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Research for Social Development in the Globalised World

"Samphunbok" Road to Global Geoparks Network

Rationale Behind a Healthy City

Transferring Knowledge about Soil and Yield Improvement with Biochar for Food Security and Agriculture Sustainability

Music Therapy for Patients Undergoing Hemodialysis

Research and Development of the Mechanism of Marketing Strategy for Thailand's 100% Fresh Milk

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Editor's Note

In today's limitless world, the rapid pace of economic and social change profoundly impacts upon our lifestyles, quality of life and the environment. National and international policies to alleviate and adapt to the adverse impacts of development are therefore of critical importance, not only to our well-being, but also to our very survival.

Although scientific research makes an essential contribution to ensuring that our development trajectory ensures a balance between economic progress and social and environmental benefits, many regard science as intangible, without much real-world relevance. Similarly, social research is also widely regarded as abstract and 'out of touch'.

Given the importance of both scientific and social research, particularly in addressing the multiple challenges faced by developing countries today, these widely-held misconceptions need to be tackled in the public arena as well as at the policy level. A clear presentation of the imperative for a new national prioritization of research and innovation at national level is needed if Thailand is to make any progress towards its professed goal of an 'innovation society'. The research community needs to work hard to convince policymakers of the tangible economic dividends from increased national investment in R&D.

We also need to change public awareness and perceptions of the relevance of R&D to society through mass media communications, community education and policy analysis to inform government agencies on policy options and their impacts, and the benefits of investing in R&D by private sector organizations. Wider public access to the outcomes of research would help greatly in driving this process, thus contributing to solving the country's problems and to long-term sustainable development.

The Editorial Board

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"Samphunbok"

Road to Global Geoparks Network

Prof. Montri Choowong, Ph.D.
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Introduction

Samphunbok and Phachun are located in Ubon Ratchathani Province along the western bank of the Mekong River, Thailand, adjacent to Phosai district, Lao PDR. This area is popular with tourists seeking nature discovery and adventure style tourism. Samphunbok only emerges in the middle part of the Mekong River when the river level falls during winter and summer, from November to May. In August 2011 and February 2012 the Samphunbok and Phachun sites were designated for detailed geological study by the Sub-committee for Natural Conservation and Art under the Thailand's National Environment Committee, Department of Mineral Resources (DMR). The study aimed first to propose Samphunbok and nearby tourist sites as areas for national conservation, and subsequently to upgrade them as part of the Global Geoparks Network (GGN) with support from UNESCO. GGN approval will result in enhanced conservation of geological and natural sites, boosting the local economy and contributing to sustainable development at both local and national levels.

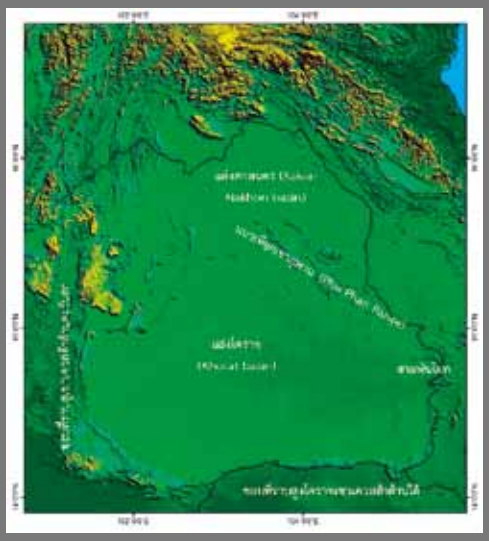

Figure 1: Digital Terrain Map showing topography of the Korat Plateau and location of Samphunbok along Thailand and Laos PDR border.
Source: Choowong et al. (2014)

Objectives of the in-depth geological research

DMR has planned for Samphunbok and Phachun to become areas for national conservation for natural and geological resources. Therefore, **Chula Unisearch** was commissioned by DMR to conduct a detailed geological investigation to underpin consideration by GGN. The objectives were 1) to conduct an in-depth geological research focusing on internal rock structures and the entire stratigraphy, paleontology and episodic evolution of the Samphunbok, Phachun and adjacent areas; and 2) to study the geomorphology, distribution, landform and dominant features of the site in order to develop a model showing how the site has evolved in relation to the pattern and origin of landform through time.

Figure 2: Emerged sandstone rock basement in the Mekong embayment of Thailand's side, showing extensive potholes or weathered pits as evidence of erosion by the river covering approximately 6 square kilometers.
Source: Choowong et al. (2014)

Results obtained from the in-depth geological research

The researcher team has produced a standard 1: 50,000 scale geological map showing rock stratigraphy following the DMR lexicon. More than 100 sites were visited to conduct detailed geological and structural studies, including sample collection from all exposed rock units in each area. Then, a 1: 4,000 scale geological map was prepared in the area where pot-hole features were dominant. The survey covered more than 30 localities with dominant areas of pot-holes, 11 stratigraphical columns, 5 stratigraphical correlations, and 400 sites for the measurement of internal sedimentary structures. A geomorphological map was made at 1: 50,000 scale, covering all pot-hole sites and a 1: 4,000 scale was also created to map the dominant features of pot-holes. Pot-holes are mostly found in sub-horizontal beds of pebbly sandstone belonging to the Phu Phan Formation.

Figure 4: Measurement of sedimentary structures from sandstone exposed in the middle of the Mekong River and nearby. The measurement was aimed to analyze the paleo-current of ancient river from the inclination angle of cross-lamination and cross-bedding.
Source: Choowong et al. (2014)

Figure 3: Phachun (sandstone cliff), located in the south of Samphunbok, is formed along a fracture and joint system as a cliff-face and is dominated by weathered holes, locally named "30,000 holes". This area is one of target areas for tourism and conservation.
Source: Choowong et al. (2014)

Results in analyzing the origin of geological features and potential conservation sites at Samphunbok and Phachun are summarized as follows.

Samphunbok, a spectacular pot-hole field, features extensive distribution of sandstone of the Phu Phan Formation. Sandstone here is predominantly coarse-grained with pebbles. The upper sandstone bed is homogenous and well sorted fine to medium sand grain with average bed thickness of 2-3 meters. Mega cross-beddings are common and show pebble grain orientation along mega cross-bedding. In sites where pot-holes are extensively exposed, sandstone beds are sub-horizontal with a dip angle of less than 5 degrees. Pot-holes in sandstone beds are located in the middle of the syncline.

Based on geological factors of pot hole host rock, morphology, lithology, texture, sedimentary structures and regional structure, patterns of pot-holes in this site are classified into 6 types including 1) pot shape, 2) curve and long shape, 3) large-pool shape, 4) sinkhole-like cave shape, 5) straight and connected shape and 6) U-shaped valley or canyon.

Weathered holes at Phachun are identified as 1) horizontal holes that were eroded at water level, 2) holes that were occurred along cross-bedding and cross-lamination structures and 3) holes in between secondary concretion of silcrete. *"Coloured stone"* observed along with weathered holes are coated at the rock surface by silica, anorthite and goethite.

In term of evolution of the site, Samphunbok and Phachun are part of the Khorat Plateau. The plateau was uplifted and folded extensively in the Tertiary period as a result of the collision of the Indian-Australian and Eurasia plates (Himalayan orogeny). Based upon detailed observation of internal sedimentary structures, all rock formations of the Khorat Group exposed here were formed

Figure 5: Channel created by erosion of the Mekong with various sizes of spectacular pot-holes.
Source: Choowong et al. (2014)

by fluvial systems including braided and meandered systems.

Paleo-currents of the ancient rivers of Phu Kradung Formation flowed to the south and west. The Phra Wihan Formation flowed to the north and west, whilst the Sao Krua Formation showed paleo-current to the west. In the Phu Phan Formation, pot-holes dominated the sandstone, and paleo-current flow was to the west and northwest. On average, paleo-current directions were generally to the west. The main source of quartz sand transported to the Khorat basin was definitely from the east. The weathered Kontum granite terrain found in Vietnam and Lao PDR was the most probable source that provided an extensive amount of quartz originating from the Khorat Plateau.

In terms of risk analysis of the Samphunbok and Phachun, both sites face risks only from natural agents such as the flow regime of turbulent water in the Mekong River, and from future changes in the course of the river and its tributaries. Impacts on the sites from local residents and tourism are minimal, comprising minor construction and graffiti. No large buildings or infrastructure is evident at the site, possibly due to risks from natural annual flooding of the Mekong River.

Conclusion

The detailed geological investigation of the geology of Samphunbok and Phachun, Ubon Ratchathani Province is another example of the promotion of the Global Geoparks Network (GGN). Apart from the completion of geological resources, Samphunbok, Phachun and nearby sites are also appropriate as conservation routes for many reasons. The area's unique ecological, archaeological and cultural features have long been known; however, it is important that any promotion as an international tourism site should ensure a balance through sustainability planning.

Figure 6: "30,000 holes" appear in sandstone cliff of Phachun, an amazing destination for adventure tourists.
Source: Choowong et al. (2014)

The study's key recommendation is that local communities must be actively engaged and work together with local government organizations to develop and co-manage a local area sustainable tourism plan. This project is one example of integrated in-depth geological knowledge for developing tourism site, the assignment complemented the University's strategic plan to develop and apply knowledge for the benefit of society and industry, and being a part of the needs of knowledge transfer to the public, one significant condition to be met for the area's future recognition as a member of GGN.

Acknowledgements

This article is part of the research project entitled *"In-depth Research of Significant Geological Data for Establishing the Geo-park Conservation"* funded by the Department of Mineral Resources (DMR), Ministry of Natural Resources and Environment.

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Music Therapy for Patients Undergoing Hemodialysis

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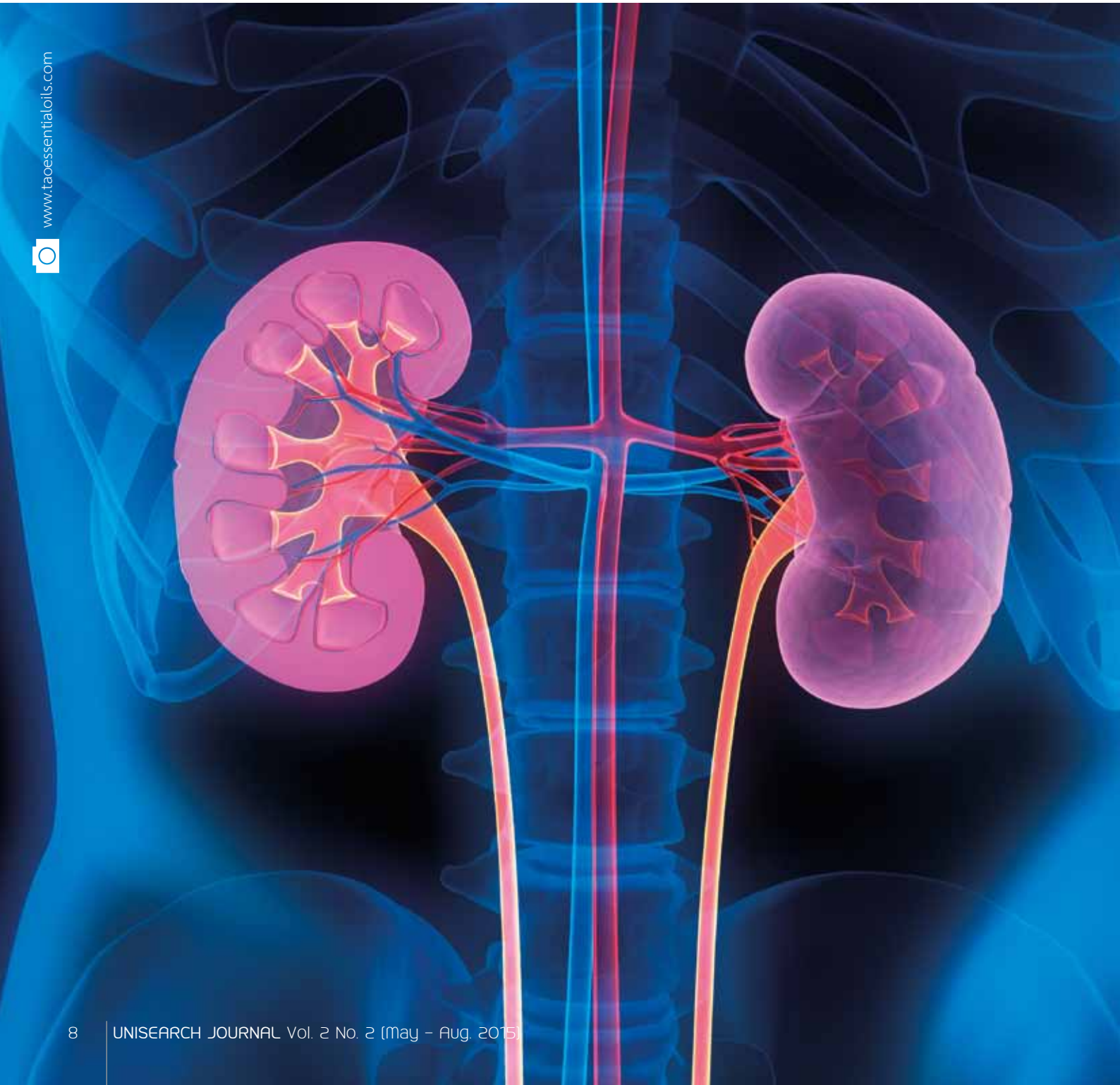

Introduction

Music has entranced humans since pre-historic times. Diverse musical cultures have evolved within the world's societies, reflecting their ways of life. Each tribe created music from their own imagination to express their feelings and emotions through rhythm and intonation, and passed on these musical traditions through the generations. Music has varying physical and mental effects, for example in physical terms on respiration rate, pulse, blood pressure, pupillary response, muscle tension and blood circulation. However, music can also affect mood, consciousness, imagination, and awareness of reality. Music therapy can play a significant role in treating physical, mental and social dysfunctions, and has been widely researched in the USA, Europe and Japan.

However, in Thailand, music therapy is under-utilized, lacking as it does the support of the government. Especially in large cities such as Bangkok, people suffer high levels of stress from environmental pollution and the challenges and demands of urban life, and hospitals receive relatively high numbers of patients suffering from stress and mental health problems. Music therapy offers hospitals in Thailand an alternative or complementary treatment that can contribute to positive patient outcomes.

Meaning of music therapy

As the name implies, music therapy uses music to calm emotions, restore and improve emotions, body and mind. The music used in the therapy has to be approved by treatment specialists, including the music therapist, physician, social worker, psychologist, person in charge of the case study and the patient's relatives. In this research, music is used as a tool to build a good relationship between the therapist and the patient through well-designed activities that are suitable for patients, including singing, listening and playing music. To use the therapy to its full potential, music therapists apply their skills and experience to personalize the treatments according to the ailment, needs, behaviour and background of each individual patient.

Activity patterns of music therapy

1) Individual Music Therapy: this can be done without waste of time because there is no need to wait for anyone. It is most suitable for introverted patients or those with serious conditions who have to be controlled by the music therapists; however, normal patients can avail themselves of music therapy as they wish.

2) Community Music Therapy: patients who cannot use individual music therapy can use community music therapy, which offers the additional benefits that patients must conform to group rules for unity, and they can interact with other patients or community members. This helps create empathy and reduce loneliness and depressive tendencies. The concept of community music therapy is very popular in Europe and Asian medicine,

and many states in America, Europe and Japan have established public organizations to support and fund community-level activities.

Criteria for the choice of music to be used are often discussed; the most important is the patient's own taste. If the patient is satisfied with the choice of music (and irrespective of whether or not the patient has any musical background or interest), this is likely to lead to more favourable outcomes of the therapy.

The utility of music therapy among BMA hospitals' patients

The current study on music therapy for patients undergoing hemodialysis in Bangkok Metropolitan Administration (BMA) hospitals emerged from cooperation between the Department of Culture, Sports and Tourism, Bangkok and the Center of Excellence for Thai Music and Culture Research, Faculty of Fine Arts, Chulalongkorn University in collaboration with **Chula Unisearch** as project coordinator. The study's goal is to advance understanding among BMA hospitals and their staff of the role and potential of music therapy. The study was piloted with patients undergoing hemodialysis at three BMA hospitals: Klang, Taksin and Charoenkrung Pracharak hospitals. This interdisciplinary research brought together music specialists, music therapists, epidemiologists, physicians and nurses. The study has fostered inter-disciplinary research and enhanced exchange of knowledge among medical staff and researchers in BMA hospitals and demonstrated the important contribution and potential of music therapy as a complementary treatment. Moreover, this research can be used as a model for other hospitals in Thailand.

This is a cross-over, pre and post-test design; simple randomization was used to assign initial treatment type (Live or Listening). The washout period was one week. Criteria for assessment were systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse, pain score and anxiety scale. All hemodialysis patients from 3 hospitals who met the inclusion criteria and who were willing to participate signed the informed consent form approved by the BMA Ethics Committee. Moreover, music therapy can be used utilized depending on patient's needs and hospital's readiness in terms of budget, staff, space and facility.

Figure 1: Music listening Intervention using Mp3 player
Source: Bussakorn Binson, October 2011

Figure 2: Music listening Intervention using Suzuki Q-chord
Source: Bussakorn Binson, October 2011

Tools used in the two interventions

A Suzuki Q-chord and computer notebook were used in the live music intervention. The music therapist placed the instrument by the bedside so that the patient could touch and sing along. An Mp3 player and earphones were used for the music listening intervention. For both treatments, the subjects were allowed to select their choice of music according to preference. This was followed by an assessment of their levels of pain, anxiety and the collection of blood pressure and heart rate data using electronic monitors.

Results

The results in Table 1 indicate no significant differences in SBP, DBP, and pulse rates for patients undergoing hemodialysis in conjunction with live music therapy (P>0.05). However, the pain and anxiety scores were significantly different (P>0.05). The pre – post pain and anxiety scores for the before and after hemodialysis with the listening-music Intervention shows a statistically significant reduction as did hemodialysis with live music therapy.

Conclusions

The results from this study indicate provide evidence to support the utility of live music or listening music therapy for patients undergoing hemodialysis treatment. Although no treatment effects on blood pressure or pulse rate, both treatments significantly reduced post-treatment pain and anxiety scores compared with pre-treatment. There was no significant difference in efficacy between the two forms of music

Table 1: shows pre-post treatment means of blood pressure, pulse, pain, and anxiety scores.

Type of Music Invention	Pre	Post	P-Value
Live			
Systolic Blood Pressure (SBP) in mm.Hg	147.90	144.20	.192[a]
Diastolic Blood Pressure (DBP) in mm.Hg.	82.00	82.30	.799[a]
Pulse rate per min.	77.00	76.80	.857[a]
Pain Score (0-10)	2.26	1.31	<.001[b**]
Anxiety Scale (0-10)	2.44	1.06	<.001[b**]
Listening			
Systolic Blood Pressure (SBP) in mm.Hg	152.90	145.10	.020[a*]
Diastolic Blood Pressure (DBP) in mm.Hg.	79.90	80.10	.895[a]
Pulse rate per min.	77.80	76.40	.122[a]
Pain Score (0-10)	2.50	1.11	<.001[b**]
Anxiety Scale (0-10)	2.83	1.33	<.001[b**]

Remark: *Level of significance at .05 ** Level of significance at .01
a = Paired t-test, *b* = Wilcoxon Signed Rank test
Source: Binson et al. (2013)

Figure 3: Dr.Bussakorn Binson received SAGE 2012 Best Paper Award at 3rd International Association for Music and Medicine 2012, Chulalongkorn University
Source: Thachakorn Kaewwan, July 2012

intervention. The results also suggest that music therapy can be used utilized depending on patient's needs and hospitals' readiness in terms of budget, staff, space and facility.

Moreover, this study was awarded the SAGE Best Paper Award in the 3rd International Association for Music and Medicine 2012, in July 2012, Chulalongkorn University, Thailand.

Acknowledgements

This article is part of the research project *"Music Intervention on Patients Undergoing Hemodialysis in the Bangkok Metropolitan Administration Hospitals"* funded by the Culture Sports and Tourism Department.

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Rationale Behind a Healthy City

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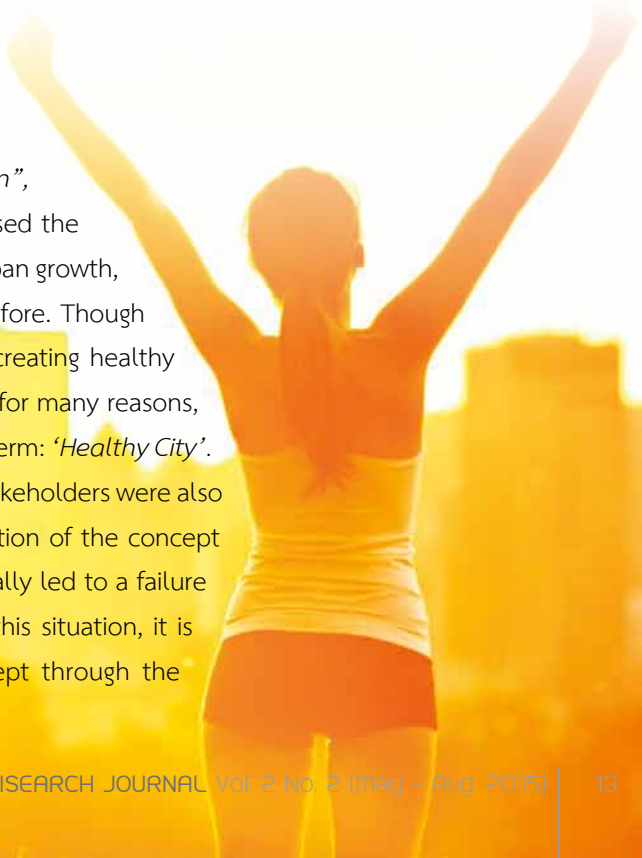
Introduction

A healthy city is one which facilitates both physical and emotional well-being for its residents. It promotes physical fitness and positive emotional health in an urban context. This is because the urban lifestyle differs significantly from the natural ways of life without pollution, where physical effort was constantly required in labour-intensive activities typical in agricultural societies. However, urban society requires humans to adapt to a hectic pace of life and a high level of stress, and lack of physical exercise. People compete for their share of limited resources in a society strictly controlled by rules and regulations imposed to ensure peace and order. Urban sprawl, congestion, and pollution alienate humans from a high-quality, natural way of life, and are typified by inadequacy of urban recreational space and inactive physical activities. It is, therefore, important to consider how can urban lifestyles be adapted to facilitate physical, emotional and social well-being?

Rationale

According to Ballobh Kritayanavaj's summary on the *"United Nations's World Urbanization Prospects: The 2009 Revision"*, it is asserted that in 2007, the world's urban population surpassed the rural population for the first time in history. With rapid pace of urban growth, issues pertaining to urban well-being have rapidly come to the fore. Though the Thai government has been trying to promote the idea of creating healthy cities to its citizens, these efforts have met with limited success for many reasons, including the absence of consensus even in the definition of the term: *'Healthy City'*. Unequal benefits and the lack of integration between relevant stakeholders were also limiting factors. These issues all contribute to the misinterpretation of the concept and idea behind the meaning of the Healthy City, which eventually led to a failure to promote the concept among the general public. To rectify this situation, it is therefore crucial to build mutual understanding of the concept through the following principles.



Principle 1 Well-being in terms of Healthy Cities refers not only to physical health and fitness, but also positive emotional well-being. Therefore, the development of well-being must address both mental and physical needs.

Principle 2 In order to take a holistic approach to building Healthy Cities, the policy must be both proactive and responsive. This includes adoption of measures to improve urban health and to prevent and assuage the symptoms of ill-being among urban population.

Principle 3 Affluent citizens generally experience a better sense of well-being through their better access to services and resources. Unequal access to health and other social services must be addressed if we are to tackle the intractable issues of disadvantaged urban communities.

Principle 4 The Healthy Cities concept does not aim to create a universal, standardized, universal model for urbanites to adopt. Instead, the guidelines must allow adaptation and

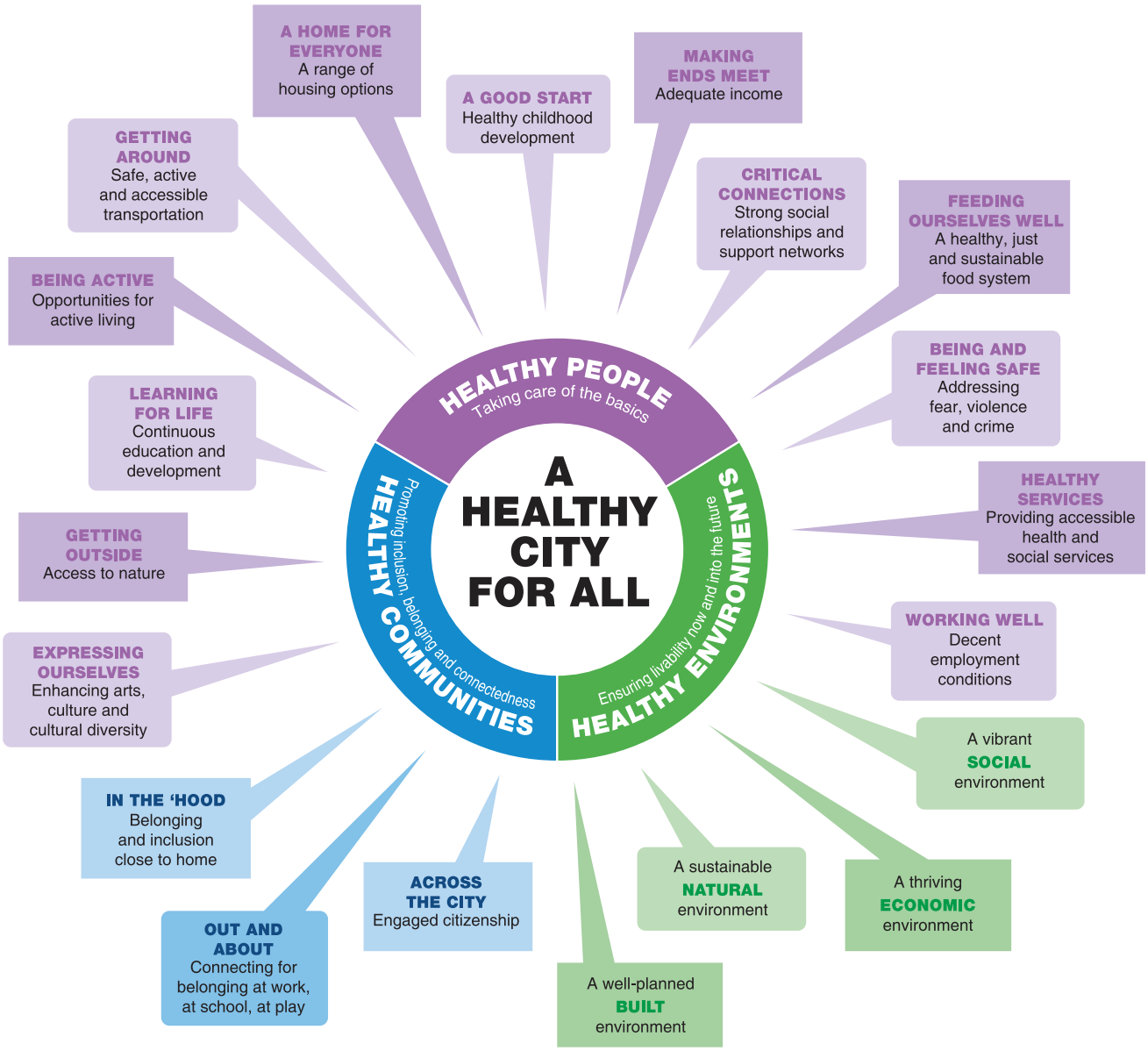


Figure 1: Principles to Develop the City of Well-being
Source: Cultivating Healthy Places (2012)

tailoring to the specific requirements of each individual community. Thus, the standards that will be created must allow a degree of flexibility to accommodate diverse needs, cultural differences and social contexts.

Principle 5 The development of the Healthy City must set specific goals. It is however important to note that the implementation of the Healthy Cities project incurs many necessary costs. The effort to promote well-being thus requires effective resource management to distribute benefits and costs equitably.

Principle 6 The development of the Healthy City should not be the sole responsibility of the central government or any particular local authority. Instead, all relevant stakeholders must work synergistically to effectively create the enabling conditions and promote urban well-being. However, local municipal authorities should take the lead, with strong support from central government.

The Elements of Healthy Cities

The six principles outlined above are consistent with the guidelines for developing a Healthy Cities project as advocated by the World Health Organization (WHO) which identified 11 elements as key parameters for Healthy Cities since 1997 (World Health Organization, 2012). These are listed as follows.

1. A clean, safe physical environment of high quality (including housing quality): urban areas are becoming increasingly congested. Consequently, biological processing in waste management alone is not an effective method in dealing with the substantial amount of wastes produced. Urban environments therefore need effective management and administration to create a clean and safe living environment which leads to the well-being of residents.

2. An ecosystem that is stable now and sustainable in the long term: a city comprises both man-made and natural environments in co-existence; therefore it is made up of diverse

ecosystems. Such diversity is in need of a good balance between different physical components to strengthen the platform for sustainable growth.

3. A strong, mutually supportive and non-exploitative community: the successful development of Healthy Cities is a public agenda that requires citizen participation and consensus. This is because the implementation of the Healthy Cities project demands a balanced combination of individual and public concerns.

4. A high degree of participation in, and control by, citizens over decisions affecting their lives, health and well-being. Thus, citizens' participation is required in the public decision making.

5. The meeting of basic needs (food, water, shelter, income, safety and work) for all the city's people: the Healthy Cities project must uphold the fundamental concept of equity and equal opportunity over the citizens' financial incomes and social status.

6. Access for all to a wide variety of experiences and resources, with the chance for a wide variety of contact, interaction and communication: resources should be accessible to citizens of all genders, ages, and financial circumstances. Besides, it should also facilitate appropriate interaction, contact and communication among citizens.

7. A diverse, vital and innovative economy: a wide variety of economic activities must be arranged and innovated. Citizens of successful Healthy Cities live in a stable economy which creates value and quality employment for its people.

8. Connectedness with the past, with the cultural and ethnic heritage of city dwellers and with other groups and individuals: it is important to bridge the generation gap and promote co-existence and understanding among citizens from different backgrounds.

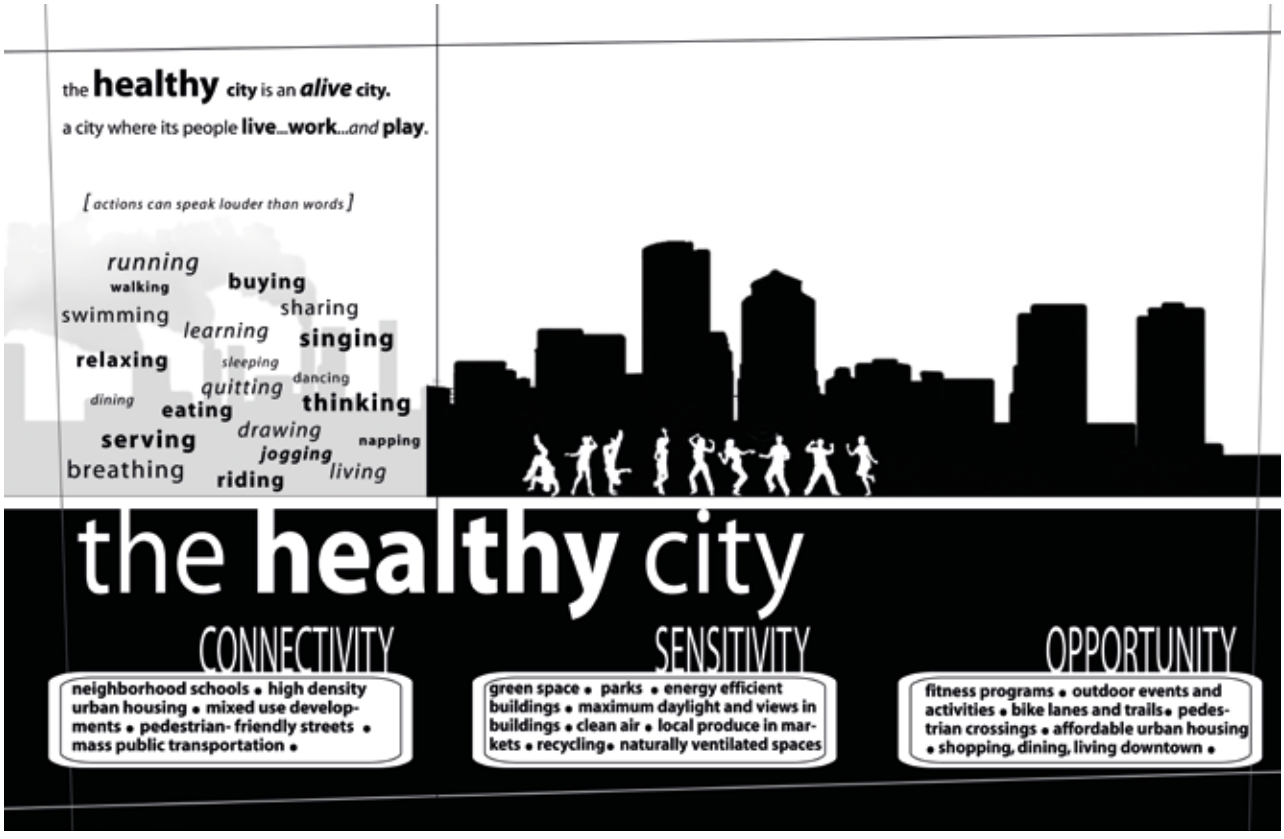


Figure 2: Key Parameters for Healthy Communities
Source: Oxford Health Alliance (2014)

9. A form that is compatible with and enhance the preceding characteristics: the addition of new components which promote Healthy Cities must take precedents into consideration and ensure continuity.

10. An optimum level of appropriate public healthcare services, accessible to all: health services must be of high quality and made accessible to all citizens equally in order to develop urban well-being.

11. High health status (high levels of positive health and low levels of disease).

Sharing Knowledge with the Community

With the aim to drive academic change in creating Healthy Cities following the international concept asserted by WHO and to build a better understanding of the relationship between physical components of a city and its impact on urban health, the Thai Health Promotion Foundation and the Department of Urban and Regional Planning, Faculty of Architecture, Chulalongkorn University, have collaborated in *"the Project to Develop Academic Support to Promote Healthy Setting and Sustainable Physical Environment in the Urban Context"*. The primary purpose is to build and transfer relevant academic knowledge in an effort to promote Healthy Cities. The project is committed to raising awareness of the concept, and created a physical urban environment that is conducive to the development of Healthy Cities. The targets of this project are urban areas under local administration at the municipal and city levels that are urban population centres in the country. The project aims to provide support using 10 key instruments as follows.

1. Training for physical planners to provide knowledge of designing the physical environment that facilitates urban health for executives and government workers at municipal and city levels. The training is divided into 2 sessions, namely an introduction to the development

of Healthy Cities and the specialized knowledge in 10 different fields according to the context and direction of the development plan of each individual local administration unit.

2. Solution seminar series function as a channel to share the latest advances and knowledge in the field of urban health to urban residents by selecting issues of concerns to the general public as topics of discussion. Experts and stakeholders are invited as participants, while the results of the seminars are disseminated to a public audience with the goal to drive social change.

3. Strategic situation reports are issued to assess and evaluate the situation concerning urban health using scientific apparatus and statistics to create a concrete measure of urban health evaluation. The results will be publicized to raise wider awareness.

4. Physical planning manuals are created to use in conjunction with the aforementioned training for physical planners. One set of manuals comprises 10 volumes that are adapted from WHO parameters to address Thailand's local urban context. The manual concerns 10 topics as follows.

1) Sanitation - Public Health
2) Safety
3) Transportation
4) Waste management
5) Leisure and recreation
6) Food - water
7) Housing quality
8) Values of urban space and architecture
9) Community economy
10) Public space design that facilitates social interaction

5. Supporting pipeline projects: an effective method of sharing knowledge through collaboration with local administration units that are considered ready and financially appropriate contribute to the Healthy Cities programme. The project will provide assistance in the form of experts and knowledge sharing to aid the coordination, final design and construction to ensure accurate implementation of Healthy Cities principles to create effective urban recreational space.

6. Visionary initiatives: build collaboration among stakeholders in the projects which are deemed highly significant to urban planning and development. Equipped with technical expertise and knowledge, the project takes a proactive role to help create a vision that encourages urban health and well-being.

7. Consultancy service for important area development projects entails collaboration with local administration units that express a need to develop Healthy Cities in the face of inadequate personnel and relevant knowledge resources. The project works with the local authorities from the outset to create a development plan that follows the Healthy Cities principles before proceeding to construction.

8. Design review offers help with the current design submitted by the local administration units. The project's experts review existing designs based on the standard criteria of Healthy Cities development and provide suggestions on areas that need to be improved.

9. Ongoing expansion and engagement is promoted by sharing new knowledge developed through the creation of manuals, situational assessments and seminars, as well as the project's involvement with urban space design, with research units centrally located in different regions of the country. These research units will localize the principles developed according to regional context and disseminate them to their areas of responsibility.

10. Development of an information system and communication area: provide a learning centre for citizens as well as function as a communication channel between the project and other organizations that show an interest in Healthy Cities development.

Conclusion

The six aforementioned principles have led to *"the Project to Develop Academic Support to Promote Healthy Setting and Sustainable Physical Environment in the Urban Context"*. The purpose of this project is to disseminate and develop practical usage of academic knowledge through the successful development of Healthy Settings for citizens based on the WHO's 11 key parameters for Healthy Cities. The parameters have been translated into 10 topics of concern that are relevant to Thailand's social context, while taking into consideration various needs of citizens from different local communities. This has helped create an operational framework for the project which acts as a central unit that compiles knowledge and coordinates with related stakeholders to achieve consensus in the definition of Healthy Setting. The main responsibilities of this project is to work synergistically with other organizations to drive change and create a better understanding to the public, develop an example of a Healthy Setting that effectively promotes urban health and well-being, as well as take part in the development of Healthy Cities in the country.

The project's operation has so far proved a success, with the results of the study cited at both national and international levels (The Association of Siamese Architects under Royal Patronage Expo, 2013 and 2014). Moreover, the results of the project have also been incorporated

in the design of the Urban Design and Development Centre (UddC). Nevertheless, a follow-up study has found that citizens still have a low awareness of well-being, presuming that Healthy Setting should be given by default as part of their daily lives. Such perception is arguably the product of the old way of life and should be seen as obsolete and outdated. The transition from rural to urban life causes significant change in citizens' lifestyles. Therefore, raising awareness of the change in lifestyles is a good starting point to encourage individuals to participate in projects and activities designed to enhance health and well-being. This should ultimately result in the success of the current project in the future.

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ARTICLE

Transferring Knowledge about Soil and Yield Improvement with Biochar

for Food Security and Agriculture Sustainability

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Introduction

People in rural areas of Thailand, most of whom are farmers, are still suffering from poverty. Despite continuous efforts to provide education and support from many government agencies, their quality of life has not improved. The reasons are complex, but include a lack of access to knowledge and production factors, including credit and modern technology. Given the barriers farmers face to adoption of any new technology, it is important to blend science and technology with local wisdom to develop appropriate innovative technologies, and to communicate them in a way that is relevant, understandable, practical, and acceptable to local communities.

Soil quality and lack of water lie at the root of poverty in Thailand's rural areas. Poor productivity forces farmers to use excessive amounts of chemical fertilizers and pesticides, adding to production costs but contributing only marginally to higher yields. Moreover, apart from increasing indebtedness, excessive use of agrochemicals affects the quality of the environment, leaves chemical residues in the soil, and impacts upon the health and quality of life of farm families and communities. Together, these factors contribute to a long-lasting cycle of poverty for Thai farmers.

H.M. King Bhumibol's initiative of the New Theory of Agriculture focuses on self-sufficiency. The New Theory encourages good environmental stewardship, reduces production costs by minimizing reliance on chemical inputs, to focus on improving soil quality to provide a long-term and sustainable source of food. The project to improve soil quality and increase productivity with biochar for food security and sustainable agriculture was funded by the National Research Council of Thailand (NRCT) as a project that transfers technology to potential target groups. Under the education and transfer of technology from research and innovation, it is expected that the knowledge from the biochar research will be used to improve soil quality and agricultural productivity. Materials for producing biochar are easy to find, particularly crop residues. Biochar can be readily produced by farmers themselves using a locally-constructed controlled temperature biochar retort; the process is simple and cost-effective. The process can produce biochar from a diverse range of feedstocks, and optimal biochar feedstocks and pyrolysis conditions are already understood. The technology is now ready to make a prototype for transferring technology and knowledge to farmers in order to contribute to sustainable agriculture and future food security.

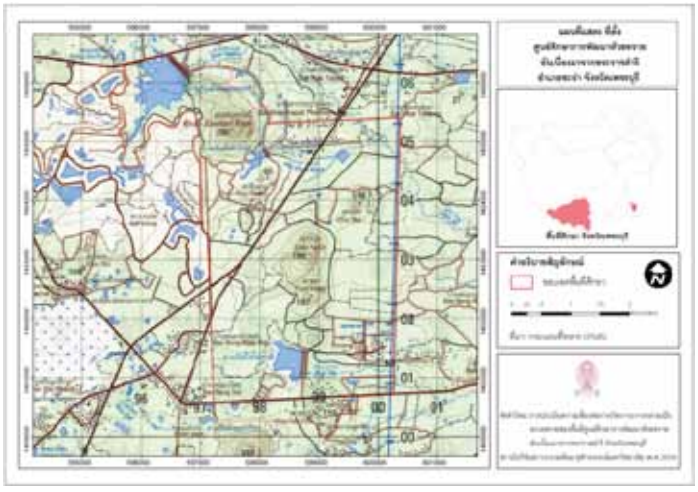
Pilot project areas

The project to transfer knowledge on soil quality and yield improvement using biochar was conducted in 2 locations: 1) a test plot at Huay Sai Royal Development Study Center, Cha-am, Phetchaburi and 2) a test plot at Pa Deng Sub-district, Kaeng Krachan, Phetchaburi (Figure 1). These two areas both suffer from low soil quality and local water scarcity. In Huay Sai, the soil lacks the ability to absorb water and is dry, hard, and eroded. On the other hand, Pa Deng location lacks fertile soils, while the community is expanding and making increasing demands for more agricultural land. Without appropriate land use planning and management, both locations are at significant risk from desertification processes (Wijitkosum 2012a; Wijitkosum 2012b; Wijitkosum, Yolpramote and Kroutnoi, 2013).

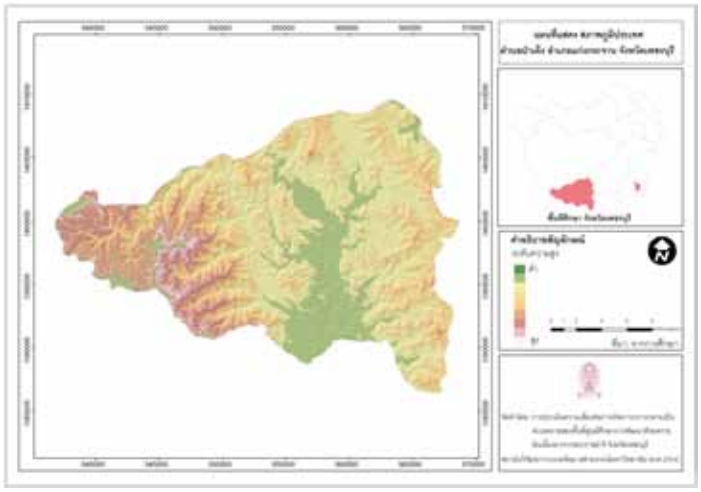
Target group

In this project, the researchers chose to transfer the biochar technology and knowledge through training workshops. 70 local participants were divided into 4 groups: 1) farmers, 2) local community leaders, 3) authorities in relevant agencies such as Chief of Pa Deng District Agricultural Extension Office, Agricultural Extension Officers and Land Development Officers and 4) staff of the Huay Sai Royal Development Study Center and local administrative officials.

Huay Sai Royal Development Study Center is for administration, supervision, and monitoring of the project's implementation, and has conducted considerable empirical research into initiatives including the New Theory and the Sustainable Economy. The target groups in this area are, therefore, well known to the staff and are familiar with the



A. Huay Sai Royal Development Study Center, Cha-am, Phetchaburi



B. Tambon Pa Deng, Kaeng Krachan, Phetchaburi

Figure 1: Pilot project Areas
Source: Wijitkosum and Kroutnoi (2011)

workshop training learning process. The training was conducted by experts including researchers and staff of the Center. Moreover, Pa Deng's local administrative organization and farmers were also ready and interested to participate in this transferring knowledge workshop. The trainers included researchers and staff of Pa Deng Biochar Research Centre. When the project is complete, both locations can serve as learning centers for using biochar to improve soil quality and agricultural yields in the future.

The project participants were evaluated in terms of their understanding throughout the project term (8 months) and will participate in a hands-on learning process throughout.

Transferring technology– from research to the community

Research on using biochar to improve soil quality and crop yields conducted since 2009 found that soil incorporation of biochar significantly increases the quantity and quality of yields in rice, vegetable, and field crops (Sriburi and Pituya, 2011; Kalayasiri and Wijitkosum, 2013; Sriburi and Mattayom, 2013; Wijitkosum, Mattayom and Sriburi, 2015; Wijitkosum and Kalayasiri, 2015). In addition, it also saved production costs (Sriburi, Mattayom and Sirichoo, 2013).

These research findings were extensively used as a basis for implementation of the current project. The activity was divided into 3 parts: theory, practical training, and training on cost-effectiveness in using biochar for agriculture and conclusion of project implementation. The activities are as follows:

1) Theory

The theoretical training aimed to educate trainees and provide basic understanding of biochar, its properties, functions, production methods and use. Training topics included properties and functions of biochar, materials that can be used to produce biochar, materials and equipment for making a biochar retort, the slow pyrolysis process, optimal ratios of materials for making biochar, applications of biochar for improving soil quality and yields, and other uses for biochar.

2) Practical training

The practical training aimed to give farmers some familiarity in producing and using biochar in agriculture, and to ensure that participants have the necessary skills to produce biochar, construct the retort, and apply the biochar correctly in the field. The practical training consists of 3 parts: 1) constructing the retort; 2) preparing feedstock and fuel materials, including preparation of the fuel, temperature control, incineration time, and final removal of the biochar product from the incinerator; and 3) applying biochar to improve soil quality and yield by conducting afield-test using white radish, shallot, and soybean. Participants will learn and practice from the beginning, ensuring the correct granule size, calculating the optimal quantity of biochar to apply, ratio of biochar, soil mixture, and organic matter, growing plants with biochar, using EM solution to fertilize

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the plant, harvesting and physical assessment of the plant to analyze and compare yields. Every step from preparing land and the number of plots were prepared following standard research methodology. Yields from the test plots were harvested and evaluated and soils were also analyzed to share the findings with the trainees.

3) Training on cost-effectiveness in using biochar for agriculture and conclusion of project implementation

In order to introduce a new technology or apply new method to change longstanding lifestyles and practices at community level, it is important to demonstrate concrete results that can be readily assessed- such as higher productivity, improved soil quality, higher profits, or lower costs. Therefore, the researchers evaluated the cost-effectiveness of biochar use in agriculture for trainees to see first-hand.

In addition, this process allowed trainees from both locations to share their opinions, challenges, and experiences during project implementation, as well as offer their own suggestions and recommendations.

Results

Throughout the 8-months implementation period, the total number of participants was 148 persons, higher than the original target of 70 persons. 87 trainees were farmers, compared with the original target of 40 (217.50%). Many of these farmers were already implementing integrated farming and the New Theory Agriculture, and were interested in learning more to benefit their lives and livelihoods. Originally, 10 staff members of the Huay Sai Royal Development Study Center were invited as speakers/trainers, but

ultimately, 31 staff members contributed (310%). These staff members were considered as potential biochar advocates who would become experts in transferring biochar knowledge to visitors at the Huay Sai Royal Development Study Center. The target of 20 officials from local administrative organizations and related agencies from both areas was also exceeded, with 30 officials attending (150%). They decided to join the project because they wanted to expand their knowledge and learn how to use biochar in agricultural land, distribute the knowledge, and apply it in their respective tasks.

Following implementation, all target groups gained a good or very good understanding of the use of biochar for improvement of soil quality and to boost farm yields, both in theory and practice. Participants were interested in testing the use of biochar on their own land, which was the result of their personal participation in the project's field trial at every step, having seen the objective result compared to non-biochar farming, calculation of cost-effectiveness, and breakeven time as explained by the workshop.

The community learning process

During implementation, it was found that participants had the potential and interest to learn. A post-project survey revealed that 30 percent of participants actually used biochar on their own farm. This is considered a significant success of the project that could change local farm practice. According to the survey, although more participants were interested and wanted to use biochar, they were constrained mainly by lack of funds to construct the retort. To address this issue, the project constructed a retort for common use by the community, to be monitored by the research team who can also advise farmers on appropriate usage of biochar. In addition, the researchers produced a manual and leaflets for using biochar; both are concise and easily understandable, for future reference.

However, some farmers preferred to applying biochar on their farm in their own traditional way. For example, they preferred to use biochar together with dairy cow compost which is easy to find in their areas, in order to increase productivity. They may also combine biochar incorporation to improve soil quality with soil conservation practices such as growing vetiver to prevent soil erosion. Moreover, farmers also suggested a new way of farming that may be useful for applying biochar such as the application of biochar in swampy farmland. The farmers were also interested in using biochar for other kinds of crops aside from those tested, demonstrating the commitment and interest of trained farmers to learn and change their practices to adopt more sustainable agricultural practices, provided they are supported in terms of knowledge sharing, budget, and introduction to techniques that are practical and visibly successful.

Therefore, the studies in the various subjects to address local needs are important and needed to be supported and published for the benefit of the local community and the environment.

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Research and Development of the Mechanism of Marketing Strategy for

Thailand's 100% Fresh Milk

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Introduction

"The Kingdom can only develop once its people are healthy[1]," **was the royal thought of H.M. King Bhumibol Adulyadej during the early years following his accession to the throne.**

In 1962, King Frederick IX of Denmark paid a royal visit to Thailand. H.M. the King asked for a pair of dairy cattle in order to test their suitability for a tropical environment such as Thailand. On 16 January 1962, H.M. King Bhumibol and H.M. Queen Sirikit inaugurated the Thai-Danish Dairy Farm (TDDF) and dairy training center.

Through the continuous development of animal husbandry in Thailand, from two original dairy cattle donated to Thailand in 1962, Thailand's dairy herd has grown to approximately 600,000 dairy cattle, yielding 1.07 million tons of dairy products in 2015. This is entirely due to His Majesty's vision and forethought. His innovative thinking allowed TDDF to experiment on raising dairy cattle more accustomed to temperate climates. Over time, Thailand succeeded in developing a breed that is acclimatized to tropical climates, paving the way for a dairy farming industry in Thailand. This is now considered as *"an occupation conferred by H.M. the King's Royal Grace"*. Since then, the King has been acclaimed as the *"Father of Dairy Farming in Thailand"*.

Dairy farming is a promising occupation, generating significant wealth for agriculturalists. The dairy price remained favourable for more than half a century, until Thailand signed ASEAN Free Trade Area (AFTA) in 1992. The new agreement impacted this *"conferred occupation"* and severely damaged the industry, which had always been considered a sustainable occupation.

Several ideas have been developed to sustain the 100% fresh milk market including applied social sciences research, synthesis of problem solving guidelines and the launching of pilot projects that can be applied to ongoing businesses.

Problems and challenges

Thailand's plant products face significant marketing challenges, due largely to the *"Supply Push"* model that dominates the agricultural production system. *'Supply-push'* also means that farmers are the only group who take risks in producing and selling their main crops. Another problem is that plant products are perishable, low-price upstream products. Therefore, every year the government has to set aside a budget to aid and support farmers' livelihoods. However, some crops remain unaffected by changing market conditions due to strong min- and downstream management plans. Successful companies often employ marketing forecasts to hire farmers to grow crops and animal products through contract farming.

[1] Unofficial translation

Figure 1: Inauguration of the Thai-Danish Dairy Farm (TDDF) and dairy training center on 16 January 1962
Source: Dairy Farming Promotion Organization of Thailand (no date)

Problems worsened since Thailand signed the ASEAN Free Trade Area in 1992, forcing Thailand to open its market for imported powdered milk, originating mainly from Australia and New Zealand. Many dairy companies dissolved the powdered milk with water and added artificial ingredients to make it taste like 100% fresh milk produced by Thai farmers. The companies used sophisticated advertising strategies to influence consumer buying decisions and misrepresent their products as 100% fresh milk. Customers were often unable to distinguish between the farmers' 100% real fresh milk and the recombined milk. This technique greatly affected sales of 100% milk, and farmer income. Moreover, the 100% fresh milk market was not very well advertised; therefore, consumers had very limited direct *"access"* to this market.

Rethinking the distribution of 100% fresh milk from the supply push model to a demand pull focus shifts the focus to the consumers. This is known as a '360 degrees reverse thinking'; a customer-centric method requires studies to understand consumer behavior and answer questions such as consumer preferences; *"Where do consumers usually shop?"*; *"How do consumers perceive the product's name?"* and *"Who is the buyer?"*, etc. Identifying customer behavior can be a major challenge. However, when the demand pull model is fully implemented it will also create sustainable demand for the product. Moreover, accurate market forecasting can also create new markets specifically for Thai farmer's 100% fresh milk. This method can be considered as product differentiation.

Researchers and marketing specialists brainstormed and analyzed the above challenges and formulated two research hypothesis:

1. Consumers are unable to distinguish between 100% fresh milk produced by Thai farmers and recombined milk.
2. Consumers cannot buy the 100% fresh milk directly which means they have limited *"access"* to the products.

Thus, in order to put these research findings to good use, a conceptual framework was developed in 4 parts:

1. Research on consumer behavior
2. Synthesizing possible solutions
3. Developing projects for the integration of possible solutions
4. Experimental shop to prove successful outcomes of the proposed possible solutions

Research on consumer behavior

The consumer behavior research were conducted in several areas throughout the country. 600 samples were taken using the stratified random sampling method. The strata were gender, age and economic status. The in-depth research was also conducted using the focus group method to verify the research hypotheses.

Both methods revealed similar trends in consumer behavior, supporting the research hypotheses, reflected in the following 3 major concerns:

1) Consumers cannot distinguish between the 100% fresh milk and the recombined milk
2) Consumers did not have direct access to the 100% fresh milk products
3) Consumers demanded variety of products made from 100% fresh milk

Synthesizing possible solutions

One of the possible solutions may be to introduce a certification mark to label farmer's 100% fresh milk and thus differentiate it from its recombined counterpart. The certification mark will help consumers with their decision on buying 100% fresh milk. However, the government would need to ensure effective enforcement of the use of the mark, and also to expand available distribution channels for the 100% fresh milk until it matches demand. This could readily be done through a system management approach through franchising, since it demands corporate or franchise identity in order to establish a standard for the brand that customers can recognize. The franchise stores must sell only products from *"milk"*. Moreover, research for the further development of processed *"100% fresh milk"* products must continue.

Developing projects for the integration of possible solutions

From the possible solutions, researchers have taken a step forward to develop 2 major projects which are tangible and practical to implement.

1. The "Golden Ribbon" certification mark

"Golden Ribbon" is a certification mark awarded only by the government sector as a tool to differentiate dairy products made from "*100% fresh milk*" and "*recombined milk*". The development of the *"Golden*

Figure 2: The proposed "Golden Ribbon" designs and the winning logo
Source: Nopparat Runguthaisiri et al. (2015)

Figure 3: Smile Milk shop at Uniserv, Chiang Mai University
Source: Nopparat Runguthaisiri et al. (2015)

Ribbon" certification mark comprised two components: logo design and guidelines for certification mark management.

1.1 Logo design

The design concept was *"admirably authentic"* and 11 logo designs were submitted initially (Figure 2). This was complemented by a nationwide survey. From 400 samples, the majority voted for the *"Golden Ribbon"* (No. 9). Researchers then proceeded to register the *"Golden Ribbon"* logo as a certification mark to guarantee the natural *"100% fresh milk from Thai farmers"* with the Intellectual Property Department. Thus, Thailand's Foreign Trade Department legally owns the certification mark since they funded the project.

1.2 Guidelines for certification mark management

The use of a certification mark requires specific specification and regulation. Researchers and Thailand's Foreign Trade Department officers engaged in two discussion sessions with stakeholders from both public and private sectors until the regulation was finalized. The regulation for certification mark management was enforced and managed by Thailand's Foreign Trade Department.

2. The "Smile Milk" project

"Smile Milk" is a franchised store to enhance market access for consumers to purchase 100% natural milk and to meet the demand for 100% natural milk processed products. The development of the *"Smile Milk"* trademark comprised 3 parts.

Figure 4: Dairy products available at a Smile Milk shop
Source: Nopparat Runguthaisiri et al. (2015)

2.1 Development of the name *"Smile Milk"*

This was accomplished partially through focus groups. 20 names were generated, including trade names such as *"Nom...nom"* (*"Milky milk"*), *"Nature Milk"*, *"Smart Milk"*, *"Milk Me"* etc. From the nationwide survey of 400 samples, *"Smile Milk"* was the most popular choice. This may be because Thailand is known as *"the Land of Smiles"* and the name reflects the country's and its people's characteristics. *"Smile Milk"* is also easy to pronounce, does not repeat other registered names and, therefore, can be registered as a trademark. Therefore, researchers design a logo to suit the name *"Smile Milk"* and registered it as a trademark with the Intellectual Property Department. The trademark is now owned by Thailand's Foreign Trade Department.

2.2 The development of 100% fresh milk processed products

The rationale behind *"Smile Milk"* is that it must be a retail product made from 100% natural fresh milk produced by Thai farmers. The urge to sell only natural dairy products resulted in a collaboration between food technologists to research and develop soft-serve ice cream without using powdered or recombined milk and did not undergo a hardening process. The soft-serve is considered an innovative menu introduced by *"Smile Milk"*. Marketing specialists are also aware of the healthy trend so the soft serve ice cream is not so sweet, without artificial chemical additives and produced from all-natural ingredients. Therefore, the Smile Milk's soft serve ice cream is a healthy and tasty ice cream for people of all ages.

Apart from the soft serve, Smile Milk also created other menu from *"100% fresh milk"* such as panna cotta, pandan kaya with fresh milk, fresh milk waffle, fresh milk slush, yoghurt slush and many more.

2.3 "Smile Milk" franchise management

Figure 5: H.R.H. Princess Maha Chakri Sirindhorn presided over the opening ceremony of a Smile Milk shop on Nimmanhaemin Road, Chiang Mai
Source: Nopparat Runguthaisiri et al. (2015)

Management is a crucial to the success of a franchise business. Smile Milk's franchise management system covers inventory control, financial accounting, human resource management, franchiser's manuals, information transfer from shop to warehouse, taxation, training and auditing. Smile Milk is managed using Enterprise Resource Planning (ERP) and cloud computing has been employed to process information across the enterprise. ERP is a good business practice that links selling information from the retail shop directly to the warehouse management system and logistics, thus maximizing inventory efficiency and minimizing costs.

Experimental shop to prove successful outcomes of the proposed possible solutions

The Smile Milk project established an experimental shop to prove whether the synthesized possible solutions will yield successful outcomes or not. The first Smile Milk shop is located on Nimmanhaemin Road, Chiang Mai. The second shop is at Uniserv, Chiang Mai University. H.R.H. Princess Maha Chakri Sirindhorn presided over the opening ceremony of both Smile Milk shops.

The Smile Milk shop has developed into three different types: Smile Milk Home, Smile Milk Hut and Smile Milk Kiosk, with a total of 18 Smile Milk shops nationwide.

Generally speaking, the Smile Milk shop builds customer trust as a guaranteed channel to shop for 100% fresh milk. It also creates a new alternative for milk lovers and proves that there is always be a business possibility for dairy products.

Conclusion

The Golden Ribbon certification mark acts as an infrastructure for dairy market of Thai farmers' 100% fresh milk. It can be considered as a sustainable platform to aid local production and service industries that were affected by the FTA agreement or also referred to as the FTA Fund, Ministry of Commerce. Smile Milk is a business that focuses on creating new markets and changing the supply chain strategy from *"supply push"* to *"demand pull"*. The Smile Milk model can be considered as a *"Think outside the box"* business idea, creating outlet channels to provide access for consumer and introduce various innovative quality products. Smile Milk creates new job opportunities, new entrepreneurs and franchisers. It also generates adequate income for dairy farmers and maintains the conferred occupation.

Recommendations

The Research and Development of the Mechanism of Marketing Strategy for Thailand's 100% Fresh Milk was selected as a case study and example for FTA Fund worldwide. Smile Milk was studied by the International Institute for Trade and Development (ITD) and the results were used as a recommendation for the government. The results suggested that countries affected by the FTA agreement should establish a department or an organization to develop business to stimulate the agricultural sector and the 100% fresh milk market. The development plan should be integrated with other public and private sectors, focused on sustainable development and object-oriented. Moreover, the organization should create business models, design trademarks, and operate experimental retail stores that are ready to be transferred or fully owned by the private sector in the future.

The Golden Ribbon certification mark and the Smile

Figure 6: Smile Milk Home
Source: Nopparat Runguthaisiri et al. (2015)

Figure 7: Smile Milk Hut
Source: Nopparat Runguthaisiri et al. (2015)

Figure 8: Smile Milk Kiosk
Source: Nopparat Runguthaisiri et al. (2015)

Milk shop can be considered as a platform for Thailand's 100% fresh milk market, and potentially can be developed as our national brand, comparable to Foremost from the Netherlands and Fonterra from New Zealand. However, Golden Ribbon and Smile Milk both still need continuous support from the government to accomplish this.

Moreover, dairy farming is a conferred occupation after H.M. the King's Royal Order; his Royal wish has been carried on by H.R.H. Princess Maha Chakri Sirindhorn. Thus, it is important for Thais from every business sector

Figure 9: H.R.H. Princess Maha Chakri Sirindhorn's Royal remarks at the Opening Ceremony of Pathalung Dairy Cooperative Limited.
Source: Nopparat Runguthaisiri et al. (2015)

to support the brands as their own. Examples of the collaboration are now making Smile Milk a national brand, making the Golden Ribbon a credible certification mark and provide support and develop the potential and livelihoods for young farmers. The development of Golden Ribbon and Smile Milk sets a successful example for other products and services.

Acknowledgements

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The researchers would like to thank the Dairy Co-Operatives Federation of Thailand Limited, the Dairy Farmers and Processing Milk Products Cooperative Assembly (2010) Limited and the Thai Holstein Friesian Association as a group who obtain support of research and development projects.

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Professor Kua Wongboonsin, Ph.D.

Concept of Socially-engaged Research for Problem Solving and Guiding towards the Future

Professor Kua Wongboonsin, Ph.D. is a former Vice President for Research Affairs, Chulalongkorn University and former director of the College for Population Studies, Chulalongkorn University. His expertise includes demographic research related to reproduction and population & development. He has published numerous academic materials including textbooks, contributions to research conferences, book chapters and research articles in top-tier international journals. Dr. Kua's academic background, spanning both the sciences and social sciences, allow him a unique insight into social context from different perspectives.

Characteristics of social research

"...The strength of social research is that it circles around current issues and problems and attempts to identify potential issues and solve problems in the society..."

"Social research embraces a range of possible approaches, including issue-based, problem-based and discipline-based research. It also embraces a wide range of themes that have attracted increased academic interest. For example, issue-based research addresses topics such as the social challenges presented by our rapidly aging population, increasing enrollment in social sciences at the expense of science-related fields at tertiary level, the falling enrollment in vocational-technical education in Thailand. The current 25:75 ratio of vocational to basic education students is different from the ratio of 50:50 projected in the National Economic and Social Development Plan. Topics in problem-based research may include insufficient savings for old age, problems in managing water resources and in integrating R&D with industry in order to enhance Thailand's intellectual assets."

"Issue-based and problem-based research may aim towards identifying appropriate approaches to tackling problems and providing social guidance. One may focus on key societal issues such as our fast-aging society- over the next 30 years the proportion of senior citizens in Thailand's population will increase from 12% to 32%. The concerns will be more conspicuous in the coming years; therefore, a proactive approach is needed to minimize the anticipated negative impacts while also capturing the benefits of the demographic shift."

The importance of social research

"...Social sciences and humanities research can point out, predict and presume social trends in the next 5-10 years..."

"Thailand's concerns regarding the Millennial Generation or Generation Y highlights the postmodern era in which the spotlight shines on nonconformist millennials. Millennials are risk-takers, prepared to challenge established rules. Peer pressure plays a much more influential role in driving attitudes of millennials, resulting in conformity across a wide range of lifestyle choices, such as fashion, sports or even ringtones. Nevertheless, millennials do not value routine corporate employment as do Gen Xers, but value the independence of entrepreneurship."

"Explaining such complex social phenomena requires a helping hand from a number of disciplines. Sociologists and anthropologists can predict new social trends; journalists are able to build awareness

and understanding through mass media and increasingly, through social media. Lawyers contribute by proposing innovative legal frameworks to accommodate new family structures, and communities that may represent a radical departure from traditional values. In the public health sector, the success of preventive medicine campaigns depends in part upon the support of social services and the effectiveness of the mass media in communicating public health messages, for example in how to protect against infection, self-diagnosis, etc."

Connecting social research with scientific research

"...Connecting different disciplines to drive research projects to support industry..."

"We believe that research projects must serve more than academic interest and publication. **Chula Unisearch** also aims to connect research projects with industry; an understanding of the social context of technical innovation can help assess market potential and positioning."

"For every 100 scientific research proposals considered, only 3-4 projects are taken forward. However, guidance from marketing specialists, financiers, public relations specialists and the legal profession can bridge the gap between pure research and the industrial sector, and contribute greatly to successful project outcomes. Thai private sector operators frequently view this as an advantage and therefore prefer to cooperate with researchers from local universities rather than with overseas institutions. Tax exemptions for local collaborative research also serve as an incentive, while universities also provide scientists and engineers support on a weekly basis. Industry can inject its own expertise into research projects, contribute to building strong networks as well as supporting staff exchange programmes to promote workforce mobility and strengthen industry-research linkages."

The direction of social research and its implementation in solving spatial problems

"...The significance of social research and its value in solving spatial problems will increase as our society becomes more complex..."

"Nowadays, social research is frequently used to address spatial problems such as preparing saving and health planning for people currently in work-force age prior to their transition to old age. Currently, the ratio of the working-age population taking care of the retired population is 6:1. Over the next 30 years, the ratio will decrease to 1.7:1. Therefore, Thailand's population aged 30 years old today may have to save at least 40-50% of their salary in order to enjoy an adequate quality life after retirement. They also need to prepare their health plan."

"There is an increase in the number of social research aimed at solving spatial problems. As society becomes more complicated, problems also become more complicated. Researchers today must take a cross-disciplinary approach in addressing new problems and challenges, taking into account the seismic social shifts, especially in communication. Journalists today need to design communication strategies specifically targeting specific demographics including the expanding ageing community, as

well as traditional target groups. Moreover, social media communities require communication through Facebook or Line. Inescapably, Thailand must prepare to adapt to and embrace an increasingly multi-cultural society."

"In common with other universities, Chulalongkorn University encourages young lecturers to conduct research, in order to drive academic advancement, enrich the teaching experience and advance the career prospects of academic staff."

The limitations of putting research into practical use

"...The social research process may be prolonged and, without continuing new results, media interest will trail off..."

"By definition, social research is easier to comprehend than scientific research, particularly in terms of its relevance to real life problems. However, the social research process may be prolonged and, without continuing new results, media interest will trail off. It is therefore important for social researchers to collaborate with marketing specialists, planners, communication artists, economists, lawyers and architects who can work together to align the research project with industry needs. For example, architects can provide invaluable guidance on designing homes for elder communities or to create a neighborhood for the elderly."

"Social research may be constrained by four factors. Firstly, social research relies heavily on rankings; the research will be well-ranked and accepted as credible only if published in an international peer-reviewed journal recognized by ISI and Scopus. Secondly, the type of research presentation also matters. Research in social sciences tends to be published outside the rigorous framework of peer-reviewed journals, and is mostly distributed through mass media and published in newspapers or as books and textbooks. Research in architecture and fine arts might be presented through models, building plans, showcases or exhibitions rather than being published in journals. Thirdly, social research is typically more time-consuming than scientific research due to the long period required for data collection. For this reason, the university allows social researchers a maximum of four years to publish an article while scientific researchers are only granted one year to publish."

"Finally, the uniqueness or ground-breaking nature of the research topic is a major factor in acceptance of a manuscript for publication. With many submissions covering similar ground, it is important that authors ensure their research addresses a real gap in the existing body of knowledge, and does not resemble or duplicate work already reported elsewhere. However, more researchers today are able to publish their articles in ISI, Scopus and TCI-indexed journals by focusing on research topics with specific relevance to the social contexts of ASEAN, Asia, East Asia and Southeast Asia."

Expectations for the support of social research

"...Research can be compared to planting a tree: a tree needs a strong primary root in order to thrive. When we grow the plant ourselves, we also grow its primary root. This also means that we will have a stronger platform for our future research..."

"There are certain expectations for social research. Firstly, universities and the Office of the Higher Education Commission should grant more research funds for social research. Secondly, ministries should recognize and acknowledge the connection between scientific research and social and human research. Moreover, focusing only on scientific research only grants partial benefits, so that priority is given to cross-disciplinary collaborative projects, in which science is linked to industry through collaboration from experts in other domains (e.g. communications, marketing, economics and law). This cooperation can yield powerful outcomes for communities and in the market, at both national and regional scales."

"Thailand needs to invest more in research. Today, the country's R&D investment stands at only 0.2-0.3% of GDP. In contrast, the figure for Singapore is 3% of GDP. Therefore, the Thai government needs to consider investing in research more attentively. Research can be compared to planting a tree: a tree needs a strong primary root in order to thrive. When we grow the plant ourselves, we also grow its primary root. This also means that we will have a stronger platform for our future research. However, if we keep buying our plants from the market, we will get plants full of rootlets and, we need to return often to the market to replace them. The industrial sector has to commission research by third parties because it is more convenient and faster than developing an in-house research project. However, this practice does not lead to sustainability or innovation within the private sector, and does not contribute to the country's pool of research expertise."

Professor Kua Wongboonsin, Ph.D.

Prof. Kua graduated with a Bachelor of Sciences in Physics from Chulalongkorn University, and obtained a Master's degree in Sociology from Chulalongkorn University as well as a Master's degree and PhD in Demography from the University of Pennsylvania, USA.

Experience

- Deputy Director, Sasin Graduate Institute of Business Administration of Chulalongkorn University (2014-Present)
- Advisor to the Board of Management of Chula Unisearch, Chulalongkorn University (2013-Present)
- Committee of the National Science Technology and Innovation Policy Office (2008-present)
- Vice President of Research Affairs, Chulalongkorn University (2008-2013)
- Vice President of Administrative Affairs, Chulalongkorn University (1996-2000 and 2004-2008)
- Director of the College for Population Studies, Chulalongkorn University (1992-1996)
- President of the Thai Population Association (1994-2001)
- Member of the Committee of the National Research Council in Sociology (1995-1996)

Research society

"Around us"

Assoc. Prof. Thavivongse Sriburi, Ph.D.

Research in Thailand is implemented by both public and private sectors, including government agencies and academic institutions. Despite the diversity of academic research within Thailand's universities, much is driven by the need for international publication for personal career advancement rather than by the needs to address real-world problems of society and national needs. Therefore, it is important to encourage social research--a 'Research society' that will bring real and important benefits to society.

Social research aims to bring benefits to all levels of society and provide citizens with a better quality of life- which is of course an enduring policy goal for every government over time. However, research tends to maintain a narrow determinist scope, without necessarily attempting to understand the social context in which technological innovation unfolds. We need to explore and understand the social landscape for education, in order to direct scarce human and financial resources where they are most needed. Research on sustainable development embraces its economic, social, health, natural resources and environmental dimensions, and enables problems to be addressed holistically and avoid unintended adverse impacts of policy or technological interventions on everyday lives. Participatory approaches to research offer an important means of understanding complex social dynamics and to derive local solutions that recognize limitations and constraints to implementation, for example in human capacity. Participatory approaches engender local ownership and commitment, and offer communities the opportunity to independently enhance their social and economic circumstances, thereby enhancing quality of life.

As an example of the kind of problems that participatory social research can address, rural communities today face increasing hurdles to achieving sustainable livelihoods through agriculture. Why today are farmers increasingly indebted? Why our natural resources are so vastly depleted, and why don't agrochemicals seem to help anymore? We need to better understand the reasons for the undermining of the foundations of rural life; small farms are no longer considered economically viable, driving an exodus to the cities throughout the country. Such major demographic shifts bring with them a host of social issues; abandonment of farms to be managed by the elderly; the slow demise of the extended family as a social safety net; the crowding of cities.

http://www.pexels.com

Such issues have of course been the subject of a large body of previous research, but they have not in general been studied in an integrated way that could lead to workable solutions. However, the following appear to be contributing factors:

- Inadequate knowledge and lack of access to updated information.
- Inadequate planning for situations such as drought, flood or other natural disasters.
- Lack of pride in their own lives and human dignity.
- Disempowerment leaves people dependent on powerful local elites, and when unable to negotiate prices for their produce, they are vulnerable to exploitation.

So, for example, lack of access to information leaves rural people dependent on received information provided by local authority figures / government officials. However, policies are often intrinsically flawed and simplistic, as exemplified by gluts and price crashes resulting from government-led promotion of certain crops. In such cases, it is the farmers who suffer; not the officials.

Irresponsible advertising also leads to problems when farmers have inadequate access to the facts. Media advertisements for chemical fertilizers encourage excessive use, leading to degradation of soil and water resources. Chemical fertilizers can cause soil compaction, depletion of organic matter and soil micro-organisms, and loss of fertility. Farmers respond by increasing application rates, creating a vicious cycle. The consequences include increased costs to the farmer, pollution of waterways and damage to natural ecosystems. Indeed such scenarios are commonplace today across Thailand.

Social research offers a way to provide access to knowledge that rural people can themselves use as a way to live better lives- for example by converting to organic farming methods instead of depending upon expensive chemical pesticides and fertilizers.

Social research is highly demanding, as each situation will depend upon a unique social context and combination of causative factors and dependencies. Often, local people have a much deeper appreciation of the problem than do the researchers themselves, underscoring the importance of local participation in such research in order to gain insight into the actual needs of local people as well as the potential and intrinsic limitations.

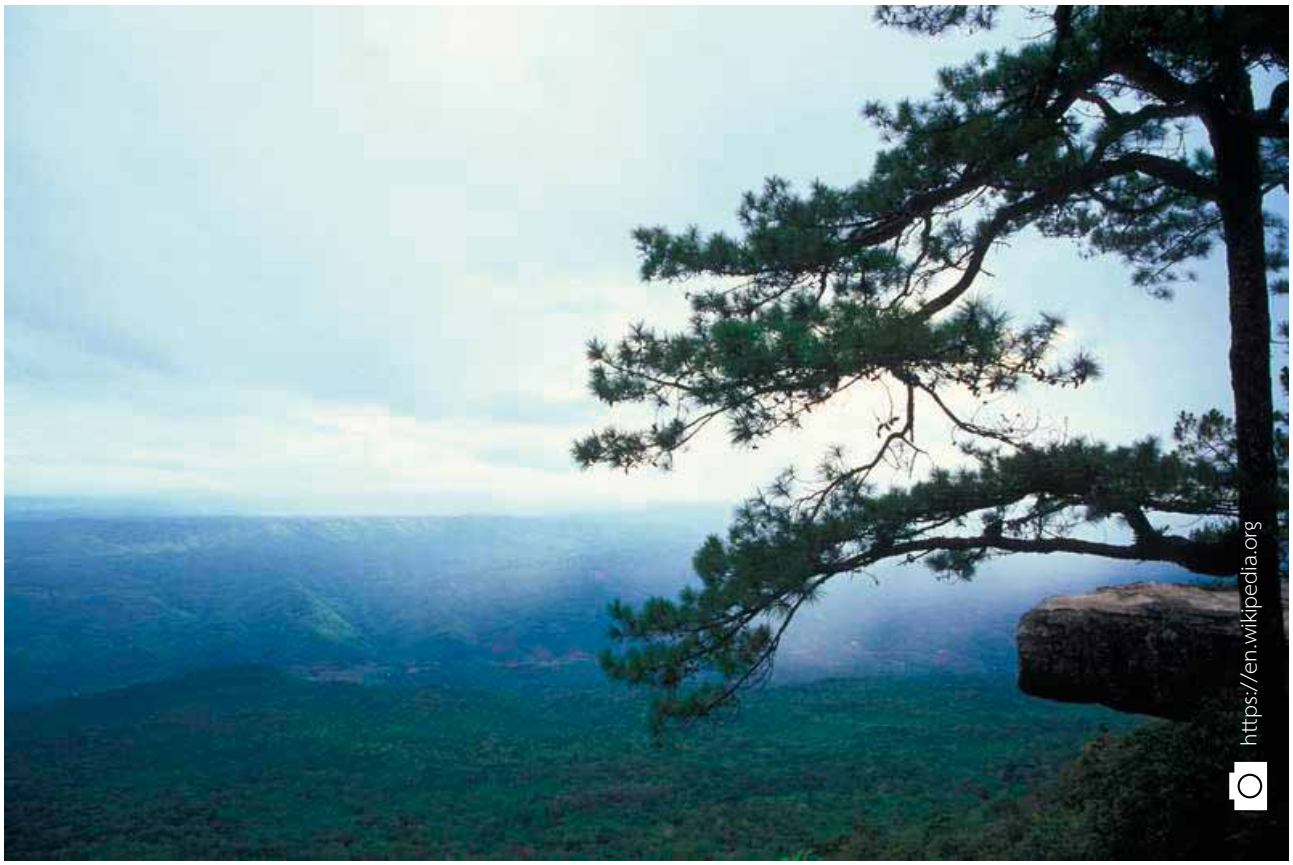
In order to build local engagement and participation in social research, it is vital that researchers should

ensure that local residents clearly understand the aims and objectives, demonstrate their willingness to address local concerns and also communicate results periodically. Only through meaningful communication from the outset can researchers hope to understand the real problems in the area, and what previous work has been undertaken. Only when such information is available can researchers put together a credible plan of action-again, in close cooperation with local communities of farmer groups.

Other examples of social research include studies of the development of tourism in Thailand, since benefits to local communities are critically dependent on the development strategy and upon a rigorous analysis of the area's limitations and development potential. Today, we see the devastating impacts of unfettered tourism development in the irreversible impacts on pristine beaches and natural ecosystems throughout the country, and upon unsustainable demand on resources such as fresh water and services such as waste management and public infrastructure. Proposed measures to estimate the capacity of any tourist attraction to accommodate tourists mark the beginning of proper management of tourist attraction areas, that might including the introduction of maximum daily visitor quotas.

Development of cultural and traditional tourism represents another important area where social research can make an important contribution. Thailand is blessed with many such unique attractions, which must be managed with sensitivity to avoid damaging those very traditions and local cultures through a massive influx of tourists. We see many examples where tradition and culture are reduced to a vestigial stage show aimed at making money from tourists. The origins and meaning are lost forever, especially to the younger generation. Research is therefore needed to help all stakeholders analyze the needs, potential and sensitivities, and in developing effective development plans that respect and protect age-old traditions and cultures.

The recognition of human rights in Thailand is intended to provide a guarantee of equal rights for all Thai people. However, we see many development initiatives that disregard or even obstruct the rights of vulnerable stakeholder groups. In forest management, we see environmental protection override the needs of indigenous people living in forest areas; in urban infrastructure development, the needs and rights to access by the elderly and disabled are routinely ignored. Such disregard for the disempowered and other vulnerable sections of our society adds to inequity and



eventually to conflict. Recently, the right to access by the elderly and disabled to the BTS and MRT mass transit systems was only affirmed following a ruling by the Administrative Court, which ordered construction of escalators at all stations.

Disabled access to Phu Kradueng National Park offers another example. The beautiful scenery of Phu Kradueng attracts many visitors each year- young and old alike. However, access on foot into the park involves a long trek through the jungle, which causes damage to the fragile mountain slopes, including soil erosion. National Park rules prohibit overnight camping within the park, but in this case an exception has been made. To make a day-trip into the park feasible, a cable car project was proposed. Despite research indicating significant public demand, the cable car project was opposed by a nature conservation group that supports ecotourism and treks into Phu Kradueng. This opposition was misplaced, because of the pressure on the fragile mountain ecosystem imposed by walkers who stay overnight, create waste disposal problems, and rarely carry their garbage home with them.

The Phu Kradueng cable car offered a practical solution to allow equal access for all tourists, whilst conserving the forest environment by reducing numbers of walkers.

The above examples show how much social research can contribute to a better understanding of the complex factors that interact to influence our well-being. Whilst most academic institutions focus mainly on research for publication in international journals, there are major opportunities to achieve real benefits for society by documenting and addressing problems at community level, and in balancing the sometimes conflicting needs of multiple stakeholders. Universities need to do more for society by creating such a Research Society.

Innovation of adding organic carbon in the soil for sustainable agriculture in saline soil areas:

Lam Takhong watershed experiment project

Saowanee Wijitkosum, Ph.D.[1]

Northeast Thailand suffers from poor soil quality for agriculture, with a range of problems such as low water-holding capacity, compaction, poor drainage, alkalinity and salinity. Inappropriate land husbandry is also a contributing factor which acceleratess oil salinity. Moreover, regular droughts result in frequent and widespread incidence of water scarcity for agriculture every year, impacting upon both productivity and quality of produce. Increasing use of chemical fertilizers to boost productivity only exacerbates degradation of long-term soil health and environmental impacts. Where the high cost of such inputs generates insufficient yield increases, indebtedness can result.

Lam Takhong watershed in Nakhon Ratchasima, an area is 3874 square kilometers, is a tributary of the Mun River, passing through 6 districts of Nakhon Ratchasima province: Pak Chong, Sikhio, Sung Noen, Kham Thale So, Mueng Nakhon Ratchasima and Chaloem Phra Kiat.

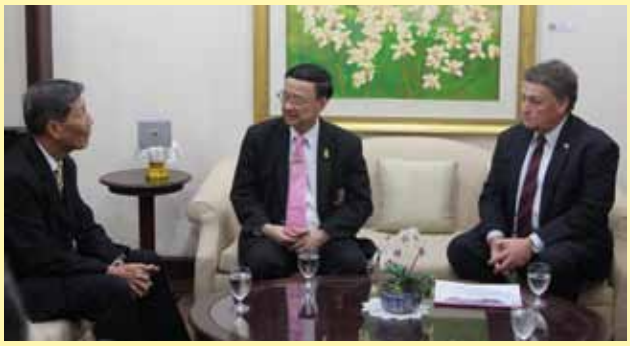
[1]The researchers responsible for the project: Assoc. Prof. Thavivongse Sriburi, Ph.D. and Saowanee Wijitkosum, Ph.D.

Lam Takhong has experienced continuing drought and almost the entire area suffers from saline soil, with low levels of soil organic matter. In Kham Thale So district, crops such as rice cannot be cultivated or result in very poor yields. Rice crops suffer from uneven growth, stunting of the leaves, shorter tillers, burning and curling of the blade tips. Drought results in elevated soil salinity levels, further impacting on crop growth and productivity.

Soil amelioration of saline soils is therefore essential to allow cultivation of rice and other crops in this area. Several approaches can be considered, including engineering and biological methods such as addition of organic matter to the soil, and cultivation of ground cover or salt-resistant plants. Soil amendments such as soluble calcium salts, acid or acid-forming compounds, calcium salts of low solubility and organic polymers can be used to replace adsorptive sodium in soil particles, to increasing the soil infiltration rate, improve soil aggregation, re-establish a durable open soil structure and improve drainage and aeration.

The use of biochar as a soil amendment can contribute to improved soil quality for a variety of soil types, from poorly drained clays, sandy soils, to hardpans. Biochar can help restore soil fertility and thereby increase crop yields and quality. Since 2011, researchers at Huay Sai Royal Development Study Center, Pa Deng, Phetchaburi have tested the use of biochar as a soil amendment, and found significant improvements to soil quality, together with increased yields of rice, vegetables and other crops. With its low production cost and ready availability of raw materials for its production, biochar offers farmers a practical alternative to restore saline soils and allow crop production. Importantly, biochar has no adverse environmental or health impacts. For farmers in the Lam Takhong area, biochar offers a real alternative to boost soil organic carbon and restore soils to a productive state.

Chula Unisearch R&D cooperation
with Intermap Technologies Group



Chulalongkorn University and Intermap Technologies have joined forces to drive cutting-edge research into artificial intelligence. Chulalongkorn University and Intermap recently met to explore possibilities for cooperation in R&D and in efficient analysis of Big Data using artificial intelligence to support security missions. The cooperation will make a major contribution to teaching as well as research at the University.

Representing Chulalongkorn University, Prof. Pirom Kamolratanakul, M.D., President of Chulalongkorn University, Assoc. Prof. Thavivongse Sriburi, Ph.D., Managing Director of Chula Unisearch and Supichai Tangjaitrong, Ph.D., Director of Industry Collaboration Office, welcomed Col. David Hisdal, Vice President for Strategic Programs at Intermap Technologies. Col. Hisdal was accompanied by Mr. John Michael, Intermap's Senior Project Manager and Board Member at Chula Unisearch, Chulalongkorn University.

The conference and signing ceremony for the Memorandum of Understanding (MOU) of the
Thailand Voluntary Emission Trading Scheme (Thailand V-ETS) Project

On Friday 16 January, 2015, **Chula Unisearch** and the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) held a joint press conference on the occasion of the signing of a Memorandum of Understanding (MOU) for cooperation in implementing the Thailand Voluntary Emission Trading Scheme (Thailand V-ETS) Project, at Centara Grand at Central Plaza Ladprao Bangkok. Assoc. Prof. Thavivongse Sriburi, Ph.D., Managing Director of Chula Unisearch and Mrs. Prasertsuk Charmornmarn, Executive Director of TGO together signed the MOU. The project brings together the two organizations to develop a test measurement system for a reporting and verification system (MRV) for greenhouse gas emissions. The system will be used as a standard operating system for the Thailand Voluntary

Emission Trading Scheme, and will be ideally suited to the context of Thailand's industrial enterprises. Several large electricity and petrochemical conglomerates have already joined the initiative, including the Electricity Generating Authority of Thailand, Gulf Power Generation Co. Ltd. (EGCO Group), Ratchaburi Electricity Generating Holding Pcl., Vinythai Pcl., PTT Global Chemical Pcl., and Rayong Olefin Co., Ltd.

Administration Agreement for Construction Engineering's global of FIDIC 3 courses

Chula Unisearch together with the Department of Foreign Trade, Ministry of Commerce (DFT) and the Consulting Engineers Association of Thailand (CEAT) recently conducted training courses on the topic: *"Administration of FIDIC international-standard contracts for construction engineering"* for senior engineers of CEAT member companies. The course was held from 22 January to 13 February, 2015 at Sasa International House, Chulalongkorn University.

The course objective was to develop the capacity of participants in contract administration and international construction engineering project management to standards accepted by international financial institutions. The trained participants will serve as lecturers for ongoing training courses for newly graduated engineers who also require contract administration skills. **Chula Unisearch** will manage three training courses, with each course following the standard of the Federal Consulting Engineers International (Federation International des Ingenieurs Conseils or FIDIC), as follows: 1) Implementation and Management of FIDIC Professional Services Agreement; 2) Implementation and Management of FIDIC Professional Services Agreement; and 3) Management and Administration of FIDIC Contracts.The first course has been honored by the participation of Mr. Seung Hoon Kang, a FIDIC expert, as a key lecturer. A total of 34 senior level engineers from CEAT member companies, participated in this training.

Signing of a Memorandum of Understanding (MOU) for cooperation in R&D between

Chulalongkorn University and Wuhan Optics Valley Bei Dou Holding Group





Maintaining Chulalongkorn University's strong focus on private sector collaboration on R&D, Prof. Pirom Kamolratanakul, M.D., President of Chulalongkorn University singed a MOU for R&D cooperation between Chulalongkorn University and the Wuhan Optics Valley Bei Dou Holding Group. The company was established by the Hubei provincial government and the University of Wuhan by Mr. Liu Junyi, the company's Executive Director. The signing was witnessed by Prof. Tian Peng, Ph.D., the company's Deputy Managing Director and Board member, and from Chulalongkorn University, by Prof. Mongkol Techakumphu, DVM., Chulalongkorn University Vice President (Research), Prof. Tharapong Vitidsant, Ph.D., Chulalongkorn University Vice President (Information Technology and the Center of Learning for the Region (CLNR)), Assoc. Prof. Thavivongse Sriburi, Ph.D., Managing Director of Chula Unisearch and Supichai Tangjaitrong, Ph.D., Deputy Director of Chula Unisearch.

The MOU launches a 5-year partnership to develop a wide range of cutting edge technologies, including solar energy farms in the network of learning centres for the region at Saraburi and Nan, an education and management system of Global Navigation Satellite System (GNSS), development of the Genius hospital system, development of the Skytrain system, innovative smart materials. The research cooperative research will drive an exchange of research knowledge that will benefit both sides. **Chula Unisearch** will serve as an information service centre to coordinate the R&D collaboration through the 5-year period of collaboration.

As one of the areas of cooperation under the agreement, on 10-11 February 2015, the Board of Directors from Wuhan Optics Valley Bei Dou Holding Group visited the network of learning centres for Saraburi and Nan to explore the potential for installing a solar-photovoltaic farm.

Signing of a Memorandum of Understanding (MOU) for cooperation in Research University Network (RUN)

As one of the nation's leading research universities, Chulalongkorn University prioritizes R&D to meet the country's needs, focusing on generating knowledge to solve the country's social and development problems, as well as elevating the nation's research standards. Chulalongkorn University has joined with nine leading national research universities to discuss the showcasing of Thailand's potential at global level, and achieving the status of World Class Universities.

On 5 March 2015, the nine partner universities signed a MOU establishing the Research University Network (RUN) to drive collaborative research among the partners. The network will lead to the creation of a centre of knowledge and innovation to support the technological and economic development of ASEAN countries.

The mandate of RUN is as follows:

- Strengthen R&D to enhance the country's academic potential and capacity in education, research and development, as well as an increased leadership role in the ASEAN region.
- Coordinate collaboration among researchers and graduate students in key fields of research, including sharing and exchange of resources and facilities to promote collaboration.
- Build and expand the cooperative network among universities, as well as the public and private sectors.
- Facilitate the transfer of knowledge and technology to address real-world needs of industry and Thai society.

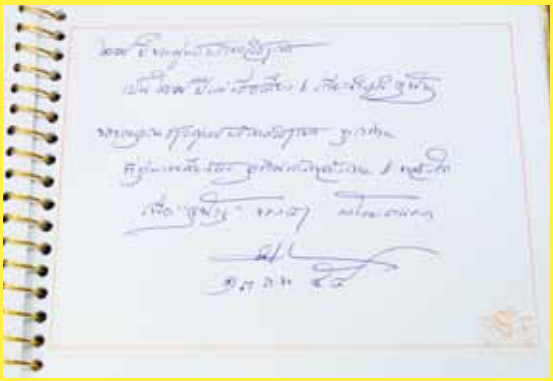
Under the concept *"Sincerely, Equally, Excellently"*, the project will focus on 6 key thematic clusters: Energy, Food and Water, Climate Change, Advanced Materials, Health and ASEAN Studies. Chulalongkorn University has agreed to serve as the inaugural president of RUN for its first 1st year, with **Chula Unisearch** assigned as the central agency to manage its operations.

A signing ceremony was held on 5 March 2015 at Chulalongkorn University, joined by Kasetsart University, Khon Kaen University, Chiang Mai University, Thammasat University, Mahidol University and Prince of Songkla University. The MOU was signed by Prof. Pirom Kamolratanakul, M.D., President of Chulalongkorn University together with the Presidents of 6 leading universities attending the event. The occasion was witnessed by the Vice Presidents for Research Affairs from the 6 universities, and by Prof. Mongkol Techakumphu, DVM., Vice President for Research of Chulalongkorn University, Assoc. Prof. Thavivongse Sriburi, Ph.D., Managing Director of Chula Unisearch and Saowanee Wijitkosum, Ph.D., Deputy Director of Chula Unisearch.

Our Beloved
Her Royal Highness Princess Maha Chakri Sirindhorn's 60th Birthday Anniversary

On the auspicious occasion of the fifth-cycle birthday anniversary of Her Royal Highness Princess Maha Chakri Sirindhorn, executives and staff of **Chula Unisearch** expressed their love and loyalty by wearing purple polo shirts throughout the month of April 2015. We salute our Beloved Princess, whose benevolence and dedication to her Royal duties for the benefit of all Thailand's people is legendary.

29th Anniversary Established of Chula Unisearch



Chula Unisearch celebrated the 29th Anniversary of its establishment on Friday 13 February, 2015 at the Chulalongkorn University Research Building. To celebrate the important occasion Prof. Pirom Kamolratanakul, M.D.,

President of Chulalongkorn University, together with the Vice President, Deans and directors of the University's Institutes, Centres and Offices joined in a special morning merit-making ceremony, with food offerings to monks. In the afternoon, representatives of **Chula Unisearch** brought flowers and a smile to patients at the King Chulalongkorn Memorial Hospital.

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