, the fishing season started at the end of June and continued until early October. But today, because of the increasing number of crabs, fishermen can bring their boats out from February to October."

Anan, as chairman of P. Sap-anan Traditional Fishermen Group, asks us to look back at the past and how the success of the present came about. Meanwhile, PTTEP trusts in the commitment of the villagers. The initial target was to release 200 million crabs in one year. But after six months, 150 million have been released. So the new target is to release 300 million crabs. PTTEP has also set a long-term goal that in five years, the Learning Centre at Ban Hua Khao will cement its operation and philosophy to become a model from which know-how and expertise can spread to smaller crab banks that have the potential to develop into learning centres.

More hatcheries will ensure that crabs will always swim in Thai waters, just as the fishermen of Songkhla Lake have proved possible. 🇹🇭


Crab Hatchery Learning Centre at Ban Hua Khao

70/16 Moo 1, Tambon Hua Khao, Singhanakhon district, Songkhla 90280

Mr. Anan Manil Tel. 08-1767-6513

Mr. Chamnan Manil Tel. 08-9737-5446

Visiting times: 08.00-17.00 hrs from Monday-Friday

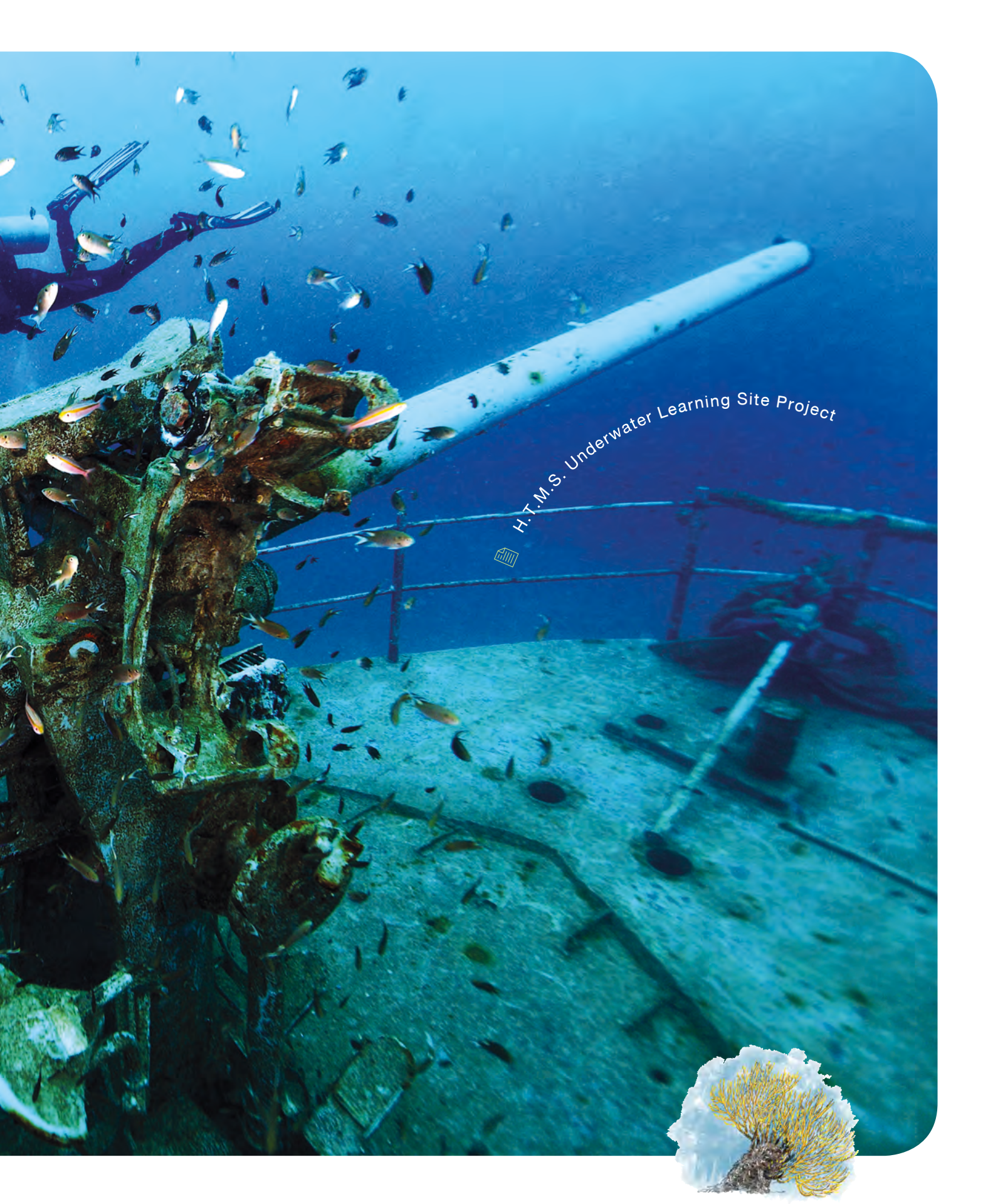
An underwater photograph showing a diver in the upper right corner, illuminated by a bright light. The diver is positioned near a large, rusted metal structure, likely a shipwreck. The water is a deep blue, and a massive school of small, colorful fish (including many orange and yellow ones) is swimming all around the structure and the diver. The scene is vibrant and teeming with life.

Marine scientists turned the area near HTMS Sattakut's gun turret into an observation point to study the variety of fish that thrive there.

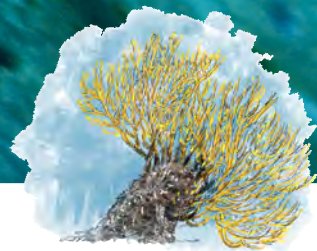
Final Mission of Battleships:

A Beginning of

Hope for New Lives



H.T.M.S. Underwater Learning Site Project



“...Siam is our nation. The national flag flies above every ship. As far as the ship sails on, the flag will not drop. Born as Thais, it’s good to stay united. With brotherhood, we can join hands to defend the land...”

The song Dok Pradu, or Burma Paduak Flower, performed by the Royal Thai Navy’s band resonated over the quietness of a tranquil sea. The sky was clear as HTMS Prab floated majestically near Ko Ngam Noi, Chumphon province, in the late summer of 2011.

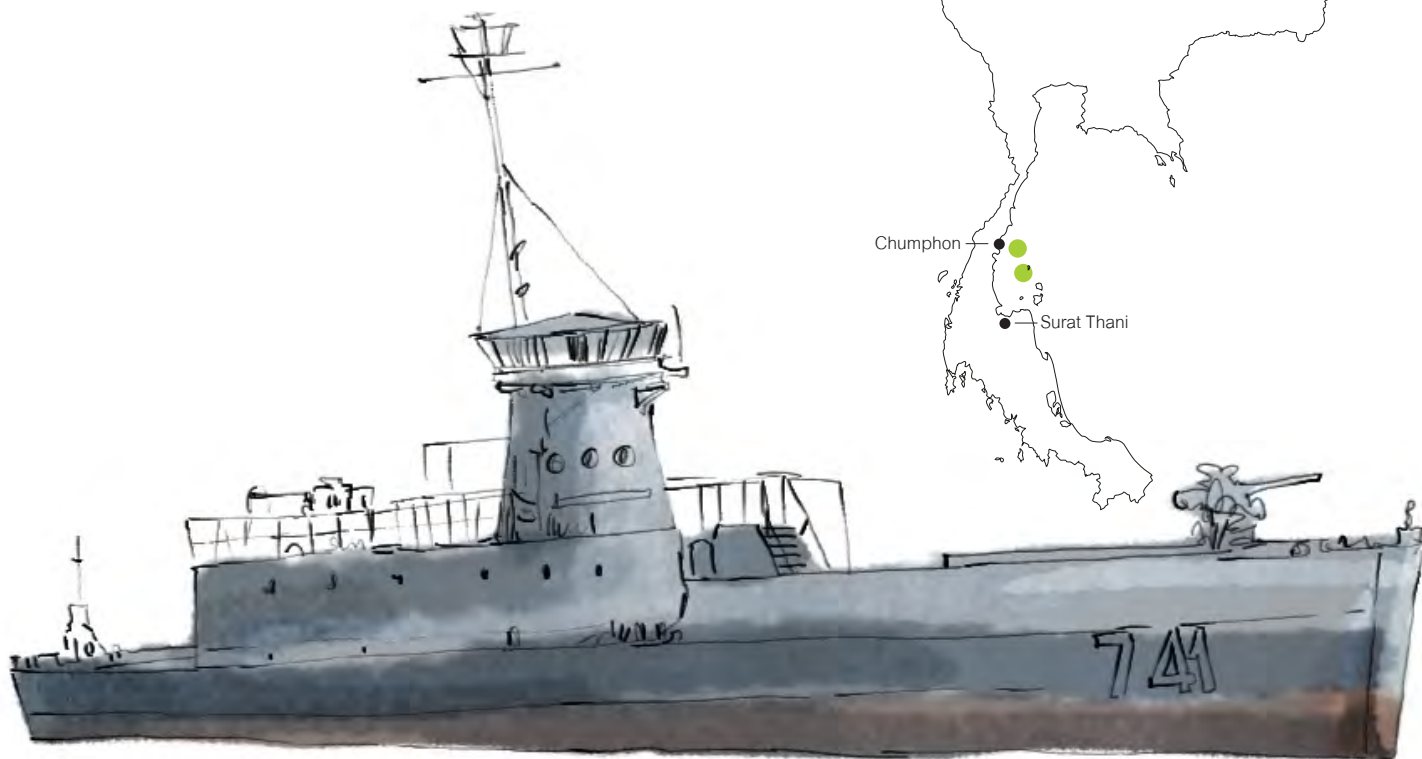
On the deck, the gun turret appeared proudly prominent. The landing ship was not in for a battle, however. In fact, HTMS Prab had been decommissioned in 2006.

Still, it was on that day that the former battleship sailed on its final mission, an assignment unlike any in which it had taken part before because it was an underwater mission. In warfare, a sunken ship would signify defeat and losses, but HTMS Prab was sunk for a particular mission. It would not be the end of the ship but the beginning of hope for a new lives underwater.

The performance of the navy’s theme song was part of a tribute to the prestigious ship as a large crowd witnessed its final journey.

A month later, HTMS Sattakut, another landing ship used to train navy cadets, was lowered down to the seabed near Hin Khao coral reef to the west of Ko Tao in Surat Thani province.

Like HTMS Prab before it, HTMS Sattakut was given a final mission to serve as an underwater site for people to learn about the Thai sea.



Representatives from various agencies lay wreaths during HTMS Prab's send-off ceremony.



Protecting the Coral Reef

Back in 2010, a rise in the seawater temperature to above 30.5 degrees Celsius for an extended period of time resulted in widespread coral bleaching under the Thai seas.

The phenomenon occurs when water becomes so warm that corals expel algae from their tissue causing them to become so transparent that their internal structure can be seen.

If coral bleaching is allowed to continue for a long time, the coral could die out because they lack energy derived from the algae's photosynthesis.

In Thailand, coral bleaching occurs from time to time, more extensively in some years than others. None of the afflictions, however, was as severe as the one in 2010 when almost all corals under the Thai seas died out.

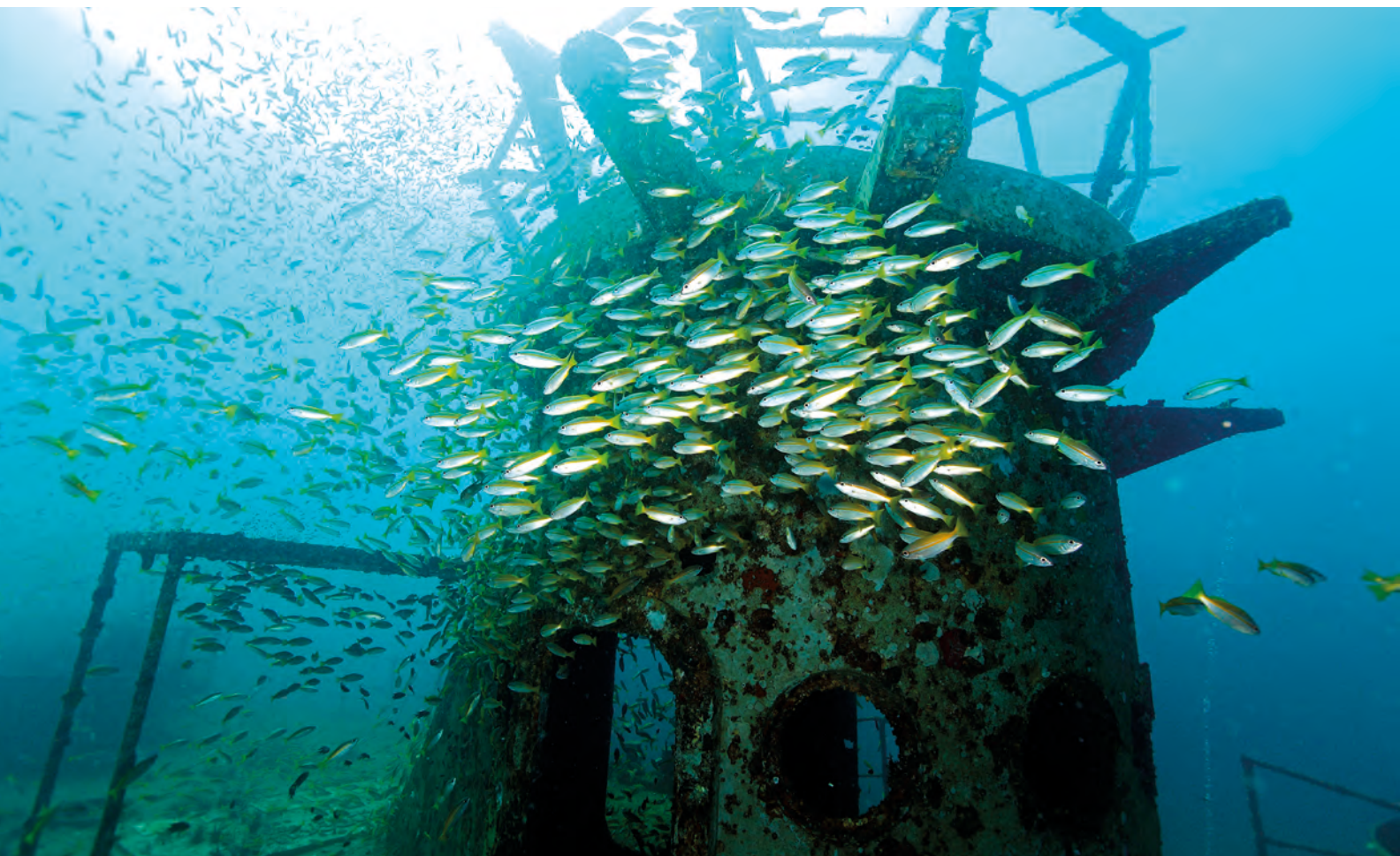
The warmer seawater and dead corals had a chain effect on other marine lives. Coral reefs serve as nurseries for young sea animals and sanctuary from enemies for grown ones. Their health is inher-

ently tied to that of the marine ecosystem and the livelihood of humans depending on the sea to provide them with food and income from fishery and tourism.

After marine scientists met at the Department of Marine and Coastal Resources to deliberate how to tackle the situation, one recommendation was to build man-made diving sites.

Studies found that when a coral reef becomes popular, it is more likely to suffer negative impacts. These range from tourist boat operators throwing anchors down on to the coral reef, or mooring their boats directly onto it, or in the case of snorkelling or scuba diving damage coming from people standing on the reef or people touching marine life, kicking coral reefs or stirring up sand sediments are among some of the harmful activities.

Closing off diving sites or forbidding people from visiting the coral reefs would affect the tourism industry and in turn cause local people to lose their



< After the ships were placed on the seabed, the number of fish that come into the area has increased from 40 species to more than 60.

income. In this situation, creating alternative diving sites would reduce the pressures on natural coral reefs and allow them time to recover from bleaching.

The task is not without challenges. Creating diving sites not only demands a huge investment but also a touch of novelty. The attraction must be strong enough to draw tourists away from coral reefs in nature.

As an operator of petroleum E&P projects in Thailand, PTTEP threw its support behind a project to study and develop methods to use former battleships to create underwater tourist attractions in Chumphon and Surat Thani.

The project is a collaborative effort with various agencies including the Department of National Parks, Wildlife and Plants, the Department of Marine and Coastal Resources, Chumphon and Surat Thani administrations, local business operators and communities as well as the Royal Thai Navy.

From the academic sector, Asst. Prof. Dr. Thon Thamrongnawasawat from Kasetsart University's Faculty of Fishery served as the project's major driving force.

While different structures can be used to build man-made diving sites, whether they are train carriages, planes or tanks, ships remain the most popular. These include passenger ships, submarines and battleships.

In Thailand, the navy laid HTMS Kham and HTMS Kut on the seabed near Pattaya, Chon Buri, in 2003.

For this project, PTTEP took the task of coordinating between the governors of Chumphon and Surat Thani and the navy. Eventually, the navy offered two suitably sized decommissioned ships for the project, namely HTMS Prab and HTMS Sattakut. Their histories themselves are impressive enough to attract people as diving sites.

Both ships are classified as Landing Craft Infantry or LCI. They are almost 50 metres long and

appear almost identical except for HTMS Sattakut's gun turret which was raised especially high.

Both ships were commissioned for major battles. HTMS Sattakut formerly belonged to the United States. It was commissioned by the Royal Thai Navy in 1944 and assigned the hull number of LCI-739.

HTMS Sattakut joined three major battles in the Pacific – the Battle of Peleliu (present-day Palau islands), the Battle of Iwo Jima and the Battle of Okinawa fought towards the end of WWII. HTMS Sattakut was therefore given a three-star status.

HTMS Prab was known as LCI-670. The ship was given a one-star status after taking part in the landing operations in Normandy, France.

After the end of WWII, the United States offered both ships to the Royal Thai Navy, which changed their names to HTMS Sattakut 742 and HTMS Prab 741 following Ko Sattakut in Sam Roi Yot district in Prachuap Khiri Khan and Ko Prab in Surat Thani, respectively.

The naming of the ships followed the navy's rule of naming small landing vessels according to the name of islands in the country.

Both ships were commissioned in 1947 and played a part in landing operations, patrols and rescue operations for fishermen involved in accidents at sea. They also served as teaching vessels for thousands of navy cadets going through navigation and weaponry courses for 60 years until they were retired in 2006.

The ships' rich histories and their stately appearances guaranteed their potential as new learning sites under the sea. Their presence would also help publicise the stories and prestige of Thai battleships among Thai people as well as foreign tourists. Especially locals of Chumphon and Surat Thani eagerly welcomed them.

Despite the ships' readiness, laying them down into the sea proved to be a challenge.

Preparations for the Final Mission

“Before the ships were put underwater, we held talks with various agencies, both public and private, state officials as well as members of local communities. We did surveys of areas under the sea to find the most suitable place for the ships to rest. We studied the sea currents, visibility, topography and the number of marine animals,” Asst. Prof. Dr. Thon Thamrongnawasawat says.

The operation took a year to be completed, from 2010 to 2011.

“For Chumphon, we picked Ko Ngam Noi, which is the province’s major deep diving destination. As for Surat Thani, Ko Tao was our choice because it is world-renowned hub for diving schools. Its coral reefs also suffered greatly from a lot of negative impacts,” Dr Thon says.

One criterion for the site’s selection is it must be proven to help mitigate impact on the coral reef. That means the chosen location must be easily accessible for divers. The area should not be too far from natural coral reefs which are known tourist attractions either.

For Ko Tao, the team chose a location close to Hin Khao rock formation, which is a major diving spot to the west of the island. Hin Khao is an important habitat of sessile organisms such as corals, mushroom anemones, sea anemones, coralline algae or sea sponges. This should ensure that once the battleship rests there, it should become home to sessile organisms as well as fish.

Ko Ngam Noi, meanwhile, is an area where concessions to harvest sea swallow’s nests are granted. The island is characterised by a steep limestone cliff. Although there is a fewer number of sessile organisms, the area attracts a massive number of marine fish.

Another major aspect of the operation is preparing the battleships for their last missions.

A team of marine scientists from Kasetsart University had checked the ship’s materials and found that they could withstand seawater corrosion

and stay under the sea for more than 60 years.

To ensure that the ships would have a minimal impact on the marine ecology, however, the hulls must be covered with lead-free paint. Materials that may harm marine animals must be removed. The task was taken care of by the Bangkok Dock Company Limited, a state enterprise under the navy’s supervision.

Structures that might cause harm to divers such as openings into various rooms within the ship were sealed off. Elements that might hook divers were also removed. Structures that appeared prone to corrosion were reinforced while signs were installed to inform wreck divers which areas are accessible.

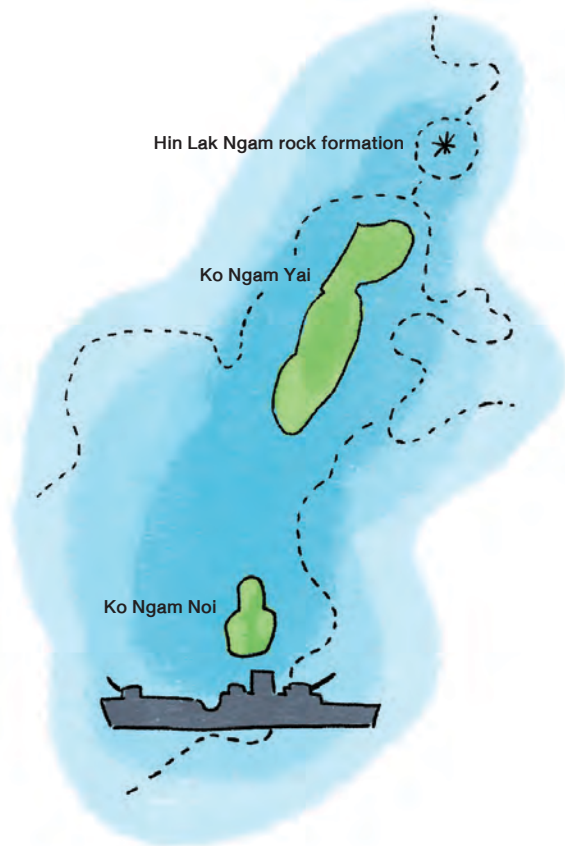
After months of preparation, the due date fell on May 19, 2011 which marks the memorial day of Admiral HRH Prince Abhakara Kiartivongse or Prince of Chumphon who is widely respected among navy officers, fishermen and sea travellers. HTMS Prab set off for its final journey from Chulachomklao docks in Samut Prakarn. The ship’s destination was to the south of Ko Ngam Noi in Chumphon where it would be officially handed over to Chumphon provincial administration.

At 8am on May 20, HTMS Prab gradually disappeared into the sea after its valves had been opened to allow seawater into the hull. Eventually, it found its resting place on the seabed about 28 metres from the surface. That’s where the ship’s new mission started.

One month later on June 18, 2011, HTMS Sattakut was laid to rest under the sea off shore of Sai Ree beach, near Ko Tao, Surat Thani.

From those days on, the two battleships had their missions changed from defending the country’s territory to protecting its natural coral reefs and marine ecology. They serve as places where people can learn about marine life and their development on a long-term basis. The new diving sites will generate a considerable income for local communities as they have the potential to expand into large coral reefs in the future.

For another 60 years, the ships will continue their service to the country.



LCI-741 HTMS Prab

Type: Landing Craft Infantry

Size: 48.46 metres long, 7.08 metres wide, 16.90 metres high

First commissioned: The United States Navy on Mar 28, 1944

First Commissioned in the Royal Thai Navy: 1947

Capacity: A maximum of 54 officers

WWII campaign: Invasion of Southern France (Aug 15-Sep 16, 1944)

Locations of HTMS Prab and HTMS Sattakut



LCI-742 HTMS Sattakut

Type: Land Craft Infantry

Size: 48.86 metres long, 7.08 metres wide, 17.05 metres high

First commissioned: The United States Navy on Feb 28, 1944

First Commissioned in the Royal Thai Navy: 1947

Capacity: A maximum of 62 officers

WWII campaign: Battle of Palau Islands (Aug 6-Oct 14, 1944), Battle of Iwo Jima (Feb 19-Mar 3, 1945) and Battle of Okinawa (Mar 27-Jun 14, 1945)

A New Home

Ceremonies to lay the battleships down into the sea might have been over, but the mission continued.

Another important aspect of the project is gauging impacts that the ships may yield to the marine ecology.

The study is divided into three areas: environmental impact, changes to sessile organisms, fish and the usage as well as management of the wreck dive sites.

The study began as soon as the ships were lowered to the seabed. The team monitored the amount of stirred-up sediments, garbage or any substance that may have been left in the ships, conditions of the seabed and currents. The results show that there was no significant impact in every area studied. The seabed, sessile organisms and fish remained in the same conditions.

To facilitate studies about living organisms, the team prepared square iron grids which they attached to the ship's gunwale. These grids were then used as long-term study areas especially when it comes to monitoring sessile organisms including sea sponges, black corals or sea whips, which are usually attractive to divers.

"A month or two after we put the ships into places under the sea, the wrecks were already full of fish. The number of small fish increased from about 10 species to more than 60. Sessile organisms multiplied. The wreck sites were close to natural coral reefs so a great number of baby animals floated there and attached themselves to the ships," Dr. Thon said.

The marine biologist served as head of the team assessing the project's success in using battleships to develop new undersea attractions in Chumphon and Surat Thani.

A group of trevallies was found to have circled around the wrecks on the first day. After a week, parts of the wrecks became home to groupers and lionfish. A year later, the number of fish found in the area increased to more than 40 species and 60 afterwards. Around HTMS Prab, whale sharks can be spotted regularly.

It took longer for sessile organisms to settle on the wrecks than fish. A master's thesis prepared by Phisadar Rungruangthongthawee entitled "An Evaluation of Types and Number of Sessile Organisms on HTMS Sattakut, Ko Tao, Surat Thani" sought to study the area thoroughly. The thesis took into account varying factors including differences in the depth level, areas where the sun could reach and those that lie in the shadow either horizontally or vertically and sediment reception areas.

The thesis divided the development of sessile organisms into three phases. At first, bryozoa, rock barnacles, oysters and black corals started to appear. During the second phase, a greater number of corals, sea whips and sponges were found. During the third phase, an increase in the amount of sessile organisms became visible. At the depth of 18 metres, certain species of sponges were found and distinguished as prominent species. Further down at the depth of 25 metres, black corals became the prominent species.

The plan to use the shipwrecks as alternative diving sites to draw tourists away from decaying natural ones was met with great success.

"HTMS Sattakut has become very popular among divers. Student divers prefer to go there for their tests because the ship's deck lies at the right depth of about 18 metres. Experienced divers, meanwhile, can choose to explore further depths of 30 metres. There is also a special zone for those who have been through a wreck diving course," Dr. Thon says as he explains why the wreck sites could meet the diverse needs of divers.

These days, boats take turns coming in and out of the wreck sites every morning and afternoon as tourists waste no time jumping into the sea. While student divers sometimes brush their fins on the wrecks' structures, they are definitely more durable than corals in nature as they are made of iron.

The two "teacher ships" have helped protect the integrity of the Thai seas beyond all expectations.



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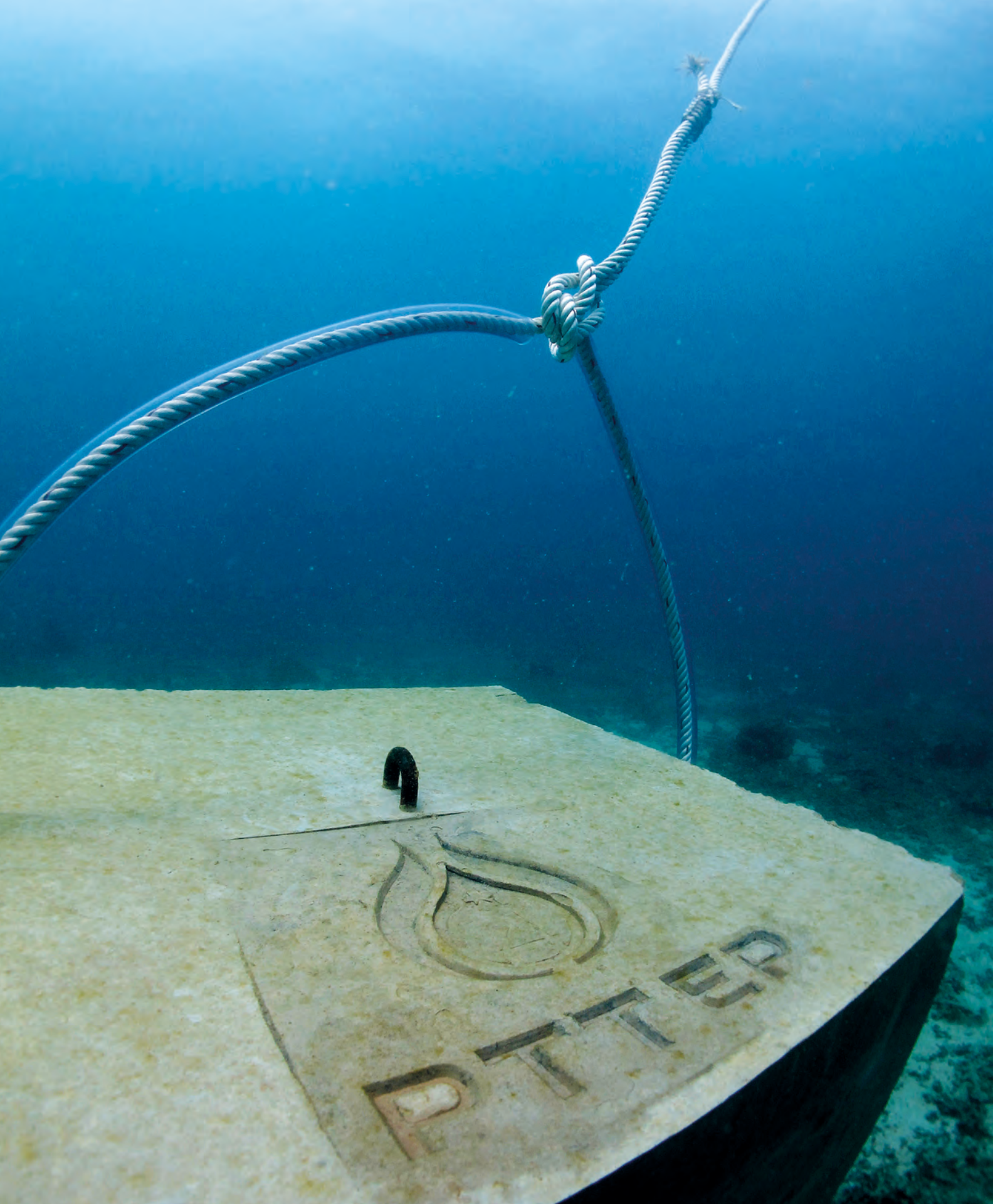
We picked Ko Tao because it is a world-renowned hub of diving schools. Its coral reefs also suffered from a lot of negative impacts

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Asst. Prof. Dr. Thon Thamrongnawaswat

The battleship has become home to sessile organisms such as rock barnacles, oysters, black corals and sponges, whose presence in turn draws more marine fish.





PATTER

< A one-cubic-metre concrete base will be placed on the seabed. The base is connected to a buoy (right) which allows boat operators to tie their vessels to this instead of throwing an anchor down to the coral reef.



The Mission Continues

Although the creation of man-made dive sites represents a remarkable attempt to protect coral reefs, their long-term conservation demands more work.

Since human beings are part of the problem, they must play a role in its solution.

As more boats bringing an increasing number of tourists into areas where there are coral reefs for them to admire, the mere act of their anchoring could cause a lot of damage to the natural resources.

Ko Tao is no exception as it is probably among the most visited diving sites in the world. Its coral reefs see visitors both Thai and foreign coming to enjoy their natural beauty every day.

Concerns about the long-term effects of tourism activities prompted diving business operators on the island to set up the Ko Tao Conservation Club. Members came together to lay down diving regulations, guidelines on how to take good care of the sea and ensure the safety of divers.

Since anchoring directly on to coral reefs was a major concern, PTTEP joined hands with Ko Tao Conservation Club, Prince of Songkhla University and other private organisations to support the construction of a buoy and its maintenance.

Through trial and error, Ko Tao Conservation Club found that the most appropriate buoy that is both durable and least harmful to nature is a one-cubic-metre concrete base embedded with an iron ring tied to a buoy. The buoy signals a safe place for the boat to moor by tying a rope to the concrete base. Anchoring directly to the coral reef or tying a

rope to it is strictly forbidden.

Up to now, up to 100 buoys have been put into place around the island's many diving sites. Still, they are not enough to accommodate the influx of tourists.

To cope with the continuing challenge of protecting the precious marine resources, joint efforts by local communities, administrations and agencies both private and public are the key.

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Today, HTMS Prab and HTMS Sattakut have been turned into popular diving sites not just among Thai divers but those from around the world. Both ships serve as artificial coral reefs while natural ones are allowed some time off from visitors to recover.

As the sites increasingly teem with marine life, they have attracted divers who can learn about the history of Thai battleships. The newly-developed abundance has also turned the ships into study areas for marine scientists searching for new and innovative ways to conserve and rehabilitate other areas in the vast Thai seas. 🇹🇭



Khung Bang Kachao

Forest Preservation:

Save Nature

Before It's Lost Forever

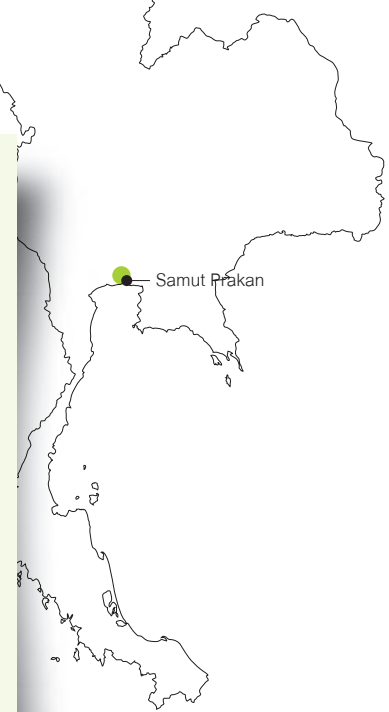
The wetlands in Bang Kachao is one of the three ecological systems that has been preserved in Sri Nakhon Khuen Khan Park



The Forest Restoration for Eco-learning at Sri Nakhon Khuen Khan Park Project

View from the top of the bird watching tower reveals a lush natural canopy that inspires visitors to appreciate the value of the place.





Khung Bang Kachao is a verdant island hugged by the Chao Phraya River and the concrete jungle of Bangkok.

If you have a chance to look down from an airplane as it flies south from Bangkok, to the West is a massive green expanse, an island hugged tightly by the Chao Phraya River and rings of skyscrapers and homes. The contrast is striking: a green area shaped like a pig's stomach amid the concrete jungle. The area is Khung Bang Kachao, a rich enclave of nature amid the rapid changes of Bangkok.

Khung Bang Kachao was lauded by Time magazine in 2006 as “The Best Urban Oasis of Asia” — the key word is “oasis”, the “lungs” that produce oxygen for the city of seven million people for nine months in a year thanks to seasonal winds. In the face of global warming and its worldwide impact, the 11,000-rai green area helps trap over 6,000 tonnes of carbon dioxide per year, according to a 2011 study by Thailand Greenhouse Gas Management Organisation (Public Organisation) and Kasetsart University's Faculty of Forestry.

But our natural lungs have deteriorated due to the torrents of change pressing in around them. They need to be protected before it's too late.



Following the Footsteps of the King

Khung Bang Kachao was known in ancient times as “the bend where sticky rice goes bad,” because it took a whole day to navigate a boat around it. King Thai Sa of Ayutthaya ordered Lat Pho Canal to be dug through it to shorten the distance. King Rama II later built “Nakhon Khuen Khan” as a fortress city at the delta of Lat Pho Canal — it became known as Pak Lat. The king moved the Mon community to settle here along with Thai Muslims and Buddhists who had inhabited the area before. The city grew to become a bustling commercial district. Nakhon Khuen Khan was later named Phra Pradaeng.

As the Bangkok side keeps growing, the bend of the river around Bang Kachao manages to shield the abundance of nature from further outside encroachment. The Mon community enriches the soil by growing diverse plants in their patches, such as various kinds of fruit, betel nuts, coconuts, mangoes, rose apples, jackfruits and decorative plants. Standing tall in tight packs, the trees are nourished by fertile soil and they become a forest. Thai-style houses and temples sit next to each other amid the green expanse.

But nothing stays the same forever.

The population growth and the encroachment of saltwater into the river caused damage to the orchards. Rising land prices also led to a diminishing number of farmers. Vegetable patches were filled up with earth to prepare for new houses built by people moving into the area. The land seemed to offer other benefits than what it traditionally did.

Between 1982 and 1987, His Majesty King

Information on the species of birds found in the park to encourage visitors to appreciate nature.

Bhumibol Adulyadej often rode in a helicopter over Bang Kachao. His Majesty remarked that the spot should be preserved as a green area and the lungs of the city.

The Environmental Impact Evaluation Bureau, under the Ministry of Science, Technology and Environment, purchased 564 plots of abandoned farmland covering an area of 1,276 rai. In 2003, 148 rai of them were turned into a public and botanical park. His Majesty gave it the name “Sri Nakhon Khuen Khan Park”, after the ancient name of the place. It has been under the continual supervision of the Office of Royal Projects, Department of Forestry.

In 2008, Her Royal Highness Princess Maha Chakri Sirindhorn visited Khung Bang Kachao and said: “Let’s preserve this green area. Do not build anything beyond the limits of the law. Promote integrated farming and forests. Every party should take part in the renovation of Sri Nakhon Khuen Khan Park to ensure the necessary benefit for tourism and create a natural classroom for young people.”

In 2013 PTTEP, with its commitment to environmental preservation through socially responsible projects, began working with the Chaipattana Foundation, the Office of Royal Projects, the Department of Forestry, Kasetsart University’s Faculty of Forestry and other related agencies, and launched the “Forest Restoration for Eco-Learning at Sri Nakhon Khuen Khan Park Project” for eight years.

The challenge facing the project was to conduct ecological research and identify traditional plant species to restore nature as it once was.

The project isn’t just about putting in money and growing any decorative plants. Neither is it about growing green lawns that can be done over a weekend.



The bike path has been improved for exercising and relaxing.



Map of Khung Bang Kachao

Khung Bang Kachao is in Phra Pradaeng district, Samut Prakan, just 20 kilometres from the delta where the Chao Phraya meets the Gulf of Thailand. It is influenced by high and low tides and salinity levels due to its proximity to the sea. The area has a unique character and a great diversity of flora and fauna. The restoration project puts an emphasis on Bang Kachao's ecological character and the principle of sustainability.

Sri Nakhon Khuen Khan Park has been open to the public for many years when the restoration project started. Researchers found that the facilities such as walking and biking trails were in a dilapidated state, and thus proposed an improvement of the 2,200-metre-long bike lane as well as a new 500-metre-long path for wheelchairs. New signs explaining the natural surroundings were installed along the path, including an outdoor exhibition aimed at promoting the park as an eco-learning centre according to the princess's initiative.

The improvement of the walking paths and nature signs took one year to complete. But the ecological restoration of Bang Kachao forest is an ongoing mission that will run until 2020.

Learning the Three Eco-systems

A large cork tree spreads its branches, on which dozens of green pigeons rest. At the mangrove forest next to the river, Portia trees form thick groves along the banks. These are the ecological riches of Khung Bang Kachao, a natural classroom of Sri Nakhon Khuen Khan Park.

Mangrove forest is one of the three ecological systems that characterise this green pig's stomach.

The mouth of the canal, with an influx of brackish water coming in from the sea during high tide, enriches the expanse of mangrove forests.

Meanwhile in the low-lying plains deeper inland, rain-water is trapped during the monsoon season and dries up in summer, and the area was once a freshwater swamp forest before it was turned into fruit orchards and irrigation canals. Lastly in the high plains in the middle of Bang Kachao which were once a rainforest has been converted into farmland and residential areas.

The restoration project has to find a way to replicate the three ecological systems in the 40-rai area of Sri Nakhon Khuen Khan Park, which was once agricultural land.

After studying the terrain, the water channels and the plants, the 40-rai plot is divided into three restoration areas: 3.63 rai of low-lying rainforest; 10.55 rai of mangrove forest; and 27.98 rai of freshwater swamp forest.

The project requires planting new species in the existing areas, monitoring their natural growth until they fit into the structure of biodiversity and finding an equilibrium within one another.

But it's not all about scientific thinking. The project requires the use of imagination, the visualisation of the outcome when the new trees grow and form parts of the ecology.

For the freshwater swampland forest, the project planted 2,000 trees from 26 species, a mix of saline-tolerant, shade and outdoor trees, such as ficus, red sandalwood, fig, *lamduan*, *thonglang*, *kankrao* and *yangna*.

For the mangrove forest, cork trees are prevalent. Supplementing them are 1,000 trees from 13 species such as fish poison trees, hibiscus tilliaceus, *kong kang*, *taum tale*. When fully grown, they will



Plain tiger butterfly



Wai ling
(*Flagellaria indica*)



Mong jak,
a type of mangrove palm

Butterflies and plants found in the 40-rai reforestation area.



serve as a nursery for aquatic creatures.

For the restoration of the rainforest, around 700 trees from 15 species of plants have been grown, such as hopea, sandalwood, champak, cinnamon and so on. When fully grown, they will form a dense forest with large shade trees, medium-height bushes as well as shrubs.

2016 was the third year of the eight-year project. Assistant Professor Sakarn Teejantuek, vice dean of the Research Station and Demonstration Forest, Kasetsart University's Faculty of Forestry, and expert in forest restoration, explains the progress.

"We've tried to plant more supplementary trees. The target is 400 trees per one rai. Together with existing trees, we shall see over 1,000 trees for every one rai. We've seen thick groves here and there. Overall the result is satisfactory, especially the mangrove forest where new pipes have been installed to facilitate water circulation," says Asst. Prof. Sakarn.

He stresses that forest restoration is a natural process that takes time. No amount of control can dictate what will happen. It will take over 10 years for the results to be visible.

"We're in the third year of the project, with five

more years to go. We'll keep monitoring the progress because we've launched this restoration project with a systematic plan, with the goal to create a large natural classroom and a model which other areas can adopt and implement."

Besides collecting data on the growth of plants, the project also collects data on forest carbon sink and degradation of leaves, since it is the first step in the cycle that improves the quality of soil and allows small creatures such as earthworms to become part of the food chain and improve the biodiversity.

In five years — the year 2020 — the project will have its final evaluation on the success of the restoration and whether it should be continued.

Nature Trails for Everyone

On a weekend afternoon, a long row of a few dozen bicycles ride along a sun-dappled trail with shimmering shadows on the ground. After crossing a pond, cyclists are greeted by a large banyan tree with dangling vines and spreading branches. Going further there is a birdwatch tower rising above the canopy. Along the way there are signs explaining the natural surroundings.

Some cyclists ride past without stopping. Others pause at the signs to read about the environmental highlights: Suicide or "Pong-pong" trees form a tunnel with their expansive branches; Nipa palm or "Dongchak" ecosystem has a wooden bridge leading into a grove; "Pond life" invites visitors to admire the biodiversity of plants, animals and birds living near the water; "Birdwatch Tower" offers a panoramic view from the top.

A survey found over 100 species of birds in the area, both native and seasonal, accounting for about 10 percent of all bird species in Thailand.



Riders can also bike along a dirt trail to explore reforestation plots and observe the mangrove forest, freshwater swampland forest and low-lying rain-forest that are in the process of being restored. The path is teeming with birds, butterflies, insects and flowers of many kinds during the different seasons.

The bike trail around the park is good for light exercise and educational purposes. It was supported by PTTEP, which contributed 20 million baht to the project, excluding landscape renovation of the botanical park that covers an area of 100 rai at the front and another 40 rai of reforestation.

The path serves not only able-bodied persons. Disabled and elderly visitors on wheelchairs can also enjoy a new, 500-metre nature trail with over 10 highlights along the way, such as copper pod trees, banyan trees, carya mitis trees and a shaded rest area by the pond. Because of the pleasant landscape near the body of water, the spot is popular among wheelchair-bound visitors as well as families with children.

One afternoon in September 2016, Pattrawan Panicha decided to visit the park after seeing the trail on television.

Seven years ago Pattrawan, now 25, was in an accident that confined her to a wheelchair. She was

impressed with the atmosphere of the trail that's also friendly to disabled people.

"The designer clearly cares about disabled people. There are signs pointing to interesting spots along the way. The surface is smooth and wheelchairs can move around easily," she says.

"The same type of path should be developed in other parks. Thailand is becoming an ageing society, and elderly people who have to use wheelchairs will also want to go out and admire nature. When my friend visits a place that has a ramp for wheelchairs, she'll think of me and phone me so we can go out there together."

Hope Springs Eternal

June 10, 2015: In the cool shade of the trees in the park, after the improvement of the trails, after all the signs have been installed in the outdoor exhibition and other facilities put in place, PTTEP handed over the Forest Restoration for Eco-Learning Project to Department of Forestry and the local community of Khung Bang Kachao to celebrate the 60th birthday of HRH Maha Chakri Sirindhorn. It also marks the 30th anniversary of PTTEP. Over 500 participants join

The tranquil atmosphere near a pond on a trail designed for wheelchairs and disabled visitors.



the “Do Good for Sri Nakhon Khuen Khan Park” event, including local residents, volunteers and PTTEP staff who come together to plant trees and release fish into the water.

“After we handed over the project to the community, the number of visitors increased from 2,000-3,000 a month to 15,000.”

Wuttikorn Kumjaroen, chief of Sri Nakhon Khuen Khan’s Eco-Green Space Management, adds that during weekdays, visitors are mostly local people who live nearby. On weekends, Thai and foreign cyclists like to come and ride along the nature trail.

The larger number of visitors necessitates the need for better management concerning bike routes, speed limits and cleanliness. In the long run, tourists need to be aware of the need to reduce the impact on the environment.

Besides the 148-rai Sri Nakhon Khuen Khan Park, which comprises of a public park and botanical park, the Eco-Green Space Management is also responsible for fruit orchards, woodlands and mangrove forests, altogether covering an area of over 1,000 rai in Bang Kachao.

“What we have to keep working on is the landscape. We have to get rid of dry branches and dangling vines and dredge the canals to improve

water circulation. To sustain the green area, we also have to study the ecological system on the banks of the Chao Phraya.

“It’d be better if visitors come to Bang Kachao and see a lot of trees and clear canals with fish in them. So we should expand the restoration from Sri Nakhon Khuen Khan Park to other areas in Khung Bang Kachao. And we have to start today to ensure a sustainable future,” concludes Wuttikorn.

Just across the Chao Phraya River from Bangkok to Bang Kachao, visitors can feel the freshness in their lungs.

But how long will it remain like this?

At least Sri Nakhon Khuen Khan Park has restored the three types of forest in Bang Kachao that will maintain the rich diversity of flora and fauna.

This is the hope amid the onslaught of change that is coming to Nakhon Khuen Khan. 🏞️

Sri Nakhon Khuen Khan Park

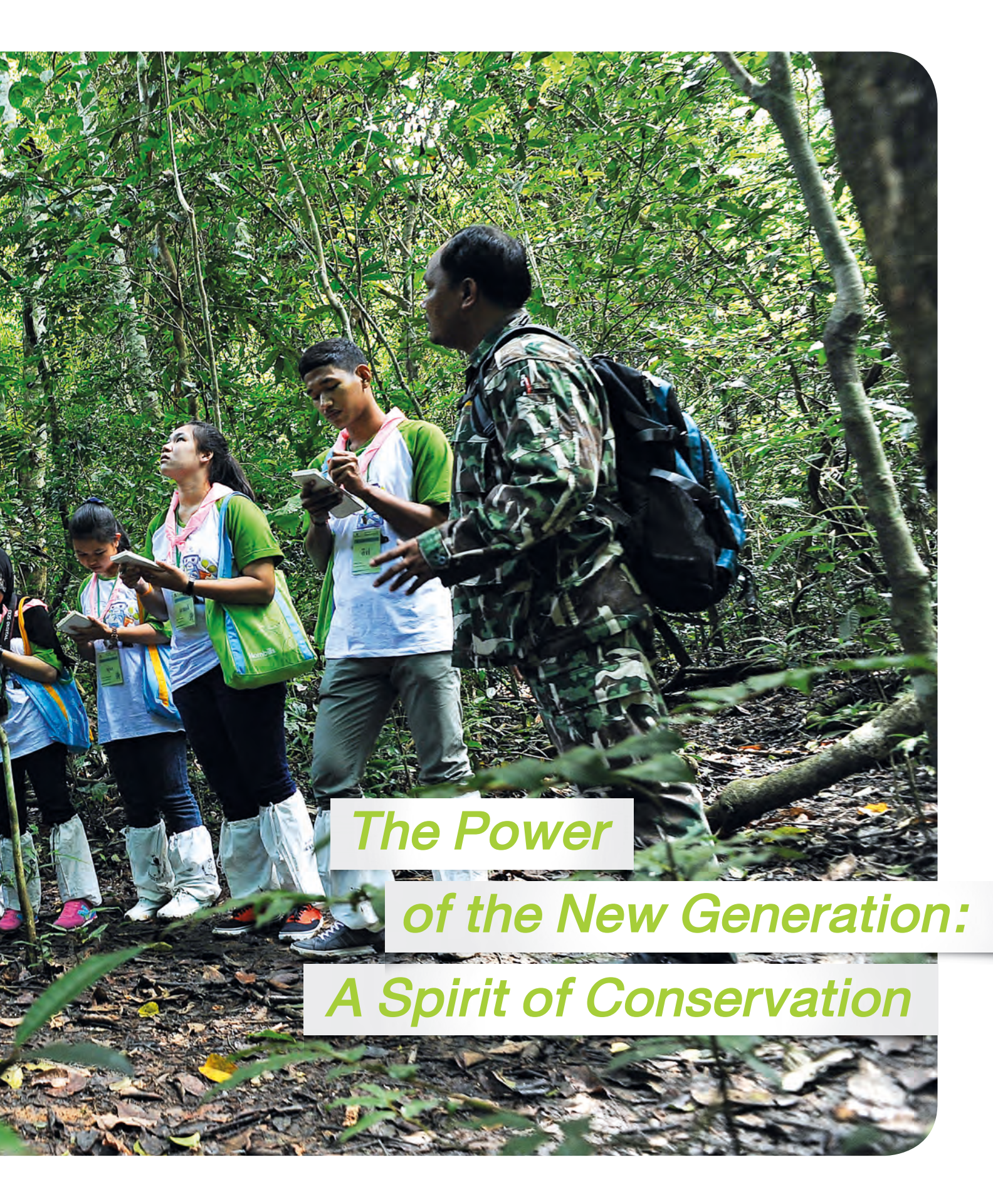
Bang Kachao sub-district, Phra Pradaeng district,
Samut Prakan 10130
Tel. 0-2461-0972
<http://www.suansri-bangkachao.com/>

PTTEP Teenergy Project

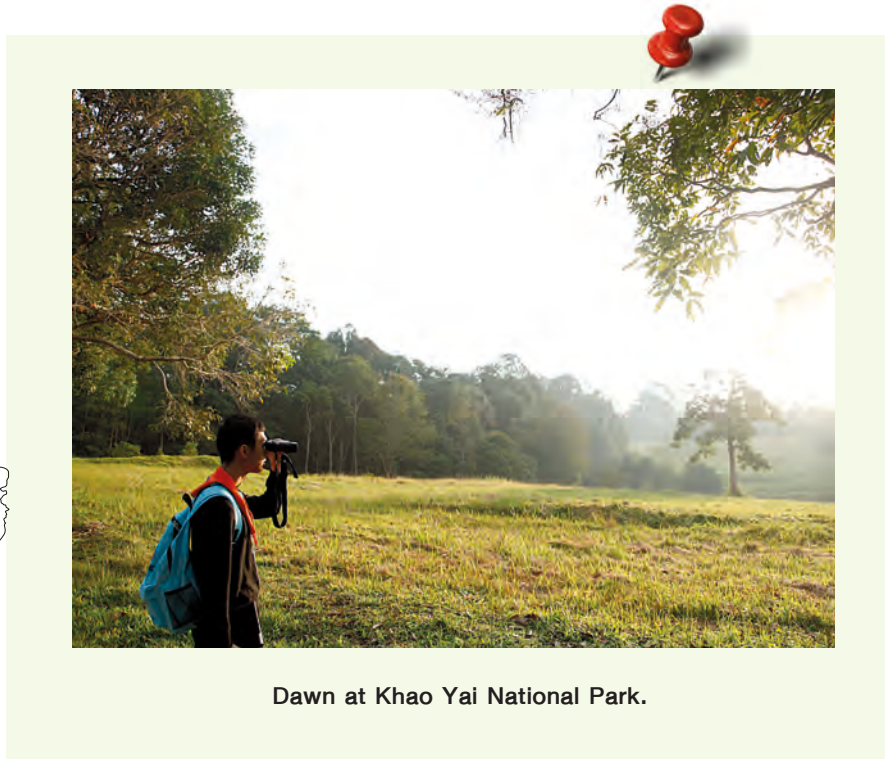


A forest ranger explains the importance of various plants in the forest to the young participants.





*The Power
of the New Generation:
A Spirit of Conservation*



Dawn at Khao Yai National Park.

Early morning on a small road in Surasawadee Camp, Khao Yai National Park.

About 100 high school students look at the edge of the forest. Some sit, others stand, they carry cameras or binoculars and consult a bird-watching guidebook while pointing at feathered creatures perching on the branches. A forest ranger from Khao Yai National Park provides them with information.

All the children are enchanted by their close proximity to wildlife and nature.

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> A giant tree and dangling vines excite youths who have never experienced nature up close before.



> Khao Yai National Park is one of Thailand's World Heritage sites (right). Birdwatching creates a bond between young people and nature (bottom right).

“Explore the Morning World” is one of the activities in PTTEP Teenenergy, held for the third consecutive year, it is an initiative of PTTEP in cooperation with the Department of National Parks, Wildlife and Plant Conservation, the Department of Environmental Quality Promotion, the Office of the Basic Education Commission and the Foundation for Khao Yai National Park Protection.

The project calls for youths at higher secondary level to take part in activities to promote an understanding of the importance of nature and the environment through first-hand experience in a three-day-two-night camp amid the rich beauty of Khao Yai National Park.

“Teenenergy” comes from Teen + Energy. It’s an attempt to rally the power of the young generation to develop a spirit of conservation.

Protecting nature and the environment is an urgent mission for the country, and young people are the engine that will drive the movement forward.

It’s time for the young participants to trek into the World Heritage forest of Khao Yai on Nong Phakchi Nature Trail Km 33. They will track animals and learn about the flora and fauna of the area. Excitement is in the air as they get their gear ready — sneakers, leech-protecting leggings, hats, water canteens, pencils and notebooks. Everything is put in a backpack and off they go!

Once in the forest, park officials instruct them to keep quiet. The youngsters are told that

they’re visiting the home of wild animals and they have to respect the owners and disturb nature as little as possible. Approaching a stream, they spot animal tracks. The rangers introduce them to different kinds of footprints from a manual, and the children take notes and photographs with enthusiasm.

“I grew up in the city. Walking along this nature trail and learning about plants shows me the great diversity of nature,” says Jutamart Sakulthai, a participant from Class 1. “One night the lights went out and we saw a deer approaching our shelter. We were so excited because we had never seen a wild animal up close before.”

Jutamart is now studying at Thammasat University. Every year, alumni from the previous classes return to mentor camp participants. They also spread the word about the camp because of the bond they feel after joining the programme.

Another highlight is the making of artificial salt licks for wild animals. Dr. Patrapol Maneeorn, a respected veterinarian better known as Dr. Lot serves as a special advisor. When the sun almost sets, Dr. Lot leads the children, spades in hand, to the area where they will make artificial salt licks. He explains the process and demonstrates the steps, then the children get to work: they grind animal feed and dig small channels, then pour in ground mineral feed and mix the ingredients. Finally they cover the holes and pour water over them to spread the smell that will attract animals.



“

To work and play in the real forest bonds us with nature... now I know why it's important to conserve energy, natural resources and the environment

”

Patcharaporn Sakkaplangkul

Working hard to dig artificial salt licks for wild animals.



> The forest of Khao Yai is home to more than 250 species of birds. When the children learn the name of each bird, they will feel a bond that develops into a spirit of conservation.



PTTEP Teenergy Camp has several fun activities over three days and two nights. The children will have a chance to hear stories from real conservationists such as Sasin Chalermkarp, chairman of Sueb Nakhasathien Foundation, and Professor Emeritus Dr. Pilai Poonswad, Thailand's leading hornbill researcher.

"To work and play in the real forest bonds us with nature. At first, I didn't know how much forest we have left, how much energy we have in the country or what it feels like to live alongside nature. But now I know why it's important to conserve natural resources and the environment," says Patcharaporn Sakkaplangkul, a Class 2 participant who has come all the way from Chulaporn Rachawittayalai School in Trang province.

"Nature can survive without man, but man can't survive without nature," Patcharaporn summarises the importance of nature in one sentence.

In the past three years, PTTEP Teenergy has expanded its mission. In the first year, the goal was to familiarise young people with the World Heritage Site of Khao Yai and allow them to appreciate nature. In the second year, the goal was to train young people to be able to communicate the importance of conservation to other people, so they were taught to make video clips with a smartphone. In the third year, the mission is to train young people to be able to organise their own camps and activities in their communities. So participants get to learn about social campaigning from scholars. Support is also given to youths who want to host their own camps.

PTTEP Teenergy has inspired many students to set up nature conservation projects in their own communities.

After graduating from the camp, Patcharaporn has become active in out of classroom activities. She joined the conservation club and started the Freshwater Fish Conservation Club in her school.

Jutamart, meanwhile, returned from the camp to organise several environmental projects with her school and community, such as a campaign to recycle waste into products, an energy conservation network in school as well as tree planting and trash collection by bike.

"I have a chance to organise projects with the school and community, and everyone is ready to participate because we make conservation friendly and accessible. Why is it so important for humans to conserve nature? It's not just for humans, but for everything in this world, because everything relies on natural resources to stay alive. If nature is destroyed, our lives will greatly be affected," Jutamart says cheerfully and enthusiastically while expressing the importance of environment conservation in a sustainable manner.

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No matter how the mission of PTTEP Teenergy expands in the years to come, the seeds of environmental conservation have been sowed. And they thrive spectacularly. 🌱



<https://www.facebook.com/pttepteenergycamp/>



A Biogas Village:

Nothing Goes to Waste





Black plastic bags are placed on biogas tanks in Thap Hai village, Saeng Sawang sub-district in Nong Saeng district of Udon Thani. More than a hundred households in the village have turned to use garbage-based biogas for cooking.

Pua-ngoen Sumalee, a cook for Ban Thap Hai School, is busy preparing food for participants of a biogas production and garbage recycling training and workshop.

Her cooking, preparing a large pot of rice and two dishes, would have been but another ordinary event had it been prepared with heat from a gas cylinder that can be found in most kitchens.

Instead, Pua-ngoen is cooking with biogas produced in a digestion tank located on the floor next to the kitchen.

The cooks at Ban Thap Hai School have not used commercially available cooking gas for years, ever since they joined the village's biogas project. The same is true of many other families in Nong Saeng district, Udon Thani province.

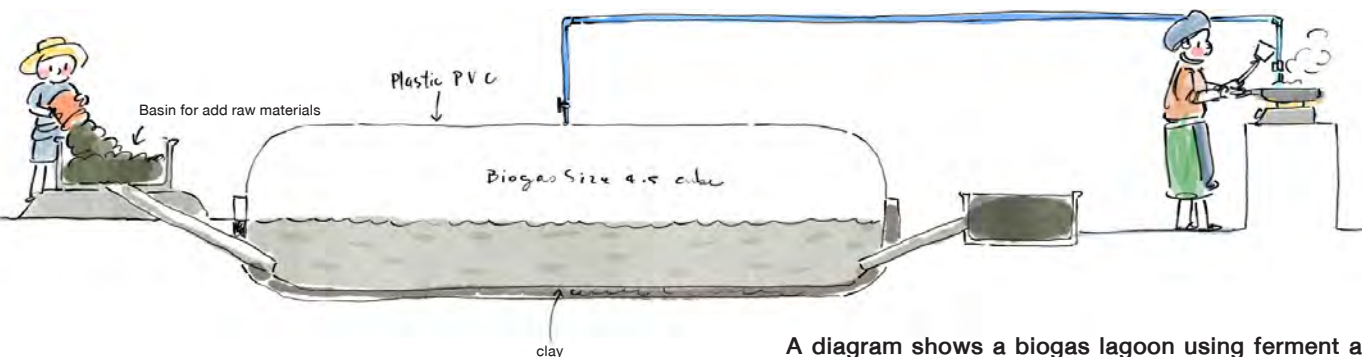
"We joined the project because it has been proven to be useful. If it's not effective, we would have said no to it and waved the project goodbye," says one of the villagers who received a grant to make a biogas tank.

Adopting biogas has many benefits. It provides savings on household expenses while being an effective way to dispose of garbage.

PTTEP started the biogas production project in Saeng Sawang sub-district in 2012 with 42 ponds, 36 in Ban Thasee and six others in Ban Thap Hai. The project was later expanded to Thap Kung sub-district, with the number of biogas ponds totalling 112 at present.

Pua-ngoen turns off the heat once the food is done. A nice smell wafts through the kitchen.

The cook then prepares to serve the food that was cooked by biogas fuel produced by people in the community themselves.



A diagram shows a biogas lagoon using ferment animal faeces or leftover food that are fed into a plastic bag. Once biogas is produced, it will run into a pipeline that is fed into households.

Cooks at
Ban Thap Hai School
and their daily routine
of preparing meals
with biogas piped
to their stoves.





Next to Biogas Tank

Not too far from the kitchen, Ban Thap Hai School director Chatchai Laokliengdee is demonstrating how to add raw materials into a biogas digestion tank.

He pours leftover food and chopped Napier grass into the tank using a long stick to push the material down.

The fermentation tank looks like a large capsule. It is covered with a black plastic sheet, swollen by the pressure of the gas inside. Some people said the gas lagoon appears like a balloon that can't float.

"I built the first pond three years ago," Chatchai says as he pours more raw material into the tank.

"As it turned out, one lagoon did not produce enough gas. The school has to feed 60-70 children, 20 days a month," the school director says.

Ban Thap Hai is a kindergarten to primary school. Even though it does not cater to such a large number of students, it has to provide lunch for every single student. In the past, the school had to buy one 15-kilogramme gas cylinder per month.

"Our cook spends three to four hours cooking each meal," Chatchai says.

The school director decided to join PTTEP's biogas production project, which provided him with the equipment and budget needed to generate the alternative fuel. Once he saw that the use of biogas helped him save significantly on cooking gas, he requested subsidies to build the second lagoon.

Ban Thap Hai School has been run on the sufficiency theory championed by the late His Majesty King Bhumibol Adulyadej for many years. It has sheds where chicken and frogs are kept, some for sale while others are to be released back into nature. The school also raises earthworms whose faeces are used as fertiliser.

The biogas production project fits in perfectly with the school's teachings and philosophy.

According to Chatchai, leftovers from school lunches are the main material for biogas production. During the past few years, the school had almost no need for commercial cooking gas and has bought only two gas cylinders.

This is compared to its reliance on one gas cylinder per month before the biogas came along. In three years, the school has saved over 14,000 baht on gas purchases.

When it comes to feeding the biogas ponds, janitors and students are tasked with the job according to a predetermined schedule. During school recess, however, there is no leftover food while the lagoon should not be left without fermentation process. The school, therefore, decided to acquire a piece of land to plant Napier grass commonly used to feed cattle.

The chopped grass can be used to fill in the biogas lagoon. Sometimes, the school also barter the grass for cattle waste, which can also be used as materials to produce biogas.

"We can probably ask for the cattle waste for free but farmers can keep it to use as fertiliser. They can sell it as well at about 35 baht per sack," the school director says.

Chatchai adds that cattle keepers sometimes go to the school's patch to harvest grass for their livestock. Some even bring their animals to the school and let the cattle roam there so that they don't have to keep a watch on them.

The director said bartering grass for cattle waste is a win-win approach for the school and cattle farmers. The school receives material for its biogas production while the farmers need not waste their time finding grass to feed their cattle.

In the future, the school may raise cattle itself so that it can use their dung for its biogas production.

- < Students at Ban Thap Hai School demonstrate how to add materials into a biogas tank.
- << Villagers grow Napier grass to use as biogas material or feed cattle whose dung can be added into a biogas lagoon.

Inside Biogas Tank

A biogas lagoon looks like a large balloon. The plastic cover appears tight and swollen from the biogas accumulated inside.

The lagoon is about 1.7 metres wide and four metres long. It is about 80 centimetres deep on the front end tapering to about one metre deep at the other end.

After digging up the lagoon, villagers then line it with a large plastic sheet.

Rundorn Pimda, who serves as a community coordinator, recounts how to prepare a biogas lagoon from his own experience.

“We will connect PVC pipes to the mouth of the tarpaulin and its rear end. The connections will be wrapped tightly by inner tubes. The PVC pipe at the front end will serve as a material feeder while the one at the bottom will drain excess water. After that, we use an air pump to inflate the tarpaulin sack into shape then add water into it,” Rundorn says.

The water must be added until its level is higher than the PVC pipe. This will prevent the air and gas from leaking.

Once the biogas lagoon is inflated, animal faeces can be put into it. Animal faeces are preferred to be used as seed material as it produces more gas. Once there is enough methane in the lagoon, leftover food or more animal waste can be added into it.

The production of biogas inside the lagoon is a rather simple process. As the faeces, garbage or organic leftovers decompose, the digestion naturally produces gas.

In case too much raw material is added into the pond or it rains, excess water will be drained off the rear end of the lagoon. The fermented water can be used to water trees.

The lagoon will also be equipped with another valved pipe where gas will be allowed to travel. This pipe is then connected to various kitchens in different households.

“

We will connect PVC pipes to the mouth of the tarpaulin and its rear end. The connections will be wrapped tightly by inner tubes. The PVC pipe at the front end will serve as a material feeder while the one at the bottom will drain excess water. After that, we use an air pump to inflate the tarpaulin sack into shape then add water into it

”

Rundorn Pimda



Map of Ban Thap Hai Village



The Waste to Energy Project holds a workshop to train people to understand the process to produce biogas and maintain all the equipment.

> Villagers help one another to install a biogas lagoon and lay a gas pipe to the kitchen.





Saeng Sawang sub-district

The biogas production and garbage recycling training was conceived after people in Ban Thasee decided to get rid of the animal faeces, especially those from cattle that were scattered around their village.

The project commenced in 2010 with 42 ponds.

Two years later in 2012, the villagers formed a group and asked for a grant from PTTEP which operates the Sinphuhom natural gas exploration and production nearby.

The villagers did so after they learned from word of mouth that biogas ponds can produce gas for household use.

Daeng Uantem, a member of Ban Thap Hai in Saeng Sawang sub-district in Nong Saeng district who has joined the project three years ago, says it is not a difficult thing to do.

“It helps us save a lot. It’s not difficult either. Just dug a pond. After that, PTTEP staff installed the gas bag and laid the pipeline for us. We can put any household waste into the pond, water or leftover food. I used to buy up to six gas cylinders a year before. Now, I only need to buy one,” Daeng says.

Daeng’s success has drawn others into the biogas project.

Between 2012 and 2016, people in Saeng Sawang sub-district built 112 biogas lagoons.

The number does not include another 31 ones being prepared by the latest group of villagers undergoing a training at Ban Thap Hai School in September 2016.

Land of Mae Ai Bootprom

Not too far from the school lies a small plot of land, complete with a water pond and a cow shed, which belongs to Ai Bootprom, the latest member of the biogas project.

A one-metre-deep pond has been prepared. Once everyone is ready, a biogas bag will be installed.

“I think it’s good to use and it’s economical,” says Ai after seeing how her neighbours have relied on the alternative fuel for a few years.

“I picked this location because the cow shed is right here. I will build another house here as well. The one I am living in has become too small,” she said.

The five cows in the shed give Mae Ai hope that they will produce enough dung to feed into the lagoon and turn into fuel. She will compliment it with biodegradable food residue as her neighbours told her.

Mae Ai has mastered the theory. All she needs to do now is to start practicing it.

.....

As Mae Ai prepares to modify a small hut built as a temporary shelter into her new house, a gas pipeline is being connected to one of its pillars.

The pipe has its start at the biogas lagoon. Before long, it will transport gas to Mae Ai’s kitchen. Yet another family will be able to produce cooking gas by themselves using animal faeces and leftovers.

As another biogas lagoon is coming into action, it will serve as a model for others to follow. ♪

Waste to Energy Project

Contact: Mr. Lamom Sittisart,
Village Headman of Ban Thap Hai
Saeng Sawang sub-district, Nong Saeng district,
Udon Thani 41340
Tel. 08-4954-3182 Time: 08.30-16.30 hrs



Embedded the Value of Culture

Imaginings of

the Cultural Past of Ayutthaya:

Preserving Our

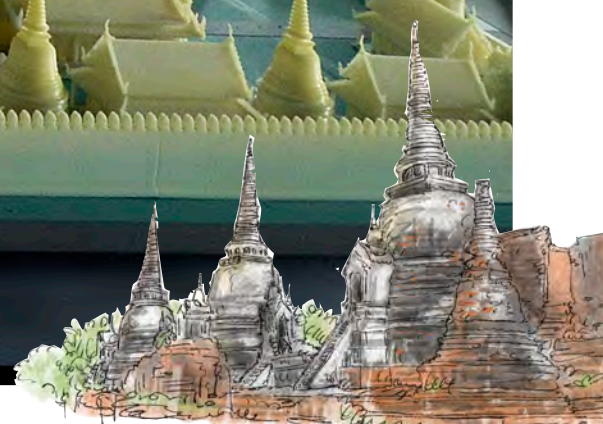
World Heritage Site



Thai Heritage World Heritage Project



A model helps visitors visualise the royal palace of the late Ayutthaya period even though only the foundations of the original structure remains standing.





A reconstruction of Chakkrawat Paichayon Hall at the site where the original structure once stood.



The Ayutthaya Royal Palace Learning Pavilion attracts a large number of students.



The ruins of Wat Phra Si Sanphet in the World Heritage Site.

“Was an ancient palace this big?”

“That’s what it looks like.”

Two students converse as a guide points at the model of an ancient Ayutthaya palace. The white models in a glass case consist of several small structures covering the entire space: opulent throne halls and lofty, majestic palaces. But as they look past the glass case in search of the actual structures outside, what they see is an empty space.

“Students, look over there. That was Banyong Rattanat Throne Hall at the centre of the pond. It was also known as Thai Sa Throne Hall (“the throne hall at the edge of the pond”), a place where kings came to relax. There were glass bowls where fish swam, a platform to spread holy popped rice, and models of hills and fountains. Do you know that the kingdom of Ayutthaya had a public water system built using Western knowledge passed down from the period of King Narai?...”

Twenty pairs of eyes excitedly gaze at the models. They have to visualise the description out of emptiness, that image of the royal palaces of Ayutthaya must have been a picture of chaos. But the white models in front of them facilitate the clarity of their imagination.

The imagination that transports them back to the past.

Heavenly Ayutthaya

No one sees with their own eyes how prosperous and splendid the kingdom of Ayutthaya was, the ancient capital located on the spot where three rivers converge. But historical evidence both from Thai and international sources agree on the narrative of a majestic, beautiful capital as recorded in the poem “Kamsual Si Prach”, which describes Ayutthaya as a heavenly city that had found its place on Earth, with temples as magnificent as the castles of the god Indra, gleaming with gold inside and outside.

*Heavenly Ayutthaya on Earth
Showered by the blessings of the gods
Temples like Indra's castles
Gold wholly gilded and wondrous*

Ayutthaya was the centre of the administrative, political, economic and social life of Siam Kingdom for 417 years, during which it was ruled by 33 kings. The citizens were devout Buddhists and they built a large number of temples. The architectural and aesthetic style established in the Ayutthaya period was passed on to the Rattanakosin period. It's fair to say that most temples we see today inherited artistic influences from Ayutthaya.

But when the city was sacked by the Burmese for the second time in 1767, Ayutthaya was completely flattened and reduced to ruins. When the new capital was being built in Bangkok, bricks from Ayutthaya were used to speed up the construction. Thieves and tomb raiders also broke in and stole artifacts from the ruins. It would take another century, in the reign of King Rama IV, before Ayutthaya regained the attention of the people.

“The archaeological site was heavily damaged, especially the ruins of the Grand Palace. Because it was a symbol of kingly power, it was the prime target of destruction. The sacking was less severe in the cases of temples, because the Burmese were

also Buddhists, so parts of the ruins still remain above the ground,” says Prateep Pengtako, director of the Third Region Fine Arts Office, reflecting on how the total disappearance of ancient structures undermines the people's understanding of past glory.

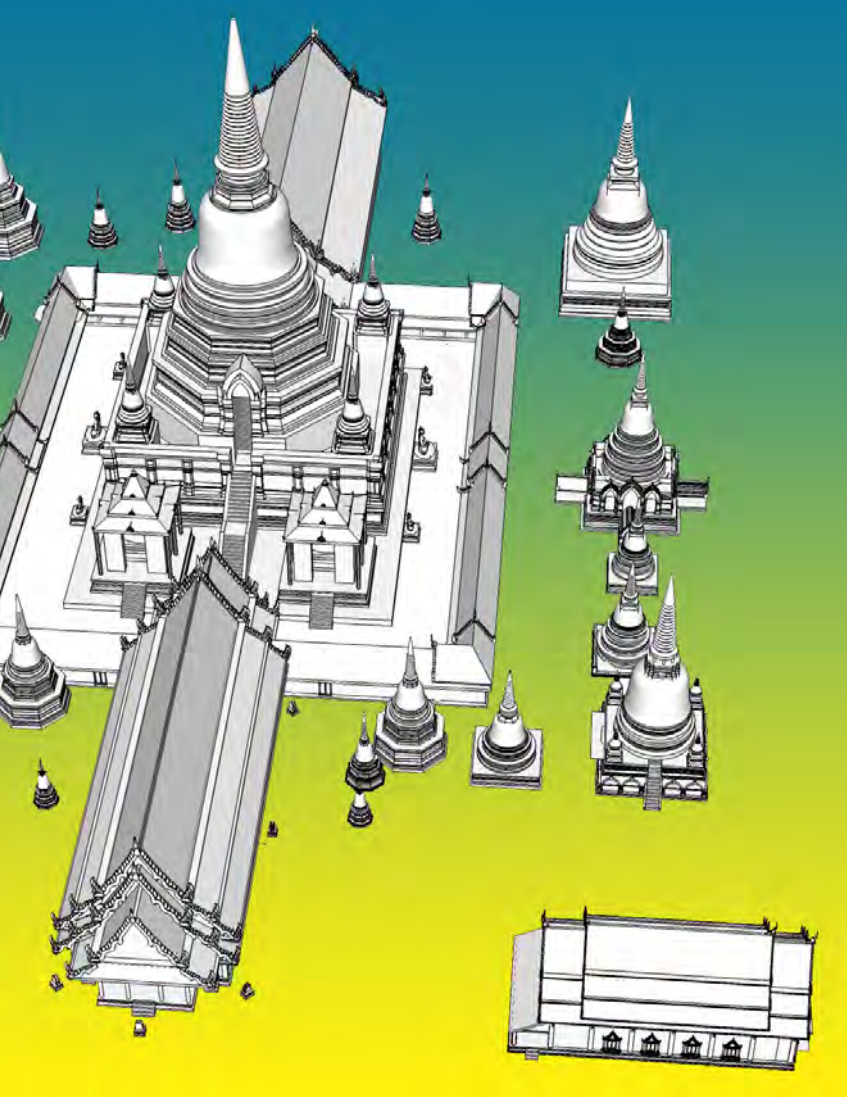
Not too long ago, visitors who entered the area of the Grand Palace adjacent to the northern side of Wat Phra Si Sanphet would only look at a 150-rai of empty space, littered with broken bricks where the foundations of the palace once stood and a few jujube trees. It was devoid of appeal and visitors would seldom venture further. It is a stark contrast to the area of Wat Phra Si Sanphet where there are still the ruins of three ancient pagodas.

This is a problem that affects not only the archaeological site of Ayutthaya but also other crucial historical sites around the country where the damage is so heavy that visitors cannot picture the splendour of the past. PTTEP realises the educational importance of historical and cultural sites and has collaborated with the Fine Arts Department to run “PTTEP Preserves Thai Heritage and World Cultural Heritage”, a project scheduled to run until 2017. The project was launched in 2007 at a World Heritage Site, Historical Parks of Sukhothai-Si Satchanalai-Kamphaeng Phet. It was a success and PTTEP moved on to work with Ayutthaya Historical Park, which was registered as a UNESCO World Heritage Site in 1991, by supporting with 70 million baht and coordinating a series of meetings of experts as well as initiating public relations activities to promote interest in the site.

The principle mission of the project is to perform reconstruction, a process of recreating the original architectural and artistic details of the ruins before they were damaged.

“The importance of reconstruction, either as a panel or a model, is to facilitate the imagination of visitors to appreciate the historical sites. From debris and fragments, a reconstructed model allows them to sense the original grandeur and magnificence. It





“
Ayutthaya wasn't an isolated civilisation but an amalgamation of nearby cultures
 ”

Prateep Pengtako

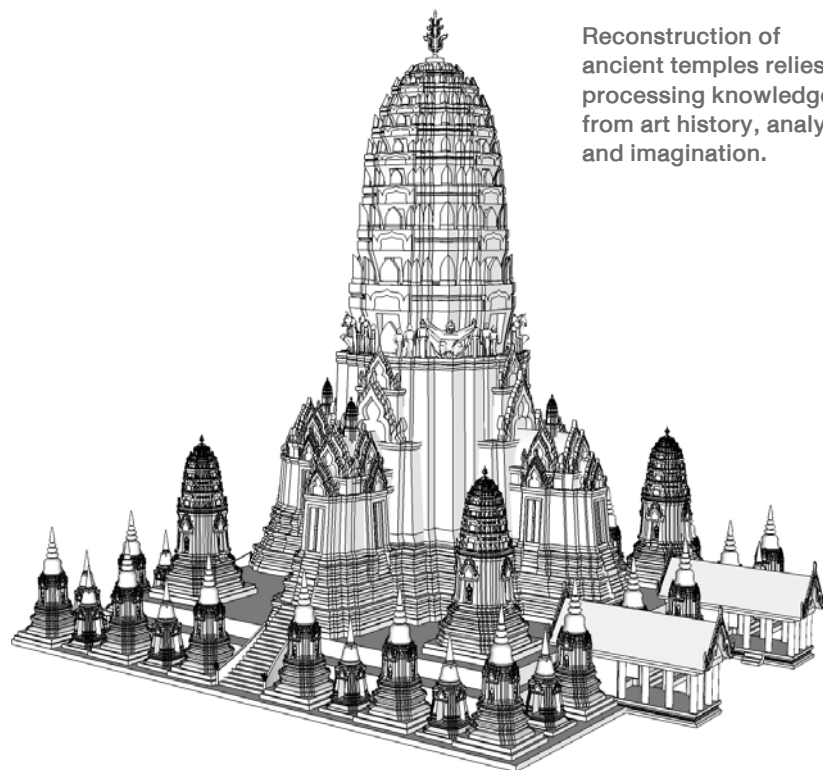
is an effective educational tool,” Prateep says of the decision to embark on this challenging project. The Fine Arts Department provides data from earlier excavations as well as blueprints of ancient structures in their archive collected over decades.

The work began with the selection of six archaeological sites to be reconstructed. They were picked based on their historical significance, such as those built by the king or those recorded in historical chronicles, which facilitated researchers looking for details. The six sites are Wat Phra Si Sanphet, Wat Phra Ram, Wat Ratchaburana, Wat Mahathat, Wat Yai Chaimongkhon and Wat Mae Nangpluem.

“Wat Mahathat housed the Lord Buddha’s relics, a sacred and most important object in a Buddhist kingdom. Wat Phra Si Sanphet was once a royal palace before King Borommatrailokkanat anointed it a royal temple; it has pagodas that contained the ashes of the royal families. Wat Mae Nangpluem has cultural and artistic importance, namely its Singhalom Pagoda, which displays influences of Khmer art and evidence that Ayutthaya wasn’t an isolated civilisation but an amalgamation of nearby cultures,” says the archaeologist.

In 2014, the project entered its second phase of the reconstruction, with the focus on completing the missing architecture of the royal palace, the heart of Ayutthaya kingdom. It was also the greatest challenge in reconstruction efforts ever attempted in Thailand.

Reconstruction of ancient temples relies on processing knowledge from art history, analysis and imagination.



Investigating the Past from Debris and Emptiness

Reconstruction is a form of detective work. Researchers need to dig up data on art and archaeological history before processing it in order to reconstruct an image that's as close to reality as possible.

The challenge lies in the fact that art and architecture are products of taste and preferences at any given period, and subject to change all the time. The style during the Early Ayutthaya Period was different from the Middle Period, which was also different from the Late. Unless scholars have a complete knowledge of Ayutthaya art, they won't be able to complete the missing pieces and sections of the ruins. A respected expert in reconstruction is Professor Emeritus Dr. Santi Leksukhum, a former lecturer at the Faculty of Archaeology, University of Fine Arts. He has been working in the field for 30 years and collaborated with PTTEP at Sukhothai-Si Satchanalai-Kamphaeng Phet Historical Parks.



“We’re not claiming that our reconstruction is accurate. It has flaws ... Look at the reconstruction and use your own analysis”

Professor Emeritus Dr. Santi Leksukhum

Prof. Dr. Santi has spent his life accumulating knowledge in art history by perusing historical documents and chronicles. He has prior experience of reconstructing ancient palaces, and his work in Ayutthaya did not start from scratch.

“In 1987 I made a reconstructed model that was exhibited at Ayutthaya Historical Learning Centre. I did my own exploration and drawing. Back then director Prateep was an archaeologist and we explored and dug together. He provided a lot of information that I relied on in the process,” says Prof. Dr. Santi.

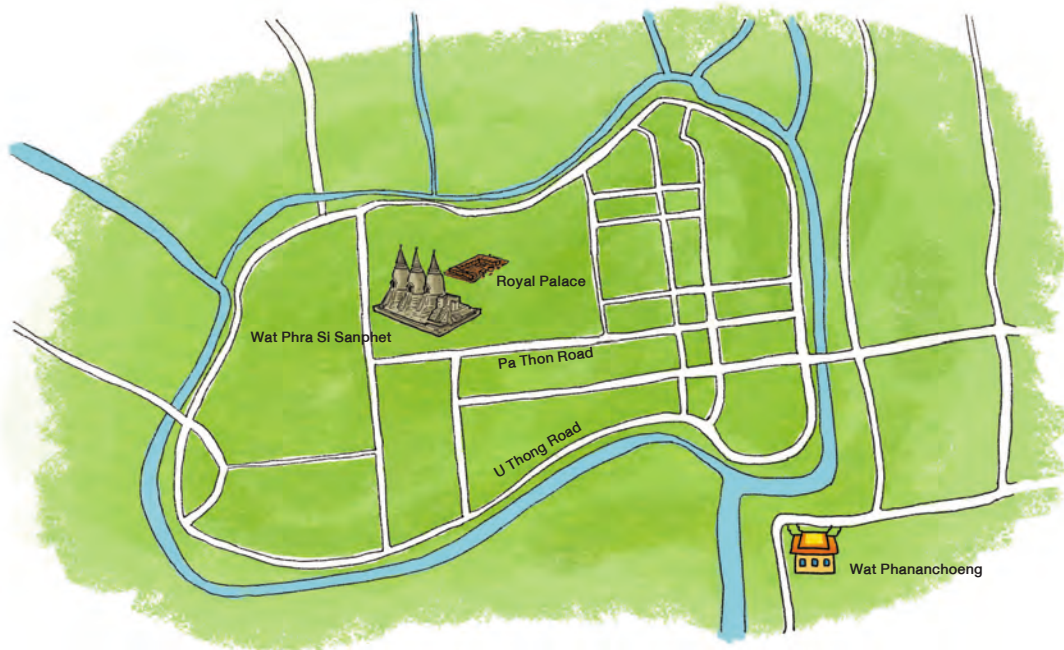
His work here is a reconstruction of the royal palace in the Late Ayutthaya Period. The palace received a major renovation in the reign of King Borommatrailokkanat, who ruled for 40 years. The monarch extended the palace ground to the north and ordered the construction of a majestic throne hall. In the area of the original grounds, the king elevated Wat Phra Si Sanphet to royal status fit for holding official royal ceremonies. It became a model for Wat Phra Si Rattana Satsadaram, or the Temple of the Emerald Buddha, in the Rattanakosin Period. The palace grounds in Ayutthaya covered a vast area to symbolise the king's power.

The palace was divided into sections according to function. The outer ground housed administrative bureaus such as the royal court, Luk Khun Hall and Treasury Office. The middle section had a throne hall for holding royal functions as well as receiving guests. The inner palace was the home of the king, queen and consorts, thus consisting of many structures.

“I read a lot of historical records, chiefly Phraya

Boran Ratchathanin's diary and the testimonies of ancient citizens. I didn't read them through the eye of a historian but as an art historian. The royal palace was totally destroyed. Only the foundation remains. The paths were confusing, with only the new paths built during renovation. All of this was an obstacle in trying to get the whole picture,” Prof. Dr. Santi recalls of the difficulty he faced in the project.

The information from Phraya Boran Ratchathanin (Phon Dechakupt) was a study done in the reign of King Rama V. It indicates the key positions of the throne halls. But the professor admits that since it



**Map of Ayutthaya City,
site of Ayutthaya
Historical Park.**

wasn't a record from the Ayutthaya Period, there are limitations. Besides, working with ancient documents means sometimes the researcher can be misled by what was written.

"In a document, a poem describes Phra Si Sanphet Throne Hall and the Great Naga coiling down it. Of course that wasn't real. The writer wasn't a craftsman, and we have to be careful. When some information is totally absent, we had to rely on imagination, piecing together what we know from palaces in the later Rattanakosin Period. Because Early Rattanakosin was directly influenced by Late Ayutthaya, the plan and structure should be similar."

But it doesn't mean that the researcher can depend on the entire plan of Early Rattanakosin in the project. Prof. Dr. Santi cites the example of decorative details such as carved gables. The Ayutthaya style shouldn't be as "curvaceous" as in the Rattanakosin's. He also takes into account other evidence to complement his understanding, such as murals, stucco reliefs and the wooden frame of Wat Chaiwatthanaram, which remains standing.

Another example that demonstrates the professor's endeavour is when he tried to locate the doors whose function was to separate different sections of the palace. Prof. Dr. Santi explored the ground on foot until he found one such door near the wall of Wat Phra Si Sanphet. It was the only remaining door from the ruined palace, and luckily it was in good enough condition to be used as a model to

reconstruct other doors that serve the same purpose.

Next is the spire of Wihan Somdet Throne Hall. There is no visual evidence of the original, so the researcher relied on analysing royal tastes and preferences. He found that this throne hall was built or renovated in the reign of King Prasartthong, a commoner who ascended to the throne. Thus the monarch built Wat Chaiwatthanaram as a grand symbol of his power. At that time, Ayutthaya's influence reached the Khmer realm. The Khmer-style *prang* spire had been adapted at the new temple, with the plan including a principal spire and eight satellite spires surrounding it. It was a new architectural style in those days and possibly popular among builders. Later in the reign of King Phra Petrachcha, the same *prang* style was used as a portal to the sermon hall. Hence, Prof. Dr. Santi concluded that the spire of Wihan Somdet Throne Hall was likely to be in the *prang* style.

Other structures have been reconstructed through historical data as well as scholastic imagination. For instance, the Treasury Office, which naturally requires security, was built in Western style. Meanwhile the Chom Dao Hall ("star-gazing hall") has no roof.

"We're not claiming that our reconstruction is accurate. It has flaws. You don't have to believe what I present here. You look at the reconstruction and use your own analysis, that's how your wisdom grows," says Prof. Dr. Santi.

The path guiding visitors through the royal palace is lined with information boards to help them learn and appreciate the glory of ancient Ayutthaya.

From Software to Model

Besides analysing the data, Prof. Dr. Santi, 71, also operates reconstruction software by himself.

“The professor handles every step of the reconstruction by himself because he has everything in his head,” says Rasi Burusratanabhund, assistant to Prof. Dr. Santi and coordinator of the project. “If he’s not sure about something, he’ll ask me to drive him to Ayutthaya. Sometimes we just went to look at one side of a staircase and rushed back to Bangkok. It shows how the professor is committed to the project. He goes at it with excitement and passion.”

The reason the professor goes all the way to Ayutthaya just to look at something is because he believes that two-dimensional pictures are unable to record every detail that the eyes can see by looking at three-dimensional reality. It also helps him find a connection and context, as well as traces of earlier renovation efforts.

“I often tell my students, the ruins can’t talk to me, but when I ask them questions I have to try to find the answers myself. Doing that helps me think,” says Prof. Dr. Santi.

After spending over a year analysing data and drafting the three-dimensional blueprint, Prof. Dr. Santi has completed the reconstruction plan of the royal palace. The next step is to turn the image into a model. PTTEP proposed 3-D printing, the latest technology that offers a high level of accuracy.

Over 200 pieces drafted on the computer — the throne hall, walls and other buildings — have been “printed” as three-dimensional models at a 1:125 scale with ABS plastic, a strong material.

However, the model is in white.

“This is a hypothesis; it’s not a replica of the real palace. We have no way of knowing the



colour palette used in the Ayutthaya Period, except by looking at mural paintings. So we use the white colour in a way to inform that this is just a reconstruction. Even when it’s in white, people still think it is an exact replica — had we used colour, people would believe it even more. The more realistic a model is, the more lies it is telling.”

While the professor was working on the reconstruction, the Fine Arts Department and PTTEP started constructing a learning pavilion of the royal palace of Ayutthaya to exhibit the models. Another challenge is the form of the building. At first the plan was to build a large Thai-style house to reflect the cultural life of Ayutthaya, but eventually it was replaced by a simple modern structure.

“We were concerned that the Thai-style structure would be overwhelming and eclipse the models. So we agreed on something simple, well-ventilated, something not too attention-grabbing,” Prateep explains the idea behind the learning pavilion and its glass walls that allow visitors to look at the models as well as at the ruins in the background. The design aims to minimise refracted light by the precise angling of the glass panels. It also reduces the cost of materials.

The pavilion houses reconstructed models as well as educational boards describing the details of each structure in the royal palace.

Outside the learning pavilion, visitors follow an educational path that takes them along the historical ruins, with boards and images of the reconstructed model to let them imagine the actual structures in



all their glory. Each board and sign is small in size, so as not to obstruct the view and claim the attention. All of this is to ensure the maximum efficiency of the reconstruction project.

All of this, however, wouldn't have been possible without the commitment and hard work of Prof. Dr. Santi Leksukhum, who calls this "the work of his life."

Feedback

Everyone can see the change when tour guides start bringing visitors to the royal palace and using the learning pavilion as a crucial stop where the story of the past is told.

There are no figures showing the rise in tourists. But Pawit Jaiplian, a young guide who's been leading tours here for four years, confirms the enthusiasm of visitors.

"Students just 'wow' at what they see. Usually visitors rarely venture into the inner sections of the palace, but with the models, they're more interested

to explore. Our work is more convenient too. We can show them exactly what to look at, how historical records describe them, and visitors can use their imagination to fill out the picture. Students also take a lot of pictures because they don't see the details of the palace in their textbooks. It helps them appreciate history better," says Pawit.

The feeling is echoed by Paweenud "Or" Srathongrad, a grade-11 student from Wat Buengthonglang School who sees the reconstruction model for the first time.

"The models help us in understanding how people lived in those days. The palace was so magnificent. It reminds me of the Grand Palace in Bangkok, but it's much grander here," she says with a smile.

For Prateep Pengtako, director of the Third Region Fine Arts Office, the models of the royal palace and the temples are a pilot project that will be extended to other important historical sites.

"Visitors are here not to look at new buildings or modernity. They're here to learn about the culture and the past. Preserving them is a good thing, because these historical ruins are a testament to our glorious past. They will make the younger generation proud of Thailand."

.....

Late morning or afternoon on any given day, students lean at the glass case to admire the model of the royal palace. Look into their eyes and you'll see a reflection of the past. History is the path that will lead them to the future. 🏰

A replica of Phra Attarot Srisukhottosaphol Yanaborpit standing Buddha has been erected at Wat Viharn Thong ancient ruins as part of the conservation and development work at Chan Palace.



Conservation and Development of Chan Palace Project





Treasure

underneath the Ground:

Carrying on the Cultural Heritage

from the Reign of King Naresuan



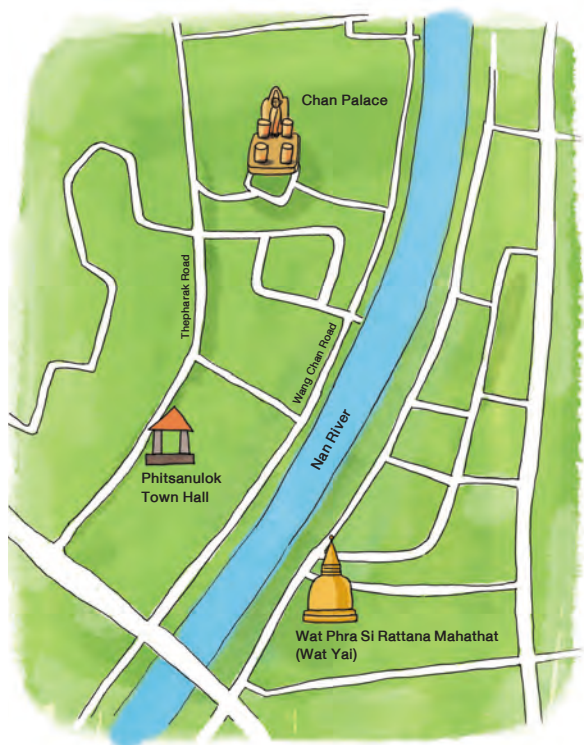
To the west of the Nan River in Phitsanulok, opposite Wat Phra Si Rattana Mahathat where the highly revered Phra Buddha Chinnarat is enshrined, stands a memorial dedicated to King Naresuan the Great, the King of Ayutthaya from 1590 to 1605.

The memorial is located in the middle of a vast field where remnants of what appear to be ancient walls of different sizes and shapes are scattered.

The empty field was once home to Chan Palace, the birthplace of King Naresuan, one of the greatest monarchs in Thailand's history.

In his book, *San Somdet, Prince Damrong*, gave an explanation of why the palace was thus named.

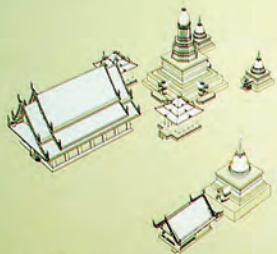
“The name Wang Chan comes from *Tamnak Chan* or *Ruen Chan*. In the past, residences were all made of wood. Residences of the king or senior royalty were built from fragrant kalamet wood or *mai chan* in Thai. The name Wang Chan is likely abbreviated from Wang Tamnak Chan.”



Map of Chan Palace

Her Royal Highness Princess
Maha Chakri Sirindhorn paid
a visit to Chan Palace in 2015.





รูปแบบต้นแบบฐานวัดโพธิ์ทอง
Reconstructed image of Wat Phothong



วัดโพธิ์ทอง

สันนิษฐานว่า วัดโพธิ์ทองน่าจะสร้างขึ้นก่อนสมัยสมเด็จพระนารายณ์มหาราช เจดีย์ประธานของวัดแห่งนี้ เดิมทีก่อด้วยอิฐหรือปูนซึ่งมีขนาดฐานขององค์เดิมกว้าง โดยมีค้ำข้างเป็นฐานของ **เจดีย์ทรง พุ่มข้าวบิณฑ์** 4 ชั้น **เจดีย์ยอดทรงดอกบัวตูม** อันเป็นศิลปะฐานที่เชื่อมองค์เจดีย์เข้ากับอาคารอื่นได้ระยๆ ด้านหน้าทางจะ 3 องค์และทางจะ 3 องค์ของเจดีย์ประธาน มีฐานฐานอาคารก่อด้วยอิฐ มีลักษณะเป็นแนว 4 ด้านกับมีเสาไม้ สันนิษฐานว่าเป็นอาคารทรงมณฑป ด้านหลังวัดมีเพียงร่องรอยของฐานฐาน ซึ่ง สันนิษฐานว่าเป็นเจดีย์ยอดทรงดอกบัวตูม โดยอาจมีอาคารขนาดเล็กอยู่ด้านหน้า เช่นเดียวกับเจดีย์ พระระฆังที่อยู่เบื้องหน้าทางจะ 3 องค์

Wat Phothong

Wat Phothong probably was built before the times of King Naresuan. Only the basement is left behind. Based on its accumulated experience of ancient site restoration, the Fine Arts Department believes the basement to be that of a *phum khao bin* (rice-ball, known also as lotus bud-crowned) type. On account of Phitsanulok's historical close link with Sukhothai, the main chedi must have been built in that shape. To the east and west of the chedi are the ruins of a building laid in bricks, with a row of holes for grounding of timber pillars. It is believed to be a mณฑป. To the rear of the temple are the ruins of a foundation, believed to be a lotus bud chedi. A small building must have stood in front of it, the same as the bell-shaped chedi a little removed to the east.

A reconstructed model of Wat Pho Thong pagoda exhibited at Chan Palace Historical Centre.



Back in the early Ayutthaya period about 500 years ago, King Sam Praya had Chan Palace built to serve as a residence when he was viceroy of Phitsanulok. (At that time, the city, which lied to the west of the Nan River, was called Chai Nat.)

Later, King Borommatrailokkanat waged a war against the Lanna kingdom which lasted more than 20 years. The centre of administration was moved from the capital Ayutthaya to Phitsanulok. The king expanded Chan Palace so that it was as grand as the royal palace in Ayutthaya.

After that, the palace by the Nan River served as the residence for many other viceroys governing Phitsanulok. The last viceroy to live there was King Naresuan.

The city of Phitsanulok and Chan Palace became less prominent after King Naresuan went on to rule in the capital Ayutthaya. It was finally abandoned following the Burmese-Siamese War in which Burmese commander Maha Thiha Thura successfully marched into the city in 1775.

Chan Palace was never mentioned again until almost a century later in King Rama V's letter written during his visit to Phitsanulok in 1901. The letter mentioned that traces of a double-layered ancient wall were found there.

About 30 years later, Phitsanulok Pittayakom School was relocated from the western side of the Nan River to the area where Chan Palace was located. Along with the school came other government buildings and residential housing.

The country's archaeological treasure would have remained undetected had some of its traces not been found during the construction of the school's new building in 1992.

Following the discovery, the area of 128 rai, 2 ngan and 50 square wah was listed as an archaeological site in 1994. Eight years later, the cabinet approved a project to conserve and develop Chan Palace which entailed a relocation of the Phitsanulok Pittayakom School and other communities out of the site.

The restoration work advanced slowly because of a limited budget, and when PTTEP learned about the important cultural mission, it offered support through the Faculty of Fine Arts and Yen Sira Phro Phra Bori Ban Foundation run by the Third Army Area.

The development work ran under the theme Treasure from the Land: Carrying on the Cultural Heritage from the reign of King Naresuan.

To develop the old palace grounds into a place of learning for the country and to honour King Naresuan the Great, PTTEP provided a grant of more than 72 million baht to the project.

"To conserve and reconstruct such an important site as Chan Palace, the restoration can't be done by a single entity. This is the kind of work demands cooperation from several parties. Fortunately, all parties could join hands so that we could start to manage the site," says Peeraphon Pitsanupong, inspector-general of the Ministry of Culture.

"After we prepared a master plan for the area's rehabilitation, a memorandum of cooperation was signed and the project was officially launched with support from PTTEP in 2010."

Peeraphon served as director of Sukhothai's Sixth Fine Arts Office whose supervision extends to Chan Palace. He says PTTEP not only supported the project financially but also took part in other activities such as studying the palace's original architecture, installing signs about its different components and published books about King Naresuan and the history of Chan Palace.

The company also procured a tram to take visitors around the palace ground. It built a historical centre where exhibits and history related to the palace are on display. The historical centre comes complete with a reception pavilion and a replica of Phra Attharot Sisukhotthosaphon Yanaborpit – the original was relocated from here to Wat Saket in Bangkok during the reign of King Rama III. PTTEP also had models and commemorative coins of King Naresuan made as part of the rehabilitation project.

The Chan Palace project was also extended to surrounding areas such as Sa Song Hong (Song Hong pond) and Wat Viharn Thong built around 14th-15th century A.D. Another site under the project is Wat Sri Sukhot, believed to be built even before Chan Palace.

Archaeological studies suggest that Chan Palace was built in three eras: during the Sukhothai and early Ayutthaya period, during the early and middle period of Ayutthaya kingdom and during the late Ayutthaya era to the Thonburi period.



Remnants of an ancient wall are all that remain of Chan Palace for younger generations to study.

Three Eras of Chan Palace



First Era: Sukhothai to Early Ayutthaya Period

Although traces of a brick wall were found, the ruins were not enough to show the palace's area. Fragments of terracotta from Si Satchanalai and Sukhothai kilns were also found.



Second Era: Early to Middle Ayutthaya, about BE 20-22

An outer line of a wall was found which suggested that it could be about 185 metres wide and 300 metres long.

There are also traces of a wall that divides the inner area of the palace into outer, middle and inner areas. The pattern is similar to that of the royal palace in the capital Ayutthaya.

Sa Song Hong, which is assumed to serve as a royal garden, lies to the west facing the Nan River.



Third Era: Late Ayutthaya period and Thonburi period, BE 20-23

An outer wall of 192.5 metres wide and 267.5 metres long was found, with eastern and western gates. Inside, the area is divided into three parts. The outer palace lies on the north side. A meeting hall, armoury, stables and sentry box were located here.

The middle palace houses throne halls where royal ceremonies were held. The inner palace, located to the south, is where the royal residence was located. This is where Tamnak Chan is situated. A Sa Song Hong was also found which is believed to serve as the royal garden on the west side, facing north.

“ To conserve and reconstruct such an important site as Chan Palace, the restoration can’t be done by a single entity. This is the kind of work that demands cooperation from several parties. Fortunately, all sides could join hands... The project could officially start with support from PTTEP ”

Peeraphon Pitsanupong

Conservation work would not bring many long lasting public benefits without a channel through which people can learn about it. That is why the Fine Arts Department initiated a project to build the Chan Palace Historical Centre next to the ancient ruins. Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the ceremony to lay the building’s foundation stone on December 17, 2009.

The building houses exhibitions showing Phitsanulok’s archaeological and historical information, Chan Palace’s arts and the biography of King Naresuan. It has a model of Chan Palace’s archaeological site which shows its areas during each of the three eras. The reconstructed model also displays how the Chan Palace should look like according to a study by Professor Emeritus Dr. Santi Leksukhum.

The first phase of the historical centre’s construction was sponsored by a group of provinces in the lower northern region. Its second phase, including permanent exhibitions, was built with a budget provided by PTTEP which also prepared promotional materials for both Chan Palace and the historical centre.

The Fine Arts Department has transferred the administration and management of Chan Palace Historical Centre to Phitsanulok Provincial Administration Organisation. On December 19, 2015, Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the opening of the historical centre which will serve as a learning centre for the public. Phitsanulok residents were in gratitude for the princess’s kindness.

“Chan Palace is a place where the pride and hearts of Phitsanulok people and all Thais are united. This is the birthplace of a great king who freed Ayutthaya. I talked to many Phitsanulok people. They share great faith in King Naresuan and are extremely proud of Chan Palace.

“The rehabilitation project has also helped develop the province’s economy and promote tourism which generates revenue for people in nearby communities and the province in general,” Peeraphon says about the project’s value.

While the Chan Palace archaeological site and the historical centre serve to instil historical knowledge into youngsters and members of the public who visit them, what is more important is its role in reminding Thai people about the value of archaeological ruins which are treasures underneath the ground.

A piece of good news that emerged after the Chan Palace Historical Centre was officially launched in 2015 was about a Phrom Phiram native Chaiyo Sangsikaew who presented what appeared to be a lance blade more than 50 centimetres long which he unearthed in his farmland and donated to the historical centre.

The Fine Arts Department estimated the blade to be about 300 years old and belonging to the Ayutthaya period.

And so the story goes. Somewhere out there, in some faraway districts, treasures and tales from the past may still lie hidden underneath the ground. All it takes to bring them out is people who understand their value, just like that man from Phrom Phiram district. 🏰

Chan Palace

Chan Palace Historical Centre
Nai Mueang sub-district, Mueang Phitsanulok district,
Phitsanulok 65000
Tel. 0-5500-5111 Open daily 09.00-16.00

Heart on Wings:

Sailing from Thailand

to the Olympics

PTTEP has continually supported sailing athletes. In 2016 for the first time two Thai sailors qualified for the Olympics: Keerati Bualong (left) and Kamolwan Chanyim.

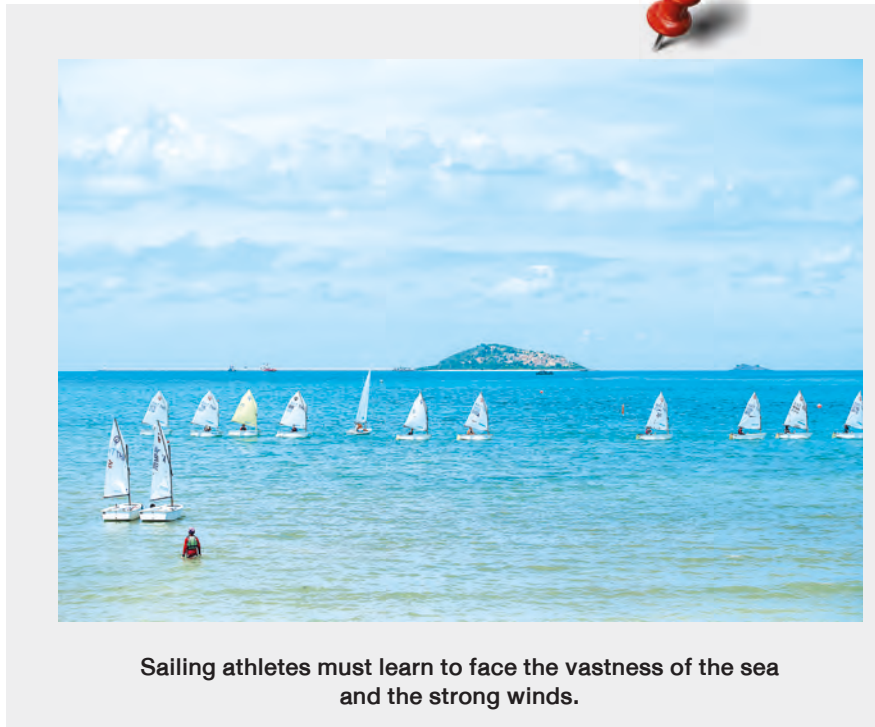




 Olympic Sailors Development Project

Kamolwan Chanyim rigorously commits to her training to improve her performance and excel in this outdoor sport.





Sailing athletes must learn to face the vastness of the sea and the strong winds.

A laser radial glides in the bay of Rio de Janeiro. When the wind hits the sail, the compact vessel, with its angled bow and stern, zips through the waves.

The white sail is stretched taut, in defiance of the strong wind, as it brings the athlete closer to the goal.

That is the finish line at the 2016 Olympics sailing event.

This is the first time Kamolwan Chanyim is experience such a moment, and it is the second time for Keerati Bualong, who competed in the 2012 London Olympics for the first time 4 years ago.

Under the blue sky, facing the hot wind and the burning sun reflecting on the water, the two Thai athletes have gone through the qualifying rounds to take part in the most challenging competition with elite sailors from around the world.

From the Thai seas to an event watched by the whole world.

They make a statement that Thai athletes are second to none when it comes to yacht racing.

“

I'm a Northeastern boy. I had never seen the sea before. When my father suggested I try sailing, I liked it instantly. I love spending time on the sea

”

Keerati Bualong

Breaking the Waves

The 2016 Rio Olympics in Brazil are over, but for the two athletes — Keerati or “Top” and Kamolwan or “Bam” — it’s as if everything happened yesterday.

“The waves were huge, maybe as high as two or three metres,” says Kamolwan, recalling the contest on the coast of Rio de Janeiro.

“Have you heard the saying, ‘small boats shouldn’t go out at sea’? That’s exactly what I thought!”

It was Kamolwan’s first Olympics race. For Keerati, it was his second, but still the memory remains vivid in his mind.

The two athletes come from totally different backgrounds.

Kamolwan was born in a family that has a penchant for yacht racing. Her grandfather did it, and her father, a navy officer, was a champion who encouraged his daughter to take up the sport.

Keerati, meanwhile, hails from the Northeastern province of Nakhon Phanom. The closest body of water he saw as a child was the Mekong River. Until one day, he visited a relative at a navy base in Sattahip.

“I’m a Northeastern boy. I had never seen the sea before. When my father suggested I try sailing, I liked it instantly. I love spending time on the sea.”

His family supported him and Keerati moved to live with his relative so he could pursue the sport seriously.

Yacht racing is a unique sport. The course relies on waves, wind, water, landscape and climate, which are different in each location. Even in the same location, conditions vary on different days.

As an outdoor sport, athletes have to face the vastness of the sea and the burning heat during training and competition. Only those who have genuine passion and can endure a tough training regime can succeed.

Keerati started from a 10-day training course and built his skills from there.

A sturdy man, standing over 180-centimetres tall, Keerati says: “I began with Optimist, which is a children’s model. When I grew up and became bigger, I switched to laser standard. I set goals for myself because I didn’t want to do this just for fun.”

Training on the sea where they have to encounter unpredictable weather, the two athletes have honed their performance to a national level.

Kamolwan started sailing when she was 8 after her father’s encouragement. She made the national team when she was 15. “I saw those senior athletes in blazers and thought ‘They’re so cool!’. I wanted to be in the national team just because I wanted to wear the blazer!”

Once she actually made it, she realised that she needed to give it everything she’s got.

The wonder woman of Thai sailing recalls an important development five years ago when the executives of the Yacht Racing Association of Thailand (YRAT) wanted her to compete in the Youth Olympics and suggested her to move from the small optimist class to the laser radial class.

Even though she missed the Youth Olympics due to being underaged, the move to the higher class before other athletes of her generation gave her a great experience.



“I felt I had to improve even more. At that point I thought I was ahead of other Southeast Asian athletes of the same age.”

Kamolwan has competed for Thailand in three SEA Games, winning a silver medal in Indonesia in 2011, a bronze in Myanmar in 2013, and a gold in Singapore two years later. She also won a bronze at the 2014 Asian Games in South Korea.

Meanwhile Keerati, who began on the substitute team, kept improving until he won several championships, such as the Youth Championship in 2009 in Japan, a gold medal at the 16th Asian Games in China and a bronze at the 2015 SEA Games in Singapore.

Both Keerati and Kamolwan are the brightest hopes in Thai yacht racing.

The Wind

“Without the wind, we can’t sail.”

Keerati talks about the essence of the sport. “I like it when the wind switches direction. Suddenly it moves in reverse. Sometimes it stops and resumes.”

Before every race, sailors need to study the direction of the wind.

Yacht racing is a sport that requires both physical strength and mental intelligence. Athletes have to face unpredictable and uncontrollable weather.

Without the wind, sailors can’t sail. Likewise, without support, the development of the sport is not possible.

Rear Admiral Wipan Chamachote, board member and public relations chief of the YRAT, speaks about the need for financial support to maintain the competitiveness of the national squad.



Keerati Bualong, one of the two Thai sailors who qualified for the 2016 Rio Olympics.

“We have to buy a lot of equipment, buy and fix the boats and hire top coaches. Most importantly we have to enter our athletes in international competitions so they can gain experience. If we have support, we can send them to many events and for longer periods. A team that has a big budget can send their staff and athletes to prepare a month in advance, to familiarise themselves with the location. That gives them an advantage over other teams that send their athletes only five or six days before the competition.”

The Shores

Like a constantly blowing wind, PTTEP has supported the YRAT for over 10 years. This is in line with the company’s mission to create strong communities through social projects aimed at four aspects: basic needs, education, environment and culture.

For the general public, yacht racing is not a popular sport due to many reasons, such as the long competitive period, the difficulty of following an event taking place at sea, and the rarity of a close contest in which a victor is decided by a hair’s breath. But still, PTTEP realises the importance of the sport because His Majesty King Bhumibol Adulyadej once competed for Thailand in the 4th Laem Thong Games in 1967. The company has supported the sailing community for many years, beginning in 2006 with the restoration of three “Mod” (means ant), the “Vachirapetra”, the “Catfish” and the “Salatan” royal sailboats as well as 44 “Super Mod” sailboats and also funded the building of 37 new “Super Mod”.

PTTEP has supported the YRAT and Thai Navy to host the Hua Hin Regattas for over 10 years. On April 19, 2016, to celebrate the 50th anniversary of King Bhumibol’s historic voyage across the Gulf of Thailand, the company organised a special race starting from Cha-am and Hua Hin and ending at Sattahip in Chonburi.

Most Thai people know that sailing was the late King's favourite sport, but not many were aware of the monarch's audacious feat he undertook 50 years ago. In April 1966, the King sailed his dinghy "Vega", a 19-foot OK class, which he had built by himself, from Klai Kangwon Palace across the Gulf of Thailand to Sattahip. It was a solo trip that took him 17 hours to travel 60 nautical miles. In that test of perseverance, the King had only sandwiches and Chinese tea during the journey.

PTTEP has also given financial support to the YRAT to develop the potential of Thai sportsmen and to send them to join international races. Thai athletes have performed well in world-class competition: in 2015 Thai sailors won gold, silver and bronze medals in both men's and women's contests at the 17th Asian Games in South Korea; in the 2016 Rio Olympics, two Thai sailors qualified for the finals, compared to only one sailor in the 2012 London Olympics. It was the first time Thailand had athletes in both men's and women's races.

Rear Admiral Wipan Chamachote looks at the transformation of Thai sailing in the past 10 years.

"Interest in the sport has grown in the past decade because Thai sailors have continually become more well known. We've had successes. We won the highest number of gold medals in the SEA Games. We also won a gold in the Asian Games, and we qualified for the Olympics and were able to fly the Thai flag at that most prestigious tournament. We knew from the beginning that it was hard to win any medal there. Our goal is to make it to the top 20 and soon, with careful preparation, we can achieve that."

The Spirit

While preparing for the 2016 Rio Olympics, Keerati was challenged by former national athlete and now sailing coach Senior Chief Officer Manas Phothong. The coach proposed a race from Sattahip to Pattaya, a major test before the big tournament.

The distance was roughly 30 kilometres. By car,

it would be just a few minutes, but by sail in regular weather, the trip can take as long as three to four hours.

Keerati accepted the challenge.

For about half of the journey, the wind was low, prompting them to sail in zigzag fashion. When they rounded the bend towards the open sea, the wind picked up and the small boats zoomed ahead.

At first the two men sailed side by side. But soon Keerati, younger and stronger, sped away from his coach.

But never too far ahead...

Manas praises his student: "The most important thing is, he is happy to sail. Now he's better than everyone else, but he still has to be happy."

Another important quality every sailor needs to have is the love for nature — the passion to move ahead without the need for any kind of fuel other than one's own strength.

"I'm near retirement and I want the younger generation to take my place," says the coach. "I will push Keerati and Kamolwan further. In a few years they'll be at the Tokyo Olympics. They'll be in their prime at 28 and 24. We have to set a clear goal and encourage them to give everything for it. They have to keep going."

Keerati and Kamolwan have a clear path in their sailing career — a path that will also make history for Thai yacht racing.

The path that began from the first day they dragged their dinghies into the water, hoisted the sails and braved the sun, the wind, the rain, the waves — all the way to the Olympics.

To the day the world knows Thailand is second to none. 🇹🇭



PTTEP
ดีการ์ด
ปตท.สผ.
โครงการพัฒนาชนบท

Support for Education



Growing Songkhla Community

to Timeless Learning Centre



สิ่งของที่มีคุณค่า
Significance fabrics of the old town

หับ โห่ หิ้น

"สามัคคี"
"กลมเกลียว"
"เจริญรุ่งเรือง"

The undamaged Red Mill or Hub Ho Hin Mill which survived World War II is today a learning centre of Songkhla's history and culture.



Songkhla Smart Centre Project



Centuries ago it was a prosperous port city during the Ayutthaya era. When the city centre on Laem Son became too crowded to expand, Phraya Wichian Khiri (Tiangsen Na Songkhla) moved the city to Bo Yang district and built a 1,200-metre-long wall with 10 gates. In 1842 the City Pillar was conferred the name “Mueang Songkhla Fang Bo Yang”. There were three main roads: Nakhon Nok, Nakhon Nai and Khao Hong (later Nang Ngam Road).

After the death of Phraya Wichian, his descendants of the Songkhla clan continued to rule the city until the Siamese Revolution in 1932 when Songkhla became a province of Thailand.

Today Songkhla is a prosperous trade centre as well as an educational hub of the south, but what’s fading from memory is the glorious roots of this ancient place.

The Beginning of Petroleum Exploration and Production in Songkhla

Petroleum exploration and production became a major part of the Thai economy in 1971 when the government passed the Petroleum Act. Foreign oil companies began to come to Thailand to explore for petroleum. In 1973, petroleum and natural gas were discovered in the area called the Malay Basin. Initial estimates indicated that the volume was too low to merit commercial production, but further exploration confirmed an abundance of natural gas in the ridge called “Structure B”, later renamed “Bongkot”.

The government at that time understood the huge benefits this discovery meant for the long-term development of Thailand and instructed PTTEP, which was founded in 1985, to buy back the Bongkot concession from Texas Pacific Co., Ltd. in 1988.

Since the establishment over 30 years ago,

PTTEP has a mission to explore, develop, and produce petroleum from both onshore and offshore sources as well as to provide reliable energy supply and sustainable value to all stakeholders not only to Thailand but also to the countries where we operate as well.

In 2006, PTTEP established the petroleum development support base in Singhanakhon district to be a supply centre for petroleum exploration and production in the Gulf of Thailand. PTTEP fully operates Bongkot Project, the country’s largest natural gas reserve, and the Arthit Project. The late King Bhumibol Adulyadej graciously bestowed the name “Navamindra Petroleum Area” on the two projects. Today the area covers 4,231 square kilometres, approximately 200 kilometres off the coast of Songkhla province.



King Bhumibol Adulyadej graciously bestowed the name “Navamindra Petroleum Area” on the two projects: Bongkot and Arthit.



New Look of Bo Yang and the New Smart Centre

In every area where PTTEP have our operations, it is committed to the development of the local community along with strengthening Thailand’s energy security. Beginning from our 25th anniversary, PTTEP has put much emphasis on promoting reading as an essential step in nurturing educational wisdom and a sense of awareness in social development. Researching for guidelines in sustainable education, we see the potential of Thailand Knowledge Park (TK Park) as an agency that promotes learning in the form of a “Living Library” with the goal to let children and young people access reading materials appropriate to their age group and that there will lay a solid groundwork for a long-term passion for reading.

Meanwhile, Songkhla Municipality at that time launched a mission to promote itself as a learning city, which matched with PTTEP. This led to the signing of an agreement between PTTEP, the city



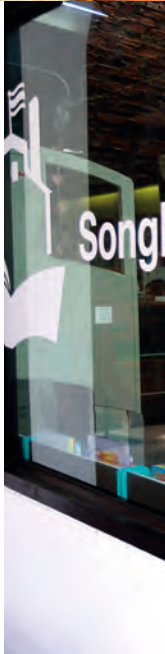
of Songkhla and TK Park to launch “Songkhla Knowledge Park and Songkhla Smart Centre” in the 3,000-square-metre area on Songkhla Buri Road, at the end of Nang Ngam Road in Bo Yang district.

The project began from an interaction with the locals. A public meeting took place at Kuan-U Shrine in the old town, while students were consulted in an attempt to find the best way to run the new knowledge park with the help of scholars and the Songkhla Heritage Trust, a local preservation society. All of this represents a cooperative effort between the government sector, the private sector and the civic sector to develop a learning centre for the community.

Through such cooperation, Songkhla Provincial Administrative Council and Songkhla Municipality

supported the construction costs, while PTTEP bore the costs for interior decoration. Songkhla Municipality will run the knowledge park, with the Songkhla Heritage Trust working on the content along with TK Park. The goal is to make the centre “alive”.

Songkhla Smart Centre is designed to create an atmosphere that stimulates reading and learning. Every book is chosen to fit the development stage of children of different ages and the local environment. The park is divided according to function and the principle of a “Living Library”: there is a Kid’s Zone, a Music Zone and an IT Library as well as an activity space and a silent room for working. There is also an exhibition space on the history of Songkhla to promote the town as a candidate for a



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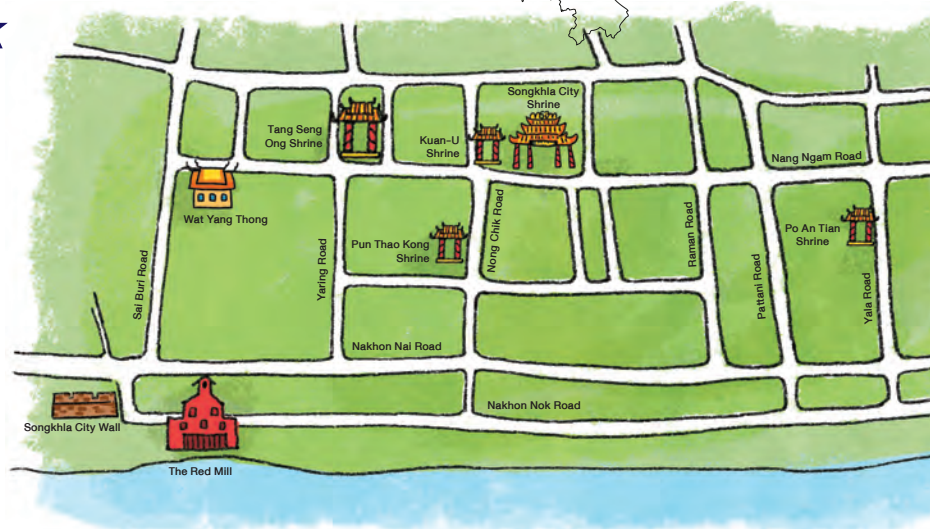
Phase 1 of the Smart Centre is a spark that promotes Songkhla as a modern learning centre, not as a traditional library. This is a pilot for the bigger, permanent facility by the municipality, Songkhla Heritage Trust, PTTEP and TK Park

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Rangsee Ratanaprakarn

< Songkhla Smart Centre Phase 1 “Living Library” for new generations to study.

Songkhla Smart Centre in Hub Ho Hin Mill is warm welcomed by people in the communities.



Map of Songkhla old town and the smart centre



World Heritage Site. There is also a part explaining the history of petroleum exploration along the city’s coast highlighting the relationship between Songkhla and PTTEP.

The construction was a huge project that took a long time to complete. So the working committee decided to set up a small knowledge park to serve children and locals in the meantime before completion of the bigger facilities.

Rangsee Ratanaprakan, owner of Hub Ho Hin Mill (known as the Red Mill), donated space in the compound of the mill to be turned into “Songkhla Smart Centre Phase 1”. PTTEP helped renovate the Red Mill into a learning centre and activity space, while TK Park assisted in training the staff.



The picture on the wall shows Uncle Khuay Putparn, a close friend of ex-prime minister and statesman General Prem Tinsulanonda. It is a memorial of friendship and of rickshaw drivers, one of the lasting symbols of Songkhla.

Design of Songkhla Smart Centre covering 3,000 square metres supported by PTTEP



Image of “Fu Jao” coffee shop on the wall in the old building

“We want to pass on cultural knowledge to the next generation,” says Rangsee. “Everyone agrees on this and I’m happy to give some space in the Red Mill to make it happen. At first it was just 650 square metres. But when the operation began, I gave more to serve as the central facility.”

“Phase 1 of the Smart Centre is a spark that promotes Songkhla as a modern learning centre, not as a traditional library. This is a pilot for the bigger, permanent facility by the municipality, PTTEP and TK Park.” Rangsee speaks hopefully about the coming project.

Dr. Jarae Suwannachart, a professor at Rajamangala Technology Srivijaya’s Faculty of Architecture, and also secretary-general of the Songkhla Heritage Trust, is a supervisor of the design of Songkhla Smart Centre Phase 1.

“We will have more than a library and Dream Space which we’ve seen in other TK Park facilities,” he says. “We designed the space to correspond to knowledge resources available in the city — visitors will also want to learn about our cuisine, architecture, people’s livelihoods and the history of Songkhla. We want the whole town to be a library and space for activities.”

In the library, there are three specially written youth books featuring local content. *Wan Sook Tiew Nai Dee* (Where to Go on Happy Days) encourages people to travel around the locality. The second

book *Pha Phuean Lae Mueang Kao* (Admiring the Old Town with Friends) focuses on cultural and architectural highlights around the Knowledge Park. The third book *Khong Roy Bo Yang* (Delicious Food of Bo Yang) details the local cuisines of the past and present. The three titles aim to disseminate knowledge about the old city of Songkhla, serving as guidebooks to its historical wisdom and cultural riches. They are published with illustrations in Thai and English.

“Learning from actual places first, visitors can then come back to enjoy the space in the Red Mill, which is designed to be lively and yet full of the spirit of preservation and creativity,” says Dr. Jarae.

In 2015, the local community welcomed the opening of Songkhla Smart Centre Phase 1 in the Red Mill with great enthusiasm.

“Once the place was known as a private rice mill and pharmaceutical storage during World War II. It is now an ice factory. But hardly anyone ever saw the inside of the mill, because it’s a closed space. Today, there are no rice mills left in Songkhla except this one.”

Chanin Sakarin, deputy chairman of the Songkhla Heritage Trust, adds that the Red Mill has become a new tourist attraction. Kindergarten pupils, their parents as well as senior citizens flock to the place. The Dream Space holds activities every

month, and the Trust organises a big event there every three months. The feedback is encouraging since every event is packed with locals in a great show of community spirit.

The area around Smart Centre Phase 1 has become a canvas for street artists who narrate the story of real events and people of Songkhla on the walls. This is another means to promote the learning of local history and culture.

The success of Songkhla Smart Centre isn’t just about having a creative community learning center, but about giving the older generation a repository for their memories, and so even though they and their families might one day move on, there remains a rich and enlivened cultural heritage.

This is how the story of Songkhla is preserved, retold and acquires a new meaning along with the transformation of the world around it. 🏰

Songkhla Smart Centre Phase 1

Hub Ho Hin Mill (the Red Mill), 13 Nakhon Nok Road, Bo Yang district, Songkhla 90000
Tel. 0-7431-2025 ext 138
Open: Tuesday – Friday, 11.00-19.00 hrs
Weekend and public holidays: 09.00-17.00 hrs
http://www.tkpark.or.th/tha/page/songkhla_TK



Hub Ho Hin

Rangsee Ratanaprakarn, owner of Hub Ho Hin Mill, explains that fishing flourished in Songkhla until the reign of King Rama VI when maritime trade began to decline. Meanwhile, rice mills operated by Thai-Chinese merchants began receiving unmilled rice from farmers around Songkhla Lake. Hub Ho Hin Mill (the Red Mill) was set up around that time. During World War II, all rice mills in Songkhla were destroyed except the Red Mill. Still, business was so slow that it was turned into rubber storage facility. Now it is an ice factory.



Mini Farm:

An Edible Playground

 Mini Farm Project



Fresh eggs from the farm tended by the students of Wat Phai Mung School, who gain protein as a benefit of their hard work.



**“
Students can’t
just have
knowledge,
they have to
have life skills that
can be expanded
”**

Sanisa Bussabong

“Learn more in less time”

The director of Wat Phai Mung School in Wang Nam Yen, Bang Pla Ma district, Suphan Buri province, often says this when describing the school’s sufficiency vegetable farm.

“Students can’t just have knowledge, they have to have life skills that can be expanded. They go home and grow basil, holy basil, and other plants they can use in a home kitchen,” says Sanisa Bussabong, director of Wat Phai Mung School, about the benefits of the Mini Farm.

The massive flood of 2011 greatly affected the school with the water submerging the classroom. In the following year the school began a major renovation and started the Mini Farm project with the support of PTTEP.

Five years later in 2016, Wat Phai Mung School, overseen by the director and three teachers, looks after 75 students. Fifty-one of them are at the elementary level and 24 in “Sapling Classes”, or pre-kindergarten and kindergarten. Because Wat Phai Mung is a small school, classes are

conducted long-distance through satellite broadcast from Klai Kangwon School.

Besides regular classes, the school arranges “Learning more in less time” activities in the afternoon from Monday to Friday for elementary-level students. For Sapling classes, the children join fun activities such as clay modelling.

“We integrate the sufficiency economy principle in the “Learning more in less time” programme. Monday is an exercise day. On Tuesday we learn about food preservation making chili paste and salted fish from our farm produce. On Wednesday we work on the farm, with students covering different bases, such as rice farming, mushroom farming, Tubtim fish ponds, trash bank, preparing fertiliser using the formula of HRH Princess Maha Chakri Sirindhorn, and growing a multi-purpose forest.”

The school director explains that every activity is agreed upon by the Student Council with the teachers as mentors.

Ban Phai Mung’s village headman Thitaporn Yuipan walks us around the farm. The sign “Mini





The vegetable farm follows the principle of sufficiency, with a well for agricultural use.



Map of Wat Phai Mung School



Farm” greets visitors behind the school building.

The farm is divided into two sides by a path. On the left next to the school building is the sufficiency vegetable farm; on the right next to a canal is a pigsty, which supplies the material for manure, and a chicken farm on a raised platform above the water.

The headman explains: “The eggs are for school lunch and we sell the rest. At first we had 150 chickens, which gave 120 eggs a day. Now some chickens have died so the output has declined too.”

Next to the chicken coops is the school canteen. On the day of our visit the cook makes *Kuay Jab* – noodles in brown soup – for the students. Of course the eggs from the farm go into the bowls.

On the sufficiency vegetable farm, the students have prepared several patches – called “sufficiency patches” – where different kinds of vegetables are planted. The area of the farm is around two rai running parallel to the length of the building, with the well in the middle.

“We grow basil, holy basil, aubergines, eggplants, cloves, pumpkins, morning glory and kale. For instance this is a patch for *Tom Yum* ingredients – chilli, lemongrass, kaffir lime. Everything you need

for *Tom Yum* soup is here!”

The produce from the Mini Farm is for consumption in the school, and a surplus goes for sale to villagers and visitors. The revenue goes to the school cooperative.

The Mini Farm project is in the area of PTTEP1 Project, Suphan Buri province. It was initiated after PTTEP consulted schools in the area. The budget allocated for the project is 50,000 baht for the first year, and 20,000 baht for subsequent years, with the condition that each school is committed to the principle of sustainability. Officers and experts will work closely with the communities and the schools to tackle any problems. In 2016, after five years, the project has worked with 13 schools, five of them succeeding in sustaining the operation of the farm. Wat Phai Mung School is one of them.





Once ranked near the bottom in quality, Wat Phai Mung School has benefited greatly from the Mini Farm, and is now the outstanding school of the district.

Now at provincial fairs, Wat Phai Mung School is always invited to present the Mini Farm operation to visitors.

“We have a chance to promote our work here at the provincial level. We are regarded as an outstanding school because we are able to cut down on food expenses through our farm. We also generate revenue to increase our capital and reserve.”

The children enjoy getting their hands dirty working in the farm. Baskets in hand, they harvest the produce in the Mini Farm as well as enrich their spirit of learning.

“I love vegetable farms. I've seen them since I

was little and that made me like eating vegetables.”

“I like collecting eggs. It's fun and it teaches me to walk carefully.”

The Mini Farm can be like a playground. Children can play as well as learn the skills necessary to live their lives.

At the end, the smiles on the children's faces as they play and work in the Mini Farm are the best indicator of the bright future of this community. 🌱

Mini Farm Project

Contact : Director of Wat Phai Mung School
 Mu 4, Ban Phai Mung, Wang Nam Yen sub-district,
 Bang Pla Ma district, Suphan Buri 72150
 Tel. 08-9221-1289

Sufficiency Patches

Growing four to five kinds of plants in the same patch reduces the need for watering and caring for them since the plants can support each other. The plants can be divided into “Babysitters” – giving shade, preserving humidity and water, such as banana trees; “Intelligent plants” – perennials that yield fruit, such as papaya and acacia; “Dumb/Daily plants” – short-lived seasonal plants for consumption, such as chili, eggplant, holy basil; “Dividend plants” – perennials that take years to grow but will yield fruits for a long time, such as mango, jackfruit, lemon; “Heritage plants” – long-lived plants that last a lifetime, such as teak, Burma paduak and gurjan.

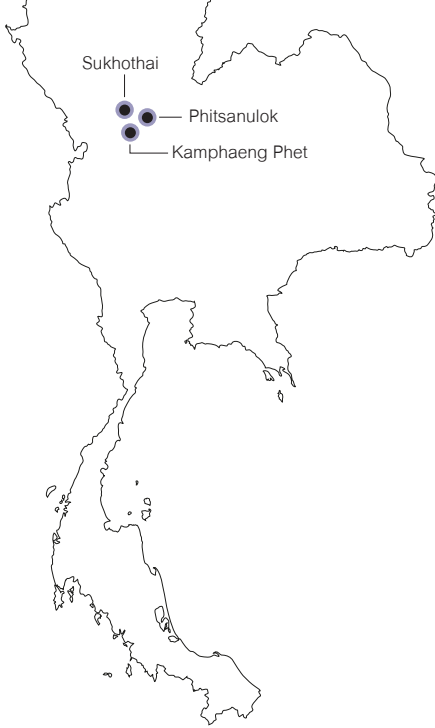
 Phet S1 Scholarship Project



University Education:

Trust in the Future





The National Education Act of 1999 mandates 15 years of free basic education for all Thais. But in reality, students have to pay for travel expenses, meals, uniforms and other extra costs along the way.

The higher the level of education, the bigger the burden. For families that cannot shoulder the expenses, they have to abandon the dreams of their children.

Statistics from the Student Loan Fund from 2010-2013 reveal that three-quarters of the funds go to university students. In 2013, as many as 4.1 million students took out loans totalling 420 billion baht, or over 100,000 baht for person.

This is a steep price to pay for most families. "My parents are farmers. They have to take care of four children in school. Lately the harvest isn't so good and our expenses are higher than our income. Without the loan, I wouldn't have been able to continue my studies," says Indhuorn Wanthat, a fourth-year student at Pibulsongkram Rajabhat University's Faculty of Education.

When she was in high school, Indhuorn borrowed from the Student Loan Fund to continue her studies at Bang Rakam Wittayasuksa. Her plan is to go to college while also working to support herself. Indhuorn is fortunate to receive a Phet S1 scholarship from PTTEP for bachelor's studies since 2013. To her, it is a light that shines on her path to the future.

PTTEP realises the importance of youth development, because they will drive the future of the country. The company has a policy to provide scholarships to children and youths at different educational levels, from elementary to secondary as well as vocational schools, in the Concession Area of S1 Project - Sirikit Oil Field, covering Kamphaeng Phet, Phitsanulok and Sukhothai provinces where PTTEP has been in a joint venture since 1985.

This is an area not unfamiliar to hardship. Most people are involved in agriculture, supplementing their income as hired labour. Incomes are unpredictable, and living conditions can be impacted by social problems, such as divorces and migration of adults to find work in the city, leaving children and the elderly behind. From the survey conducted at schools, many good

Students eligible for the scholarship have to fulfill a number of requirements. One of them is to have participated in social responsibility activities project for their communities.



“PTTEP’s Phet S1 scholarship is one of the best scholarship programmes in the country because it is a long-term commitment that supports the students through to graduation”

Teerapat Deeterdkiat

students who have passed the university entrance examination lack financial resources and have to forfeit their places. Thus PTTEP set up the Phet S1 Scholarship Project to support all expenses for students until graduation, including registration fees, textbooks, equipment, accommodation and living expenses.

“PTTEP’s Phet S1 scholarship is one of the best scholarship programmes in the country because it is a long-term commitment that supports the students through to graduation, covering everything including personal expenses. There are no fixed subjects, and it requires nothing in return. The recipients are under no obligations to pay anything back,” says Teerapat Deeterdkiat, director of Bang Rakam Wittayasuksa, Phitsanulok.

The only condition is that the students finish their studies, and every school break they have to be intern at PTTEP according to their field of study.

Each year since 2002, PTTEP’s Phet S1 Scholarship Programme has supported 10 students all the way to completing a bachelors’ degree. Altogether there have been 98 recipients, with 50 already graduated and 48 studying, with a total budget of over 20 million baht. The programme plays a part in correcting inequality in education and promoting long-term development in the area that PTTEP has operated in for over 20 years.

“Good opportunities should go to people who deserve them. There are a lot of applicants but we follow a strict screening rule. First, the students must come from a low-income family. Second, they must have outstanding academic performances. Third, they must contribute to society and public good,” Teerapat explains. Class teachers, who are closest to the students, will do the preliminary screening, then guidance teachers and school educational committees will pick representatives for final consideration by PTTEP.

The director cites the example of Indhuorn, who fulfills all requirements. She was the school representative in academic contests and she volunteered for public activities all the time.

“I am lucky to get this opportunity. When I feel tired from studying, I realise that besides my family, PTTEP is fully behind me. It gives me the strength to go on, otherwise the scholarship would mean nothing,” Indhuorn says.

“Education is important to me. I always wondered how I would get to study. Now that I have a chance, I have to work hard to pursue the goal of passing the test to become a teacher. I want to work and support my family so they can have a better life.”

The amount of the scholarship may seem small, but to some families it means a great opportunity to build a better future.

For society, it is part of an effort to build quality individuals who will contribute to the strength and sustainability of the nation. 🇹🇭





Develop the Quality of Life



Scholarships for Community Nurses: Returning Love to the Roots

Nipa Taiso and Niparat Anusart, nurses from Ubolratana Hospital in Khon Kaen province, are treating patients in the community instead of waiting for them to come to the hospital.



Community Nurse Project





> Chawee (left) and Niparat (centre), grandmother and granddaughter, illustrate the warm relationship between villagers and community nurses who return to work in their hometowns after receiving educational opportunities.

“Grandma! The doctor’s here!”

A neighbour, upon seeing a woman in a white uniform slinging a medical bag approaching, calls out to Grandmother Chawee.

The old lady, who’s recuperating on her bed, is a resident of Nong Phue village, Thung Pong sub-district, Ubolratana district, Khon Kaen province. She was diagnosed with gallbladder cancer three years ago.

The “doctor” is the term the villagers use informally to refer to Niparat Anusart, a certified nurse from Ubolratana Hospital.

At least once a week since Niparat started working at the hospital five years ago, she leaves her ward and makes a round at Nong Phue village to give advice on medical issues to the residents.

What Niparat does may sound on the surface like an activity of any health volunteer. But the difference is that the nurse is in fact returning to her hometown as a “community nurse” and “homecoming graduate” after she left the village to study nursing in the city.

Chawee is Niparat’s grandmother. The love and care the young woman has for the old lady exemplifies the warm relationship between community nurses who return to their villages to look after patients.

Because it’s their home, they know the roots of the problem. Because the nurses are often related to the patients, they can communicate with them without difficulties. This close relationship greatly assists their professional duty as medical workers.

And that means a general improvement in the community’s health.



Doing it with love

The Community Nurse project of Ubolratana Hospital is a crucial part of the Network of Healthcare System in Ubolratana district, Khon Kaen province. Not only does it solve the lack of nurses, it also reduces the number of young graduates who move out to find work elsewhere. It also allows students as young as grades 9 and 10 to start studying to become a nurse.

It is an effective way to prove a teenager's passion for the profession.

Dr. Thantip Thamrongwarangkul, secretary general of the Sustainable Community Development Foundation for the Good Quality of Live at Khon Kaen University, talks about the problem regarding medical personnel in the province.

"Most doctors have houses in the city, or they've come from other provinces. Nurses represent the largest part of the medical work force, and as many as 98 percent of them came from other areas."

One of the reasons is that local students rarely pass the exam for their desired faculties.

"Children in the city have more opportunities. For instance, students from Ban Phai or Phon districts get into university and when they graduated they come to work here. They work among strangers and on weekends they want to go back to their families."

In 2006, Ubolratana Hospital initiated the Community Nurse Project. The hospital reaches out at rural schools calling for students who wish to become nurses to apply for the scholarship. Ubolratana Hospital also works with nursing schools at Khon Kaen University, the College of Asian Scholars, and Boromrajonani College of Nursing. Several organisations contribute financial support including PTTEP, which has been exploring and producing natural gas at the Sinphuhom Field in the area.

Jongkolnee Srisud, a former student at Puwat Wityyakom School in Khok Sung sub-district, Ubolratana district, recalls her experience. "I joined the programme after hearing the advertisement on the village radio. It said the hospital was organising a volunteer programme for children. I always

“
Most doctors have houses in the city, or they've come from other provinces. Nurses represent the largest part of the medical work force, and as many as 98 percent of them came from other areas
”

Dr. Thantip Thamrongwarangkul



wanted to be a nurse. My grandparents supported me, and I applied for the project.”

Jongkolnee was active in the project through her secondary school years. She logged 60 visits during which she performed various activities, such as helping nurses record patients' information, observing nurses on their field visits, as well as public relations work such as inviting children to grow trees and campaigning during the dengue fever season to reduce the risk of infections.

Now a freshly graduated nurse, Jongkolnee has been working for three months. “I'm proud – more than when I was a volunteer. Now I can give injections and treat people before they reach the doctor. It's hard work but I'm happy. Being a nurse is not easy but it's worth.”

Jeeraporn Nanongtoom is another graduate of the Community Nurse programme. She has returned home to work three years ago. “The project allows students with no financial means, or those who love the profession but have average scores – not necessarily outstanding – to have a chance to study nursing. When we graduate, we come home to work instead of moving to other places. I'm happy to be able to help my patients.”

Going back to their roots

Support and consent from the community is a requisite for candidates. The rules set in 2013 requires parents to fully support the children who want to join the programme.

The condition is set so that parents will receive a budget to plant 100 *yangna* trees and 100 banana trees before their children can go to the nursing school. Once their children are in school, the parents have to sit in adult schools as well. If some of those trees fall or die, they are obliged to replace them. This is a strategy to promote the sufficiency economy and build a strong foundation not only for the children but for the whole family.

The idea is to foster a strong community in relation to a proactive healthcare policy.

Nipa Taiso, a professional nurse, explains the importance of field visits: “Usually only 25 percent of sick people come to a hospital. The remaining



Personal familiarity and family relationships help the nurses to perform their duties smoothly, paving the way to better health for the community.

75 percent stay at home. To visit villages and communities means we can better take care of them. We have to be proactive instead of just passively waiting at the hospital.”

As a senior nurse and mentor, Nipa stresses that poor health largely is a result of eating and living behavior as well as our relationship with the environment.

“For instance, the problem of teen pregnancy is a social one. Illnesses caused by pesticide is an environmental problem. These things can’t be cured by spending 15 to 30 minutes at a hospital.”


Visiting the people in their environment allows community nurses to understand the complex structural problems and to tackle them at their roots. This is the way to ensure a sustainable healthcare provision.

Nipa has a lot of experience working with communities. She is also a guardian of scholarship students in the project. “Soon, these young people will return home as public healthcare professionals.

They will become nurses and they will be a part of the community. For them to return home is also to inherit our good work and make it even better.”

During the 10 years of the Community Nurse Project, a number of graduates have devoted themselves to the nursing profession. They look after patients, who actually are their friends or family members whom they’ve known since they were young. They are proud of their status as professional nurses, an achievement that began when they were just volunteers.

The fabric of love and care woven by the project is an immune system that better safeguards the community from physical and social illness. 🏠

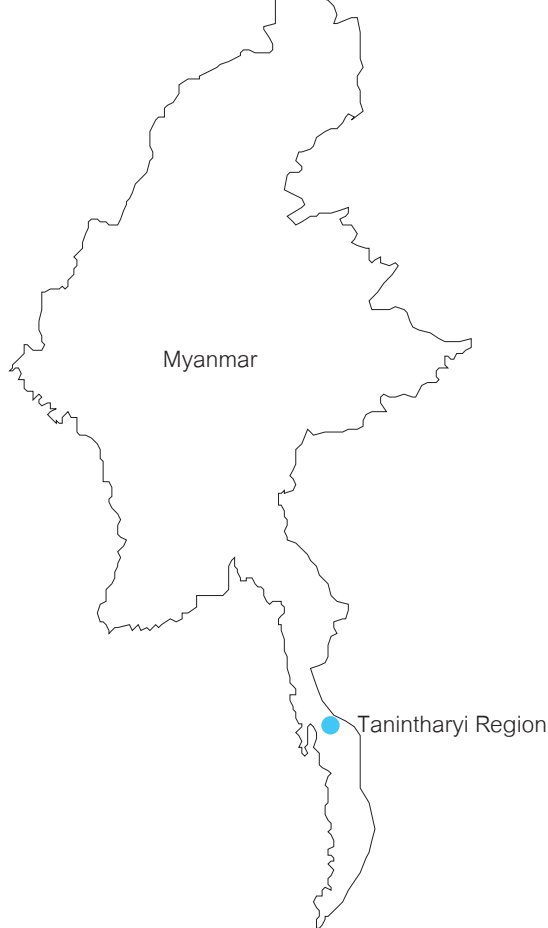


A survey on health among Myanmar students in Kanbuak area reveals that over 60 percent of children have intestinal parasites.

*Healthy Schools,
No Parasites*

Parasite-Free School Project





> Clean drinking water can reduce the risk of intestinal parasites, a project initiated in Myanmar by PTTEP.

In a small town, a middle-aged woman elicits giggles from the classroom when she shows a picture of a boy defecating by the sidewalk.

“What do you do if you have to relieve yourself?”

“Go to the toilet.”

“Don’t do it like this boy!”

Dr. Kalayar Htun, a public health specialist from Yangon, continues by telling the students about intestinal parasites and why the boy in the picture is a bad example. The doctor is talking to primary school children at Daminseik village in southern Myanmar. Dr. Kalayar is chief of the **“Parasite-Free School”** project initiated in Myanmar by PTTEP International Ltd, a wholly own subsidiary of PTTEP in 2010. The goal is to improve the quality of life of young Myanmar people living near the natural gas pipeline routes on corridors.



Perilous Parasites

In 2009, PTTEP surveyed the area around Kanbuak in the Tanintharyi Region, a fishing community on the southern coast of Myanmar, and found impoverished living conditions. PTTEP enlisted the expertise of Mahidol University's Faculty of Tropical Medicine to travel to Myanmar and collect health data of the locals. It turned out that a number of villagers suffered from under-nutrition, especially children. More shockingly, over 60 percent of the people have intestinal parasites.

The main cause is unhygienic behaviour: eating without washing hands first, walking barefoot, using unsanitary outdoor latrines, an overall lack of cleanliness and clean water. Failing to clean up after relieving oneself also contributes to the spread of the disease.

Myanmar authorities have tried to solve the problem by prescribing anthelmintic drugs, but the number of patients kept rising. Efforts to raise awareness about hygienic behaviour has been minimal, especially among primary-school students who are most susceptible to the disease.

Dr. Kalayar Htun heads the "Parasites-Free School" project with the aim to spread knowledge about preventing intestinal parasites and to promote public hygiene. The project is supplemented by health check-up programmes in three main areas: general health, nutrition level and treatment of parasites. A working committee has eight medical professionals divided into two teams to cover the high number of schools in the project.

Every six months the team will visit the schools to address health issues based on criteria outlined by the World Health Organisation. The first trip is in June, when they outline the project, address personal healthcare regime, sanitary knowledge, the proper use of toilets and the fatal risk of intestinal parasites. They collect faecal samples from children before administering proper treatment. The second visit is around November, in which the teams follow up on the results of the first visit, as well as evaluate nutritional conditions. All of this is free of charge.

The project distributes "Health Report Books" to all students so they can record symptoms of illnesses to assist Dr. Kalayar's teams in tackling long-term health problems.

Stools Samples!

At schools, every student is handed a plastic tube with a red cap. This is where they collect their stool samples for the medical team.

During the first year, only half of the students cooperated. The locals, and even the teachers, regarded the process as dirty.

"We had to persuade them to believe in what the project is trying to achieve. The villagers and teachers at first refused to cooperate because they thought every illness could be cured by taking anthelmintic drugs. We had to explain that it wasn't that simple. We have to lab-test the faeces to determine which type of parasite each student has contracted and to administer proper treatment. Letting just one parasite enter a vital organ can be fatal," Dr. Kalayar recalls the obstacles she faced at Daminseik village, another fishing community whose residents have intestinal parasites.



“

We had to persuade them to believe in what the project is trying to achieve. The villagers and teachers at first refused to cooperate because they thought every illness could be cured by taking anthelmintic drugs. We had to explain that it wasn't that simple. We have to lab-test the faeces to determine which type of parasite each student has contracted and to administer proper treatment

”

Dr. Kalayar Htun



Poor quality of life and the lack of public hygiene contribute to repeated contraction of parasitical illnesses. Statistics show that the number of children at Daminseik village who had parasites dropped by just 5-6 percent between 2010 and 2011; whereas in other villages, such as Taung Yin Inn and Phar Chaung, the percentage of children having parasites dropped from 60 to 30 percent.

To convince the children to change their attitude, the project adopts a fun and entertaining means of spreading knowledge, such as using cartoon-style information boards, group discussions to determine the children's awareness of health issues – for example, asking them what happens when they do not wear shoes, or what's not right when they don't wash their hands and behinds after using the toilet.

After six months, the teams saw some progress. Other schools that weren't part of the project asked to be included. From two pilot schools in two villages covering 232 students, four years later (2010-2014) the number of schools in the project increased to 35 from 28 villages, covering over 6,000 students.

Most importantly, the rate of contraction declined sharply. In the first year, about 41.5 percent of all students had parasites. After four years the number fell to 15.4 percent, or one in six students.

In 2015-2017, the project focuses on 10 schools that still have a high rate of contraction, reducing the risk of repeated contraction, as well as expanding the coverage to schools in other remote areas where medical access is limited.

Field examination takes place twice a year. All free of charge.

Convincing students to realise the importance of collecting stool samples in plastic tubes is crucial to the success of the project.





From Children to Communities

Besides providing treatment and raising awareness, PTTEP's Myanmar Project also improves general public hygiene, by building high-standard toilets for schools and providing clean drinking water to reduce the risk of parasitical diseases. Even though patients are free of parasites, chances are that they contract them again if they live in an unhealthy environment.

"We want to reduce the risk of contraction. When we find a severe case in a child, we want to examine other members of the family in order to provide treatment. This is our plan for the future," says Dr. Kalayar.

In the future, the "Parasites-Free School" programme will also organise other activities to increase awareness and promote healthy living among locals. Among them is a healthy school contest, in which the winner is the school that has the lowest number of children with intestinal parasites. The goal is to spark a movement for better healthcare, expanding from children to family and the whole community. The final reward is a society with a sustainable long-term development.

From a small start full of difficulties
We change the attitude of people
Parasites are gone, good health returns

In the end, a sound body is a sound mind,
which leads to happiness in a life that may lack
other opportunities. 🏠

Free Clinic Project

Dental care is one of the services given by the PTTEP-LKC Free Health Care Service programmes. Over 100,000 people visit the clinic each year.



*Free Clinic: A Hope for
Impoverished People*





Free health care clinic for the low-income people in Jakarta



“It’s free? Really? Thank you so much!”

Several locals are pleasantly surprised. They can’t believe that there’s really a clinic that offers healthcare services totally free of charge.

Around half of the population in Indonesia live in poverty with an average monthly income of \$28 (900 baht). The poor who live in slums suffer from various health problems, shortage of food and illnesses that lead to a high death rate of mothers and babies. Economic difficulties slow down the attempt of the Indonesian government to improve public healthcare.

Influenza, dengue fever, diarrhoea and cholera are some of the illnesses that the locals have to endure and compound their everyday hardships. Earning enough to put food on the table is tough enough. When the poor fall sick, the money required for treatment puts an even heavier burden on their finances.

“Take the pills according to the instructions, uncle. Don’t forget to come on your next appointment,” a nurse reminds her patient.

The patients leave the Free Health Care Clinic with the same amount of money as when they entered the clinic – the doctor’s fee, lab fee as well as medicine are totally free of charge.

It’s like a gift from heaven.

Everything's free:
The patients are not required
to pay for doctor's fee,
lab fee and medicine.



Free Clinic for the Low-Income People

PTTEP started petroleum exploration and production in Indonesia in 2010, and the company wishes to give back to the people of the country through the introduction of the PTTEP-Layanan Kesehatan Cuma-Cuma Free Health Care Service (PTTEP-LKC). In short, it is a “Free Clinic” for impoverished locals with the aim to help those who lack access to public healthcare. The project is run in cooperation with Dompot Dhuafa, a non-profit organisation.

Dompot Dhuafa or DD, founded in 1993, is a foundation working on basic public healthcare. Indonesia's Ministry of Religious Affairs certified its status as a national organisation in 2001. DD works to improve the living conditions of poor people and is nicknamed “the poor's purse”.

At the beginning of the project, officers from PTTEP and DD surveyed various communities in Jakarta on foot. They decided to set up the Free Clinic in Rorotan village in the North of the city, a slum area similar to Klong Toey in Bangkok. It is a densely populated area but with the fewest health-care facilities compared to other districts in the city.

The 500-square-metre building was designed to be a standard two-storey polyclinic. An emphasis is put on ventilation and hygiene. The front part of the lower floor is the emergency ward, an information counter, a registration office, examination rooms and a pharmacy. The upper floor is an open space for holding activities.

After the foundation was laid in 2014, the project launched a publicity campaign by sending an ambulance with medical professionals to visit remote villages, give free treatment and register people as members. The idea is to screen and classify the patients. The construction of the clinic was completed on April 1, 2015. Indonesia's Minister of Public Health graciously presided over the opening ceremony.

PTTEP Indonesia has set a five-year target between 2014 and 2018 to treat 100,000 patients, or 20,000 a year.

The mission of the Free Clinic is to offer basic examinations and to promote knowledge of healthy living and illness prevention. Encouraging people to take care of one's own health, the project trains

> The key mission of Free Clinic is to offer basic examinations along with promoting knowledge of healthy living and illness prevention.



volunteers to spread knowledge to the locals. Meanwhile PTTEP staff members in Jakarta also serve as healthcare volunteers who go out and visit remote communities.

During 2014-2015, the project focused on basic examinations, pregnancy care, mother and baby hygiene and dental care. The second phase in 2016 focused on 24/7 emergency unit with an on-duty ambulance ready to respond at all hours.

In 2017, the team plans to open a centre for tuberculosis or TB, a serious health threat that causes death to those who fail to get treatment. In the slum areas with high humidity, TB can spread

quickly. The following year, the team plans to open an Aids centre to tackle another serious disease afflicting the area.

Doctors and medical staff who work in the clinic are all volunteers from the DD network. There are doctors on duty for eight hours at the clinic, unlike many hospitals in Indonesia which do not have doctors on stand-by. The clinic also links up with hospitals in the DD network and other state hospitals to refer patients with serious conditions – as well as taking care of part of the bills.

The Free Clinic has created a database of patients for the staff to follow up on each of them effectively. The information also helps the team grasp the bigger picture of the community's health status. Even larger hospitals do not always have such a database system.

Even though the clinic has a permanent building, the team still dispatches mobile clinics to serve people in remote areas for eight days every month, serving 60 to 100 patients a day. The team realises that there are still elderly patients and disabled people who have difficulty travelling to the clinic, thus the mobile clinic is their only hope.

Early in 2016, the team organised a special activity to mark the first anniversary of the clinic. They set up a mobile clinic to take care of 1,100 drivers of public transport vehicles in Jakarta. These drivers work hard from morning until night and live an unhealthy life, but their health is crucial to public safety. The special unit also operated on 101 cataract patients as well as organised fun activities such as sports day in the community.



*From a survey,
around 70 percent of the patients rate
the facility as satisfactory
and 30 percent as excellent*

Going Forward in a Sustainable Way

Indonesia's Minister of Public Health joined the first anniversary celebrations. He was once a volunteer doctor for DD and thus had first-hand experience of the value of the project.

Today the members who visit the clinic rise to 60 to 100 a day. In the morning, the patients are mostly mothers who visit the doctor after having sent their children to school. Evening time sees schoolchildren and workers coming for treatment. The number of patients in 2016 reached over 120,000, higher than the initial target. From a survey, around 70 percent of the patients rate the facility as satisfactory and 30 percent as excellent. The team also pays attention to feedback and suggestions in order to improve the service further.

The team hopes that the clinic will be able to stand on its own feet in a sustainable way and become a model for other communities in Indonesia.

One of the indicators of the success of the Free Clinic is the Platinum Award in Best Community Program in the 8th Annual Global CSR Summit and Awards 2016, an honour that lifted the spirits and devotion of the team members.

Likewise the sight of poor villagers, the elderly, mothers and their babies visiting the clinic, their eyes full of hope and a million words of gratitude – they continue to fuel the spirit of the team. 🏠



An Explorer with Emphasis on Environmental Protection and Sustainable Social Development



After over 30 years of operation, PTTEP has arrived at the key philosophies that set our course towards becoming a sustainable organisation. The three principles are: High Performance Organisation (HPO), meaning a strong organisation with the potential for growth; Corporate Governance (CG), aimed at promoting accountability and transparency; Corporate Social Responsibility (CSR), meaning a commitment to protect the environment and natural resources.

Our staff is at the heart of our success.

PTTEP trained staff to have a sense of responsibility towards their duties as well as to society through the corporate values called **EP SPIRIT**.

E = Explorer : Always look for new challenges. Never stop striving and finding opportunities for growth.

P = Passion : Going forward with passion, strength and the confidence that everything can be achieved. Always moving the organisation in the right direction.

S = Synergy: Finding strength in unity and cooperation to achieve the targets of PTTEP and PTT Group.

P = Performance Excellence : Striving for excellence. Maximising the capacity to work and consistently improving efficiency and outcomes.

I = Innovation : Innovating and learning new knowledge. Thinking outside the box and daring to change.

R = Responsibility for Society : A strong sense of responsibility towards society. Using natural resources with care and looking after all stakeholders with fairness.

I = Integrity & Ethics : Promoting goodness, honesty, integrity, virtue, accountability and transparency.

T = Trust & Respect : Building confidence and trust among all stakeholders. Respecting differences and making judgments based on data and reason.

To develop our staff into efficient, virtuous and responsible members of society, PTTEP pays great attention to improving our human resources.



It's not just our field staff who have a direct responsibility towards society. PTTEP promotes participation from staff members at all levels and trains them to become environmental conservationists and to join forces in our sustainable development. We encourage all staff to participate in our PTTEP CSR Volunteer projects as well as other related societies and clubs set up by the staff themselves. Over the years staff members have joined more of these activities, spending long hours on them, which reflects the rise of social awareness and a sense of social responsibility.

PTTEP makes sure it allocates a suitable amount of budget to our socially responsible projects. Even in periods of economic decline and stagnant growth of the petroleum industry, we remain steadfast in our support since we realise that social and environmental conditions are as integral to the success of PTTEP as the economic situation.

PTTEP will continue to move forward to explore new sources of energy while maintaining awareness of community development, social benefits and environmental protection. Our activities and projects are always initiated with the aim of promoting efficiency and social contribution.

For a beautiful world and a sustainable society. 



Beautiful World, Sustainable Society

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In our journey to secure energy security, we are conscious of our responsibility to develop the well-being and quality of life of the community, preserve nature and the environment and conserve historical and cultural sites. Passing on to the next generation a rich heritage based on concepts for business, society and the environment that will take us to a sustainable future.



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