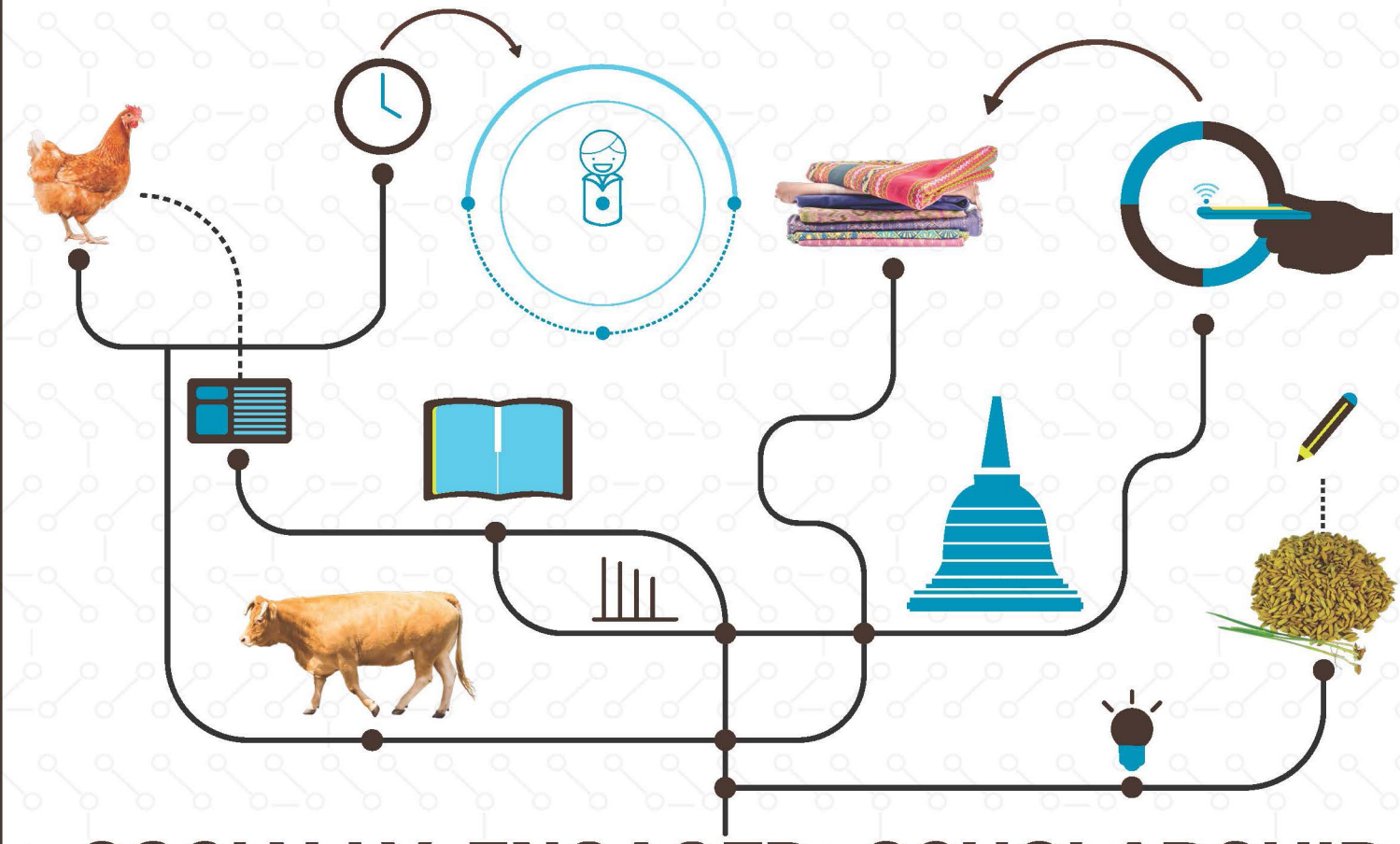
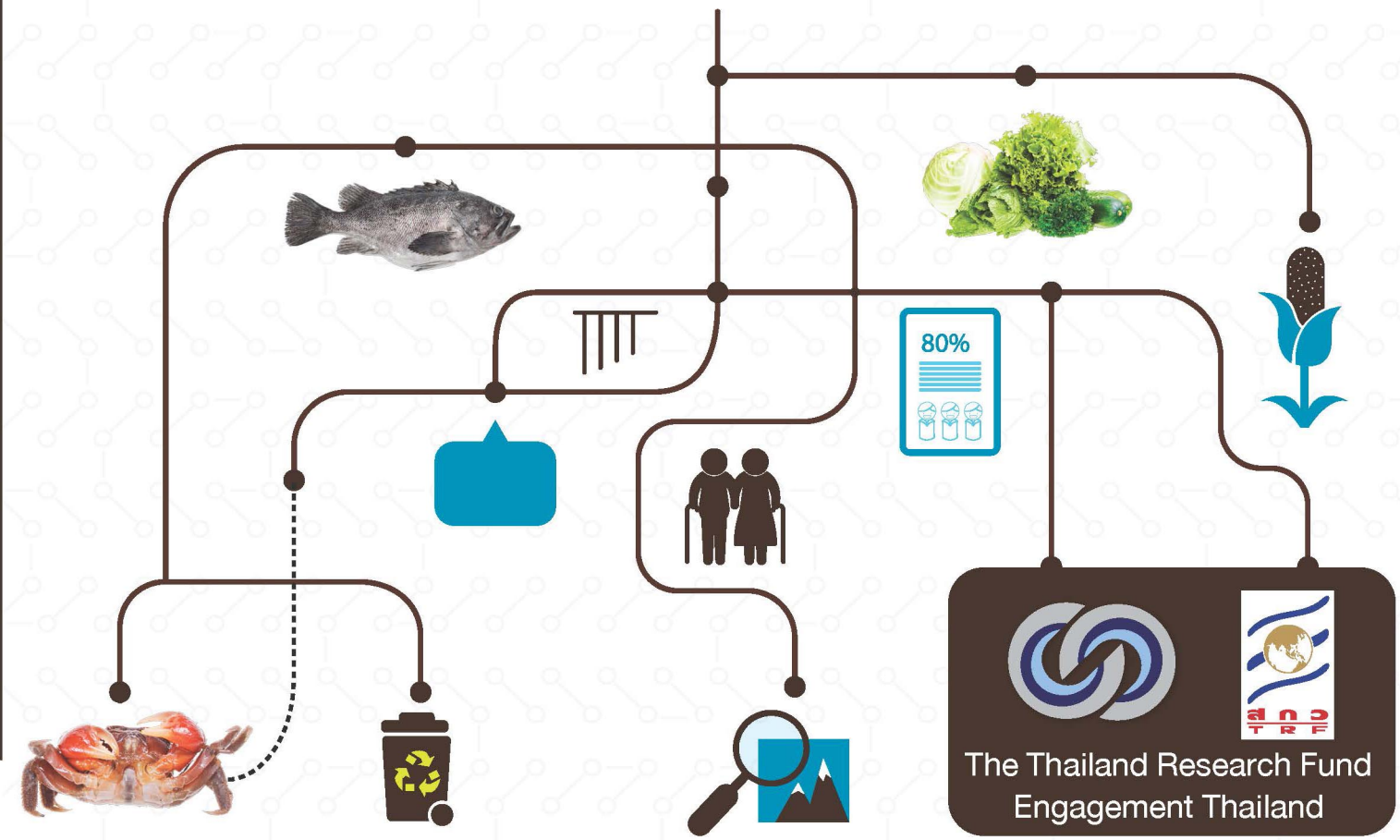
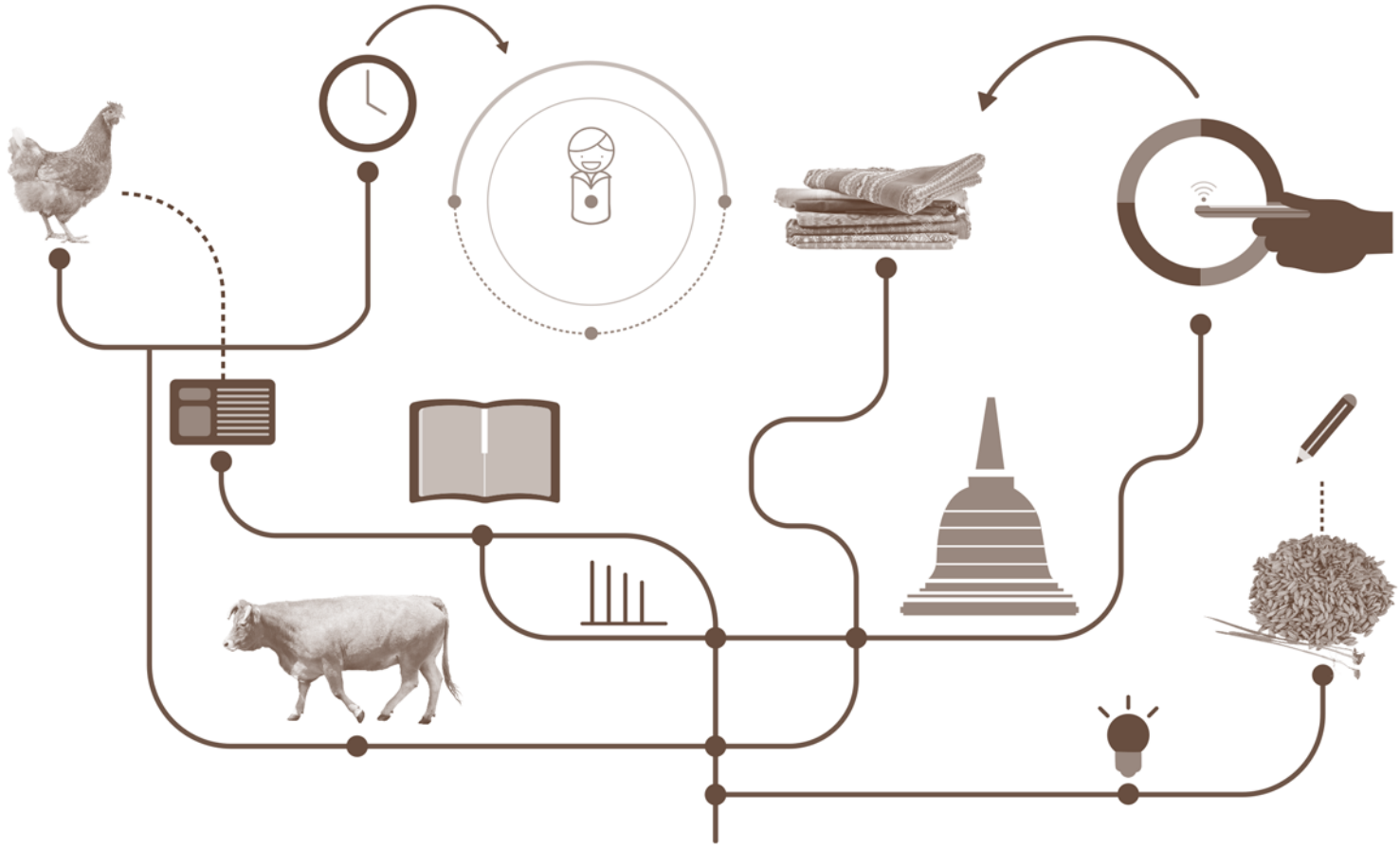


SOCIALLY-ENGAGED SCHOLARSHIP
ประมวลบทความวิชาการเพื่อสังคม

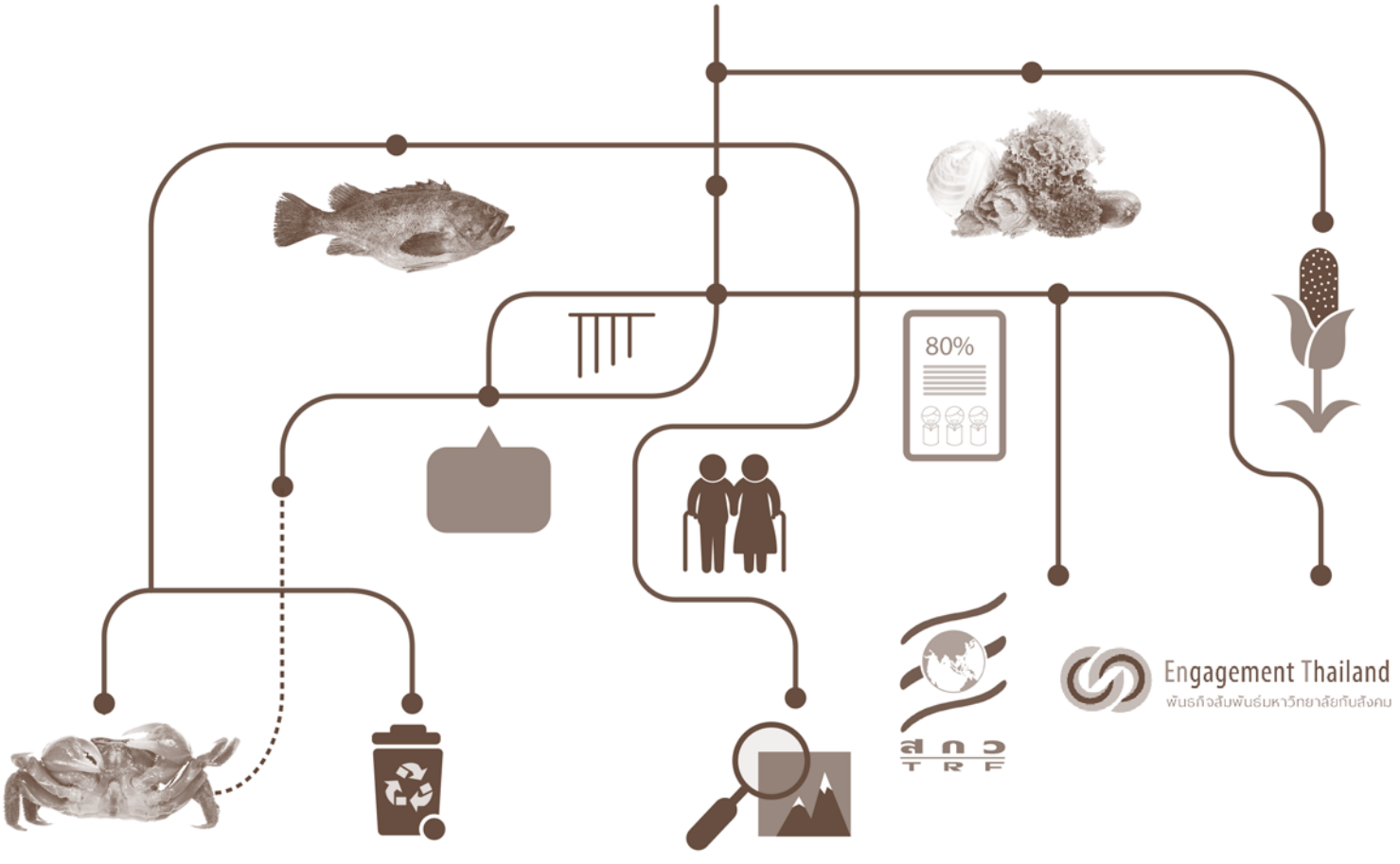


The Thailand Research Fund
Engagement Thailand



SOCIALLY-ENGAGED SCHOLARSHIP

ประมวลบทความวิชาการเพื่อสังคม



Engagement Thailand
พันธกิจสัมพันธ์มหาวิทยาลัยกับสังคม

ISBN (E-book): 978-616-395-806-8

Socially-engaged Scholarship

Published by: Engagement Thailand (EnT)

www.engagementthailand.org

Support by: The Thailand Research Fund (TRF)

14th Floor, SM Tower,

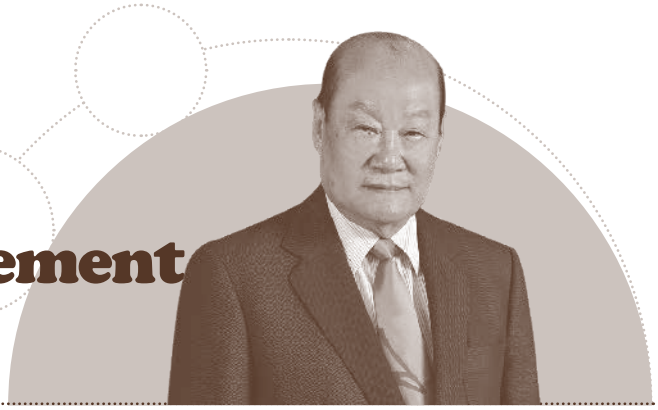
979/17-21 Phaholyothin Road,

Samsan Nai, Phyathai, Bangkok

10400

www.trf.or.th

Message from The Chairman Engagement Thailand



Engagement Thailand (EnT) came into existence as a result of an alliance formed by a number of universities in Thailand. These universities share one admirable mission to advocate the creation of the management and administration system for more rigorous university-society engagement and the integration of all aspects of their missions for the benefit of the society. Such system will call for a development of manpower who are passionate about engagement ideology and equipped with knowledge of and skills for undertaking university-society engagement activities in a systematic and sustainable manner. When this set of manpower works in the system created, it will bring about higher recognition of academic works that aims to serve and benefit the society. Then, development of quality assurance system for those academic works will follow, which ultimately will put Thailand's higher education in the forefront of the international arena as a leader in the university-society engagement, embracing firmly the four key principles of:

1. Partnership
2. Mutual benefits
3. Knowledge sharing and scholarship
4. Measurable social impact

This collection of university-society engagement academic articles is deemed as one of the collaborative efforts among the members of EnT. It aims to showcase impressive university-society engagement activities from multiple perspectives, be it location, method, or academic discipline, all of which are truly established on the four principles above. It is my hope that the articles in this collection will be an inspiration for all to produce more works of this nature for the mutual benefit for both the universities and society.

Professor Dr. Wichit Srisa-an,
Chairman
Engagement Thailand

Message from The Thailand Research Fund

University Community Engagement has been a global trend during the past 5 years. In Europe, North America, Australia and Asia, there have been increasing expectations for university to deliver services and solution to the impending crises many countries are facing. In Thailand, the Engagement Thailand Network was established in 2013, with the Knowledge Network Institute of Thailand as its secretariat. Later on, 14 universities joined the International Conference on "Innovation and Creativity: Collaboration with communities to tackle problems across ASEAN, Asia and beyond" in Bali, Indonesia, in November 2014. Upon the post-conference resolution, the 14 universities agreed that Thailand should compile cases studies that demonstrate the socially engaged scholarly work that could help exemplify and promote a wider understanding. The Thailand Research Fund is honored to grant support to this project which aims to 1) compile case studies of social engagement in Thailand that could set a good example and 2) develop social engagement criteria for selection of exemplary case study.

In developing selection criteria, Engagement Thailand has convened the Academic Sub-committee and the Membership and Network Sub-committee and came up with 2 sets of assessment criteria:

- Quantitative assessment includes partnership, mutual benefits, knowledge sharing and scholarship and measurable social impact
- Qualitative assessment is based on the summary viewpoint of assessment expert groups

The assessment process was intensive, including renowned experts in multi disciplines. The cases studies presented in this book are the result, comprising 41 cases from 17 universities and 4 institutional case studies, a total of 45. Several pieces were TRF-supported research with varying nature, ranging from Community Based Research, Area Based Collaborative Research to Translational Research, while many pieces came from university supported and other granting agencies.

The credit for this exceptional work is due to the Knowledge Network Institute of Thailand. The Thailand Research Fund hopes it could help generate the general public understanding of socially engaged research, the value of utilizing knowledge to solve the country's problems, thereby fulfilling TRF's mandate to promote wisdom for national development.

Dr.Silaporn Buasai
Deputy Director
The Thailand Research Fund

Message from Secretary Engagement Thailand

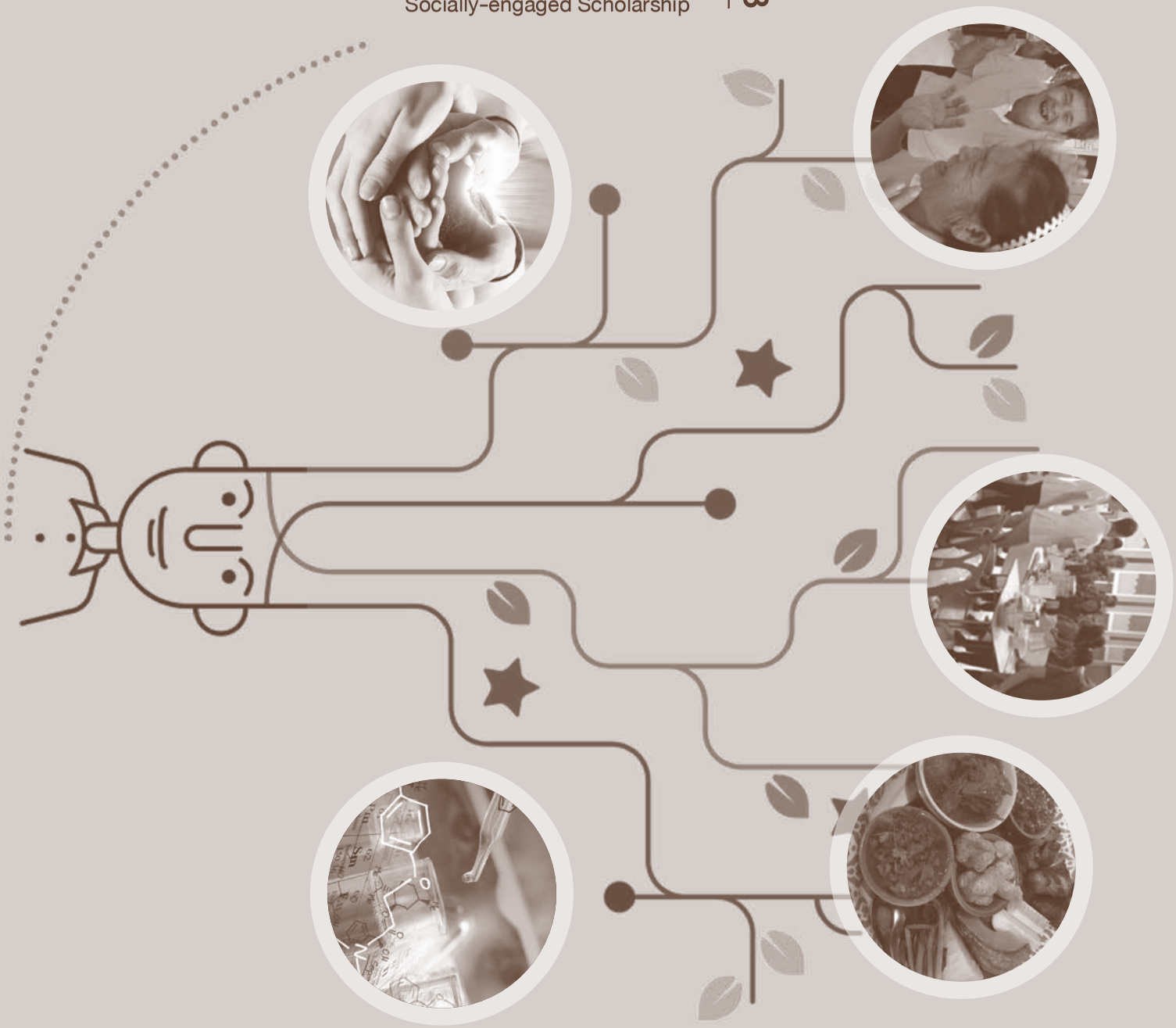
In 2014, a group of Thai universities decided to form a network to promote university engagement with society. The network, called Engagement Thailand (EnT) - after Engagement Australia from whom the idea originated--, under the leadership of Prof. Vichit Srisa-an, aims to enhance understanding and deepening Thai university engagement through exchange of experiences and good practices. It has as guiding principles four criteria for engagement activities, i.e., partnership, knowledge sharing and scholarship, mutual benefits, and measurable social impact. Meetings and training workshops were organized to promote activities along these four principles. Fifty universities as well as a number of individuals and one research funding agency have joined the network. Three annual conferences have been organized, as well as three study trips (to Australia and Indonesia).

This book is part of EnT's efforts to bring to light real-life examples of Thai university engagement, especially with local communities. Fifty case studies -- 41 projects and 4 institutional cases-- are represented here. The cases were selected through a blind review, each by three reviewers, and endorsed overall by the Scholarship Sub-committee of EnT. Each case offers a different context, history, content and method of engagement, but it is insisted that the four aspects of engagement mentioned above always be made clear in the document. Financial support for the project was provided by the Thailand Research Fund, for which we gratefully acknowledge.

As there are more than 170 universities, more than 60,000 university personnel, and more than 2 million students in Thailand, fifty cases is a very small representation of Thai university involvement with society. For this reason, we see the present book as just a beginning, and we look forward to seeing more examples of good practices on university engagement from many other sources in the near future.

Professor Dr. Piyawat Boon-long,
Secretary
Engagement Thailand
2014 - 2015

CONTENT



Health

The Development of Primary Health Care and Community Health Care in Saraphi District, Chiangmai, Thailand : Saraphi Health Model

Authors: Assoc. Prof. Wilawan Senaratana and team

Institute: Faculty of Nursing, Chiangmai University

Duration: October 2012 - September 2015

Keyword: Primary service system, Community health system, Saraphi Health Application

"Community preparation is the most important step"

Since 2012, Primary Health Care Unit, which includes Primary Health Care (PHC), and Primary Care (PC) Service-Based, was a responsibility of District Hospitals and Sub-district (Tambon) Health Promotion Hospitals. All staff had to deal with the overloaded work, especially in health care services. For instance, in Saraphi district, Chiangmai, we found that there were many bed-ridden patients who did not have access to the public health care services. The authors, who are a former dean of the Faculty of Nursing, Chiangmai University, and another key person, the Director of Saraphi Hospital, as well as other health party networks agreed that Saraphi district needed to improve and strengthen the community health system as well as participation in health promotion mission. This will convince the community in the sense of being owners and developers. Thereby, district hospitals and sub-district health promotional hospitals have to take responsibility for a primary healthcare service and be effective supporters, by assisting the community to manage and organizing any activities for the community when they need it.

These conceptual ideas led to our project "The development of primary healthcare system, Saraphi district, Chiangmai province" which was funded by the Thai Health Promotion Foundation for 3 consecutive years (October 2012-September 2015). The goal of the project was to develop a procedure and a healthcare system in primary healthcare

unit and community health system to support health promotional activities in households and in communities, along with improving human resources management and local organization parties. This project aimed to develop the primary care and community health system as well as to enhance capacity of individuals and community networks to promote health promotion behaviors. These goals will be achieved with the support of the academic professionals and by establishing a learning and innovation process in order to improve the primary care service.

Partnership

To begin the project, a team building process was organized. Our team consisted of 23 staff members from Faculty of Nursing, Chiangmai University, 19 staff members from the Department of Public Health, 1 staff member from the Department of Adult Nursing, 1 staff member from the Department of Surgical Nursing, and 2 staff members from the Department of Pediatric Nursing. Not only faculty members but also nursing students from undergraduate and graduate levels participated in our study. This project has become their field academic activities and research. Besides the academic staff from Chiangmai University, the director of Saraphi Hospital, who plays the important role in the community healthcare service development, has assigned 4 staff members from Saraphi Hospital to participate in our project, 3 of them are registered nurses and another is a physical therapist who is responsible for community care unit, which is a separated unit in the hospital.

The next step was the intensive step, "preparing the community". This step focused on the introduction of the project's objectives, goals, and methods to the communities, through meetings organized during a period of 3 months. First was the district level meeting, introducing the project to the participants. The invitations were sent to all 12 district-representatives, including public organizations, District Health Offices, Sub-district Municipalities, District Administrative Organizations, heads of sub-district health volunteers, heads of elderly consortium, sub-district health promotion hospital officers, heads of the community, and other related parties in the community. All of the mentioned parties were gathered together to discuss the participation in the project. From the beginning, we expected only 80% participation from sub-districts. However, after the project presentation has been made, all 12 districts agreed to participate. Second, we established a team in each sub-district. A staff member from the Faculty of Nursing, Chiangmai University, was assigned to each team as an academic advisor. Then, volunteers were recruited to be district-level working groups, and the district chief officially appointed three committees including steering committee, general committee and local committee.

During the first phase, after the team has studied the community's health situation, the methods and tools to be used were agreed upon. We picked a new technology to use in our project, so called "Saraphi Health Application", and proposed it to the community. The idea must be agreed by the community in order to use in the data collecting process and will later be owned by the community themselves. After all parties agreed, we then developed the "Saraphi Health Application" for the community to "change" from conventional paper-based to digital-based data collection. This application was made available on all smart phones and tablet in both iOS and Android operating systems. Real-time data together with geographic information system (GIS) and big data technology had been analyzed into spatial data. The application is able to store, modify, search, manipulate, analyze and present results and report online. Merging GIS with health information has resulted in novel innovation in primary care system.

During our data collecting phase, there was collaboration from the private sector. The True Corporation supported us with enough data SIM cards to use in data collecting process. Google Thailand helped us record the Google Street View in Saraphi district area; at that time Saraphi district was the first district in Thailand with the most complete street view in Google Map®. After all was set up, we recruited another group of volunteers with their smart phones for data collecting process. 154 volunteers consisting of youth volunteers, health volunteers, and community's leaders joined the tutorial. All participants were provided with precise understanding on the questionnaires, and a method to install and set up the application. We also provided a call center for Q&A and troubleshooting for the volunteers who worked on data collecting process.

The results from data analysis in the district and sub-district reflected the health-related problems in the community, social capital, and community's scholars. Once the community was able to identify their persistent problems, the community vision was proposed. Each 12 sub-district had its own different vision. When the community vision has been stated, the next phase was brainstorming process. We established a program for process training. The attendees who had completed the program were able to facilitate the group meetings to achieve the community vision, set up action plan and road map that would lead the community to achieve a well-being goal which was different in each area.

Mr.Kwanfa Ta-inkam, Director of Khua Mung sub-district (Tambon) Health Promotion Hospital, Assist. Prof. Wilawan Tuanrat and graduate students of Faculty of Nursing, Chiangmai University and Khua Mung health volunteers and woman group were developing “Khae Curry Chili Paste” recipe.

Waste separating bin were placed 24 areas at Tha-Kwang sub-district

Mutual benefits

From participatory sub-district health development plan, lots of activities are spinning out from each area. For example, in Khua Mung sub-district, the community members wanted to solve the uncontrolled hypertension problem that was caused by inappropriate nutrition. They came up with "Khae Curry Chili Paste" recipe with small amount of sodium in the recipe. This innovation has received an award from The Nephrology Society of Thailand; the award is a pride of the people in the community. Ta Kwang sub-district has developed an effective plan for waste management that resulted in decreasing waste amount from 6 tons per month to 3 tons per month, and reduced the waste management cost for more than 200,000 baht per year.

Knowledge sharing and scholarship

From all 12 sub-districts visions, there were 5 common-issues that led to district brain storming process including elderly health, youth and women health, all vices, environment and waste management, and pesticide-free agriculture. Each sub-district shared their ideas and solutions that led to public policies and learning centers in their own community. For the healthcare dimension, there is an establishment of 3 essential care groups consist of Non-communicable Diseases (NCDs) group, elderly care group, and disability care group. Moreover, there are other small healthcare networks evolving in the community, such as home health care for End-Stage Renal Disease (ESRD) that required peritoneal dialysis, and home health care for disability people. Also home care application was developed in order to monitor bed-ridden patients. With all these outstanding healthcare management, Saraphi district has been awarded "The best primary care service" with full scores.

For academic conferences, we have presented the results at several conferences, both national and international, for example, The Second International Conference on Digital Disease Detection, held by HealthMap and Skoll Global Threats Fund, during September 18 -20, 2013 in San Francisco, United States of America.

Measurable social impact

Due to the achievement, the Thai Health Promotion Foundation has become a major sponsor for expanding the project to 51 districts throughout Thailand and to cover every district in Chiangmai. Not only Thai Health Promotion Foundation but also National Health Security Office (NHSO) wishes to be our partner. "The development of primary healthcare system, Saraphi district, Chiangmai" is proved to be the outstanding community project that integrated the academic knowledge to solve community problem. It is a good opportunity for every scholar and researcher to learn from the community and gain their experiences. Meanwhile, the community has benefited from the activities and innovations. The ideas have been shared and applied. We could say that university and community have completely integrated work together through our project. Currently, Saraphi district is a learning center for another district that is on the way to their goal, as well as a place for internship for students whether from Chiangmai University or from other universities.

Kuang Kam Kid (Public hearing) was held on November 30, 2014 at Aunt Chansom Surinta's house (in Sunsai Mahawong sub-distrct, Saraphi district). She was health volunteer and member of organic farm network. There were more than 100 participants to join these activity.

A Model to Develop Potential of Village Healthcare Volunteers for Healthy Community

Author: Ms. Ajchamon Thammachai

Institute: School of Allied Health Sciences, University of Phayao

Duration: 2014 - 2015

Keywords: Mae Jai district, Village health volunteer, Tambon (Sub-district) Health Promoting Hospital, School of Allied Health Sciences

"Collaboration and relationship based on equality and mutual respect"

University of Phayao first launched the project of "1 Faculty 1 District" in 2011, viewed as the strategy to achieve the university's ambition, "Wisdom for Community Empowerment". The School of Allied Health Sciences was therefore assigned to take a responsibility for Mae Jai district. The project started with talks and discussions with public health organizations closely involved with the communities, including the Tambon (Sub-district) Health Promoting Hospital, was to investigate the health-related problems in communities and to observe the work procedures of District Health Promoting Hospital. These included the process for monitoring, tracking, and seeking the preventive measures to boost well-being of local people, together with a reduction in diabetes, hypertension, and high cholesterol, including rehabilitation for disability due to strokes, and promotion for the elderly with bone and joint diseases. A health survey among people residing in Charoenrat sub-district conducted by Charoenrat Tambon Health Promoting Hospital and Phayao Provincial Public Health Office in 2014, showed that there were a total of 667 elderly people, 175 patients with diabetes, 543 patients with hypertension, 427 people at risk of diabetes and hypertension, and 27 patients with strokes and bed-bound elderly patients in need for the physical therapy. Accordingly, the School of Allied Health Sciences were expected by Tambon Health Promoting Hospital to help change the "Eating behavior" of local people, through applications of knowledge to persuade them to accept and adopt the right guidelines. Another main finding was that each village has village health volunteers who are committed, work together in harmony, and

have volunteer spirit for their hometowns. These people are regarded as the main forces for development of the community's health system.

Partnership

A concept for solutions to the health problems in communities of Mae Jai district in a sustainable way proposed by School of Allied Health Sciences was "self-reliance of the communities based on practical knowledge" through "an integration of the four missions of the university, with strong leadership from the faculty's administrators. This operation has been making gradual changes in the community for four years until the present time. It began with an entry to local communities in order to recruit healthcare key persons from villages with a high potential, along with collaborative operations as a partnership for making a survey, identifying the problems for solutions, mutual learning while rendering healthcare services, field trip-based teaching for students, and developing the research questions of lecturers in response to the problems or demands of the community, accompanied by promotion of cultural arts and student activities.

Arranging the public hearing to identify the community problems and planning for projects in collaboration with village health volunteers and community leaders

Mutual benefits

Implementation of this project has brought mutual benefits to relevant parties as follows.

1. **Patients** participating in this project, especially patients with strokes, disability, and bed-bound elderly people, were visited by village health volunteers and provided with the physical therapy for one-month duration. All of them have shown a better life quality, in particular, daily routines, more ability to participate in social activities, and more ability to control their emotion. Moreover, local people are more knowledgeable and realize the importance of self- healthcare through ongoing practices as suggested. According to an evaluation among participants in the activity of returning knowledge gained from the research and knowledge sharing on diabetic patients, most participants have more awareness of the problems and impacts of diabetes while attempting to adjust their lifestyle, eating habit, and physical exercise.
2. **Village health volunteers/ healthcare key persons** are more competent in health promotion and disease prevention in the communities, they are more confident in working as volunteers, and they are viewed as the main force to lessen the burden of health professionals at District Health Promoting Hospital. Knowledge assessment among village health volunteers, before and after the training programs, showed a marked increase of 94.44 percent, and they were capable of transferring knowledge to other participants accurately, accounting for 100 percent. In addition, there was an integration of knowledge, manpower, and budget for implementing this academic service project

by lecturers of School of Allied Health Sciences, funded by University of Phayao, and health professionals of Tambon Health Promoting Hospital, financially supported by the Health Security Fund and Charoenrat Sub-district Municipality. These two funded projects are potential promotion project of healthcare key persons for reduction of non-communicable diseases (diabetes and hypertension), Charoenrat Tambon Health Promoting Hospital, Mae Jai district, Phayao province for the fiscal year 2014, and health promotion project for disability, Charoenrat Tambon Health Promoting Center, Mae Jai district, Phayao province.

3. Knowledge sharing among **folk scholars, lecturers, and students** of School of Allied Health Sciences on the subjects of Community Medical Technology, Community Physical Therapy, student's thesis, and lecturers' research, for example, invitations for folk scholars to instruct students or work as joint researchers in the research projects. In this regard, students learned from real practices in accordance with the plans set out by lecturers, whereas some research was also inspired by meetings and discussions with local people in need for solutions, such as the invention "Microwavable Thai Herbal Hot Pack" by Lecturer Pattamavadee Parasin, Division of Physical Therapy. This also helps increase a number of lecturers applying for research scholarships, and the number of applicable research studies. It is therefore a proof of wisdom for community empowerment in line with the ambition of University of Phayao, which is beginning to be widely recognized by the public.

Knowledge sharing and scholarship

To make the community self-reliant, the researchers organized **"Taking Turns Being Teachers, Learning, and Skill Training"**, targeted at encouraging key persons who already received the trainings to transfer knowledge to newer key persons, through an assessment of teaching and learning by lecturers. It is important to note that knowledge and practice skills of key persons in each area were different, due to differences in social contexts. To illustrate, village health volunteers of Charoenrat sub-district were capable of healthcare delivery to patients with non-communicable diseases, disability, and elderly persons, whereas village health volunteers of Sri Toy sub-district were capable of healthcare delivery to diabetic patients and specialized in local herbs.

Visiting the patients while rendering the service and instructing their relatives by village health volunteers

Moreover, collaboration and relationship between School of Allied Health Sciences and communities did not depend on the patronage system, but on equality and mutual respect. Lecturers and students jointly worked and shared knowledge, not solely taught the local people. For instance, the activity of **"Returning Knowledge to Community"** at the community's learning center required participation and knowledge sharing among healthcare key persons, local people, and interested persons. Meanwhile, the research topics as presented by lecturers were based on their local problems, and explained in the local dialect without academic words or terms to make it understandable to local people. The project also led to an integration of knowledge, manpower, and budget for implementing the academic service project by lecturers of School of Allied Health Sciences, funded by University of Phayao, and health professionals of Tambon Health Promoting Hospital, financially supported by Health Security Fund and Charoenrat Sub-district Municipality, as mentioned previously.

Measurable social impact

It was found that most participants were more knowledgeable and became more aware of healthcare through ongoing recommended practices, according to an evaluation of attitudes and ways to manage diabetes among the participants, who attempted to adjust their lifestyle, eating habit, and physical exercise according to the guidelines. In addition, village health volunteers or healthcare key persons in communities are more competent in health promotion and disease prevention to local people, and are more confident in working as volunteers, viewed as the main forces to reduce the burdens of health professionals at District Health Promoting Hospital. The 94.44% increase in knowledge was found among village health volunteers after the trainings, compared with their prior knowledge. Meanwhile, their ability of transferring knowledge to other participants accurately was 100 percent.

The success of this project increased efficiency of healthcare as a result of proactive operations of healthcare key persons. It improves the well-being of local people, and they have paid more attention to healthcare. The School of Allied Health Sciences will therefore adopt this concept for future work, expanding its networks with the aim to bring positive results to all the communities in Mae Jai district.

Social Innovation: "A Tripartite Home-based Health Care of Urban Elderly Residents in Hat-Yai: Health Care Service Prototype for Thai Aging Society"

Authors: Asst. Prof. Kanittha Naka, Ph.D and team

Institute: Faculty of Nursing, Prince of Songkla University

Duration: 2014 - 2015

Keywords: Three Coordination, Home-based Health Care, Urban Elderly

"From the triangle that moves the mountain to tripartite home-based health care for rural elderly residents"

Hat-Yai municipality is the local government of a large urban community which consists of 4 administrative regions with 102 communities and 15 public health centers. In 2013, the number of elderly people in Hat-Yai was 18, 359 (male 7,634, female 10,725), which constituted 11.79% of the whole population (Hat-Yai Registration Administration Bureau, 2013). From this statistics, Hat-Yai is an **'aging society'** according to the definition proposed by United Nations. Prince of Songkla University and Hat-Yai municipality has developed a memorandum of understanding (MoU) to cooperate in the development of Hat-Yai city. Under this MoU, the Faculty of Nursing has participated to increase quality of life of the residents through teaching-learning strategies, academic services, and research, in particular elderly health care under the cooperation of the Research Center for Caring System of Thai Elderly, Faculty of Nursing, Prince of Songkla University.

The Research Center for Caring System of Thai Elderly, Faculty of Nursing, Prince of Songkla University, and Hat-Yai municipality recognize the problem of home-based health care of urban elderly residents, in particular the elderly who are bedridden, disabled, lack caregivers, have

economic problems, or lack social support. From this, a tripartite approach for home-based health care of urban elderly residents has been developed based on the "Triangle That Moves The Mountain" proposed by Prof. Prawase Wasi. This project has been conducted in parallel with a project to develop the competency of village health volunteer (VHV), proposed by Hat-Yai municipality to serve the health care demands of the elderly, disabled, and chronic patients. The pilot study has been conducted with 300 patients from every community in Hat-Yai. These two projects aim to develop home-based health care services of rural elderly residents in Hat-Yai.

Partnership

The tripartite home-based health care of urban elderly residents project is a pilot study conducted in 3 public health centers including Phetkasem, Pohthipongsah Boonmee Intahrassamee [Klongtoey] and Municipality School No. 2 healthcare service center, with the participation of community and partnership networks as follow :

- **Academics** from Faculty of Nursing, Prince of Songkla University
- **Community network** include the communities in Hat-Yai municipality and other community networks, in particular Songkhla Community Foundation. This foundation plays a vital role in knowledge management, mutual collaboration, and funding to develop communities in Songkhla province.
- **Local administrator** includes local administration which are Hat-Yai municipality, Songkhla Provincial Administrative Organization, and National Health Security office (NHSO) Area 12, Songkhla.

The development and implementation of home-based health care service of urban elderly residents project was started from understanding the context. Data collection were done regarding the elderly and family focusing on 1) health information and health care services, including the local context that affected the current health care services, 2) local and provincial public policies , 3) community resources and social capital, and 4) social and cultural contexts. The findings derived from the data analysis regarding these 4 domains were used to identify the specific problem, the optimal goal, and the design of the home-based health care service of urban elderly resident model. The tentative model consists of two health-care service systems: home-based care system, and elderly club-based care system. In this model, the partnership networks consist of the health services networks, the community networks, and the local administration network. Four strategic conditions were employed, which consist of 1) task shifting, 2) mutual aids, 3) resource development/ allocation, and 4) public participation/ policy.

The database system was also developed to serve this model with the collaboration of Songkhla Community Foundation via the website communeinfo.com. The information in this database includes home visits system, follow-up system, transit information system, and management of elderly and disabled residents in Hat-Yai. The task force on elderly, disabled, and patients with chronic diseases was also launched. The committee consists of all staff representatives and stakeholders. In addition, the Thailand Research Fund (TRF) and the National Health Security Office (NHSO) approved research grants for the Research Center for Caring System of Thai Elderly, Faculty of Nursing, Prince of Songkla University and Hat-Yai municipality, respectively.

Mutual benefits

During the first six months after implementing the project, the working system was developed continuously and systematically. The urban elderly residents received better care that met their needs. The caregivers were more competent, with clearer guidelines in caring for the elderly. The physical therapists also performed rehabilitation services in the target population. The practical guideline of home-based health care service of urban elderly residents was therefore developed as follows:

The urban elderly residents: received continuing care from village health volunteer (VHV) and nurses,

The caregivers and VHV: developed the competency in caring for the elderly via the workshops and training

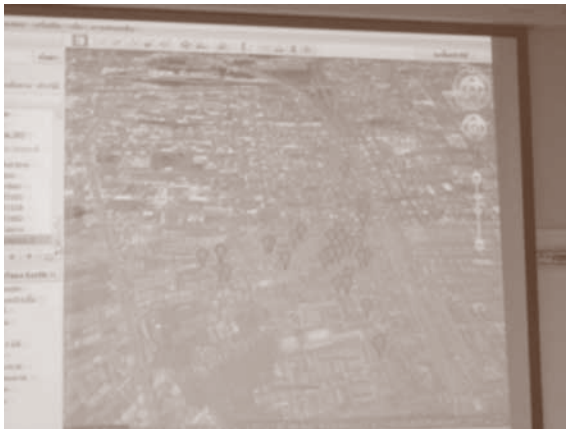
Health care services: developed the training course for caregivers, the practical guideline of home-based health care service of urban elderly residents, including the home visits plan, task shifting for care system, and developed evaluation forms and evaluation system.

The community: launched new health promotion groups and health volunteer such as elderly clubs.

Faculty of Nursing, Prince of Songkla University: The integration of the findings into the teaching-learning contents and strategies, conducted new research under the cooperation with the National Research University (NRU), the Thailand Research Fund and the Office of the National Research Council of Thailand (NRCT). A number of academic services activities were also launched such as knowledge sharing, competency development training and workshops for the village health volunteer (VHV). Dissemination and utilization of home-based health care service of urban elderly resident guideline were also conducted to the local hospitals such as Bang Klam hospital, Tha Phae hospital, and Sri Nakharin hospital. Moreover, collaboration among project researchers and multidisciplinary scholars (nurses, dentists, and agro-industry) resulted in a new project to develop a healthy diet for the elderly. The integration of research and postgraduate study was also employed with regard to palliative care for the elderly at home.

Knowledge sharing and scholarship

The home-based health care service of urban elderly resident project in Hat-Yai city municipality consists of 3 subprojects as follows; 1) the development of geo-informatics system to manage the well-being of the elderly, 2) the development of practice guidelines for home-based health care service of rural elderly residents, and 3) the development of a system to care for the elderly at home. Currently, database has been developed which can link the data between the geo-informatics system and the community website, including the home-based health care service of urban elderly resident toolkits and the caregiver training course.



Measurable social impact

The findings derived from the home-based health care service of urban elderly resident project in Hat-Yai city municipality provide a basis for further research as follows; 1) expansion of the community networks to care for the less active and bed-ridden elderly at home, 2) development of community social enterprise and to serve the need of elderly care, 3) development of high quality and standardized database system, and 4) development of the palliative care model for the elderly at home (granted from NRU).

Enhance our elderly's happiness via Siam Laughter Therapy: A case study of Baan Ta-Chang Community, Wattananakorn District, Srakaew Province

Author: Jitra Dudsdeemaytha, Ed.D

Institute: Graduate School, Srinakharinwirot University

Duration: December 2012 - June 2015

Keywords: Happiness, Elderly, Siam laughter therapy

"Siam laughter therapy toward model to enhance the elderly's happiness"

According to the policy and practice in community engagement epitomized by the "One University One Province" government project, the community in NongMak Fai sub-district, Wattananakorn district, Srakaew province was selected as community services area by Srinakharinwirot University. In 2012, the university along with public health technical officers, community leaders, village health volunteers and representative of the elderly population in Baan Ta Chang community, investigated the need of the elderly community and found that development of an elderly club was one of the significant needs for the elderly since the community attempted to set up the club but failed in 2004. However, the elderly club has been reestablished in 2011 with a full range of activities focusing on health promotion such as Isan dance, long stick exercise, income generating activities e.g. weaving baskets, making dishwashing liquid, broom making, making sweet banana chips, and social activities on religious holidays such as meditation, listening to sermons, making scented-wood flower for cremation ceremonies, and so on. Although, the activities were various, only a small number of the elderly participated in the activities, and the participation was mostly passive, with little social interaction.

Moreover, the survey also found that 27.64% of the elderly faced physical and mental health problems, with 9.75 % of them having a mental disorder. Sixty-two out of 124, or 50% of the elderly in this community, were at risk of depressive disorder with a 2.43% suicide rate, of which 0.81% were completed suicide and 1.62% were attempted suicide. They mostly harmed themselves by taking drug poisoning and hanging themselves. The majority factors related to suicidal behavior were physical and mental health problems and family problems. The results from this study led to research and development to enhance happiness for the elderly in Baan Ta-Chang Community, Wattananakorn district, Srakaew province.

Partnership

Based on the survey on the elderly problems, our working group focus on community-based care for developing the quality of life --physical, mental and social-- and enhance the elderly's happiness, as well as promoting and empowering community leaders on Siam laughter therapy practice program. In order to do these, our working group together with community co-researchers and officers from the health promoting hospital in Baan Ta Chang investigated the needs and possibility of promoting meaningful participation within community using the focus group technique. The study found that the needs of the villagers were to restore and strengthen the elderly club, and to promote not only elderly self-efficacy, especially in taking good care of their physical and mental health, but also self-determination to live happily during their final period of life. Besides, Siam laughter therapy has been selected as a suitable technique for the adults from its well- known therapy, and had been practiced before. Furthermore, the community also requested instructional methods and practice techniques. Although the working group has limitations in conducting the fieldwork due to other work schedules, and could only visit the community only three times a year, the community nominated leaders who came to the campus weekly and took the practice techniques to be reviewed and practiced within the club, supported by public health technical officers from the health promoting hospital in Baan Ta Chang.

The PDCA technique was used in this three -year project of community-based care to enhance elderly happiness as follows;

Plan Focus group discussion, between working group and participants, on frequency and duration of training as well as appropriate activities which include brain activation, breathing exercise, laughing yoga via Siam laughter therapy and experience sharing.

Do Implement a project according its plan and participatory group discussion.

Check Measuring the overall operation, analyzing work environment, process and reflection in pre-, post- and ongoing development.

Act Replanning the action plan for the following year, unsuccessful plan or activities in the first year shall be adjusted for the second year plan and readjusted again for the last year plan.

Knowledge sharing and scholarship

The processes of happiness development concentrate on using brain activation, breathing exercise, and reflection technique in Siam laughter therapy. Brain activation was used at the beginning of the therapy so as to stimulate brain functioning. Breathing exercise aimed to use the breath as object of concentration, or known as meditation, and to increase oxygen rate which will affect self-control, anxiety reduction, and mindful living; all the processes took three years in developing model, details of which are as follows:

The first year: only four basic laughter exercises were used, i.e., stomach, throat, heart and face. The first two activities were sitting exercise, and changed to standing exercise in the third activity. These activities were set up every Friday morning and conducted by a public health technical officer (the director of health promoting hospital) in Baan Ta Chang.

The second year: the community created their own style of laughing, using breathing in, breathing out song, and combined it with Siam laughter therapy. The working group, on the other hand, observed and adjusted exercise postures as well as rhythmic activities which were suitable for the elderly. Moreover, Baan Ta Chang elderly club also performed their show in activities or festivals within Srakaew province, as well as took part in health promotion contest projects. As a result, Siam laughter therapy is widely known, and its knowledge and techniques are passed on from Baan Ta Chang to other communities which lead to the building up of community reputation and promote and strengthen community at the same time. Village health volunteers and even students also request Siam laughter training as they realize that it has made their elderly change.

The third year: the working group formed a core-team of community leaders, which consisted of youth, working age, and elderly, with an aim to promote and strengthen the community. Moreover, since the Srakaew provincial strategy is "Srakaew The City of Happiness" and the province wants to promote quality of life for sufficient living; doing good, healthiness, nice environment and good income, therefore the working group integrated its project with the province to organize The First World Laughter Day festival on May 1st, 2015, in order to disseminate the Siam laughter therapy and promote a sustainable community. An article on "Development of recreation therapy program for aging happiness via Siam laughing therapy, A Participatory Action Research : A case study of Baan Ta-Chang Community, Wattananakorn district, Srakaew province" was published in Area Based Development Research Journal Vol.7 No.1 (January - March, 2015)

Mutual benefits

Individual level:

- The elderly who participated in activities program improved their mental and physical health status, as well as increased their self-esteem, and their potentials have been more accepted both in the community and at the province level.
- Academicians gained new knowledge and innovation for curriculum design and development in enhancing elderly happiness.

Community level:

Community relations were strengthened via group activities. Youth, working age, and elderly acted as core-team leaders and demonstrators in group activities, and these brought about continuous activities and sustainable community development.

Provincial level:

Srakaew province plans to create networks for setting up elderly clubs and to encourage each community to enhance elderly happiness via Siam laughter therapy.

Institute level:

The new knowledge and innovation gained from this study is a part of university strategy, and will be applied in curriculum design for Ph.D. program.

Measurable social impact

Economic

- In 2013, the number of elderly people being admitted to hospital or took medicine decreased, and the percentage of cost of medical care for the elderly decreased to 44.62% compared with that in 2012.

Social

- Rate of depression in elderly were lower, from 50% in 2012 to 23.08% in 2013.
- Elderly Club has been set up and membership has increased.
- Community relations have been built via group activities and joined by youth, working age, and elderly.
- Core-team leaders have increased from only one person in the first year to 20 persons in the third year.
- Siam laughter therapy was practiced in elderly monthly while they were waiting for their welfare allowance.

Province

- Srakaew province arranged " The First World Laughter Day festival"
- Laughter Therapy Club is a part of provincial strategy.

The success of this project is shown by its continued activities for over 3 years, and the activities also expanded to other communities such as Huai Chot, Wang Sombun, Ta Phraya, Ban Nong Nam Sai, NongTakhian Bon. The most important thing is that both youths and adults participate in the activity since they realize the benefits for elderly and community. Moreover, the club activities have been broadcasted on NBT and Thai PBS channel.

Box Jellyfish and Portuguese man-of-war: A Case Study of Thailand's First Toxic Jellyfish Surveillance System and knowledge establishment

Author: Assoc. Prof. LakkanaThaikruea MD, Ph.D

Institute: Community Medicine Department, Faculty of Medicine, Chiangmai University

Duration: 1998 - 2015

Keywords: Box jellyfish, Portuguese man-of-war, Surveillance system, Prevention and control

"7 years of Engagement to Toxic Jellyfish Surveillance System and co-creation of knowledge in Thailand"

Box jellyfish kill over 100 people worldwide over the last century. The majority of reported cases occurred in Australia. Thailand has reported at least seven deaths of 'probable box jellyfish' since 1999. The reported deaths occurred in Surat Thani province (6 cases) and Krabi province (1 case). The latest two deaths occurred in 2015. The number of death is underestimated due to lack of knowledge, absence of toxic jellyfish surveillance system, not all patient contacted health services for help, and misdiagnosis. Evidences of box jellyfish stings in Thailand include

clinical manifestations, wound characteristics consistent with box jellyfish envenomation and box jellyfish collected on location. In 2008, when we started studying the health problem caused by box jellyfish stings in Thailand, the situation was difficult and complicated - experts denied the existence of box jellyfish envenomation; health personnel perceived that foreigners died due to allergic reactions, when in fact they had died from toxins; misdiagnosis led to inappropriate treatments, which caused complications; death of foreigners was a politically and diplomatically sensitive issue.; deaths caused by box jellyfish stings drew media attention, and the international media perceived that Thailand ignored and concealed the problem; the existence of box jellyfish envenomation was a controversial issue among experts due to no prior education available in academic sector; no laboratory could confirm box jellyfish cases; no laboratory could identify either box jellyfish toxins or box jellyfish species; no anti-venom was available; and knowledge was lacking.

Given the underreporting, denial of jellyfish related deaths in Thailand, and the lack of effective first aid, thus, the author, a medical epidemiologist from the Faculty of Medicine of Chiang Mai University (Med-CMU), collaborated with a medical epidemiologist from the Epidemiology Bureau of the Public Health Ministry (BOE-MOPH), to investigate whether deadly toxic jellyfish existed in Thailand and, if they existed, what was the magnitude of the problem. The findings of existence of box jellyfish stings and magnitude led to establishing of knowledge, risk communication, a toxic jellyfish surveillance system, treatment guidelines, and prevention and control measures.

Partnership

The author worked to reduce the health threat posed by toxic jellyfish in Thailand, because quick access to first aid increases the probability of survival (in which communities and stakeholders play a major role), while inappropriate treatment can lead to death. Furthermore, jellyfish stings can be treated at existing health facilities, if the health personnel accept the existence of box jellyfish envenomation and are trained in proper treatment. From the beginning, the author has been one of the project leaders, playing a role in defining the research question, developing the proposal, designing the study, creating research tools, determining the target population, selecting the study population, collecting data, cleaning data, analyzing data, interpreting results, writing the report, providing information to the communities, and building sustainable measures.

To execute this project, the author had to be knowledgeable in epidemiology, evidence-based management, human resource development, strategic thinking, and risk communication. In addition, the author needed leadership skills and both national and international experience. The author integrated various strategies: setting the strategic plan, seeking cooperation and collaboration from involved organizations and stakeholders, establishing ad hoc surveillance of toxic jellyfish along coasts, improving the surveillance program to integrate it into the national surveillance program, investigating suspected cases of toxic jellyfish stings, collecting medical records from health services along the coasts and data from target populations, conducting outbreak investigations, establishing a toxic jellyfish network working group (Med-CMU of Educational Ministry (MOE), BOE-MOPH, Marine and Coastal Resources Research and Development Center of Marine and Coastal Resources Department of Natural Resources and Environment Ministry (MNRE), Surveillance and Rapid Response Teams, and Regional Offices of Disease Prevention and Control), establishing a toxic jellyfish network expert group (Med-CMU, BOE-MOPH, National Science Museum, Phuket Marine Biology Center, Marine and Coastal Resources Research and Development Centers along the Gulf of Siam, government and private health services along the coasts of Thailand, an expert from Australia, journalists from aboard, and the Divers Alert Network), conducting studies in box jellyfish species, communicating with communities / stakeholders/

involved organizations about the risk, providing seminars/training courses that cover all issues, creating and producing a variety of educational materials appropriate for each target audience, establishing a toxic jellyfish network of communities (e.g., hotels and resorts, province/city/town/sub-district/ municipality administrative organizations, tourism organizations, the Thailand Hotel Association, the Tourist Association, the Tourist Guide Association, the Long-tail Boat Association, the Emergency/ Rescue Association/Unit, fishermen, mass media, the Naval Medical Department, teachers, Med-CMU, and BOE-MOPH), implementing interventions by the three toxic jellyfish networks (working group, expert, and community), expanding the toxic jellyfish network of community and developing a Memorandum of Understanding (MOU) between the Disease Control Department of MOPH and the Marine and Coastal Resources Department of MNREin order to establish prevention model in selected provinces.

Mutual benefits

Experts, business groups, and fishermen helped each other to create innovations (vinegar first aid pole and sting net) that have been used in many provinces on both the Andaman and Gulf of Thailand coasts. A toxic jellyfish investigation guideline was developed. The surveillance system of injuries and deaths caused by toxic jellyfish was established. Prevention measures were expanded to other provinces with risks of toxic jellyfish stings. Our work and research findings about box jellyfish envenomation and jellyfish identification contributed to academic fields.

Knowledge sharing and scholarship

We applied various knowledge fields to build up knowledge about the deadly box jellyfish in Thailand. We also participated in creating innovations that used available resources in the communities in a creative way. These included development of the surveillance system, investigation guideline, warning in the event- based surveillance system, and prevention measures.

Measurable social impact

Social impacts and outcomes can be observed, measured, and generalized.

First year of project: 2008 - 2009

1) Established ad hoc surveillance 2) Established a toxic jellyfish network working group 3) Established a toxic jellyfish network of experts and4) Training courses for personnel and populations.

Second year of project: 2009 - 2010

1) Proved that box jellyfish envenomation caused injuries and deaths in Thailand 2) Helped communities understand the magnitude of the problems and established a toxic jellyfish network of communities3) Expanded the toxic jellyfish network working group4) Expanded the toxic jellyfish network of experts 5) Improved the surveillance system. 6) Developed guidelines and a manual, 7) Created educational materials, VDOs, t-shirts, and posters8) Developed educational materials via websites/blogs (www.oknation.net/blog/lakthai-written in Thai and English for professional groups and www.oknation.net/blog/peeguay- written in Thai for the general population9) Provided training courses/seminars for target populations.

Third year of project: 2010 - 2011

1) Reported the existence of the Chironex species for the first time in Thailand 2) Improved the manual3) Signed the first MOU between MOPH and MNRE (2-yearperiod). 4) Improved the surveillance system according to results of the evaluation 5) Expanded all toxic jellyfish networks (working group, experts, and communities). 7) Executed prevention and control programs.

Fourth year of project: 2011 - 2012

1) Proved that box jellyfish envenomation occurred in Thais, not only foreigners.2) Expanded all toxic jellyfish networks. 3) Expanded prevention and control programs. 4) Collaborated with the selected provinces for implementing proposed prevention model 5) Published an article in an international journal (Toxic jellyfish situation in Thailand. Chiang Mai Medical Journal 2012; 51:93-102: Review of fatal and severe cases of box jellyfish envenomation in Thailand. Asia Pac J Public Health Jun 2012).

Fifth year of project: 2012 - 2013

1) Implemented intervention model in selected provinces. 2) Improved the manual by adding more information. 3) Expanded all toxic jellyfish networks. 4) Expanded prevention and control programs, including vinegar first aid poles and sting nets, to other provinces along the coasts. 5) Created educational warning signs. 6) Distributed information to international parties. (Thaikruea L. Documentation on best practices of event based surveillance in the member countries in the SEA Region, 2013. World Health Organization)

Sixth and Seventh year of project: 2013 - 2015

1) Signed the second MOU between MOPH and MNRE (4-yearperiod). 2)Shared experiences about prevention model with the selected provinces. 3) Improved the surveillance system. 4) Wrote are referenced book to disseminate knowledge (Injuries and Deaths Caused by Box Jellyfish and Portuguese man-of-war: Treatment and Prevention. Chiang Mai: Faculty of Medicine of Chiang Mai University Publishing; 2014.ISBN 978-616-361-506-0: Thaikruea L. Event-Based Surveillance of Republic of Maldives, 2014. Health Protection Agency, Ministry of Health, Republic of Maldives).5) Improved capacities of the model provinces.6) In 2015, the government notified the involved organizations to launch interventions based on our recommendations.

Models of Sustainable Solutions for Dengue Problem in High Risk Area in Nakhorn Si Thammarat Province: from Sub-district Level "Kamphaeng Sao Model" to District level "Lansaka Model"

Author: Assoc. Prof. Charuai Suwanbamrung, Ph.D

Institute: Unit for Dengue Research and Service, School of Nursing, Walailak University

Duration: 2009 - 2015

Keywords: Solutions for dengue problem, Sustainability, Kamphaeng Sao model, Lansaka model

"Dengue ...the Problem that needs all Stakeholders' Participation for a Solution"

Dengue has been significant health problem of several countries in tropical and sub-tropical area. There were estimated 50 million dengue infected occur worldwide, approximately 2.5 billion people living in dengue endemic countries which 1.8 billion live in South-East Asia Region and Western Pacific Region, which 500,000 cases of dengue require hospital each year, and leads to death 2.5% (WHO, 2009, 2011). In Thailand, dengue has been spreading for more than 50 years, with a pattern of outbreaks one year followed by two years of normalcy. Nakhorn Si Thammarat province has the highest rate of infection. Dengue outbreak in Nakhorn Si Thammarat province showed that in 2010, there were 6,053 cases, with 19 deaths (0.31%), and in 2012 there were 4,548 cases, with 8 deaths (0.17%).The latest statistics, from January to September 2015 (9 months), showed 1,307 dengue cases (85.2 cases/100,000 populations), and 2 deaths (0.13%), with both sexes and all ages represented, especially in children and teens (CDC, official of public health Nakhorn Si Thammarat province, 2015). The main risk factors are non drugs specific treatment, adult mosquito being

resistant to chemicals , the mosquito's life cycle being shortened due to hot weather, life styles, density of people per area, and human behaviors being barriers to dengue prevention. A study of eight countries in 2005-2006 (including Thailand) showed the overall cost (combining the ambulatory and hospitalized patients, and factoring in the risk of death) estimated a dengue case was 828 US$. The average annual burden for dengue over a five-year period is 465.3 DALYs per million (Disability Adjusted Life Year: DALY) (WHO, 2009).

Prevention in the community against dengue transmission is a significant strategy to reduce dengue outbreaks. The World Health Organization (WHO, 2009) suggested integrated vector management (IVM) which consisted of five components, i.e. 1) advocacy, social mobilization, and legislation, 2) collaboration within the health sector and with other sectors, 3) integrated approach to disease control, 4) evidence-based decision-making, and 5) capacity-building based on local level and situation analysis. These guidances for dengue prevention were in line with Walailak University's mission, stated as "building scholarship excellence for solving community and area problems in southern, Thailand", and a literature review on the dengue problem did not find any model for sustainable solutions for the southern region of Thailand. Therefore, Walailak university supported the establishment of "the Unit for Dengue Research and Service: UDRS". The unit aims to solve the dengue problem (decreasing morbidity rate) in community at the individual, group, village, sub-district, district, and provincial levels.

The dengue solution model was based on the Community Participatory Action Research approach: CPAR. Starting at the sub-district level, in Kamphaeng Sao sub-district, Nakhorn Si Thammarat province, where there were morbidity rates of 210, and 123 cases/100,000 population in 2008, and 2009, respectively, the research team conducted five projects in five years (2009-2013) covering all groups such as primary students, high school students, people in nine villages, village health volunteers (VHV), primary care units, and sub-district local government organizations (SLOA). As the community became more aware of the problem, the SLGO supported the budget for dengue project representing the community's partnership. The result was that in 2012 the rate of dengue's morbidity decreased. It was the beginning of the model of community capacity building to strengthen sub-district for dengue control, named "Kamphaeng Sao model". Subsequently, the knowledge was disseminated to Lansaka district, which consists of 5 sub-districts and 44 villages. This area was a dengue high-risk area of the province, with high morbidity rates in 2009, 2010, 2011, 2012, and 2013 at 175.4, 833.9, 52.4, 209.8, and 467.9 cases/100,000 populations, respectively. In 2014, the project was launched for sustainable dengue problem solution in this high risk area, based on participation of all stakeholders. The model consisted of participation by all levels of area or groups, and surveillance system on mosquito breeding sources in households, (larval indices), collected by VHVs to Zone leaders of each village, to PCUs for retrying the computer program http://lim.wu.ac.th, and data feedback to stakeholders for organizing dengue activities. Morbidity rate decreased from 164 cases/100,000 in 2014, to 64.5 cases/100,000 during January - September 2015.

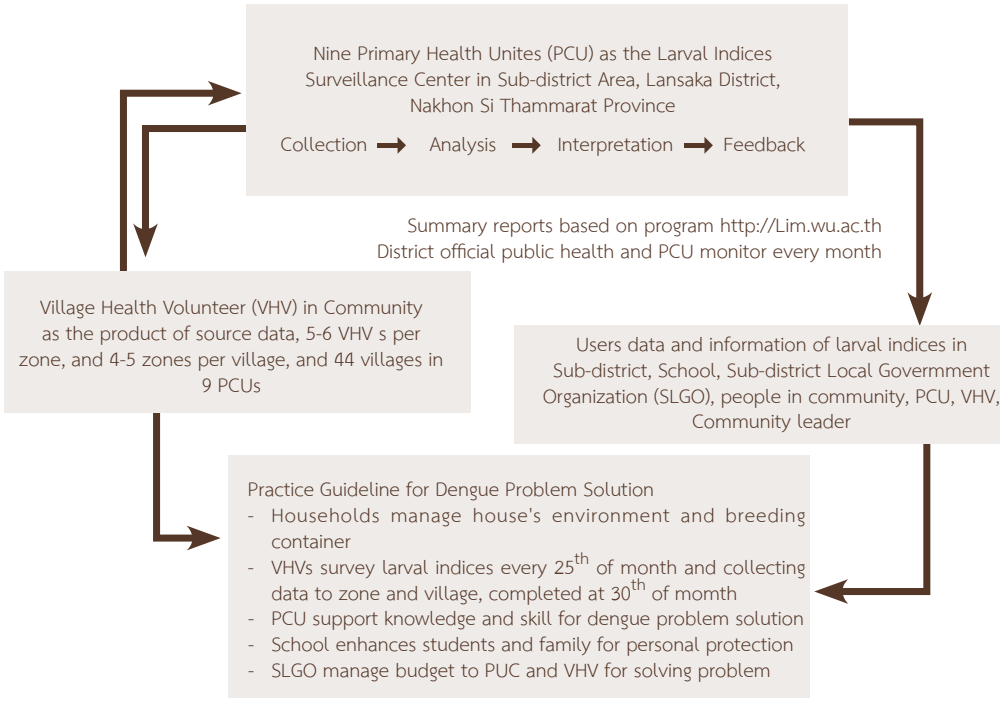
Partnership

First of all, the body of knowledge of Community Capacity Building for Sustainable Dengue Problem Solution: CCBSDPS is based on community participation. There were developed the tools for assessment of community capacity building such as "Dengue Community Capacity Assessment Tool: DCCAT". This tool was used as an indicator of stakeholders' competencies in reducing dengue problem in the community. The community participated in the assessment, planning, implementation,

and evaluation of the measures. Moreover, they were partners in grants such as SLGO, which provided a total support budget for conducting program in five primary schools, while community leaders and community members participated in the activities of all steps in the five projects. The resulting pattern was "Starting as recipients, continuing as co-investors". The research results clearly showed decreased morbidity rates in the community. The SLGO accepted and supported projects in nine villages, a high school, and five primary schools in the years 2010, 2011, and 2012, respectively. Moreover, the VHVs participated very effectively in the larval indices management program in the year 2013. The end result of the model was the partnership from group and SLGO.

Secondly, the knowledge gained was distributed to the district level a dengue high risk area in Nakhorn Si Thammarat province. The study was conducted during the years 2013 to 2015, integrated with concept such as 1) community capacity building, 2) epidemiology, 3) research design for Health Development, and 4) computer program online. The result was the "Lansaka model: the model of larval indices surveillance system covering district area". The model found all stakeholders as the partners such as the Lansaka district-chief officer, the Lansaka hospital, eight primary care units (PCUs) in district, the Lansaka official of public health, community leaders, and SLAOs. The system consisted of: First, VHVs were divided into 3-4 groups per village for larval indices survey every 25th day. Second, each VHV surveyed the larval indices in 10-15 households/VHV in "violet book", and sent larval indices data to the head of the group. Third, the head of the group collected data from VHVs in "blue book". Fourth, the head of VHV in each village collected the total data from heads of VHV groups in "yellow book". Fifth, the PCU collected and recorded data from all villages into the online program http://Lim.wu.ac.th, analyzed the data and reported the results on the 30th of each month. Sixth, larval indices levels of BI, HI, and CI were reported in the VHV's meeting on the 9th of each month. The health workers then proposed level of larval indices as information for all VHVs in order to prevent dengue in the high risk villages, and Seventh, communicated information to all stakeholders in the community such as local administrative organization, primary school, and households by VHVs.

Lansaka model: Larval indices Surveillance System from Households to District Level



Mutual benefits

In the first phase, the beneficiaries of "the five years for Kamphaeng Sao model" were community leaders and people in nine villages. The community learned about dengue , dengue prevention, and dengue control system. While in the second phase, the "Lansaka model" covered 44 villages in 5 sub-districts, based on eight primary care units, Lansaka community hospital, Lansaka municipality, with all stakeholders becoming more alert and being safer from dengue. Moreover, two districts, Sichon (115 villages in nine sub-districts), and Thasala district (105 villages in ten sub-districts), have effective larval indices system as the proactive surveillance in the community. For the university, this work was integrated to the university's missions such as teaching and academic service to community, course materials such as "principle of epidemiology I health care and nursing", and nursing research, evidence based nursing practice, and systematic review.

Knowledge sharing and scholarship

Learning outcomes of the long-term study in association with the mission of the lecturer in the university were: 1) a monograph on the method of dengue problem solution "Suwanbamrug C. (2014). Kamphaeng Sao Model: the model of community capacity building to strengthen sub-district for dengue control. Bangkok: Chulalongkorn publishing."; 2) basic dengue knowledge for the general public, students, VHVs, and people in the community, entitled " A sustainable dengue problem solution: basic knowledge of dengue prevention and control", more than 12,000 copies of which were published; 3) three research articles published in national-level journals (Thai Citation Index), and three in international-level journals (Scopus and ISI); 4) three oral and five poster presentations at international conferences; and three oral and two poster presentations at national conferences; and 5) sharing of knowledge on the new approach of dengue problem solution to areas such as Sichon, Lansaka, Thasala, and Chaiya district through the UDRS.

Measurable social impact

The social impact of seven year of work with CCBDPS was measured by the DCCAT, showing that the community capacity for dengue problem solution had increased at post-intervention test at all levels, such as household, village, sub-district, and district. Moreover, all areas were learning about the larval indices surveillance system and the larval indices calculus computer program (http://lim.wu.ac.th) (Figure 5). The network of dengue prevention and control of three districts among Lasaka, Sichon, and Thasala districts, were meeting regularly, and monitoring the surveillance system based on http//www.lim.wu.ac.th. Five research projects on dengue problem solution in Lansaka district were supported by Thailand Research Fund (TRF), including advance computer program, genetic study (CD29), and cost. The UDRS became the center of dengue problem solution research and academic service in the southern region of Thailand.

Integrating Nursing Education, Community Services, and Research to Develop Community Empowerment for the Prevention and Control of Hypertension

Author: Asst. Prof. Naruemol Singha-Dong, Ph.D

Institute: Institute of Nursing, Suranaree University of Technology

Duration: October, 2012 - November, 2014

Keywords: Community empowerment, Hypertension, Tha Chalung sub-district

"Tha Chalung sub-district: a health innovative model for hypertension prevention and control"

According to community need assessment of Tha Chalung sub-district of Chok Chai, Nakhon Ratchasima province, from 2012-2014, there were more than 900 individuals diagnosed with hypertension (HTN). Hypertension has been a major cause of illness (63.2%) among people with chronic conditions and increasing, with the prevalence similar to that of the nation. Factors contributed to HTN in this area included consumption of local food and vegetable with salty chili paste, which has high level of sodium. Most community residents knew less about HTN and those with high risk of HTN were not screened. In addition, the majority of HTN patients had inappropriate illness behaviors and were not screened for complications. Even though the primary care clinic has been trying to prevent and control HTN based on the "Healthy Thai lifestyle" policy, HTN situation is still uncontrolled. This situation suggested that an effective community-based HTN control program is in an urgent need. Therefore, School of Community Health Nursing, Institute of Nursing (IN) Suranaree University of Technology (SUT) initiated a comprehensive community-based hypertension prevention and control project in collaboration with Tha Chalung Health Promoting Hospital (Primary care clinic) for its catchment villages. This project targets individuals with hypertension and those who are at risk of hypertension.

Partnership

This project aimed to develop community capacity to health self-reliance by collaborating local authorities, Primary Health care center, and SUT Department of Community Health Nursing targeting Tha Chalung sub-district of Chok Chai, Nakhon Ratchasima province regarding the prevention and control of hypertension. This community engagement project is an integration of nursing education, community health nursing practicum course, faculty practice, research, and community services. The project began with **community health need assessment**. Institute of Nursing, the primary care clinic, and communities utilized a variety of methods to collect and assess community risks and health needs information including 1) conducting community walk-through survey 2) exploring individual and family health risk behaviors using validated questionnaire 3) conducting In-depth interviews, and 4) analyzing health services trend. **Data were analyzed and summarized by SUT and triangulated** with community leaders and clinic staff to ensure accuracy of community needs findings. Students, coached by faculty, conducted community forum to 1) present and discuss need assessment findings to community members, health volunteers, community leaders, and local authorities, 2) gather community inputs, then 3) conduct priority setting to **select high-impact community problem** using criteria of problem size, severity, difficulty to resolve, and community participation. According to need assessment findings and community forum, the priority and influential community problems that persist for several years are hypertension followed by non-communicable chronic illnesses. Students and the local clinic worked with community members to **conduct root cause analysis, identified project objectives, activities, plan for implementation, sign up for roles and responsibilities, design project evaluation, and implement a hypertension prevention and control project together.** Students obtain their course requirements; faculty 1) taught students, 2) worked with the clinic to provide care and services to needed population through faculty practice, 3) supplied clinic staff, community health volunteers, and other stakeholders with empirical and evidence based knowledge, and 4) conducted research. In addition, faculty initiated collaborative community grand round with clinic staff, leaders, health volunteers and local authorities targeting to ease patients and family with complex needs. All parties participated in project monitoring and evaluation. Prior to the completion of the practicum, students summarized, documented, and presented evaluation results to community residents and stakeholders. Issues with **follow up needs were as well presented** to respective agencies/ groups, the residents, and care givers. After student course completion, the clinic provides continuing care and services to the population, monitor community changes and impacts with support provided by faculty. In the following years, new groups of students were assigned to practice in neighboring communities within Tha Chalung sub-district where faculty could follow up on issues for the communities of the previous years, along with providing community health improvement to new nearby communities at the same time.

Mutual benefits

Collaboration among government agencies, community leaders, and village health volunteers provides desired positive outcomes. Collaborative work promoted access to preventive care for **individuals with hypertension risk** as well as strengthen community's health independence which resulted in health and well-being of the community as a whole. One village received a regional award for outstanding health management as a result of continuing work on community health improvement.

Moreover, **clinic staff** gained comprehensive knowledge and adopted it to their problem based practice appropriately resulting in effective disease monitoring. **The clinic** reported patient care and screening activities along with outcomes from this collaborating work and received budget for perspective operation. Furthermore, the clinic continues to improve its patient care management which resulted in an award for outstanding patient management. **Leaders and local administrative office** participated in care for disadvantage population according to their roles. Watchara Komsombat, a nurse practitioner of the clinic mentioned that "working with SUT urged me to update knowledge and promote opportunity to adopt evidence based practice to improve community health. It improved my understanding about roles and competencies of community nurse in caring for individuals, families, and community health. We reviewed and documented our practice and issues around community practice and search for new approaches suitable to the area and identified areas of improvement. We came up with clear procedures and expanded the gained knowledge to other villages resulting in an effective model of care suitable to our setting and healthier communities".

For **nursing students,** authentic learning experience in community health gave students better understanding of nursing role and responsibilities in providing comprehensive care to improving health of individual, family, and community across the life spans. Students gained experiences in providing care at primary care setting according to rural community culture, way of life, and health belief by learning with the clinic staff. Moreover, students were able to apply holistic and Humanize Health Care concepts to context of their target population. The success in promoting access to health services and providing holistic nursing care for the local help students understand that improving health for individuals, families and communities can be achieved through nursing practice at a community level. Through this practicum, students gained higher order thinking skills such as Analysis, evaluation and creation, Logical reasoning, and Problem Solving. Students have very good attitude toward community nursing, community nursing competency, and all students (100%) passed nursing license examination in Community Health Nursing and Basic Medical Care subject. Student project presentation at a national nursing education conference received an award. Faculty shared this collaborating practice of nursing education as an approach to implement university engagement in community improvement in national and international conferences. Findings of hypertension research conducted in the second year of this project were presented at an international conference. In addition, school of Community Health Nursing faculty used this community mission for their Faculty Practice.

Knowledge sharing and scholarship

The success and effectiveness of this community empowerment project were achieved through multiple strategies and through collaborating work force between different organizations including district hospital. Effective strategies such as 1) knowledge learning and sharing between university faculty and local health care team members and students 2) lay health workers training program, hands on practice experience and 3) multi-level work collaborations, and 4) ongoing project monitoring and evaluation, were identified as key factors of the success of the project. More importantly, this project was conducted based on the integration of empirical knowledge and conceptual frameworks of health science and community health nursing. The faculty team members utilized standards of nursing care to deliver health care to the population. With research-based approach and their expertise, the faculty team successfully gained trust and willingness to participate from the locals.

SUT School of Community Health Nursing initiated the Community Grand Round (CGR) in order to provide a comprehensive health care services to the locals with complex needs. Tha Chalung Health Promoting Hospital utilizes its "District Contracting Unit for Primary care" and resources to provide health services in the catchment area. In addition, resources used to provide proactive community service were from SUT and the community. Nursing students and the faculty have developed suitable and practical innovations in order to promote hypertension prevention and control. Those innovations include 1) one unit of protein from local food, insects/ bird, for the malnourished 2) medication and blood pressure diary, and 3) Three color food (local food categorized by an ability to influence blood pressure and renal function). Three colors of traffic light concept and pictures of food were used in education media to ease understanding for those who was unable to read. The food groups are summarized in the following table as shown.

	Hypertension	Kidney disease
Green Harmless and suitable, consume as wanted	Holy basil/spicy basil, chinese celery, ivy gourd, basil, lemon basil, green pea, garlic chives, baby corn, bottle gourd, wildbetal leafbush, cilantro, water convolvulus, chinese cabbage, eggplant, onion, roselle, garlic, string bean, pumpkin, tomato, green roselle, chinese finger - rhizome, round eggplant, pearl eggplant, drumstick, neem tree, shallot, cauliflower, raw papaya, banana	Holy basil/spicy basil, chinese celery, climbing wattle, ivy gourd, green onion, bean sprout, basil, lemon basil, babywinged bean, green pea, pandan leaves, roselle
Yellow Consume with cautions, may be in one meal per day	Senegalia pennata, green onion, bean sprout, winged bean, cabbage, cucumber, cassia leaf, star gooseberry, banana blossom, reddish, sweet potato	Cabbage, chive, baby corn, cucumber, bottle gourd, wildbetal leafbush, parsley, water convolvulus, chinese cabbage, eggplant, onion, raw papaya, black pepper
Red Not suitable, recommend not to consume	Bamboo shoot, black pepper	White popinac, garlic, string bean, cassia leaf, pumpkin, green roselle, tomato, chinese finger – rhizome, round eggplant, pearl eggplant, drumstick, neem tree, banana blossom, reddish, shallot, bamboo shoot, cauliflower sweet potato, banana

Faculty publication and presentations derived from this project included 1) Academic report entitled "Three color food groups" [food groups identified by traffic signal color concept] for individuals living with hypertension and/or chronic kidney diseases 2) Academic Presentation entitled: "University-community engagement, Nursing education, and social impact: A case of SUT". Presented at the Inaugural Asian Symposium on health care without borders. Hiroshima, Japan. August 6-8, 2014 and 3) A presentation of research findings entitled "Reducing Disparities in Hypertension Control: A Community-Based Hypertension Control Project for Population in rural Thailand" present at The 6th Annual Consortium of Universities for Global Health Conference: "Mobilizing Research for Global Health" at Boston, Massachusetts, USA March 26-28, 2015. Moreover, students present two health improvement projects at Thailand dean's consortium: national nursing education conference held on February 12-13, 2014.

Student's project: community-based comprehensive hypertension management focusing on dietary, exercise, stress management and drinking and smoking cessation won a popular award.

Measurable social impact

Impact on community

This continuing hypertension prevention and control project has increased the population's health knowledge in particular areas such as perceptions and awareness regarding determinant of hypertension, understanding of disease and symptoms, and health practices regarding hypertension. Moreover, 81% of the participants were able to estimate the amount of sodium intake in various foods they cooked and consumed. This indicates the increase of awareness of sodium effect on hypertension among the participants. In addition, participants who practiced sodium control and sodium awareness had expanded and shared their success with peers in order to persuade them to initiate behavioral changes. Some participants also demonstrated and educated others about healthy food choices to reduce the risk of hypertension. All known hypertension cases received screenings for hypertension complications and the project was able to reduce errors in medicine administration by 75%. Family members reported and demonstrated their knowledge regarding signs and symptoms of hypertension in order to detect early complications such as stroke, so that such family can seek health care services for the patients in a timely manner.

Impact on local health agencies

The team effort and work collaboration provides several benefits and impacts. For example, it defines roles among different health professional and health care team members who work for this project. Public health worker working at Tha Chalung Clinic can integrate and adapt this model of practice to other disease control projects, as well as to teach and educate incoming public health students from other universities. This community empowerment-based project has demonstrated its strength and benefits widely and is being recognized by several agencies in other areas and its surroundings. The project team has received several interests to participate in the similar collaborative community improvement model.

Impact on academic interest

SUT Department of Community Health Nursing has expanded this teaching - services - and research collaborative model to Chaimongkon sub-district, with supporting budget from its sub-district community health promotion fund in 2014. The Faculty is expecting to receive continuous grant for hypertension and chronic disease study from SUT (grant received since 2014). The project has been recognized by many other educational institutes within Thailand and from other countries. The University of Michigan at Ann Arbor, School of Nursing (UMSN) has been participating in the project by enrolling their students from Nurse Practitioner Master's degree program as part of the UMSN Global Clinic since 2013. This makes the SUT community clinical nursing experience as attractive as global clinic programs in Japan and New Mexico. Other universities have expressed increasing interests in joining community nursing practicum with SUT.

Diabetes Prevention in Community Health System using Lanna Food

Author: Asst. Prof. Chanita Praditsataporn, Ph.D
Institute: School of Nursing, University of Phayao
Duration: October 2013 - November 2014
Keywords: Community health system, Diabetes prevention, Lanna food

"Working as a family, one look reveals the mind"

Following Phayao University's motto "Wisdom for Community Strength", the Division of Research and Educational Quality Assurance of Phayao University launched a project entitled "One Faculty One Model" in 2010. The author, who was the vice dean for academic affairs and research at that time, was put in charge of this project. The designated area the project was Mae Sai sub-district, which is only 10 kilometers from the town of Phayao province. The area is a flat plain with the Mae Sai river flowing into Phayao Lake. The local cultures and ways of life are similar to those in nearby Lampang province. This resulted from the first generation of the people in Mae Sai sub-district who immigrated from Lampang province. At present, 75 percent of the people are farmers. The household income is only 14,000 baht per family, which is lower than the national average which is 49,950 baht (The Phayao Provincial Office of the Comptroller General, 2010). The social capitals are the elderly and folk philosophers who are active in community affairs and can pass on their ways of thinking, values and knowledge system to the next generation. The community leaders are ready and conscious, and desire to develop community. The people manage themselves naturally. Their natural resources are regional vegetables which are herbs from gardens and rice fields. Phayao Lake is also the source of good protein from fish, shrimps, and shells (Chanita Praditsathaporn, 2013: 1).

Previously, the people in Mae Sai Sub-district ate local food including to Kang Care (spicy pork, Acacia leaves, herbs, and vegetables), Tam Khanun (green jackfruit and minced pork), Kang Hungle (northern pork curry), etc. The ingredients of these foods are collected from the rice field, garden, and home-grown vegetables. No coconut milk is mixed in the food. The flavor of chili sauce is strong. Grilled and fresh vegetables are side dishes. The ways of cooking have been passed on from the ancients which are like Lampang people (Kanitkarn Pankaew, 2015: 103). However, the ways of living have been changed according to the development of nearby areas. The new generations of people in Mae Sai eat fewer vegetables. Instead they eat ready-made food from the market, fried food and pizza, and food contained and sold in plastic bags. There are only some families that keep eating regional food. The vegetables that they buy from the market are not local ones; for example, Chinese cabbage, cabbage, carrot, etc. The popular modern ingredients include at least 5 items; shrimp paste, fish sauce, pickled fish, seasoning powder, and monosodium glutamate, which are harmful to their health.

Since the year 2011-2013, diabetes has become a threatening problem in Mae Sai community, with the number of patients increasing from 50% - 75% of population. The ratio of the patients at risk to have diabetes is 1:1.5 and this number has been increasing in all 12 villages (Phayao Provincial Health Office, 2010). The local people have been trying to handle the problem of diabetes by themselves, which can be observed from the exercise projects in eight villages, and the project on diabetes screening in five provinces which are supported by National Health Security Office (NHSO). These projects were initiated by the interest of local health volunteers (HV), however without the participation of sub-district and village leaders and committee. After the projects had been carried out, they were not analyzed so that they could be improved for future steps, and they were deficient in promoting, protecting and caring continually. The health services provided by Tambon (Sub-district) Health Promoting Hospitals (THPH) are also deficient in connecting to local cultural ways of living; for example, food menu for avoiding diabetes consists of the foods in the central region such as fried stir snakehead fish with celery. Consequently, the number of the people in the risk group is increasing. The researchers believe that if the community health system starts from realization, thought, action, and solution by the community itself, it will be capable of preventing diabetes among the diabetes mellitus risk group. The healthy food menu in Lanna style is chosen to be the primary activity, with other activities to prevent other diseases to be initiated by the people in the community that will work and brainstorm together for further solutions, and this can lead to the strengthening of the community as well.

Partnership

The development of community health system on diabetes prevention by Lanna food in Mae Sai sub-district, has resulted in a strong partnership, as the Chief Executive of Sub-district Administrative Organisation and the well-being developer said “We have been working together like a family for such a long time, that one look reveals the minds.” The work of many units have been integrated and developed constantly, the burden of the leaders is relieved, and the people’s understanding have been aligned. The budget has been set together by applying Participation Action Research (PAR) and the resources from all partners have been shared. Specifically, the project involved:

- **People:** teachers and students from the Faculty of Nursing, and the people in the community including to the director of Division of Public Health and Environment, Sub-district Administrative Organisations (SAO), the nurses in the THPH, HVs, community leaders, the leaders in family health and diabetes mellitus risk group.
- **Knowledge: Knowledge from the university:** 1) professional knowledge and skills on Nursing 2) public health science, 3) concepts and theories: Romer's health system, systematic theories, participation and empowerment, medical pluralism, primary health care, theory on stage of change, theory on PRECEDE Model. ***The knowledge from the community:*** community nutrition, Lanna food - Kang Care (spicy domestic fowl, Acacia leaves, herbs, and vegetables), Fried fish with Chilly Sauce, Pestled Cow-Pea and Round Eggplant, Chiang Da Curry (Bymermainodorum (Lour.) Decent.), Sisiad Curry (Glinusherniarioides Curry), and local foods - local diabetes-reducing foods, herbs, and local foods with no coconut milk.
- **Materials:** equipment from the Faculty of Nursing, THPH, and natural resources in the area.
- **Budget:** budget from The Thailand Research Fund (TRF) and Phayao University, Mae Sai sub-district Administrative Organisation, and the villages.

The foundation of the community relates to the people and the network as pioneers who manage resources and knowledge together, share responsibilities and benefits, and reduce conflicts. This is regarded as the development of community health system.

Mutual benefits

- **Society:** the model of the community health system on Diabetes Prevention using Lanna food has been established in Mae Sai sub-district, because the people realized that disease prevention is essential. The roles of the individual people in the community are important to solve the diabetes problem. Lanna food menu is the primary activity that all parties work together. Each person engaged in solving the problem.
- **Health:** 1) The degree of Hb A1C (Hemoglobin A1c) in the diabetes mellitus risk group has been decreasing. Health behaviours have been modified; for example, the number of food containing high levels of starch and sugar has been reduced, the number of the people working out has been increasing and they have exercised more correctly. 2) The leaders of family health have realized their roles in being responsible for family health, and their behaviour of adding sugar and fish sauce in their food has been reduced. 3) Partnering to plan for the development of the sub-district on health, and the plans/projects on well-being sub-district has been consistent and continual.
- **Education:** 1) The students have learned how to strengthen communities. 2) The teachers' paradigm have been shifted from the hospital –based "curing" to the community focusing on health "promotion". 3) New knowledge has been developed in that providing clear information to people can lead to behavioural changes. 4) Twelve new researchers were produced both in the Faculty of Nursing and in the area, and 5) Four study reports were made.
- **Economic:** This project has resulted in a plan for commercial production of natural condiments as a small and micro community enterprise of the village group

Knowledge sharing and scholarship

The community health system on diabetes prevention by Lanna food started when the students as the trainees had to find out what were the real problems and the requirements needed to be solved in the community. They made the survey and brought the data back to the people in the community; they listened to the people's opinions and interests towards the problems needed solving in the community and finally resulted in creating the new project on behavioural shift: reducing harms from diabetes/high blood pressure of the village number 5. The various activities have occurred; for instance, providing the knowledge by teaching physical education, arranging the exhibition on "3 E, 2 A" (promoting eating healthy food, emotion, and exercise and exercising, as well as no smoking and no alcohol-drinking), and exercising by aerobic dance, etc. Village number 4 has launched activities on exercising by using elastic bands, promoting consumption of local vegetables, and planting herbal gardens, etc. **The significant aspects found** were the information return on the food map and kinship diagram made the people in the community visualise the causes of diabetes by behaviours rather by heredity, and this could replace the old belief, and caused the people to understand that they needed to change their behaviours. After that, these aspects have been extended in the nursing practicum II course emphasising health promotion. The students invented PVC innovation to explain the mechanism of having diabetes so that people could see and understand easily.

From teaching and learning to do a research: After the students were trained in the course 501426 Practicum in Community Health Nursing II and they had to find out what the real problems were and the requirements needed to be solved in the community, it was extended to the information survey and the information return to the community. The author played a role to encourage and empower the community leaders. The director of the division of public health and the nurse at THPH have also been the local researchers. The information on current diabetes has been brought back to the community in order to arouse the consciousness and the roles of the local leaders on public health. The Appropriated Influence Control (AIC) meeting has been conducted to plan the sub-district's future. After evaluating all of the villages according to the regulation on health management village, six main problems were found (Chanita Praditsathaporn, 2013: 2): 1) all the parties engaging in it had never done SWOT-analysis in the level of sub-district together, 2) the sub-district had health charter, sub-district development plan, but there was no plan on health development, 3) even though each village had individual plan, in some villages there was no plan on health, and in some villages this role has been driven by HV alone, 4) the projects on health and health promotion were repetitive and the process of learning hasn't been generated despite previous experiences, 5) most of the villages did not do PDCA and reports and follow up, and 6) the leaders were overwhelmed by many duties and need to develop those who are the next in line of community development.

The meeting has reached the conclusions to solve the problems by 1) appointing the sub-district well-being developers (17 people who are the chief executive of SAO, the head of the SAO members, village headmen from 12 villages, the members of SAO Council (SAOC), the representatives of the people, local scholars, the head of housewives, the youth leaders, the disabled leaders, the teachers in the school, and monks) to plan on policy level, 2) planning on well-being development in Mae Sai sub-district to be in line with the health charter, 3) announcing on the intention from that Mae Sai sub-district is a pleasant town to stay to the well-being sub-district so that the people will have known, 4) developing the plan/project on health promoting and well-being of the people in the community

which is not overlapped and developing the learning process, and 5) producing the well-being developers in the village level in order to determine the project activities, evaluate, and report systematically.


The author was responsible for encouraging, supporting, and enhancing the teachers in the Faculty of Nursing from the hospital section to participate in doing research, piloting the project on health behaviours of the healthy elderly. It was found that the elderly in Mae Sai Sub-district ate the local vegetables from rice fields, gardens, and Phayao Lake; they ate local foods which were not mixed coconut milk; their sweated everyday, and they were not stressful. The result of this research led to analysing five dishes of nutritional value of the main foods which were common in the community: Kang Care (spicy domestic fowl, Acacia leaves, herbs, and vegetables), fried fish with chillie sauce, pestled cow-pea and round eggplant, Chiang Da Curry (Bymermainodorum (Lour.) Decent.), Sisiad Curry (Glinusherniarioides Curry). In addition, the Faculty of Medical Science of Phayao University insisted confirmed that they were healthy menu. Later, the team worked together on developing self-management program and manuals for the diabetes mellitus risk groups. Practical ways of exercising and emotional promotion were also generated.

From researching to academic services: the team, the well-being developer, and the students worked together to conduct the seminar and to hear the opinions on progressing the model village on community health system. This led to two model villages: the village number five was the model village on health behavioral changes and the village number four was the model village on health promotion. The activities conducted were the elastic band exercise, the exercise demonstration by using 9-square-table aerobic exercise by the speaker from Institute of Physical Education and a national athlete, emotional management according to Buddhism principles by a provost, and planting local vegetables and herbs with diabetes- reducing properties. The regulations in the village have been set; that is, having dinner before 8 p.m., reducing the quantity of rice from 3 fists into 1.5 fists, and increasing the quantity of vegetables in food with the 2:3 ratio per meal, especially for dinner. The quantities of monosodium glutamate, seasoning powder, shrimp paste, fish sauce, and pickled fish have been reduced in one cooking pot. The number of households setting goals to decrease diabetes in one year has been counted. The evidences gathered were the cooperative map. The cooperative map has been under the responsibility of the village headmen. Besides, the chief executives of the local administrative organization also participated in and provided some budget to conduct such activities.

The director of the sub-district health promoting hospital, together with the researchers, has realised the significance of those preparing food in the household, so the project of the family health model was held to urge cooks, those in charge of food preparation, and merchants to realise their important roles on cooking that they should decrease sweet substances, oil, and salt. This project led to holding the provincial competition on cooking which has reduced sweet, oil, and salt and eventually Mae Sai sub-district got the second-best award.

From the academic services to arts and culture preservation: the information above was presented to the director of Chumchon Ban Mae Sai School. The awareness on the disadvantages of seasoning powder and monosodium glutamate and the advantages of local vegetables and food have been raised. Therefore, the discussion among the cookers, teachers, and nutritionists was made and agreed together to reduce the quantity of seasoning powder and monosodium glutamate of school lunches from one pack to a half pack. They welcomed the well-being developers to give the know ledge to the students on local vegetables and food, and encouraged the children and youth to explore local vegetables and herbs in the household through the project of cultural food: the culture in the kitchen for children and youth.

Measurable social impact

In the area: in Mae Sai sub-district, the people are now well-informed. **The SAO**, **the THPH**, the risk group, and the family health pilot have become the well-being sub-districts. The community well-being developers received research fund from the NHSO to work on diabetes, screening the risk group, the diabetes patient group for six projects. In addition, Thai Health Promotion Foundation promoted Mae Sai sub-district forward to be the model of the well-being sub-district at the provincial level. Chumchon Baan Mae Sai School supported the project on Lanna healthy food. The group of housewives planned to produce natural seasoning powder as their small and micro community enterprise, and set the rules to reduce the seasoning powder and monosodium glutamate for all merit events held locally. Moreover, Mae Sai sub-district was also the site of learning how to develop the community health system on diabetes protection by Lanna food to District Health Office Krathumbaen, Samut Sakhon province.

For the academics, they have presented this research in various stages; for example, the national conference on “Transforming Contemporary Nursing”, Faculty of Nursing, Naresuan University, during December 1-3, 2014 on the topic of Self-Management Program for Type 2 Diabetes Patients: a Systematic Review, and the national conference on “Chronic Disease Protection and Management” at Ramathibodi Hospital, Mahidol University on December 26, 2014 on the topic of the factors influencing healthbehaviours of the diabetes mellitus risk group in Mae Sai sub-district, Mueang district, Phayao province”. The study on the Community Health System Diabetes Prevention using Lanna Food is being submitted to the International Journal of Public Health. In addition, the study on the health behaviours of the healthy elderly is also being published in the Public Health Nursing Journal. Moreover, the academics have also received research funds on related aspects such as the development of natural seasoning powder products, on the benefit package for the diabetes mellitus risk group, on the effects of a self-efficacy promoting program for well-being developers towards the knowledge and capability of being the master of ceremony and the leader on recreation, on the year two project of cultural food : the culture in the kitchen for children and youth, on the project to promote chemical use behaviours of Mae Sai farmers to eliminate pests, and on the Bumbad-Tuk Bumrung-Suk Project with the ABC Pattern Project.

Knowledge Transfer on Indigenous Vegetables Leading to Diabetics' Eating Habit Modifications

Author: Mrs.Rossukon Wongdokmai

Institute: Faculty of Science and Technology, Uttaradit Rajabhat University

Duration: January 2012– January 2013

Keywords: Participatory action research, Local vegetable recipes, Eating habit modifications

"If you love yourself, minimize sweetness, fat, and salinity, top up with vegetables and fruit, and always exercise"

The number of diabetics in Mae Phun sub-district in Laplae district, Uttaradit province grew from 2010 to 2012 with severe effect such as feet becoming ulcerated, fingers having to be amputated, eye becoming blear (diabetic retinopathy), kidneys becoming dysfunctional (diabetic nephropathy), and death. According to the analysis of diabetes' causes, except from heredity, the primary causes of diabetes include living behavior in imbalanced food consumption such as eating food that is too sweet, fat, and salty, lifestyle depending on technology leading to the lack of exercise, and social conditions that affect mental health. These behaviors can be modified to lead to effective prevention and a slowdown in diabetes occurrence. Therefore, due to the community's need to reduce severe diabetes in the locality, both diabetics' health protection as well as promotion behavior alteration and the disease treatment should be done in parallel.

As an academic in the Food and Nutrition Program, the researcher provided professional services to diabetic patients and educated them in the community to promote their health. This is in accordance with the vision of Uttaradit Rajabhat University, i.e., "Uttaradit Rajabhat University is a higher education institution for locals and has a mission to provide solutions to local and societal problems." To do so, the

researcher collaborated with public health technical officers of the Health Promotion Hospitals in Mae Phun and Phamup sub-districts and the local organizations as well as community network. The work that which had the community's participation as well as the local sectors involved communicative activities focusing on promoting consumption of vegetables leading to modifying eating habits and transferring the information to diabetics in the areas to strengthen diabetics' self-care resulting in community to well-being.

Partnership

This study is participatory action research with mixed methods: quantitative and qualitative methods. Moreover, documentary research, field research, group discussion, interview, meeting, lesson summary, training, and knowledge exchange were used to make the diabetics modify their eating habits by using the recipes of the local vegetables against diabetes as the media in convincing the patients to apply them to their meals. The sample in this study was 90 diabetics who did not need any insulin intake, who were interested in participating in the project, who live in Mae Phun sub-district in Laplae district, Uttaradit and who were admitted to Health Promotion Hospitals in Mae Phun and Phamup sub-districts and Laplae hospital. Every sector collaborated as follows:

Community Collaboration Public Health Division of Hua Dong Municipality, Mae Phun Sub-district Administrative Organization, the director and nurses of the Health Promotion Hospitals in Mae Phun and Phamup sub-districts, the sub-district chiefs, the village headmen, public health volunteers, diabetics and their family members, the lecturers as researchers from the Food and Nutrition Program, Communication Arts Program, and the students from the Food and Nutrition Program exchanged knowledge and ideas with each other to review the health problems of the people in the area and to find solutions to the problems. They also identified the media that are appropriate for the community and used the media. After that, the diabetics adhered to the slogan, "If you loves yourself, minimize sweetness, fat, and salinity, top-up with vegetables and fruit, and always exercise." Moreover, for four months, the sectors followed up on and assessed the diabetics' adaptation to eating habit of local vegetables and their blood glucose. The results were examined and corrected through the collaboration of the research team and the community. Finally, the concerned organizations or institutes applied the findings in the area.

Use of Knowledge from University Knowledge of nutrition was used to analyze nutritional values and the advantages of local vegetable recipes and to adjust them to healthy meals for diabetics. The university also proposed nutritional tips regarding alternative eating habits of local food to keep their normal blood glucose levels. In this work, nutritional science was integrated with communication science with the lecturers from the two fields as a researchers designing communication formats for

the local vegetable recipes: Sa Phakkat (flowering cabbage salad), Kang Cae (mixed vegetable curry with some meat), HuamPhak (mixed vegetable curry or steam), PonMakhuea (long eggplant salad), KangsomKhanun (sour raw jackfruit curry), KangsomtunSaimalako (sour curry with the vegetable from caladium family and raw papaya), HuapliSaiphakkut (raw banana blossom with fern), Nam PrikPla Yang Phaktom (chili paste with grilled fish and steamed vegetables), and Nam PrikPla Ra Phaktom (chili paste with pickled fish and boiled vegetables). The formats focused on using media that are easy and appropriate for the community's contexts. As a result, four communication formants: activity media, personal media, document media, and material media were created for the patients.

Materials The diabetics and their family members cooperated in providing local raw materials and food materials, the Health Promotion Hospitals in the sub-districts facilitated the places for the activities, and the Food and Nutrition Program supported the materials needed for following up the patients' behavior.

Budget The budget was provided by Thai Health Promotion Foundation (THPF)

Mutual benefits

1. **Health Core/ Model**

A diabetic patient who is regarded as the best model of diabetics' health care due to normal blood glucose monitor and control is Chamrat. In addition, Chamrat shared his diabetic information and experience with his neighbors as a peer support. The action inspired the neighbors to participate in the activities. This is in accordance with Kazuhiko Kotani and Naoki Sakane' study having diabetics' participation through a peer support method. The patients had opportunities to exchange experiences with each other.

2. **Patients**

The findings of the study showed that the sample or the diabetics who participated in the determined activities perceived the four type of media. As a result, their eating habits were changed continually. The results from the data collection of the vegetable intake and the amount of blood sugar showed that the group that participated in the activities every time had 208.45+ 68.09 grams of vegetable consumption on average. They were also able to control their blood sugar levels. The sugar levels after meal were at 115.83 + 16.94 milligrams per liter (mg/l) on average which was close to the normal level of blood glucose (<130 mg/l). However, the group that did not attend the activities regularly had 134.42 + 55.07 grams of vegetable consumption on average. Their sugar levels after meal were at 152.57 + 42.45 mg/ l on average. Additionally, the results from following up the patients' behavior and symptoms the nurses of Health Promotion Hospitals in Mae Phun and Phamup sub-districts found that the one who participated in this project got better and could reduce their medicine intake. Therefore, the diabetics' behavioral changes led to healthy conditions. The modification became a starting point leading to well-being of people in the sub-district.

3. **Local Institutes**

The village public health volunteers, Health Promotion Hospitals, and local administrative organizations had important roles in being volunteers, cooperators, and caregivers of the diabetics in this project yielding success in the modification of their eating habits. After that, the organizations still

kept the roles. For example, the Health Promotion Hospitals in the sub-districts continued with the promotion project of local vegetable against diabetes. The budget for which was given by the municipality. The result from following up the patients' eating the local food based on the recipes against diabetes showed that the eating of local food and reduction in the use of diabetic medicines were correlated. Strong groups of diabetics were also established, which recruited new members into the groups, and disseminated the local food recipes through exhibition and various media such as newspaper and television resulting in the communities' realization of the benefits of local food.

4. University

The students in the Food and Nutrition Program gained knowledge in their course, Food Management and Sito therapy, based on a case study titled "Food Management for Diabetics." Besides, they followed and recommended nutrition to the diabetics in the community by collaborating with the nurses of the Health Promotion Hospitals in the sub-districts.

Knowledge sharing and scholarship

Cooperative learning of the community, local authorities, researchers, and food merchants in the markets who changed their food recipes to reduce sweet, fat, and salty tastes helped increase the diabetics' alternative consumption of healthy food. In addition, the use of food coupons to have the patients learn the local food tastes made the merchants more confident in selling the food with less sweetness, fatness, and salinity in the community. This yielded the use of the local food to treat the diabetics' health through the media that are appropriate for the local context and that are related to alternative consumption of vegetables available in the community to control diabetes. In the diabetes treatment, the doctors of the Health Promotion Hospitals in the sub-districts assisted in adding information about the medicine used to cure the diabetes. Moreover, the village public health volunteers used the media to disseminate how to consume local vegetables against diabetes and how to use the medicine correctly. Two important media are the guide for the diabetics and the healthy calendars used to track the patients' behavior related to nutrition, mood, and exercise monthly. The researcher presented the research entitled "Nutrition Education of Local Vegetable Recipes for Diabetics' Eating Habit Changes at Health Promotion Hospital in Mae Phun sub-district, Laplae district, Uttaradit province" at the 8th national food conference in 2014.

Measurable social impact

In returning the information to the community, it was found that the local authority, Hua Dong Municipality continued applying the research findings and allocated funds to extend the advantages of the local vegetables against diabetes by collaborating with the Health Promotion Hospital in Mae Phun sub-district. This resulted in continuing care activities for diabetes such as food consumption that is appropriate for diabetics. In doing so, the Food and Nutrition Program provided professional knowledge to the patients and educated them to promote their health in the community. All the action is associated with the vision of Uttaradit Rajabhat University, "Uttaradit Rajabhat University is a higher education institution for locals and has a mission to provide solutions to local and societal problems."

The Integration of Family Medicine and Community Medicine Practices with Solutions for Diabetes in Local Community, by Fifth-year Medical Students, Faculty of Medicine, Chulalongkorn University

Authors: Thanapoom Rattananuponget, Ph.D and team

Institute: Faculty of Medicine, Chulalongkorn University

Duration: June 2014 - February 2015

Keywords: Diabetics, Community medicine, Family medicine practice, Medical student

"Roles of doctors and social responsibility"

According to the survey by National Health Examination Survey Office, Health System Research Institute, Thailand, under the 4th project of Thai Health Survey by Interview and Physical Examination (2008-2009), it shows that the percentage of diabetes frequency in Thai population aged <15 year-old is 6.9. It also shows that the diabetes is found more frequent in female than male in a proportion of 7.7% and 6.0% respectively. The increase of diabetes frequency resonates with ageing. That is from 0.6% in patients aged between 15-29 year-old to 19.5% in male patients aged between 70-79 year-old and 16.7% in female patients aged between 60-69 year-old; the highest rate of frequency. This statistics is applicable even in the area of Chonburi province. Furthermore, according to statistics from Chonburi Provincial Health Office, it shows that in the fiscal year of 2014 the percentage of diabetes frequency in Chonburi province's population aged <15 year-old is 3.09. With this regard, the Department of Preventive and Social Medicine, Faculty of Medicine, gavea chance to the fifth-year medical students to take on a fieldwork and medical schemes for solving basic health care problems in other provinces in Thailand, which is considered as one of the course's requirements of Theory of Family Medicine course and Family Medicine

and Community Medicine Practice. Thesefieldwork and medical schemes are on account of the aim of Chulalongkorn University as a public university; the 5th achievement entitled “To Become a Warm Home for the Good Heart and the Intelligent Who Have Social Responsibility”, whereby employing “helping” strategy to achieve “University Social Responsibility”.

In the academic year 2014 (June 2014 - February 2015), 212 medical students were divided into 13 groups in order to go on a fieldtrip in 2 provincial areas: Panatnikom district, Laemchabang district, Banglamung district and Muang Pattaya district of Chonburi province and Nongkae district and Kaengkoi district of Saraburi province. The assessment for these courses is in accordance with Roles of Doctors and Social Responsibility; one of the principles under the Desirable Characteristics of the Graduates from Faculty of Medicine, Chulalongkorn University.

Partnership

The scheme for solving diabetes, as one of 13 health care schemes, consists of 5 minor projects. The medical students had a chance to implement each project with local organizations in the communities; for example, putting forward the idea as to how to solve the health care problems, along with community’s members and relevant parties (village volunteers, health care workers from local hospitals and sub-district health promoting hospitals, officials from local government agencies). This collaboration is based on the need of the local communities. On this occasion, all activities have successfully been attended by the locals in the area studied, as follows.

Project name	Area studied	No. of participants (person)
Dessert without sweetness	Bualoi sub-district, Nongkae district, Saraburi province	94
Healthy cooking and making merit	Nong-oe village, Banglamung district, Chonburi province	129
Field of getting together for fighting diabetes	Nongheang sub-district, Panatnikom district, Chonburi province	77
Screening test of diabetes, high blood pressure and metabolics	Nongprue sub-district, Banglamung district, Chonburi province	230
Not sweet, not oily, not salty to be happy in one’s life	Nakluea sub-district, Banglamung district, Chonburi province	90

One shop one knowledge

Healthy kitchen

Mutual benefits

Regarding the community, despite the fact that the entire students' performances in tackling the health problems, especially diabetes, has not yet obviously resulted in self-care of the community's members, the students' activities in each project proves to be fruitful to the all participants; both the locals and the students themselves.

As for university, not only have the students been assessed as part of the course's requirements of Theory of Family Medicine course and Family Medicine and Community Medicine Practice, but the Office of Students Affairs at Chulalongkorn University also attains one of its primary objectives; that is, to develop various skills of living one's life among students and university's personnel, to create awareness and volunteering mind in students, to teach students to be socially responsible, to educate students as to how to be a giver, follower and practitioner of knowledge from classroom to community by mean of cooperative learning processes, to develop knowledge sharing among students and community's members based on the need of community and social responsibility. Although the ultimate goal of health care practices and activities is to gain the knowledge of being healthy and its outcomes would not be obvious in a few weeks, all students' workshops and projects have covered every level of preventing diseases; primary prevention (i.e. promoting health care and disease prevention), secondary prevention (i.e. screening of diseases) and tertiary prevention (i.e. preventing the deterioration of diseases and the recuperation from diseases).

Knowledge sharing and scholarship

When implementing the projects under the courses' requirements of Theory of Family Medicine course and Family Medicine and Community Medicine Practice, all medical students applied knowledge acquired in classroom and shared what they have learned with the locals, village volunteers and health care workers in the area studied, as follows.

1. **The project "Healthy cooking and making merit"** is initiated. In this project, the medical students found after survey of health problems in community that not only laymen but monks in community equally suffered from diabetes. The students then apply the way of making merit by giving offerings to the monk to the project as its title. The activities of the project are to screen the diseases according to the risk of each person, other diabetes complications, abnormal cholesterol levels, and high blood pressure. Some of the interesting activities for learning how to be healthy "It's Not Too Late to Protect (Health) Together" and "Healthy Kitchen: Specialty and Good Health" are aimed at educating the local as to what kind of food they should give as offerings to the monks. They have also learned how to cook nutritious food. Beside these activities, in the area of Nongprue sub-district, Nakleua sub-district, and Banglamung sub-district, the students as well initiate the project to screen for diabetes, high blood pressure, and metabolic syndrome. The project "Not sweet, Not Oily, Not Salty to Be Happy in One's Life" consists of the screening for high blood pressure, diabetes, metabolic syndrome, along with knowledge sharing as to how to take care of one's self and work out regularly.

2. **The project "Field of getting together for fighting diabetes"** is a fieldwork project with various booths in the project area. For example,"Doctor wants to ask" booth is for educating the locals with basic knowledge about diabetes, "Self-Indulgent Now, Suffering Later" booth is for giving knowledge about food and beverages for diabetes patients, and "Unable to control?" booth is for

giving knowledge about complications derived from blood sugar level fluctuation. Moreover, there are video clips presenting songs related to project; such as, “Don’t get diabetes”, “What is diabetes”, and “Allergy to diabetes”. To improve how the community’s member received information about diabetes, another activity called “One shop, one knowledge” was created to disseminate information through local shops and village volunteers instead of usual channel like hospital.

3. **The project “Dessert without sweetness”** is the project where medical students carry out fieldwork in an attempt to screen diabetes by piercing the tip of participants’ finger to test the blood sugar level and high blood pressure. It included the promotion of knowledge sharing among the locals and medical students, i.e. “Know Yourself before It’s Too Late” for helping the locals know the stage of their diabetes in advance, “Tri-colour food”, “How to eat fruits with safety” and “Good drinks without sweetness” for helping diabetes patients and those who are at risk of getting diabetes understand the edible level of sugar in food and fruits, and promote the use of local materials for cooking.

Sweet egg

Measurable social impact

Apart from the successful number of participants in the scheme, it was also found that the participants have acquired additional knowledge in every area studied, whereby the assessment of the activities has higher score after implementing activities. They have also learned how to take care of themselves, giving rise to the understanding of how their behavior scan affect their health in the end. In addition, health care units and other provincial units in the area studied had a chance to attain their objectives related to health care from nearly every scheme and activity organized by the medical students, i.e. disease screening by risk, screening of diabetes complications, abnormal cholesterol in blood, and high blood pressure. Likewise, in the future the local health care units can make use of the pattern of activities designed by medical students.

Integration of Education, Academic Services and Research Leading to Healthy Community Development: A Case Study of Mahasawat Community, Phutthamonthon District, Nakhon Pathom Province

Author: Asst. Prof. Piyatida Nakagasian, Ph.D

Institute: Faculty of Nursing, Mahidol University

Duration: October 2013 - September 2014

Keywords: Integration, Community health

"Participation is vital to development....Communities lead... universities support"

The National Education Act of 1999 places importance on education and integration as evident in Article 22, which prescribes education guidelines with adherence to the principle of self-learning and self-development in each student by considering students to have the greatest importance with emphasis on consistent integration of knowledge, morals and learning processes combined with knowledge in various fields for a balanced ratio. Integration concepts also include the creation of new knowledge and experience in a comprehensive form to be concurrent with needs and situations in real life environment, in addition to creating and using knowledge from multiple fields together. The important question is how to achieve the integration concept. The Faculty achieve results, instructors produce academic works and students learn. Most importantly, communities benefit from development.

In the academic year of 2013, the Department of Public Health Nursing, Faculty of Nursing, Mahidol University, carried out a research project in Mahasawat community, Phutthamonthon district, Nakhon

Pathom province, a suburban community with rapid changes in community lifestyles and many problems from illness with chronic diseases such as diabetes and hypertension. The Mahasawat Tambon (Sub-district) Health Promotion Hospital (THPH) is a healthcare service facility in the area which made efforts to reduce the aforementioned problems.

Partnership

Healthy community development in the contexts of Mahasawat emphasizes participation in work and partnership from the perspective that community members should have good health conditions. Therefore, cooperation from every sector is needed in addition to participation by everyone, especially on the issue of managing chronic diseases in the community through the "3 No Measures:...No Drinking, No Dipping and No Adding," (i.e. not drinking soda, not dipping food in chili and salt, and not adding chili and fish sauce), a project initiated by Mahasawat Tambon Health Promotion Hospital. The parties participating in the project were composed of the following:

1) Local healthcare service facilities: Mahasawat Tambon Health Promotion Hospital participated as the healthcare service facility closest to the homes and hearts of community members, and Phutthamonthon Hospital participated to provide support in service provision, transfers and network connections.
2) Local administrative organization: Mahasawat Tambon Administrative Organization provided support in terms of budgets, manpower, materials, equipment and various instruments in hosting various activities. Moreover, the Chairman of the Tambon Administrative Organization cooperated by participating in the "3 No Measures" project as a model organization in discouraging soda consumption at various community parties or activities.
3) Community organizations: Community leaders, public health volunteers and local citizens participated in various activities.
4) Institutes of education: Local institutes of education such as Ban Khlong Yong School and Ban Mahasawat School allowed access to their facilities as a shared learning area.
5) Faculty of Nursing, Mahidol University: The Faculty of nursing provided academic support for the area in addition to training nursing students in providing care services for the local population.

The activity began with a forum for discussion and planned integration among institutes of education, healthcare service providing facilities and local organizations such as the Mahasawat Tambon Health Promotion Hospital, the Mahasawat Tambon Administrative Organization (TAO), the sub-district's public health volunteer network, senior adult clubs, personnel from the Phutthamonthon Public Health Office, monks and teachers from two schools, community organization representatives such as the sub-district headman, the village headman, the assistant sub-district headman and civil defense volunteers, etc. An activity calendar was prepared for the year (through coordination between activities of the Department, the Tambon Health Promotion Hospital and community organizations). All parties participated in designing integration activities or mechanisms, education, academic services and research question development to support the problems and needs of area development. Afterward, a forum was hosted to exchange learning at the sub-district level among institutes of education, local healthcare service facilities and community organizations, to jointly synthesize a model for improving the health conditions of the Mahasawat community. The model should support the public health policies and plans of Nakhon Pathom and Phutthamonthon, in addition to

identifying conditional factors supporting and obstructing development of health conditions for the Mahasawat community, along with summarizing and assessing project outcomes to create lessons learned for the next stage.

Mutual benefits

As a result of working together, every party involved learned about key outcomes and products concerning health, society, knowledge and the economy which can reduce health costs as follows:

- **Area partners (Community, TAO, and THPH)**

The Community/THPH/TAO: 1) Development of community data such as walking maps, physical data, population data and public health condition data for use in health activity management and design, 2) people of every age group in the community received healthcare screening services and participated in health projects/community health activities which combined cooperation with the area and the faculty/institutes of Mahidol University, 3) a healthcare project was created which aimed at solving health problems in the area with focus on health promotion among healthy persons and risk groups, disease prevention and recovery among sick persons in addition to implementing local ingenuity in improving healthcare skills, 4) learning exchange and capacity development in various aspects such as training to improve public health volunteer capacity with instructors in the Faculty of Nursing, hosting forums for exchanging knowledge at monthly public health volunteer meetings, community forums, TAO planning stages, and meetings of senior adults, with instructors and students providing academic support for the community while the company promoted learning from real experience for students and colleagues, and 5) ability to have knowledge and see issues in community development such as pushing the community by creating healthy public policies, arranging social measures or community rules to promote health, etc. Students and educators learned health promotion and disease prevention by emphasizing joint learning activities such as learning preparations, experience training enabling students and instructors to perform early health screening, project/activity development to solve the problem of students' health using local ingenuity to eradicate illness and encourage health promotion exercise.

- **Institutes of education**

Students received education based on real experience in the context of the area seen to have network function, linking of work requiring skills and compliance to roles and duties of nurses in jointly promoting community health among educators. The researcher herself received experience in integrative education design in terms of education, academic service and network research operations, partnerships in the area and had new research questions to address problems and area needs in addition to completing academic work such as academic services, namely, academic articles, research articles and implementing discoveries in text book writing.

Knowledge sharing and scholarship

Outcomes and products of the first stage of the project created joint learning and expansions to academic work as follows:

1. **From education to academic service** - The Faculty of Nursing provides education emphasizing student ability to apply theoretical knowledge in learning based on real experience and ability to provide academic services for the local population. Year 4 nursing students learn NSID.384 to provide care for individuals, families and communities with emphasis on community studies, healthcare

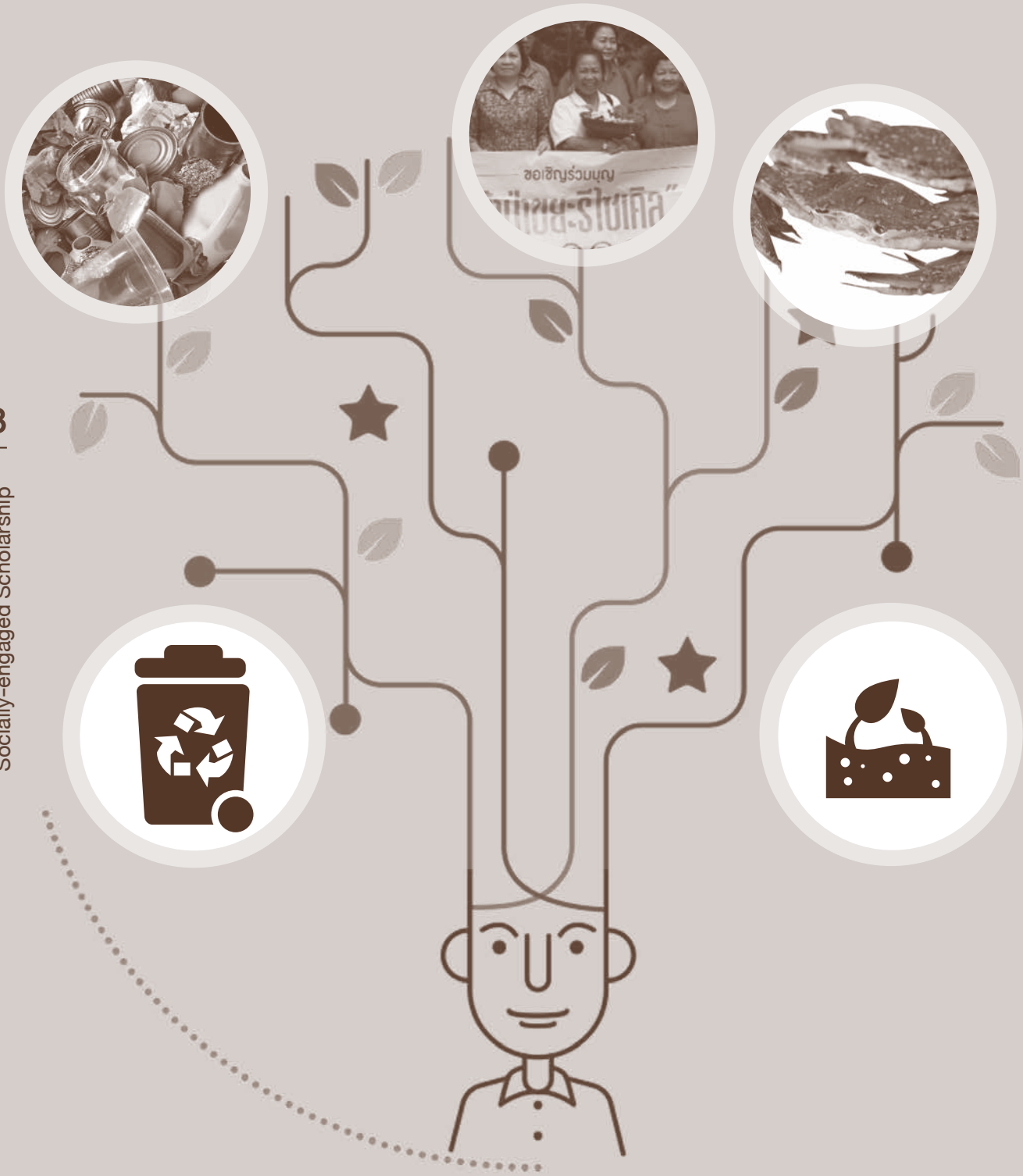
projects linking cooperation with various community organizations and other faculties of Mahidol University to provide Interprofessional Education (IPE). School health service provision includes health surveys among students, development of health promotion student leaders (mosquito killers and school aerobic leaders), development of innovative projects/activities to solve student health problems such as beautiful hair without lice through local ingenuity, health examinations for farmers and working-age community members with pre-diabetes and hypertension screening for the local population including development of senior adult and public health volunteer capabilities. Educators and Year 4 students organize activities to educate senior adults in senior adult clubs on health promotion and disease prevention, along with hosting practical trainings to improve primary healthcare capacity among public health volunteers. Although Year 2 students study NSID. 212: Health Promotion and Disease Prevention are studying a theoretical subject, the students are sent to learn about health situations in the community population at various ages to use assessed data in planning appropriate health promotion projects for age groups. Experience from education and academic services enabled the researcher to develop academic work in the form of books and articles consisting of 7 Module: Health Promotion Learning (written in Module 3: Development of Health Promotion Networking), which was supported by the Nursing Council and the Health Promotion Foundation of Thailand and used for education in NSID 212: Health Promotion and Disease Prevention and training of professional nurses in courses for capacity building and health promotion.

2. **From education to academic services and research** - According to the outcomes from providing academic services in the area, funding was received from the National Health Commission Office of Thailand (NHCO) in the project to cooperatively push for participatory public health policies at 35 sub-districts in the central region. Hence, the researcher invited the sectors in the Mahasawat area to participate in the research project. Currently, the work committee of Mahasawat has incorporated lessons and processes for developing sub-district public health policies in addition to expanding to development to become the "Mahasawat Health Charter" in the future. At present, the researcher has developed the following: 1) an academic article on "Nursing Professional and Developing Healthy Public Policy, Chapter 1: Concepts and Principles" published in nursing and healthcare journals and 2) the research report on "A Survey of Nurses' Health Promotion Capacity and Roles in the Central Region" (Faculty of Nursing, Mahidol University/participated in the study) and the research on "Nursing Health Promotion Innovation: 3 No Measures" by the Mahasawat Health Promotion Hospital, Mahasawat, Nakhon Pathom province (Faculty of Nursing, University of Mahidol or participated in the study) and 3) the "35 Good Stories of the Central Region" from areas participating in the project. The aforementioned is currently published and disseminated with support from the National Health Commission Office of Thailand (NHCO).

Measurable social impact

Noticeable effects in the area consisted of health awareness, especially policies or measures in the area. The people of various villages uniformly reported, "I've stopped drinking soda and fish sauce. I've stopped eating salty foods and curry....with clearly visible effects. I'm healthier and I'm in better shape. We did well and told other people in the community". Impacts and changes may be assessed factually and conceptually as follows:

- **Socially,** the community learned to manage problems. The concept of empowerment and participation that enabled the community to manage problems and self-develop the area became a concept of area-issue ownership, as evident from the fact that more community leaders give importance to community health development and the meeting to push for public health policies which had many participants including 40 leaders in senior adulthood, middle-age and adolescence who follow up and give importance to learning and area development. In addition to community organization leaders in hosting activities or stages, TAO representatives participated in exchanges including approximately 80 leaders form the senior adult club and approximately 80 members who were ready to cooperate and participate in area activities. Health condition improvement and management for chronic disease issues in the area also expanded to two local schools. The school designated soda-free school measures and emphasized nutritional promotion among children, and organized projects to solve problems among obese children, etc.
- **Economically,** network functions will conserve and reduce repeated working costs for all parties as evident in the reduction of THPH project budgets from 40,000 baht in 2014 to 22,000 baht in 2015 because multiple parties were involved in organizing projects or activities in the area.


ขอเชิญร่วมบุญ

Natural Resources & Environment

Participatory Strategies for Effective Restoration and Preservation of the Tong Wad Canal, Pho Tok Community, Pho Yai Sub-district, Warin Chamrab District, Ubon Ratchathani Province

Author: Mrs.Kingkan Sumnuanyen

Institute: Faculty of Political Science, Ubon Ratchathani University

Duration: April 2011 - July 2012

Keywords: Restoration and preservation, Community-based research, Participatory action research

"Restoration and preservation of Tong Wad Canal from a crisis"

The Tong Wad canal is the main water resource for the communities in four sub-districts in Warin Chamrab district. The upstream of the canal is located in That sub-district. In the past, the Tong Wad canal was beneficial for people in the area. Originally, the villagers used water from the canal for drinking, showering, washing, and farming on a daily basis. In more recent times, the community underwent an expansion, including the construction of Ubon Ratchathani University in the community area, which increased the local demand for water, causing an unexpected water crisis. People were not able to consume water as they had done in the past, and many species of aquatic animals became extinct from the canal due to an influx of both household waste water and agricultural chemicals. Nowadays, the water from the canal cannot be used to produce tap water for household consumption, nor can it be used for agricultural purposes because of the high pH of the water.

Therefore, Ubon Ratchathani University decided to help the community solve this crisis, as it is a university which is located in the community area, and the villagers felt that the creation of the university was the primary cause of the water crisis, because the university released waste water into the canal which made the color of the water dark and

turbid. Some of Ubon Ratchathani University's lecturers participated as researchers by working to observe and find a resolution for the water crisis by communicating with local people and performing field research. Additionally, they helped identify various problems within privately-owned sewer junctions, the local government, and Ubon Ratchathani University itself, in order to find effective strategies for preserving and restoring the Tong Wad canal, and they also worked with the villagers in the community to solve these problems together.

Partnership

Partnership in the research project has included many people and institutions in following processes:

1. **Research preparation and data collection process**

This process was performed to identify facts about the water crisis and also to select the main issues affecting the community, with an aim to create a sense of belonging and to gain participation from the local people to solve the crisis together. At the beginning, the research activities were organized by focusing on debating and developing the research questions with the locals, building up a volunteer researcher team from the community, and planning each research duty individually for each researcher in the team. Moreover, a research skills development workshop was organized for the researchers, including locals, to practice how to effectively collect data and learn how to use and create research tools. The final activity of this process was returning the data that the research team had collected to the community and people who were involved, such as the local government, entrepreneurs, and environmental institutions. Particularly, a Political Mor Lam, or traditional Isan stage play, that involved political issues was used as an instrument to educate the local community about the research, with an aim to bring people together and help find a resolution for the Tong Wad canal crisis.

2. **Project duration**

This process was carried out by applying the agreement from the political Mor Lam performance to the actions to solve the crisis. This phase put agreements from the forum into practice. It is further divided into three aspects as follows:

- Monitoring and solving the problems was done by using the tools that had been created from the workshop, such as water quality testing by the local population, and making Effective Microorganism (EM) Balls. It was done with the knowledge and skill sharing workshop conducted by the experts from Regional Environmental Office 12 Ubon Ratchathani and the student of Environment major from the community.
- Environmental policy strategy was successfully developed by arranging forums for the representatives in order to broadcast the information and look for cooperation. Many forums were organized, such as a forum for apartment owners, and forums for local participants who are able to make decisions in the area, like Ubon Ratchathani University administrators, the mayor of Sri Khai sub-district, the president and officers of Pho Yai sub-district Administration Organization, the heads of 13 villages, the head of four villages from Sri Khai sub-district, dormitory owners, and restaurant owners. Furthermore, media coverage of these forums was provided by Cable Health Ubon Ratchathani. They conveyed the message by broadcasting a program called "Standing Shoulder to Shoulder" on their local cable TV channel and local radio channel.

- Sustainability strategy was used to organize learning activities in the community such as a media workshop in a community school. This activity was arranged in order to create a group of youth who were willing to protect Tong Wad canal environment.

3. **Conclusion and Evaluation process** was carried out by the academic team, community researcher team, and all local participants. The conclusion of the study will hopefully lead to proper restoration and preservation of the Tong Wad canal in the future.

Mutual benefits

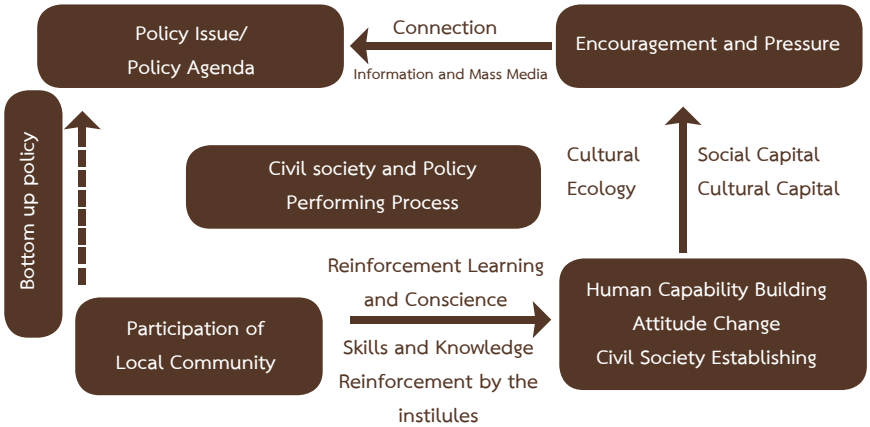
In terms of mutual benefits on the social level, the research identified defensive measures which can be used to prevent the release of chemicals into the Tong Wad canal. Moreover, several institutions benefitted in many ways, including the following:

- Sub-district Administration Organization discovered new personnel training and development strategies and local environmental policy strategies
- Apartment owners learned methods for controlling chemical releases into the canal
- The community developed skills to monitor the crisis, work cooperatively with various institutions, gained the capability to educate others about what they have learned
- Ubon Ratchathani University has gained trust from the community after providing important academic work for the benefit of the community.

Additionally, it was discovered that the research benefitted the community by creating connections among the community and related people who worked on solving the canal crisis. Particularly, the academics from Ubon Ratchathani University and Regional Environmental Office 12 Ubon Ratchathani have benefitted from the field study by publishing the research in Ubon Ratchathani Office 12 Area-Based Research Journal and Environmental News.

Knowledge sharing and scholarship

This study integrated many things together such as academic knowledge and tools, participation of the locals, environmental knowledge, local customs, social capital, and cultural capital of the community. Moreover, the study has created cooperative learning among people in the community and researcher teams, and it eventually created important tools that lead to strategies for restoration and preservation of the Tong Wad canal. The study could be summarized as the following diagram;



Knowledge and tools for community participation,
civil society supporting and environmental policy development

Additionally, the study has successfully integrated four missions of Ubon Ratchathani University, which are providing research for community, providing academic services, preserving local arts and culture, and producing graduates. In other words, the study applied a participatory research method that required the scholars to apply many areas of knowledge such as political science, sociology and environmental studies with the local wisdom, social capital and cultural capital of the community, in order to find a solution to the water crisis. Moreover, the keys that can be used to retrieve cultural capital were discovered: local beliefs, the Boon Pa Wade festival (the Isan festival that is held annually in March asking for protection and blessing from local spirits), and Mor Lam. Those keys have been applied as a tool to cooperate and encourage people to have their mind on community issues. Furthermore, this study has produced effective graduate students. After they have learned and worked to solve the crisis together with other people in the field research, the graduates understand more and care more about the issues in their own community.

Simultaneously, after the 2013 academic year was finished, the two studies – youth capability development and Tong Wad canal environmental preservation – have accordingly received financial support from the SAPAN project under the United States Agency for International Development (USAID). Also, these studies have continued to be developed in 2015 and the conclusion of the research has been brought up to the polity under the name "Cooperation and Environmental Policy Development Project of Local Administration". Additionally, the Tong Wad Canal project and Tong Wad groundwater contamination project were funded by Area Based Collaborative Research (ABC) with the collaboration from Ubon Ratchathani University.

Measurable social impact

Social impacts have been noticed at two different levels: individual level and group level.

1. Social Impact

- Individual level; A group of community leaders and a group of local people from the community who were involved in community issues, such as preserving the Tong Wad environment, were acknowledged as researchers who contributed positive changes for their community. Moreover, the local administration has also recognized the participation of locals who designed and developed the Tong Wad canal environmental preservation, and has revised their three year plans to focus on restoration of Tong Wad canal.
- Group level; A Sri Khai - Pho Yai connection was created by a group of leaders from the two communities. Simultaneously, youth groups from the communities who were willing to protect their environment have been created, as well as the Tong Wad preservation fund group.

2. Environmental Impact

The amount of waste in the Tong Wad canal has decreased, and overall there is a less harmful effect on the physical environment. Also, the local administration has improved the canal landscape by planting trees that can absorb chemical substances in the water, such as local olive (*Elaeocarpus hygrophilus* Kurz). Finally, a canal dredging plan has been set up in some areas in the canal where there is stagnant water.

An Integrated Cooperation Model for Community Refuse Solution: a Case Study of Chang Puak Sub-district, Muang District, Chiang Mai Province

Author: Ms. Alicha Treerotchananon
Institute: Faculty of Mass Communication, Chiangmai University

Duration: July - October 2014
Keywords: Waste offering, Community solutions, Community engagement, Waste management

"Locals – Monks - Waste- Community"

Chang Puak sub-district of Chiang Mai province is a small community with a total area of 6.1 square km and a population of 9,149. The community is vibrant and colorful, and includes the economically dynamic Nimmanheamin Road, a wide range of educational institutions, and "Wat Ched Yod, Royal Monastery" – a historic Buddhist site of the Lanna Kingdom, where the 8th Revision and Compilation of Pali Canon (Tripitaka) was held in 1477 during the reign of King Tilokraj the Great. The seven-spired temple, as the community's main attraction, has turned Chiang Puak Sub-district into a popular tourist destination. The combination of residents and visitors generate over 27 tons of waste daily, of which 50 percent has the potential to be recycled. Unfortunately, due to a lack of constructive waste separation, only 8 percent of daily waste is currently being recycled, causing an accumulation in the community which general waste management practices are unable to handle. ChiangMai University is committed to its social mission of integrating expertise and resources to academic-service on local issues. As Chang Puak is the university's neighbor, the author, a Mass Communication lecturer, endeavored to find a solution based on the science of social communication for environmental solution.

Partnership

The project was initiated with the researchers attending the community's regular monthly meeting at the Chang Puak municipality building; here the sub-district municipality mayor and community leaders get together to discuss all the local matters with residents and concerned parties.

At the meeting it was agreed to set up an unofficial working committee, including representatives from the Sanitary and Environmental Department of Chang Puak Municipal office, Chang Puak village and Sonsuay village; Wat Ched Yod Royal Monastery monks; and environmental NGOs – Dhamma Drops Foundation, Green Beauty Scented Organization, and Chiangmai Self-Governing Group, together with social movement NGOs, the M Plus Foundation for LGBT and the Global Campuses Foundation for the disabled. All parties joined together under the name, "Chiang Mai Waste-Free Network." As a result of the working group discussion, a sustainable waste management program **"Turning Garbage to Merit"** was developed to link waste management with merit-making, under the concept of "Phaa Paa". Phaa Paa is a religious offering ritual, based on community unity, aiming to raise funds for public interests. The meeting concluded with the members agreeing to provide support according to their expertise and means, namely:

- The Municipality Office provided a refuse collection vehicle with sound equipment for vocal announcements, to operate along the regular collection routes;
- Wat Ched Yod, Royal Monastery, provided its monks as the key personnel on the ritual ceremony as the abbot announced a recyclable wastes-collecting call and also provided the area for waste separation ;
- NGO volunteers, led by the Dhamma Drops Foundation, informed all the prospect villagers about recycling procedures for the offerial ritual;
- Faculty of Mass Communications, Chiang Mai University provided communication specialists to create content and designed forms of communication, including interpersonal communication, public relations in communities and educational institutions, mass communication via local radio channels, publications and promotional activity-flash mob;
- Field volunteers, led by the Homeless Group, and including both local residents and students from schools and universities in the area (Wat Ched Yod School, Rajamangala University of Technology Lanna, and Chiangmai University) separated waste by its ultimate value under the lead of homeless group members who were appointed trainers. These volunteers made a great difference on productivity, since they were experts on waste separation.

Turning garbage to merit activities

Mutual benefits

The Municipality Office acquired support from linkage to environmental NGOs on their environmental improvement mission; Wat Ched Yod, the Royal Monastery, gained opportunities for socialization of Buddhist religious activities among the faithful in the community; Educational institutions in the community, from primary schools to universities, cultivated a volunteer spirit among their students (especially at the university level) to engage in improving the environment, creating a better understanding among communities, and promoting a sense of community engagement through the decreasing of alienation, and narrowing the gap between academia and the community; Communities joined hands to solve local problems through local initiative, resulting in a fund created from selling recyclable waste; The recycling middleman within the community automatically became the sole buyer under the project, despite buying at rates lower than large-scale operators; The Homeless Network acquired working space and gained acceptance for its local wisdom, while earning revenue from grants.

The sum of these efforts to create environmental awareness in the local community paid off when closer to the "Phaa Paa- Turning Garbage to Merit" waste offering date, an exhibition on waste separation knowledge was held, as well as a seminar entitled "Locals, Monks, Waste, Communities" attended by representatives from the religious, governmental, civil and NGO sectors, joining together and promoting environmental preservation. Recycled items collected on the offering date weighed 8,492 kg, and generated THB 36,639. Combined with an additional sum of THB 45,000 from donations, the effort raised a total of THB 83,639.

Knowledge sharing and scholarship

The religious ritual of waste-offering: united to recycle project relates to Chiang Mai University's commitment in providing academic service, from students to faculty, through communication, field trips, and classroom integration - such as the Writing for Communication class, where students gained hands-on experience writing public relations material. Some students served as MCs for events, while university executives, including the Vice President on Social Service and Development, Art and Culture

and Special Affairs joined as a counselor. The “Seats for Good Students” project, under the Student Affairs Department, included the waste-offering project on their student activities calendar. The project also became a study entitled “An Integrated Cooperation Model for Community Waste Solution: a Case Study of Chang Puak sub-district, Muang district, Chiangmai province

Measurable social impact

The effort to promote waste separation resulted in a 20 percent reduction in the amount normally handled by the municipality. The Waste Offering Project ended in 2014. Chang Puak Municipality integrated the project into its annual plan, assigning its Sanitary and Environmental Department to take charge. The academics gradually reduced their roles as facilitators, creating the space for the local community to step in and take over the project in nearby areas within Chang Puak sub-district, supported by a faithful group of Wat Chang Khian for the new year (2015). Later, a seminar on community environment management through waste separation under Chang Puak Municipality was held. These continuing operations by staff reflected the commitment of the new generation to carry on what the founders had initiated.

The participatory action research “An Integrated Cooperation Model for Community Waste Solution: a Case Study of Chang Puak sub-district, Muang district, Chiangmai province” was successful due to the deep collaboration achieved between the local community and external resources, using coordinators who fully understood the concept and context of participatory community management. Faith and belief created trust and good relations among the various participants, further driving the project to success.

Waste Crisis: a Driver to Creative Economy and the Creative Community

Author: Jariyaporn Onwong, Ph.D

Institution: Industrial Engineering Department, Ubon Ratchathani University

Period: June 2013 – February 2014

Keywords: Community enterprise waste, Process innovation, Product innovation, Creative economy, Creative community

"Interdisciplinary collaboration between value engineering principle and community participation"

Rieang Taw Tai village, Sirindhorn district, Ubon Ratchathani province, is a 315- household community containing 502 men and 664 women. The primary occupations were small scale agriculture and trading. Every household has supplementary work leading to the establishment of the "community enterprise". The community enterprise describes the links between people with similar objectives, working together and facilitates cooperation in the local group. The fossil wood furniture was the first group to be set up in 2004. Common rules, norms, and sanctions are the mutually agreed upon on members behavior to ensure group interests are complementary with those of individuals. Currently, there are 10 enterprise groups consisting of Thai-snack, cow farming, fish farming, fossil wood furniture, healthy herbal drinks, sufficiency economy, food preservation, kitchen garden vegetable, dried fish, and dishwashing liquid producing groups.

The Moon-river sandpaper, which is suitable for wood rather than metal material, was developed by researchers from the industrial engineering department, Ubon Ratchathani University. It was intended to expand the product from lab-scale to commercial scale, but instead of being interested in the proposed sandpaper, the fossil wood furniture group requested solutions for waste management of left-over materials from their production. The total waste from fossil wood furniture and Thai-snack groups is up to 85 tons per month. Waste management process and the participation at the community level were limited due

to the lack of mutual understanding and responsibility. Consequently, a specific character of waste management which is dependent on information sharing, mutual understanding and agreement, and innovation became the research theme. The objective of the study was to enhance the knowledge of how operation management and environmental management can be integrated on a community level, focusing on waste management by new idea or value creation. To fulfill this objective the following research questions were identified.

Partnership

Clean technology with community participation in environmental management was the waste management strategy chosen by the research team. The process started from building community responsibility awareness. The community is an important mechanism for participation of utilization resources, process development, and continuous improvement, in order to eliminate losses from material as well as to reduce consumption that may have an impact or risk to harm the environment or the community. Therefore, waste either directly reused in the processing or converted to a higher value added product is the appropriate approach to managing the waste crisis of the community.

Waste from the manufacturing process was categorized by sizes and types. Information was shared among university researchers and community member in order to brainstorm ideas for new and unique products. Based on the community knowledge two products, a new style torch and charcoal briquettes were developed.

Mutual Benefits

Three dimensions highlighted in this article are

Economic: Household expenses were reduced by 600 Baht/month from the reuse of left- over material and the creation of new supplementary work.

Environment: Dust and smoke from waste disposal were reduced which helps in achieving positive environmental outcome of community.

Education: There are two ongoing research projects focusing on educational capacity building of community and local economic empowerment.

Knowledge sharing and scholarship

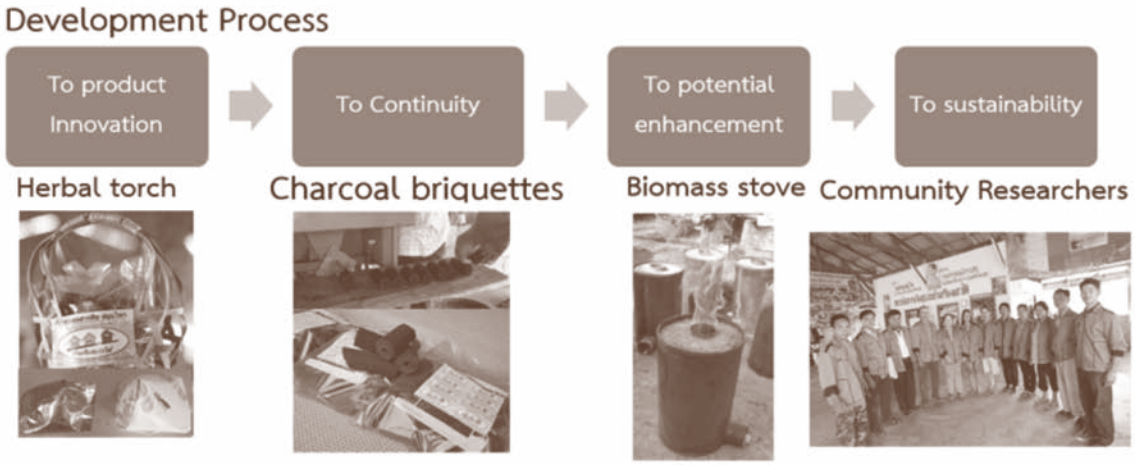
In this project, researchers and stakeholders have shared learning throughout all stages

Data collection community context The data collection was performed on two levels to answer the research questions. On the first level, quantitative data on the amount of wastes, process characteristic and performance were collected. On the second level, qualitative data, human relation, behavior, circumstance, includes multi-cultural and multi-skill occupations, government organization, the surrounding physical features, location, trend, and ASEAN situation were collected. The information collection method included on-site visiting, interviews, and reviewed reports.

Analysis and decision making The data was synthesized to be used by both researchers and community, by analysing the current situation and finding improvement potentials with regard to material losses and inefficient use. Decision making is a problem solving activity, therefore, it is a process which can be based on explicit knowledge or tactical knowledge. The daily used torch was the first product to be developed based on expertise of the community. Wool chips and tree oil are low cost material. The herbal insect repellents were added to the ingredients in order to create higher value product. Finally, the candy-like packaging changes the original torch to the unique product that increases users' satisfaction.

Implementing The combination of operational management and environmental management, with the principle of value engineering and packaging design added, become the process innovation. The piece of torch was wrapped by reused printed-advertising paper, and then packed into the recycling basket woven from plastic strapping strip. Logo and brand was created to identity the product. The "herbal torch" is an innovation product which responds to the changes in society and technology. This is the beginning of the creative economy based on the knowledge of the community. The second product, "charcoal briquettes", was required by the community. Every household uses charcoal briquettes 2 kg per day on the average. A charcoal briquetting machine was therefore developed. The different raw materials and difference ingredients were statistically tested. Meanwhile, the direct recycle of waste was achieved by the use of "biomass stove". The biomass stove is the research product from the energy center of the Faculty of Engineering. Community feedback is used to develop the biomass stove for household use.

Research utilization The research utilization includes presentation in the National Conferences, Ubon Ratchathani Research Conference, and Industrial Engineering Network Conference, publishing the research paper in the Area based Development Research Journal, sharing experiences to academic staff, and integration into engineering classes.



The process of developing the creative community starts from setting common goals and mutual understanding. The community researchers play an important role in driving the mechanism. The participation among community research teams builds their confidence and cooperation, with strong leadership and optimistic vision. This is one of the critical factors to achieve the successful and continuous development. The result of the research project was appreciated by both the Thailand Research Fund and the local authorities, and enjoyed a high demand for capacity building by other local authorities.

Measurable social impact

- After the project ends, the community researchers become instructors of training and staff of the community learning center. The result of the research was disseminated through variety media such as public television, newspapers, internet and academic dissemination.
- The group of researchers becomes the main mechanism of the community, who act as the leader in solving community problems. The research process could build system thinking and problem solving system, leading to a creative community.

"Crab Bank" Blue Swimming Crab Conservation Activity of a Coastal Community

Author: Asst.Prof. Apirak Songrak, Ph.D.
Institute: Faculty of Science and Fisheries Technology, Rajamangala University of Technology Srivijaya

Duration: 2009 - 2015
Keywords: Crab bank, Coastal fisheries resources management, Blue swimming crab fisheries

"Crab Bank: Model of coastal fisheries management by the community"

The blue swimming crab is an economically important marine resource. They can be found in the warm water near coastal areas. In Thailand, blue swimming crabs are found in the Gulf of Thailand and the Andaman Sea. They are major export products. In 1997, there were approximately 40,089 tons which were worth more than 3 billion baht. However, in 2011, the information from the Department of Fisheries showed that the number of crabs had decreased to 22,800 tons which were worth 2.5 billion baht. It was because of unlimited fishing, such as not caring about the size of crabs, catching crabs that are carrying fertilized eggs under their abdomen, or developing fishing tools that increase the efficiency of harvesting.

Blue swimming crab fishery management is organized by defining various types of measures in order to control fishery levels appropriately. However, it is found that there are some limitations of enforcement, because of the way people fish and the tools used for harvesting. The fishermen don't classify the tools which are used for catching blue swimming crabs by size. As a result, the researchers from the Faculty of Science and Fisheries Technology, Rajamangala University of Technology Srivijaya, Trang Campus, conducted a research on the situations and ways of fishery management in Trang province from 2004. The results showed that 40 percent of Blue Swimming Crabs the fishermen caught were too small and 60 percent of them were female. Most female crabs

caught were growing to their reproduction period of laying eggs. Therefore, the fishery management, with the right measures of the responsible fisheries, needs to be done appropriately, but time is needed to design a pattern of management systematically and build up the understanding and the acceptance of the fishermen who live in the coastal community. Raising awareness and consciousness in people is important. It is because if they realize how important Blue Swimming Crab is to them, they will be more responsible about preserving the resources.

The "Crab Bank" is the system of managing female blue swimming crab carrying fertilized eggs under their abdomen by keeping them in floating baskets. This is a first model management that is set to give mother crabs a chance to release their eggs into the sea. This management is expected to increase the growing number of baby crabs to compensate for crabs in nature. The crab bank is popular with fishermen who live in the coastal communities and catch Blue Swimming Crabs for a living. The crab bank project is supported by a budget from the government, the private sector, and the Department of Local Administration; therefore, it has expanded to the coastal communities in both the Andaman Sea and the Gulf of Thailand very quickly.

Partnership

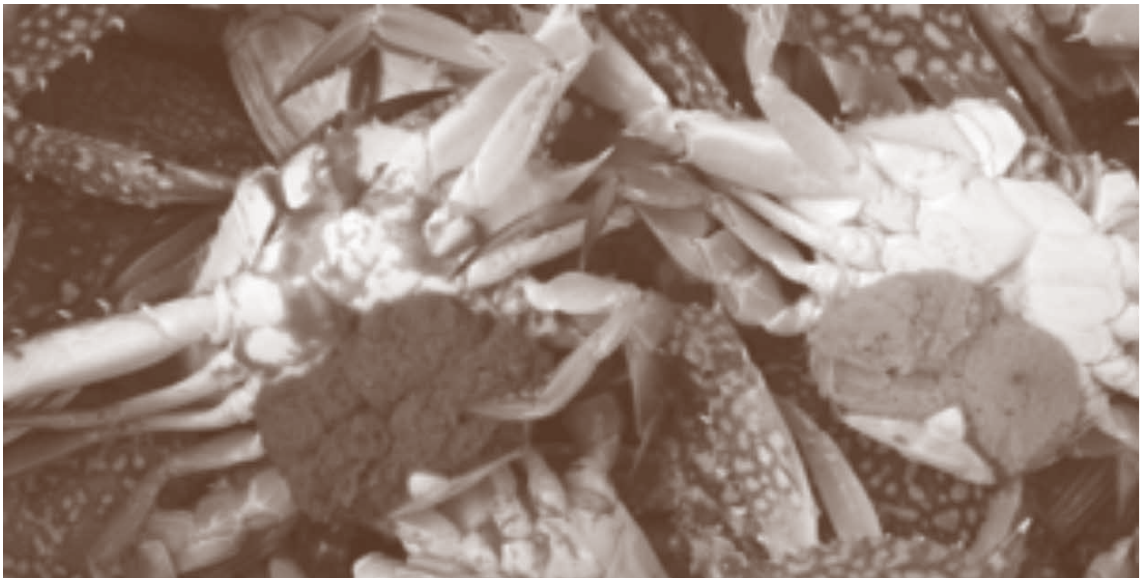
Blue swimming crab conservation in Trang province is working well under the cooperation and the integration of Rajamangala University of Technology Srivijaya, Trang Campus, as a major coordinator, Trang Provincial Fisheries Office, Trang Coastal Fisheries Research and Development Center, Office of Marine and Coastal Resources Conservation No. 6, the Andaman Foundation, the Trang Local Fisheries Club, Ban Pru Jude Community Enterprise on Fish Cage Farming, and the community networks in four districts located in the coastal areas. With the help of every sector, the executive committee of Trang was formed and the power to manage the marine resources and the coastal areas. The committee forms a working group to support every activity that is held by the crab bank. The working group is led by Trang Provincial Fisheries Office. The form is set for people to exchange ideas, experiences, and

Blue swimming crab caught from the fishery.

problems of each coastal community in order to get the information for planning the management to enhance the Crab Bank's activity called "Blue Swimming Crab Hatchery in Trang Community" and to have the idea of how to support the crab bank's activities systematically as well as aware of the need and the readiness of each community. With the work of the committee, this led to very good support from Trang governor with a budget for the year 2013 under the project called the strengthening of Trang Crab Bank community networks, and this project was set to manage and keep the marine resources and the coastal areas in a sustainable way, and to have sufficient tools for fishermen to start administrating the crab bank.

Mutual benefits

The crab bank in many communities started to have problems in the crab bank activity administration. Some of the communities gave up the crab banks because of not having a central office to support them for both academic knowledge and a budget continually. Also, the fishermen have limited time to administrate the crab bank. And the most important thing was the blue crabs in the floating baskets were not suitable for some areas. These problems caused the researchers to change from the blue swimming crab bank in floating baskets to blue swimming crab bank hatchery. The people in communities were trained and encouraged to experiment with hatcheries by the academic staff with easy steps to administrate. Moreover, the researchers have designed the systems of the crab hatchery in order to get a lot of healthy baby crabs to be ready for release into the sea. The researchers also gave an opportunity to the fishery communities to adapt the hatchery systems with the local equipment. The fishermen also donated pregnant female blue swimming crabs carrying their fertilized eggs outside the black shells which show that they are ready for the reproduction to keep in the crab banks. From the observation of the blue swimming crabs, the results showed that the crabs with 12 centimeters wide shells carry approximately 1 million eggs. The survival rate was between 60 to 80 percent, which means the hatchery of one crab can produce 500,000 zoea. If one considers the survival rate of the zoea to turn into a big blue swimming crab to be only 0.001, this will increase 50 kilograms of crabs in nature from one mother crab.



An amount of blue swimming crab's eggs.

Knowledge sharing and scholarship

Nowadays the management of marine resources and the coastal area networks in Trang has established a learning center at Baan Pru-jude (Borhin Farmstay), Baan Pak-klong local fishery group, Baan Lam-makham local fishery group, Sikao district, Trang province, with the support of the Agricultural Research Development Agency under the project called "Thailand Blue Swimming Crab Resource Management: A case study on Sikao Bay, Trang Province". This project was conducted with the cooperation of researchers from the Faculty of Science and Fisheries Technology, Rajamangala University of Technology Srivijaya, Trang Campus, the researchers from the Faculty of Fisheries and the Faculty of Science, Kasetsart University, and the researchers from the Department of Fisheries. The aim of the study is to answer the question "Can community blue swimming crab banks help increase the productivity of crabs in nature?". Blue swimming crab banks in Trang coastal communities were linked to conserve coastal resources of each community, for example, marine banks, fish traps, or fish farm community.

Blue swimming crab conservation for youth

Measurable social impact

The Blue Swimming Crab Bank Community Hatchery is the turning point for the community to accept academic knowledge and the change from the original concept. The blue swimming crab bank has become community activity that is expected to be a way for every sector to be able to work together, so it will be of benefit to coastal resources management on the basis of the agreement of every sector, and everyone participating in the community to strengthen the coastal communities. Nowadays, in Trang, the crab bank is put in the working plan of the Trang executive marine resources and the coastal area committee. It is the guarantee of the sustainability of the work mechanism of the government sectors to strengthen and integrate the community development.

Eco-friendly Earth House: from the University to Communities, a Success in Integrating the 5-in-1 Mission (Research, Learning, Academic Service, Conservation of Arts and Culture, and Volunteer Camp)

Authors: Rattana Hormwichian, Ph.D and team

Institute: Mahasarakham University

Duration: 2012 - 2015

Keywords: Earth house, One curriculum one community, Faculty of Engineering, Mahasarakham University

"Earth house, a tool that drives participatory learning between the University and communities"

Earth house building by Mahasarakham University was initiated as a community service project known in the name of "One Curriculum One Community", which uses a diverse range of knowledge gained from a research study on "Eco-friendly Earth Houses" conducted by the Faculty of Engineering. Regarded as a tool for both learning management and community service, the "Eco-friendly Earth House" project was conducted between 2012 and 2015 in three communities including Charoen Phon Temple (in Thakhonyang village, Thakhonyang sub-district, Kantharawichai district, Maha Sarakham province), the Buddhist Site of Suanthammachot Panya Rarm (in Khao Phra Non sub-district, Yangtalad district, Kalasin province), and the Puttho Pakhawa House of Priest (at Map Krat village, Kokkrachai sub-district, Khon Buri district, Nakhon Ratchasima province). The purposes of this project were: 1) to develop

earth houses by using local materials, 2) to find out if there is a possibility to use biomaterials in earth house building, and 3) to create strength within communities based upon the philosophy of sufficiency economy as well as to promote sustainable communities through the use of biomaterials.

That an earth house was built at Charoen Phon Temple in Thakhonyang community in 2012 is viewed as a cooperative development with a local community, based on its history 20 years ago when a building for herb drying, covered with galvanized iron sheets, was built. However, there is currently no evidence of the existence of such building. Mahasarakham University together with Thakhonyang community has constantly arranged a wide range of activities to preserve and rehabilitate cultures, traditions and recreational activities of the Tai Yo people. Besides preserving cultures and traditions, they are also involved in making a low energy consumption charcoal kiln there, and even in conserving the community's history related to the legend that a son of the ruler of Maha Sarakham was swallowed by a crocodile which is still being retold today. Therefore, earth house building can be regarded as an integration of both learning and community service, where the identity of a local community is built upon the investigating process of their social capital in various dimensions. In this regard, earth house building is a key tool to move this forward in aspects such as local history, healthcare and energy.

The construction of an earth house at the Buddhist Site of Suanthammachot Panya Rarm in 2014 has been viewed as an extension of knowledge in earth house building from Charoen Phon Temple, whose earth house is coated with wet Tapioca, to the earth house coated with Para rubber, which has currently become an economic crop of Kalasin province, and the structure of the earth house is changed from a rectangle structure to a round structure. Additionally, this site has been used as a retreat for Dharma practitioners and for sick people who are poor or homeless. So, the therapeutic process there is a combination of Dharma practice, local wisdoms about herbs, earth houses, and nature. Apart from being a place for Dharma practice, it is also the site that promotes the preservation and rehabilitation of the community forest. The monks and the villagers had tried for 2 years to make adobe bricks to be used in this Dharma retreat, but they did not succeed. This failure led to the beginning of their learning with MSU where "wisdom from a local community and technology from the University" finally met. Moreover, the knowledge about earth house building was further expanded to the Puttho Pakhawa House of Priest in Map Krat village in 2015, which is the Buddhist Site of Suanthammachot Panya Rarm's associate network. Thus, this can be viewed as a conjugation of knowledge and related people from a previous place to a new place.

The building earth house

Partnership

The earth house building project has been conducted on the basis of **"Service Learning"** among the University, communities and associate networks. All the processes involved are based on the concept of "participation" which refers to **"mutual thought, mutual decision, and mutual act"** as can be described below:

- New bodies of knowledge have constantly been contributed by the University. For instance, the Faculty of Fine and Applied Arts helped in recording local histories on earth house walls through the form of bas-relief sculpture. Moreover, the Faculty of Engineering conducted a research study on the durability of an earth house coated with wet Tapioca and Para rubber.
- The Creator Club and the Faculty of Engineering Student Club were both the financial sponsors and the responsible parties for earth house building at the Buddhist Site of Suanthammachot Panya Rarm.

- There was great support regarding both local materials and knowledge (i.e. using biomaterials as a house roof, floor laying and floor hardener, providing information about local history from the local scholars and the monks at the Buddhist Site of Suanthammachot Panya Rarm.
- Financial support and knowledge (i.e. adobe brick making, casting/drawing on earth house walls, giving information about local history) were kindly provided by the local scholars, youth groups, the teachers, the students and the monks at the Puttho Pakhawa House of Priest in Map Krat village.
- Financial support and knowledge (i.e. adobe brick making, construction materials, information about local history, casting/drawing on earth house walls) were greatly provided by the local scholars and the monks in Thakhonyang community.

Mutual benefits

- **At the Community Level**

1. Through research, the communities have gained a new body of knowledge about earth house building, e.g. which soil texture/component is suitable for earth house building in a particular area.

2. The communities got to review their social capital in relation to earth house building, reduction of energy consumption and global warming.

3. The locals learned to review the history of their own community, and then recorded it in the form of bas-relief sculpture on earth house walls.

4. There is evidence to prove that the learning of Global Warming Reducing Earth House really exists in the community.

5. A wide variety of learning processes initiated by the University and the communities though earth house building have emerged, i.e. local wisdoms plus modern technology for adobe brick production, the use of natural materials found around the community as an element of building structure or as an adobe brick.

- **At the University Level**

1. The “Eco-friendly Earth House” project is dedicated to integrating research into classroom practice like in the course, 0303341 Energy Conservation and Management.

2. Both instructors and students have conducted research in parallel with class instruction, i.e. a study on the effects of green roof on the internal heat of an earth house, an experiment about a mixture of adobe bricks and dammar, an application of biomass as alternative building materials, maintenance of the internal temperature of earth houses and concrete houses, and house walls coated with wet Tapioca and Para rubber.

3. Learner centeredness in the 21st century placing an emphasis on community-based learning, project-based learning and activity-based learning, has been practiced throughout the University's project.

4. More sites are available for the participatory learning between the University and communities. That is, communities have become the site for professional practice in terms of teaching and learning, research, and preservation of arts and culture.

5. More sites are provided as a space for community service performed by MSU students (through volunteer camps), particularly led by those who are members of the Faculty of Engineering Student Club, together with those who are members of the Creator Club.

Knowledge sharing and scholarship

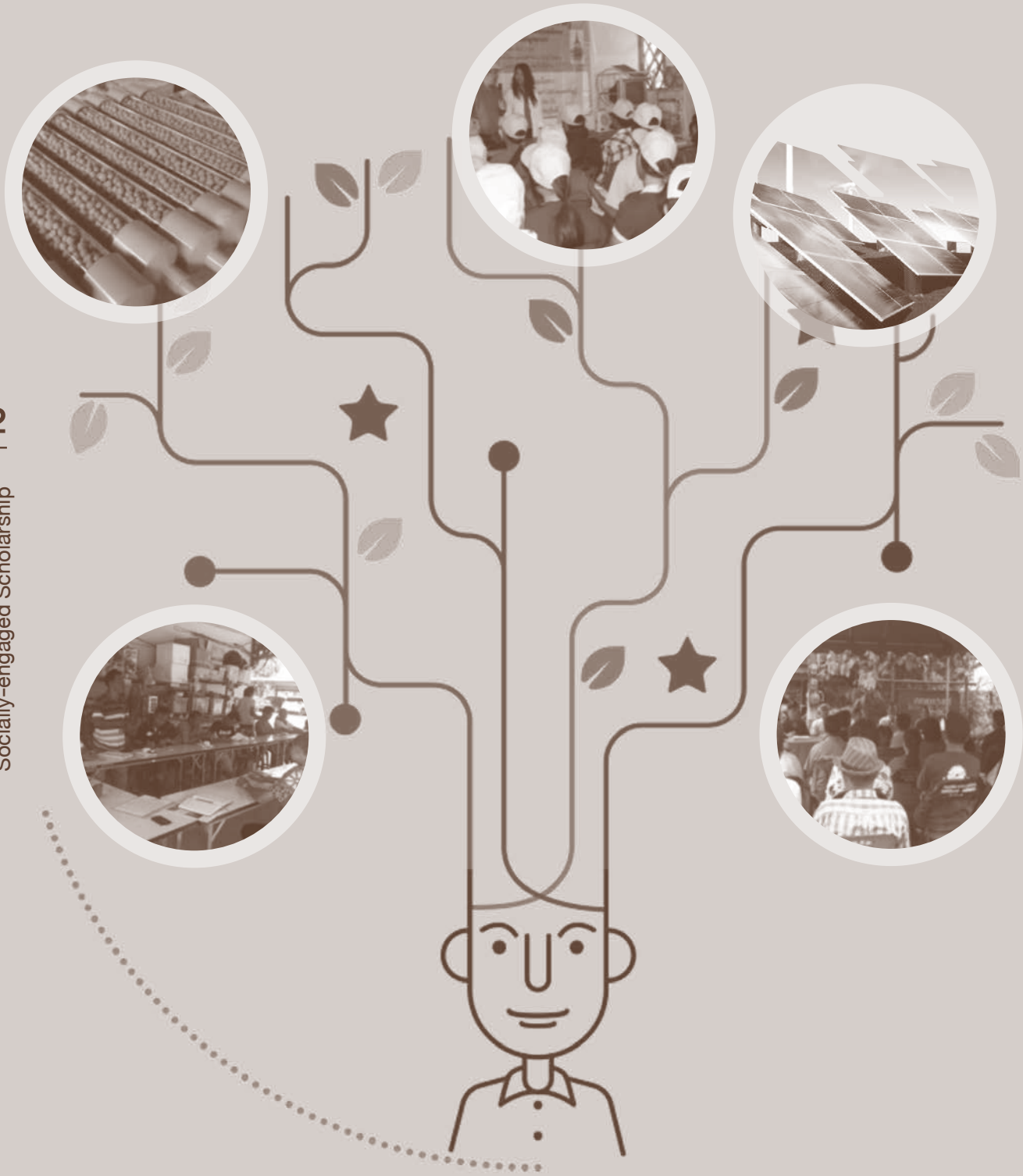
The earth house movement was not a single-purpose project, but an integrated set of activities among academics, students, and community members. There were knowledge exchanges on the subjects of community history, local context, and local craftsmanship such as earthen-block making, use of local building materials, and energy savings, together with the university's knowledge on earthen-house designs and building, and the community's long-standing tradition of labour exchange ("Long Khaek"). These resulted in the following sets of knowledge:

1. on earthen-block making and earth house building appropriate for the local contexts,
2. on herbal spa and herb preparation through steaming,
3. on preservation of earth-house herbal spa and steaming equipment,
4. on the integration between biotechnology and visual arts (sculpting) through the making of low-relief sculpture,
5. on the integration between local wisdom and modern technology in earth house making,
6. on the coating of earthen walls with para rubber and starch, to increase durability.

The project resulted in a research article on "Earth House ... A local wisdom worth preserving", as well as at least 5 student projects. Furthermore, the university has integrated the research into teaching, both in-class room and out-of-class room, service, and volunteer camps, the so-called Five-in-One program, the achievements of which were recognized as a best practice in One Curriculum, One Community program in 2012 and 2014.

Measurable social impact

Thakhonyang community is a Tai Yo community that has its own historical database presented in the form of the art of earth house building and bas-relief sculpture. Such knowledge of Thakhonyang community has been adapted to other areas including the Buddhist Site of Suanthammachot Panya Ram in Kalasin province, and the Puttho Pakhawa House of Priest at Map Krat village in Nakhon Ratchasima province. The three sites under the University's project have become important learning resources for the general public. They are also regarded as a wisdom network for earth house building, global warming reduction and therapy of life. Furthermore, "Bio Ways" consisting of herbs, chemical-free vegetables, tree conservation and environmental conservation, are situated around an earth house for both learning and utilization. Apart from gaining a new body of knowledge, a resource person whose job is to deal with earth house building and casting/drawing on earth walls has arisen every day. Additionally, the Earth House Room at Map Krat School was initiated so as to raise awareness of teenagers and children for the preservation of their communities and their surrounding environments.



Energy

A Device for Removal of Hydrogen Sulfide in Biogas: A Social Enterprise for Small-scale Farmers

Author: Asst. Prof. Chedsada Mingchai, Ph.D
Institute: Faculty of Agriculture, Uttaradit Rajabhat Univesity
Duration: 2013 - 2015
Keywords: Hydrogen sulfide, Social enterprises, Biogas

"Innovation in order to lead to self-reliance community"

In November 2009, Baan Huay-Bong community, located in Muang district in Uttaradit province, held a forum with the title, "The Search for Good Things in Huay-Bong Community", to identify existing assets and potential of the community, and plan for future development. Leaders in the community working as community researchers brainstormed, designed work and developed solutions to problems through several activities, such as the Sub-district Well-being in Uttaradit project, and the science and technology village project entitled, "College of Cow Science", which used cows as the center of development related to all cow affairs such as breeding, feed, farm management, and waste management. The projects were conducted with the cooperation of Pa-Saw municipal Sub-district, Uttaradit Rajabhat University, and other parties. In 2013, the leaders of Ban Huay-Bong community and academics got together and set up the Ban Huay-Bong Energy Conservation Group to develop innovation in local energy production and use. The group first focused on a device to remove hydrogen sulfide gas in biogas, which was in use throughout the farm community, to solve biogas users' health problems, expand the use of biogas, and reduce their dependence on imported technology of hydrogen sulfide gas removal. In 2014, the group decided to become a social enterprise on energy and environment, and registered itself as Ban Huay-Bong Community Enterprise, to use to the device for hydrogen sulfide gas removal in biogas as a tool to create learning processes for other groups and other communities in Thailand.

Partnership

In the first phase of work, the researchers interviewed people who were involved in biogas with hydrogen sulfide gas in Baan Huay-Bong community and Yangkadai community in Laplae, Uttaradit areas, and found that the gas users often became dizzy, had headaches, and had sore noses from exposure to hydrogen sulfide[1]. Besides, hydrogen sulfide caused damages to electrical power generators, and agricultural engines such as water pumps, chemical sprayers etc. In fact, the biogas that can be used in the generator must not contain more than 100-200 ppm of hydrogen sulfide gas. However, most of the biogas that was produced contained hydrogen sulfide gas over this value.

Today, although there are various types of technology for hydrogen sulfide gas removal, their capital costs are high because they are imported. As a result, community enterprises, farmers, and smallholders are not able to access the technology.

Therefore, community researchers collaborated with academics to design and test a device to remove hydrogen sulfide gas in biogas by using iron oxide as raw material. This material, orange in colour, is a waste material disposed from the village's tap water supply system in Pa-Saw Sub-district, Muang district in Uttaradit. Results from laboratory analysis showed that more than 83% of iron oxide in the materials can be used to remove hydrogen sulfide gas. Mingchai et al. (2013)[2] conducted a research study to develop a manufacturing process based on clean technology to enhance the removal effectiveness, by adjusting properties and formulating iron oxide into pellets. The resulting material proved to be more effective in removing hydrogen sulfide than other materials. It also lasted a longer time because the spent pellet materials, which became iron sulfide (Fe_2S_3) with a dark color, could be regenerated back to orange-color iron oxide (Fe_2O_3) by simply exposing it to air for 2-3 hours.

Efficiency test of the hydrogen sulfide removal device was conducted with target groups in Baan Huay-Bong, Yangkadai community, and Khae-lang Nakon municipal community, which used biogas from animal dung, flour liquid, and food remnants. The analysis was made with a Portable GFM130 Biogas Analyzer and Portable Multi Channel Gas Analyzer for Biogas Application. The test results showed that the efficiency of the removal device has a mean value of 95.23-99.72 percent. This is more effective than the efficiency of rust removal with shredded steel which has a mean value of 50-69 percent.

The key partners of this work were classified into three groups based on each group's responsibility. First, the work of research and development was conducted by the Faculty of Agriculture in Uttaradit Rajabhat University, Asia-Pacific Renewable Energy Development Institute Foundation, Ministry of Science and Technology funding for this work, and academic parties supporting the development and enhancement of the innovation. Second, the work of manufacturing, installing, and controlling product qualities was done by Ban Huay-Bong Energy Conservation Group and Alternative Energy Network. Lastly, the work of marketing and social affairs belonged to the Well-Being Policy Foundation, with Pa-Saw Municipality in Muang district, Uttaradit, being the mentor of Alternative Energy for Well-Being Group's operation, under the "Mana Energy Mani Power" Network.

[1] Prawat Kamchin and Kanyawi Wansuk. Interviewed on November 2014.

[2] Mingchai et al. (2013). Improvement of biogas quality to enhance community energy efficiency for smallholders in Ban Huay-Bong, Muang district, Uttaradit. Research report. Uttaradit : Uttaradit Rajabhat University.

Mutual benefits

The Energy Conservation Group in Baan Huay-Bong submitted the innovative device for removal of hydrogen sulfide gas in biogas to in the Thai SE Awards 2014, sponsored by the Thai Social Enterprise Office (TSEO), and was awarded one of the prizes. The award received was then used for further prototype development of the device in the contexts of wider problems.

Figure 1-2: Transferring knowledge of the hydrogen sulfide gas removal device to the network

In addition, marketing plans were developed for the hydrogen sulfide removal device to be sold and experimented with in Uttaradit, Kamphaeng Phet, Phetchabun, Nakhon Ratchasima, Ubon Ratchatani, Phang-Nga, Kanchanaburi, Petchaburi, and Phatthalung, through the alternative energy network. In the first stage, four different groups were approached: 1) community enterprises with waste flour from manufacturing processes, to use biogas for thermal energy; 2) small-hold farmers using Napier Grass as a raw material to produce electric power in the community; 3) other smallholders using waste water from natural rubber production to produce thermal energy; 4) households using waste food and waste products in their households to produce thermal energy. In the second stage, marketing plan identified four target groups. The first is a smallholder group which produces biogas from materials such as animal dung and waste agricultural products. This group is most likely to be expanded due to support from the public sector and local governments. The second group is the medium-scale enterprises which have biogas systems in conjunction with their main production processes, such as pig farms and cow farms, and agro-industry factories which have the potential to produce thermal energy and electric power. The third group is the companies that do not have any biogas production, but would like to develop their social responsibility by enabling community to have alternative energy, through supporting the community with materials and budgets to build green society for better well-being. The fourth group is the companies doing business in installing the biogas production systems, who will purchase the removal device for use in controlling biogas quality.

Knowledge sharing and scholarship

The production of the device for removal of hydrogen sulfide gas in biogas has been done in parallel with research and development since 2013. In doing so, Baan Huay-Bong Energy Conservation Group has main activities as follows:

Production of hydrogen sulfide gas removal substance: In this activity, labors and materials in Baan Huay-Bong were used to collect raw materials, transport, and form pellet materials at the community enterprise's organic fertilizer plant in the village. Then the sizes of the materials were classified, their qualities were examined, and they were stored and delivered. In this first phase of operation, financial matters were managed by agreement of the members of the group.

Research and development of the device for removal of hydrogen sulfide gas: In this activity, labor, materials, and laboratory of the Faculty of Agriculture were applied to develop efficiency of the removal, collect the research findings and the experiment results, solve technical problems, coordinate financial sources for continuing development of the products, draft the registration of the intellectual property and patent by collaborating with Energy Conservation Group for public benefits.

Knowledge management and public communication: In this activity, labor, equipment, and resources were shared between Pa-Saw Sub-district municipality and "Mana Energy and Mani Power" Network, to create awareness of the products through exhibition and information dissemination, and continuing learning. The Agricultural Promotion Division was the coordinator at the local level, while the Well-Being Policy Foundation was the coordinator at the national level.

Measurable social impact

Social Return on Investment (SROI from the investment with Energy Conservation Group in Baan Huay-Bong in the product, the device for removal of hydrogen sulfide gas in biogas, was significant in terms of well-being (physical, mental, social, and intellectual dimensions), especially the reduction of expenditures on health issues in the inhalation of hydrogen sulfide gas. The farmers spent only 0.33 to 0.55 baht per day in order to be protected from the gas' harm. The vision of creating good environment to reach zero waste (waste materials) yielded employment in community enterprises. For example, the in 2015, Energy Conservation Group in Baan Huay-Bong, produced and sold at least 530 sets of the removal device, at 1,000 baht each.. This led to more employment and the effective income distribution in the grass-root economy. Moreover, the creation of the learning center in the community enabled hundreds of people to learn from various learning stations. Today, the center is under supervision of Pa-Saw Sub-district municipality. All of the actions helped people to be more aware and understand more about energy and environment and resulted in better well-being due to the achievement of the project.

Figure 3-4: Development to be social Enterprises of Energy Conservation Group in Baan Huay-Bong

The gas removal device is an innovation that was developed to solve the problems of hydrogen sulfide in biogas based on the concept of clean technology to enhance efficient application of biogas in both the users' well-being and the efficiency of engines that use biogas as their fuel. Additionally, the development enabled people to rely on appropriate technology rather than imported technology, and to promote social affairs under the concept of the social enterprises. Finally, the production of hydrogen sulfide gas removal device enabled people to use materials, energy, and resources effectively and to minimize the impact and risks to human beings and the environment.

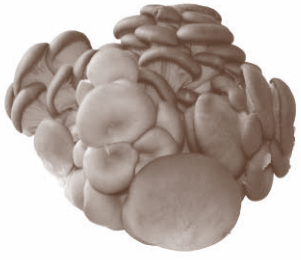
Pongyankok Model: Integrated Management of Residues from Mushroom Cultivation at Ban Thungbopaen Community Enterprise, Pongyangkok Sub-district, Hang Chat District, Lampang Province

Author: Rawipha Yongprayun, Ph.D
Institute: Lampang Rajabhat University

Duration: May 2010 - August 2013
Keywords: Residues from mushroom cultivation, Pongyankok model

"The use of knowledge management of residues from mushroom cultivation"

Baan Thungbopaen Community was one of 13 villages of Pongyangkok sub-district, Hang Chat district, Lampang province. The village was the result of a merger of two villages: Baan Thung and Baan Bopaen, to create "Baan Thungbopaen". Farming was the main occupation in Pongyangkok sub-district, but in 1988, mushroom cultivation was introduced into the village, with knowledge transferred from Maejo University by Mr.Thawon Maniyot, the village headman, who was a major force in those days in building up mushroom farming in his home under the name "Farm Hed Saifa". As a result, other residents who came to work with him learned about the mushroom cultivation technology and were interested to go into a business of their own. In 2015, after a period of 27 years, mushroom farming is practiced by a group of 24 households, who bring their mushrooms to the wholesale spot at Mr.Uaru Pinchai house, the head of the group, where the traders come to take the mushrooms to sell every day in the evening.



In 1999 the Institute of Research and Development, Lampang Rajabhat University, which aims to be “A leading university of the region, providing wisdom to the local people”, created a project to develop theoretical and practical skills of new researchers by working together with the community. In the practical part, the researchers studied the problems of the occupation and the living conditions of the community at Pongyangkok sub-district. At that time the community had a dispute about the removal of residues from mushroom cultivation, since each household had on an average 5 mushroom cultivation sheds, and each shed contained 5,000 mushroom-producing lumps, which must be disposed of after harvesting the mushrooms, resulting in 48-72 tons of residues from mushroom cultivation every four months. These residues were usually removed either by burning in the open air, which caused toxic fumes, or by dumping onto public land, both of which methods caused continued disputes between Baan Thungbopaen and the 12 neighboring villages.This led to an attempt by an academic researcher using a knowledge of energy technology, to manage problems of residues from mushroom cultivation in a way which is consistent with community life, chosen by the mushroom farming group as to any knowledge or technology which is appropriate. This is the source of the “Pongyankok Model”

Partnership

This research was based on a Participatory Action Research: PAR. The main partners in the area are the 24 mushroom farming households and the researchers from Lampang Rajabhat University, supported by external parties such as Maejo University on composting knowledge, and the Thailand Research Fund (TRF) and the Energy Policy and Planning Office Department of Energy for funding.

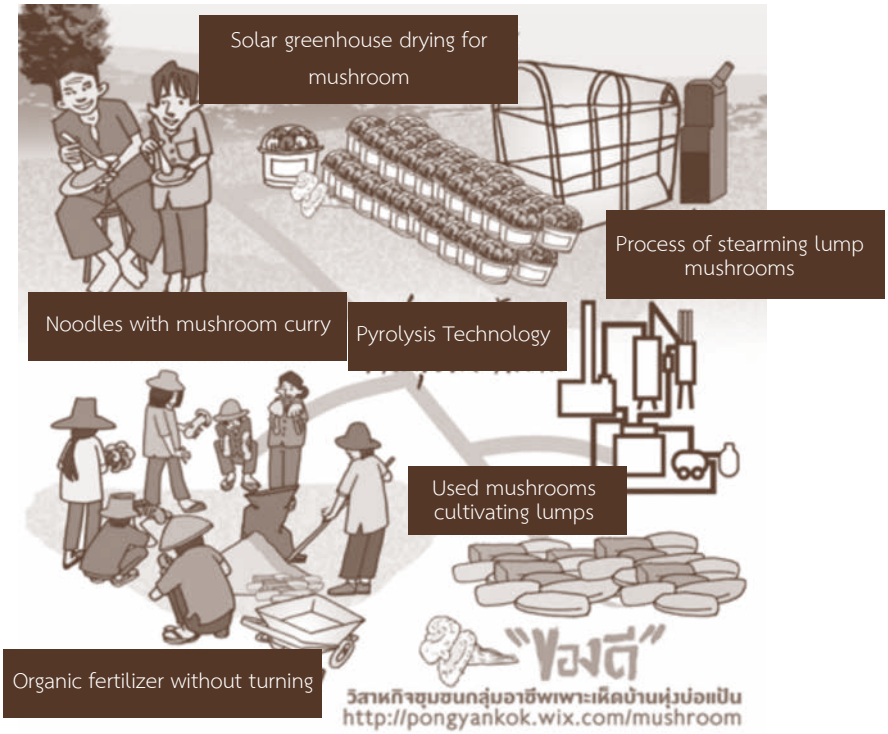
Upstream. An initial phase of work between the 24 mushroom farming households and researchers from Lampang Rajabhat University studied and analyzed the strengths and weaknesses of the group, the problems, as well as the needs of those involved in the joint study

Midstream. A period of designing and testing solutions appropriate to the community, with external party support to fill in knowledge, coordination, equipment and budget.

Downstream. A final stage that focused on two processes: 1) dissemination of results as well as research reporting or other forms such as forum presentation, preparation of booklets and article publications as well as creation of websites. 2) multiplying the results, both at the community level by the people in a community-driven project, and above the community level by government agencies such as Lampang Provincial Energy Office, which has included this project in the enhanced power management and integrated district communities program in 2015, as well as driving it toward the agency's policies.

Mutual benefits

- **Baan Thungbopaen Community Enterprise:** In addition to resolving the problem of the residues from mushroom cultivation already mentioned, the community also has options to engage in a new occupation such as the processing of organic fertilizer without turning, an oyster mushroom drying process to be “Jerky Mushroom” “Herb Mushroom” and “ Baked Mushroom with Butter”, which has been registered under the trademark “Khu-Nay-Huahed” by the enterprise members.
- **Lampang Rajabhat University:** This research responded to the mission of the university in terms of research and development, including academic and service. It was also integrated with teaching in three topics of bachelor research in 2010 : “Property Study of Mushroom Substrate Waste for Gasification Technology”, “Feasibility Study of Pyrolysis Technology Application for Plastic Waste in Mushroom Products Working Group”, and “Potential Evaluation of Charcoal Briquettes from the Used Mushroom Cultivating Lumps.. These studies were the basis of the next four topics of bachelor research in 2011, i.e., “Feasibility Study of Pyrolysis Oil Application by Mushroom Cultivating Group”, “A Comparison of Potential between Fuel Briquette and Charcoal Briquette from Used Mushroom Cultivating Lumps for Community Mushroom Steaming Process”, “A Study of Technical and Economic Feasiblity of Biomass Fuels Produced from Use Mushrooms Cultivating Lumps”, and “Development of Liquid Fuel Properties from Residues of Mushroom Group with Waste Materials from Ceramic Forming Process”.



Knowledge sharing and scholarship

From Participation Action Research: PAR process between the main partners and external parties, three methods of residue management emerged:

The first way is to create value from the residues from mushroom cultivation, by using technology to eliminate the residues and to process the residues into new products in four ways:

1. Processing the used plastic bags from the mushroom cultivation into a liquid fuel replaceing gasoline and diesel fuel types by using Pyrolysis Technology,
2. Burning the sawdust residues under limited oxygen with Down-draft Gasification Technology, and using the gas produced as a heat source in the process of steaming lump mushrooms,
3. Compressing the sawdust residues into charcoal briquettes,.
4. Processing the mushroom cultivation residues into organic fertilizer without turning.

The second way is to reduce and slowdown the increase in the amount residues from mushroom cultivation:

1. Transferring knowledge in green mold prevention - the epidemic mass cultivation. In the past, when mold or disease is detected, the lumps will be removed from the mushroom house immediately, resulting in an increase in residues over the usual harvest time,
2. Slowing down mushroom house expansion by promoting Solar Green House Dryer for oyster mushroom drying process to create value added in "Jerky Mushroom" "Herb Mushroom" and "Baked Mushroom with Butter" and the food menu from mushrooms such as noodles with mushroom curry.

The third way is to strengthen the management of residues from mushroom cultivation:

Developing the mushroom cultivating group to be a learning center for other communities, such as producing fuel from plastic bags used at Mr. Sumpha Chaireungdaj's house where the Pyrolysis Technology is installed, mushroom farming process at Mr. Arun Pinchai's house, and a solar greenhouse drying for mushroom at Mr. Naris Homsuwan. Later, Baan Thungbopaen and other villages jointly formed mushroom cultivating group, and officially registered it as "Baan Thungbopaen Community Mushroom Farming Occupations Enterprise" Registration Code 6-52-12-04/1-0023 and "Baan Thungbopaen Community Organic Fertilizer Enterprise" Registration Code 6-52-12-04/1-0024 on February 14, 2014.

Measurable social impact

Nowadays Baan Thungbopaenarea is recognized in its ability to manage the problem of burning residues in the open air by the local administration and agencies as well as the surrounding communities that have been in dispute with it in the past. This activity creates revenues and leads to the forming of networks to reduce the problem, such as the collaboration with the District Agriculture and National Science and Technology Development Agency (Northern NSTDA.) with training and transfer of knowledge on the topic "Process quality organic fertilizer by mushroom cultivation residues" on November 9, 2013. This training contributes to the extension of the use of mushroom cultivation residues in producing organic fertilizers for growing organic vegetables at Village no.6 : Baan Chum,

Village no.13 : Baan Nanglae, and Village no.1 : Baan Sanhnongbong. The project's result is also presented at an exhibition show case: 5th Thailand Rural Energy Community on December 18, 2012 at Chiangmai Rajabhat University, NSTDA Annual Conferencein Chiangmai province on February 15, 2013, and the 6th Anniversary of Community and Education Approach exhibition on February 19, 2014 at Nation University, Lampang province. For the researchers, this research has extended the findings from the original project and the continuing new area of research leads to the award "Best Researcher of the Year in 2014 on research to develop and strengthen the community" in the 3rd International Academic and Research Conference of Rajabhat University : INACRU III, during May 20-22, 2015 at Nakhon Si Thammarat Rajabhat University.

“Biogas” Innovation for Sustainable Development

Author: Mr. Noppadon Podkumnerd
Institute: Faculty of Liberal Arts, Rajamangala University of Technology Srivijaya Songkhla
Duration: 2013 - 2015
Keywords: Biogas, Innovation, Sustainable development

“Innovation to further development and extension”

The energy crisis is an urgent problem that must be solved as well as prevented. Thailand has few natural energy resources such as oil and natural gas, and needs to rely on other countries for energy, causing lack of energy security. Moreover, the energy resources currently being used is the nonrenewable energy; this caused the interest to find sources of raw materials to produce renewable energy. Biogas is an alternative source of energy in the future which is expected to bring the energy contained in produced from nature. It is a gas that occurs naturally from fermentation of biomass under anaerobic conditions. Because of the price of Liquid Petroleum Gas (LPG), which rose steadily and is likely to be priced even higher in the future, the researcher recognizes the importance of using wastes from animal husbandry and agriculture to provide biogas for use in households and agribusiness for reducing expenses and adding income in households and businesses. Also, it can reduce the discharge of wastes into the environment, which enables communities and enterprises to be stronger, more self-reliant and more sustainable. Therefore, this research aims to create biogas from innovative low-cost materials.The main material used is Low Density Poly Ethylene (LDPE), for storing 7-8 cubic meters of digesting sludge, to ferment and produce about 2-3 cubic meters of methane gas per day, in order to provide enough biogas for cooking instead of

using LPG. Moreover, the residue from decomposition can be utilized as fertilizer as well. The target group of the project is the communities in Songkhla Lake Basin.

Partnership

This innovative biogas project began in 2013; researchers received knowledge from an expert at Chiangmai University, Assoc.Prof.Dr.Suchon Tangthaweewiphat, under the project to transfer technology for biogas production in households, within community as a multiplier. Since 2013 - present (2015), the community has been involved in every step (Figure 1B), from preparation, decision-making, selecting participants with potentials in raw materials and locations (Figure 1A), as well as in the mutual learning process which will result in further uses and development of biogas. Moreover, there were external partners from both government and private sectors, joining to support this research project as follows:

- **People,** consisting of researchers, students, government officials, and representatives from the private sector/sub-operators, and representatives from the community.
- **University knowledge,** which is the integration of teaching and learning, academic services and research for development of high efficiency biogas innovation for the community.
- **Budget,** which was provided by nine organizations, of both government and private sectors, for building 71 digesters, which are 1) the Ministry of Science and Technology for 33 digesters, 2) Bangrieang Sub-district Municipality, Khuanniang district for 13 digesters, 3) Khuanniang district for 10 digesters, 4) Rajamangala University of Technology Srivijaya for 5 digesters, 5) Khuanniang District Development Office for 3 digesters, 6) Songkhla Provincial Energy Office for 2 digesters, 7) Khuanso Community, Khuanniang District (private funding)for 2 digesters, 8) Bangkeiad Community, Singhanakhon District (private funding) for 2 digesters, and 9) Bangklam Agricultural Co-operative Ltd. for 1 digester.

(A) (B)

Figure 1 : The community has been involved in every step.

Mutual benefits

Biogas innovation has increased awareness of the benefits from using resources and wastes in community as well as a result of the operation since 2013 - present (2015), the researchers have been able to expand biogas use in Songkhla Lake Basin for a total of 71 sites in Singhanakhon district, Satingpra district, Khuanniang district, and Bangklam district, Songkhla province.

In addition, the research has been contacted by small entrepreneurs from Thunglaan community, Khlong Hoi Khong district, Songkhla province, and rubber tapper group, Yang-kaew, Thakham sub-district, Hatyai district, Songkhla province, to help solve the odor problem from waste water in the production of smoked rubber sheets. The researchers created a biogas innovation from LDPE bags to solve the smell of sewage; the system was successful and could produce biogas for use as an energy source in the household. Furthermore, the researchers have an idea to extend the use of biogas to reduce the cost in production of rubber smoked sheet.

Overall, the benefits to all parties were as follows.

Community: Songkhla Lake Basin community had a better knowledge and understanding in using the benefit from resources and waste in community.

Researchers: the researchers achieved an integration of knowledge into teaching and learning process and were able to expand the innovation to other communities, as well as use the knowledge to resolve other issues in both the energy and environment areas.

Students: the students obtained skills in learning outside classroom, and they were able to tackle practical work to develop more effective innovation, as well as bringing their experiences to join a competition and won a prize.

Knowledge sharing and scholarship

In order to achieve integration of teaching and learning process with academic services and research, the research team has let students join the academic services for biogas innovation with community, to reinforce their skills outside the classroom, to train for teamwork and to increase their public consciousness, from the academic year 2013 – present (2015) (Figure 2A). These students were enrolled in the Human and Biological Science and the Environment and Resource Management courses. After the academic service, the shortcomings of the innovation have led to students developing the biogas innovation to be more effective. The students designed a pumping equipment to remove sludge in biogas digesters (Figure 1B), to control the amount of sludge in the system in order to prevent excessive accumulation in the digester, which makes the digesters last longer. Moreover, the students invented a device to increase the biogas pressure (Figure 2C) in order to transmit biogas to burners effectively. From this concept, students submitted their project to participate in the STI Thailand Award 2014, and received the honorable mention award with a 5,000 baht prize (Figure 2D). The equipment to develop biogas innovation which was created by the student was transferred for use by communities. In addition, the researchers presented the research results on the topic of Production of Biogas from Cow Dung by Using the Digester of Low Density Polyethylene: LDPE: A Case Study in Ramdang sub-district, Singhanakhon district, Songkhla province, in the 6th Rajamangala University of Technology National Conference at Rajamangala University of Technology Suvarnabhumi, and were representatives of Rajamangala University of Technology Srivijaya in biogas innovative exhibitions in the 3rd Songkhla Lake Basin conference at Songkhla Rajabhat University.

Measurable social impact

After the project has been completed in 2015, the research was coordinated by Udaijarern Sub-district Administration Organization, Khuankalong district, Satun province, to solve odor problem from pig farms, which were complained by villagers to the Damrongtham Center, Khuankalong district, Satun province. The researchers coordinated with the Ministry of Science and Technology in creating biogas innovation for the project of Technology Transferring for production of biogas from LDPE plastic bags to medium-size pig farms. It is a prototype for solving environmental problem from pig farms sustainably by using biogas innovation, and the Ministry of Science and Technology has continually provided financial support.

(A) (B)

(C) (D)

Figure 2: Integrating teaching with research and academic services.

Economic: From the results of the biogas innovation project since 2013- present (2015) with partners and communities, it is shown that the researchers created biogas innovation in Songkhla Lake Basin in a total of 71 areas which could reduce the cost in using LPG at least 28,400 baht per month (71 areas x 400 baht), or approximately 340,800 baht per year, and reduce the cost of buying chemical fertilizer by using the digested sludge as organic fertilizer.

Social and environment: The project led to community well-being, generosity and mutual-help, and also helped to reduce odor problem and insects which disturbed others in the community, as well as created value from the resources and waste in the community.

Photovoltaic System for a Sufficiency Economy Community

Author: Pimnapat Iemsomboon, Ph.D
Institute: Department of Social Science, Faculty of Liberal Arts, Rajamangala University of Technology Thanyaburi

Duration: June 2013 - November 2015
Keywords: Solar cell electricity, Sufficiency community

"Understanding, reaching and development to sustainability"

From policies of the Ministry of Interior, which aimed that all households in Thailand must have electricity by the year 2005, so that at least they should have televisions or radios for news and information reception.Most of these areas are located in conserved forests, reserved and remote areas along with hill slopes.Extension for electricity services by traditional methods was very difficult and expensive. Therefore, in areas where people consumed a little electricity, a solar cell system was an alternative method of the government-supplied electricity. This type of system could be easily installed in all areas, could sufficiently fulfill users' basic requirement such as lighting and information reception, is friendly to the environment, and incurs little operating costs. At present, the government-sponsored electricity service extension project with solar electricity (Solar Home System: SHS) has been completed for 203,000 households. However, a study of the project operation from starting to July 2007 found that SHS installations and management did not meet some of the project's objectives, which affected the sustainability of the projects, as well as losing opportunity for further annual government funding, and opportunity to gain income from fees to cover administrative expenses (Office of the Auditor General of Thailand, 2008).

Mae Salong Nai sub-district, Chiang Rai province, had some communities locating along hill slopes, on decadent conserved forests (Forest zone C), with only SHS installation by the Provincial Electricity Authority for 127 households (Civil Engineering Division of Mae Salong

Nai Sub-district Administrative Organization, 2008). Currently this project is suffering from inefficiency of SHS and inattention from government sectors, which resulted in negative attitude to SHS (Iemsomboon, 2012: 147-150). Poojinda (2012) had studied the renewable energy management for energy generation in community and households and found that the energy management system of renewable energy in remote community had not been successful. The main problems and barriers were insufficient analysis of raw materials and resources, and local energy demands, which resulted in inappropriate technology selection for energy generation, as well as the community's lack of knowledge on renewable energy generation and their familiarity with traditional comforts. Moreover, Kongthong, et al. (2014) studied community energy volunteers in an energy planning project of Nakhon Si Thammarat province, and found that there were deficiency of communication and publicity, cooperation, knowledge, and energy perception. The participants also thought of energy as being far removed from their daily lives.However, the development of competent and sustainable renewable energy depends on successful management of community SHS. Related developers and government sectors should therefore understand priorities of objectives and problems on SHS management of community electricity users.

One key factor, which led to success or failure of SHS development in Thailand, was integration of energy management among all related sectors, i.e. the government sector who was the SHS project initiator, Sub-district Administrative Organization who was responsible for SHS maintenance, and community users of electricity. Community users should have the ability to maintain and fix basic problems by themselves. Their attempts to do this by themselves would mean that they accepted SHS technology, and recognized the values and benefits of renewable electricity.These were background concepts for this research.

Partnership

The project was conducted in Mae Salong Nai sub-district, Mae Fah Luang district, Chiang Rai province. The objective of this research was to develop a method of management for integrated community solar cell electricity generation, by applying His Majesty the King's principle of "Understanding, Reaching and Development". The "understanding" meant SHS overview analysis of situations (Macro views) by joint cooperation between academics, Sub-district Administrative Organization, and solar cell electricity users, which led to alliance cooperation, conflict reduction, initiation of objectives and policies of SHS development corresponding to community needs. In parallel, there was an analysis of user's current problems in using SHS electricity (Micro views). The researchers then summarized overall problems and solutions based on the community potential (Holistic), and developed guidelines for sustainable SHS development, using the Participatory Rural Appraisal (PRA) method, as follow:

- **People,** including researchers, electrical engineers, forestry specialists, representatives from Sub-district Administrative Organization, SHS supervisors (civil engineering department officers), representatives from community SHS electricity users (village headman or assistant, village committee members, members, and household representatives).
- **Knowledge from universities**, this research used integrated knowledge from 1) electrical engineering which transferred knowledge on SHS supervision and maintenance to the community; 2) socio-environmental sciences which used concepts for internal and external environmental analyses (SWOT Analysis), concepts for modelling by Analysis Hierarchy Process (AHP), and concepts of community participation, to simulate management factors diagram of SHS in Mae Salong Nai sub-district, Chiang Rai province, as shown in Fig. 1.

• **Funding,** supported by new potential researcher projects from The Thailand Research Fund (TRF), contract no. MRG 5680168.

Knowledge sharing and scholarship

From survey data, public hearings, and situational conditions and factors for community SHS management in Mae Salong Nai community, it was concluded that community should understand three things: the limitation of electricity generation, in kilowatts, from SHS, SHS maintenance requirements, and SHS management which must be done mostly by themselves. The community chose not to set up a fund for SHS maintenance, since it will lead to users' neglect to take care of SHS by leaving as a duty of maintenance fund. The community also decided that monitoring by Sub-district Administrative Organization after installation was not desirable, since it would not address the cause of the problems.

Form research to teaching and learning. The research experiences were applied to the course 01110004 Societies and Environments, by assigning students to attend/ analyze the research results, and to design a global-warming reduction bag which was a part of the research. The results were also used to apply for two research project funding: 1) Lesson development for Societies and Environments Subject curriculum, by integration with research processes and 2) Social Innovation for Learning Skill Development in Renewable Energy in the 21th Century.

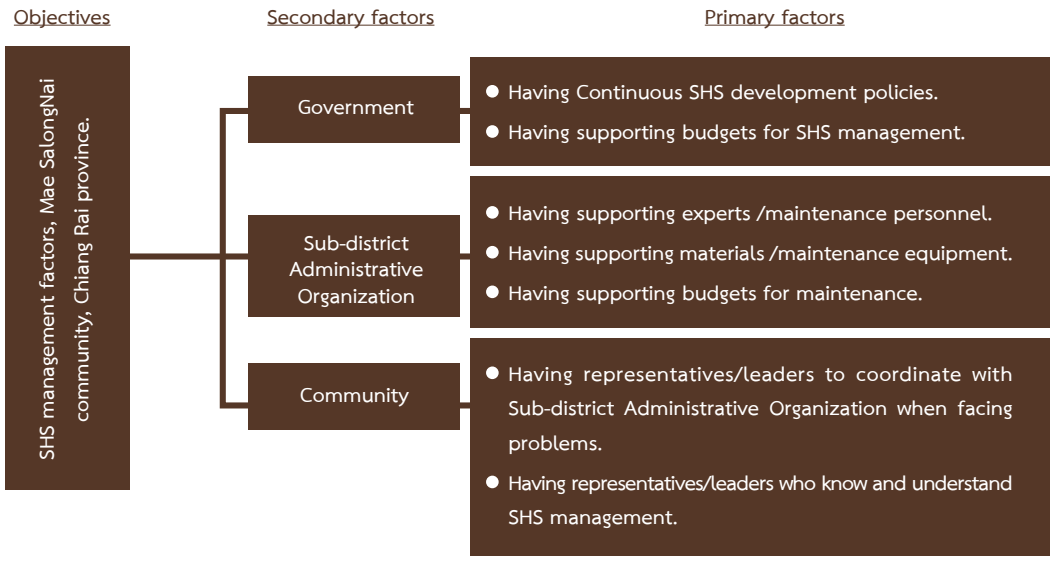


Figure 1: Pictorial Model for management factors of SHS community in Mae Salong Nai Community, Chiang Rai.

From research to academic services. The project's results were disseminated in seminars on integrated community solar cell electricity generation management at Mae Fah Luang Learning Center for Thai Hill Tribe Community, Bann Huy Makk village, Mae Salong Nai sub-district, Mae Fah Luang district, Chiang Rai province as shown in Fig. 2. Better understanding, especially in basic monitoring and maintenance, led to more favourable attitude in Mae Salong Nai community towards sustainable management of renewable energy.

For the researchers, this research resulted in academic presentations on many occasions, such as "Problems and Barriers on SHSs Management in Thailand's Rural Areas based on SWOT Analysis" presented in "The 11th EMSES International Conference" on December 18-21, 2013 at Phuket province, Thailand. This paper was selected to receive the best paper award on Environmental and Social Impact Session, and published in the Journal of Energy Procedia: Volume 56, 2014, Pages 598 - 603. An article on "Pictorial Model of Management Factors for Solar Home System in Mae Salong Nai Community, Chiang Rai province" was presented in "The 1st RMUTL Chiang Rai Conference, RCCON 2015", between March 23-24, 2015 at Wiang Inn Hotel, ChaingRai province, and was awarded the best oral presentation.

Figure 2: Knowledge transfer activity in study area.

Mutual benefits

- **Mae Salong Nai community,** gained accurate learning and understanding on SHS electricity usage and management.
- **Government sectors,** such as Highland Agriculture Developing Stations from His Majesty's Initiatives, Baan Hui Yuak Pah So, Mae Salong Nai sub-district, Mae Fah Luang district, Chiang Rai province, had adopted the management methods to quality of life development in their respective areas. The personnel in the station also had an opportunity to learn and coordinate with the researchers during the research processes.
- **Mae Salong Nai Sub-district Administrative Organization,** gained accurate knowledge and understanding of SHS management.
- **Universities,** 1) integrated research process and results into teaching and learning; 2) new awareness that sustainable development must depend on simplicity and practical solutions which the community could handle themselves; 3) two new research projects have been proposed and are pending for approval.

Measurable social impact

From an economic aspect, Mae Salong Nai community solar cell electricity generation system helped reduce lighting expenses and increase additional incomes from night working. **On social aspect**, electricity from the community solar cells resulted in better and more timely news and information reception by the people. Lighting made lives easier at night and provided more alternative recreations such as meetings within families or between neighbors and villagers. **On environmental aspects**, Mae Salong Nai community solar cell electricity promoted environmentally-friendly electric generating technology and reduction of greenhouse effects.

Renewable Energy for Community: The First Compressed Biomethane Gas (CBG) Production Project in Thailand to Replace Natural Gas for Vehicles (NGV) and Liquefied Petroleum Gas (LPG) for Households at "Rongwua Village"

Author: Assoc. Prof. Prasert Rerkkriangkrai

Institute: Energy Research and Development Institute-Nakornping, Chiang Mai University

Duration: 2012 - 2015

Keywords: Compressed biomethane gas, Natural gas, Liquid petroleum gas, Gas transmission system

"Prototype of renewable energy learning center for sharing society"

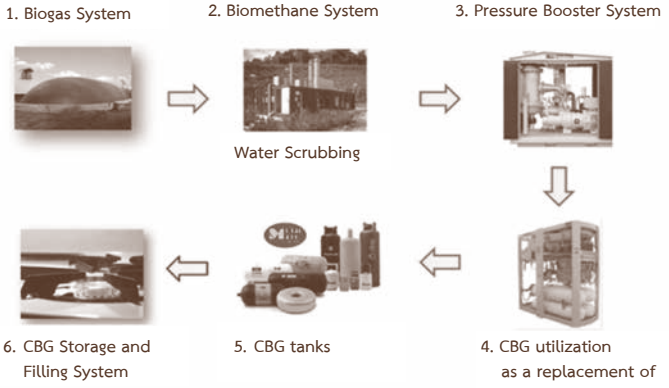
Thailand has a lot of potential biogas systems. The country's total volume of produced biogas from livestock, agro-industrial, and community sectors is 1,405.58 million m^3 per year (Department of Alternative Energy Development and Efficiency, Ministry of Energy, 2014). However, household biogas has low thermal efficiency as its heating value is less than Liquid Petroleum Gas (LPG), and also lacks safety function and engineering standard equipment.

In 2012, Energy Conservation Promotion Fund, Energy Policy and Planning Office, Ministry of Energy granted a research project on "Development of Biogas Production Efficiency from Energy Crop to Replace Liquid Petroleum Gas at Commercial Scale", as biogas is the

only renewable energy that has the potential to replace LPG. The research finds that the quality of biogas can be improved by removing Carbondioxide (CO_2), Hydrogen Sulfide (H_2S), and moisture. The improved biogas or Compressed Biomethane Gas (CBG) has similar characteristics to Natural Gas for Vehicles (NGV) that it can be used to power motor vehicles, and compressed into tanks for household use as an efficient replacement of LPG. The research gathers a wide range of both domestic and international academic research knowledge to support engineering design, drawing, installation, analysis, and actual application.

Partnership

In 2013, CBG Station was established under a cooperation between Energy Research and Development Institute-Nakornping, Chiang Mai University (ERDI-CMU), Ruampornmitr Farm Co., Ltd., Head of Rongwua village and Rongwua villagers, and Energy Conservation Promotion Fund. CBG Station, which is located at Ruampornmitr Farm, is the first station that converts biogas from chicken manure into CBG using Water Scrubbing technology at pressure 4 barg. The station can produce 420 kg/day of CBG or 153,300 kg/yr with a cost of 12 Baht/kg. The produced CBG can replace LPG 133,000 kg/yr, valued at 3,308,000 Baht/year (equivalent to the price of LPG at 24.82 baht/kg), and generate 25,200 kW of electricity for use on the farm, valued at 100,800 baht.



In 2014, the cooperation team has commenced the project "Energy Sharing to Rongwua Village" starting from the area around Ruampornmitr Farm. The CBG station handover ceremony was held on August 6, 2014 and the produced CBG wasthen distributed to 82 participating households for use as replacement of LPG. After CBG successful implementation, CBG Station Management Committee was appointed by Rongwua Villagers accordingly.

Mutual benefits

Biogas system enables the farm and villagers to live together in harmony and sustainably, and become an independentee society without conflict and infringement. The "Independentee Society" proves a success in reducing LPG expenses of Rongwua village due to CBG distribution from Ruampornmitr Farm. Not only does the farm use CBG to generate electricity, but the generated CBG is also distributed to 82 surrounding households to replace LPG. ERDI-CMU, Ruampornmitr Farm, and CBG Station Management Committee have distributed CBG knowledge to a lot of interested communities and organizations as well as welcomed a lot of domestic and international visitors. It is apparent that CBG Station is a great renewable energy learning model for the communities and livestock entrepreneurs, and also a learning center of academic knowledge development for students, lecturers, academic officers, and both domestic and international government and public organizations.

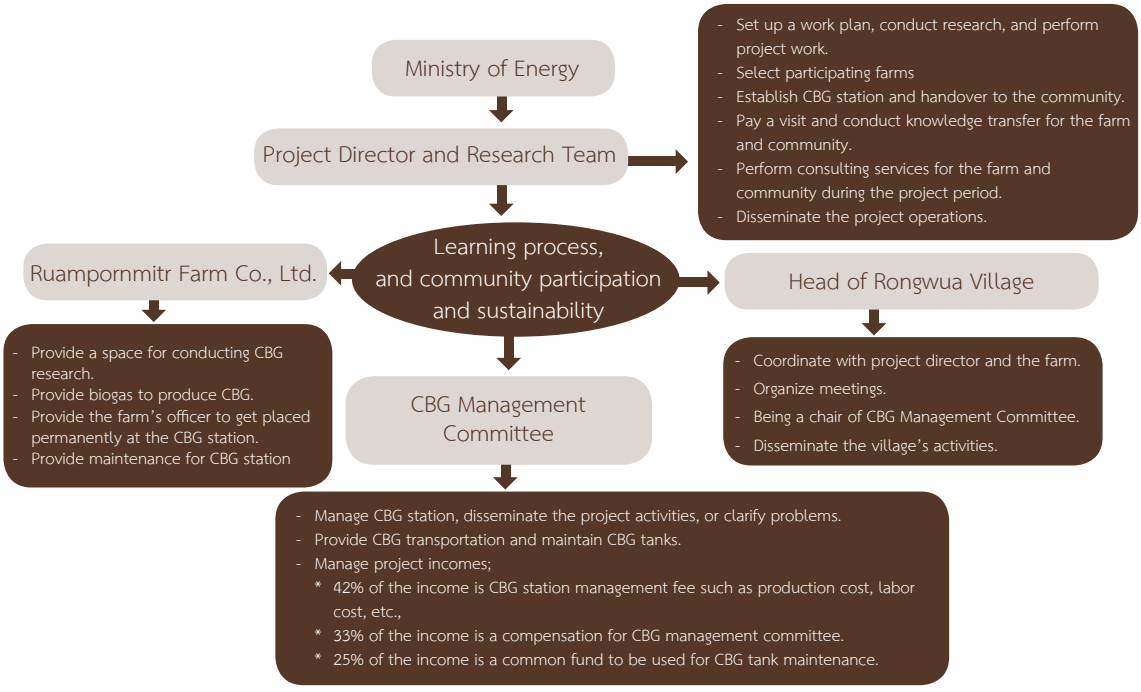
CBG Station Management Committee was established by local volunteers who are interested in learning the whole management procedure to encourage the village effective collaboration, and lead to sustainable energy consumption in accordance with the philosophy of sufficiency economy. Ruampornmitr Farm has consequently applied biogas utilization under sufficiency economy philosophy to the farm management system in terms of sustainability and energy independence. The farm's biogas system truly helps the farm owner lower the energy costs and increase competitive capability.

In regards to the project operation, ERDI-CMU has adopted renewable energy technology to generate researches and innovations focusing on integration and interdisciplinary in order to 1) build local development and organization image, 2) become a model for other organizations that realize the importance of energy consumption as well as students, lecturers, academic officers, entrepreneurs, communities, local society, and government and public organizations, 3) develop new energy innovations and technologies, and 4) further develop knowledge that supports the country's renewable energy security, strengthens the community, and corresponds to the university's mission.

Knowledge sharing and scholarship

The research team and project network consist of a farm owner, head of the village, and volunteers who are interested in learning the whole management procedure. Together they set up meetings and have established collaboration to determine CBG management plan. The research team has focused on knowledge distribution, understanding creation, and process mentoring until the system administration team, CBG user regulations, CBG administration fund, and CBG management committee were established and determined.

In 2015, after the success of CBG project handover to Rongwua village and the establishment of CBG station management committee, however, it is found that the CBG tanks are insufficient to meet the household requirements due to the relative high price of the tank, which costs approximately 30,000 Baht each and contains only 8 kilograms of CBG. The committee and the research team has realized the problem and figured out the solution by presenting the project success to Energy Conservation Promotion Fund, Energy Policy and Planning Office, Ministry of Energy and finally received a grant to proceed further with demonstration project of Biomethane Utilization in Households by a Micro Gas Grid.

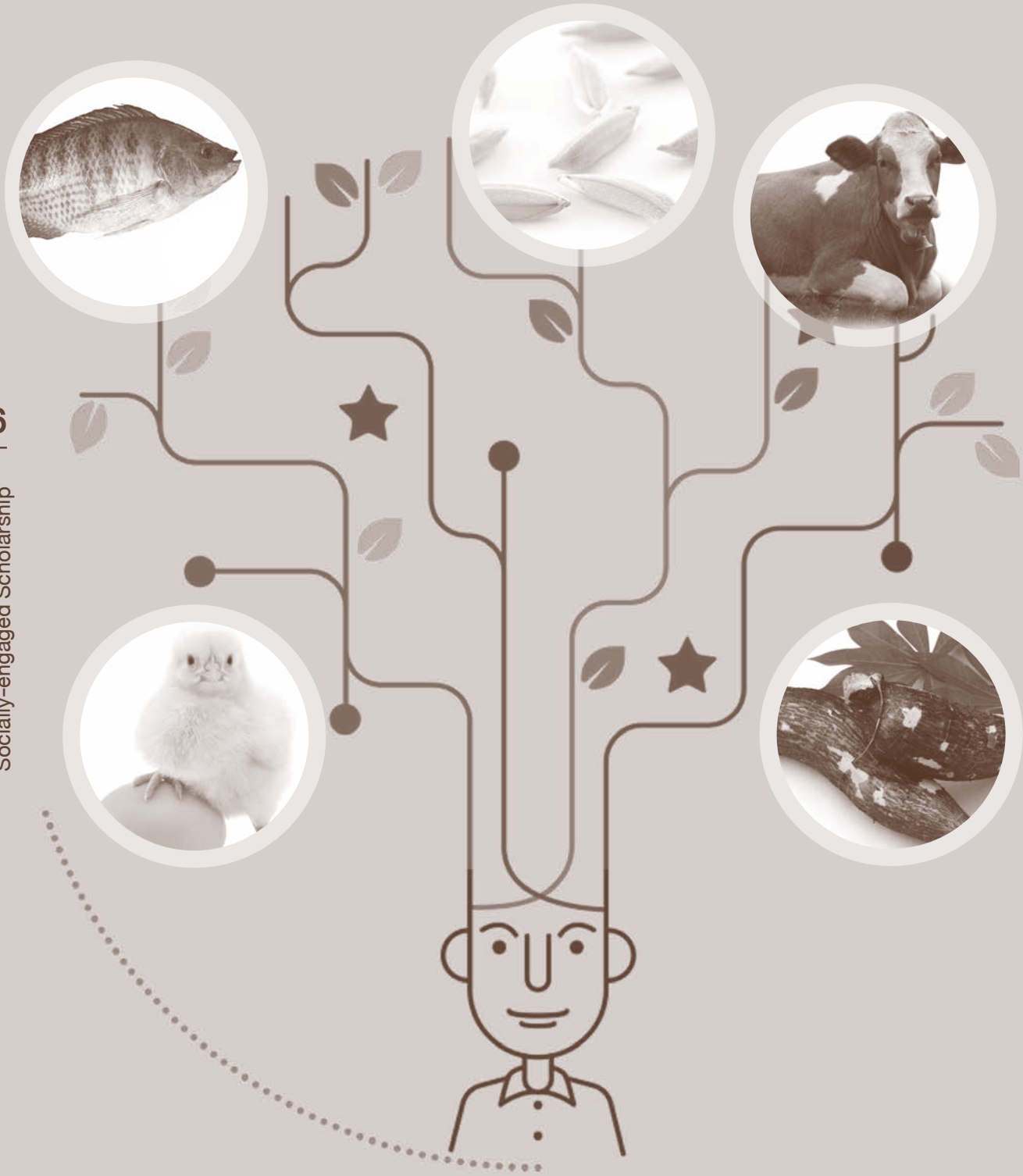


Measurable social impact

Demonstration Project of Biomethane Utilization in Households by a Micro Gas Grid isan efficient and safest method of transporting low-pressure gas through a micro gas grid, which gains safety and transport engineering standards. The project has ensured the gas transporting system technology, and biomethane utilization as a replacement of LPG in household sector. ERDI-CMU has designed a gas transporting system to serve 100 households in Rongwua village in order to facilitate the access of CBG thoroughly and safely. Not only does the project develop new form of renewable energy production, but it also helps reduce fossil fuel usage, minimize the amount of methane and carbon dioxide that is generated by wastewater digesters being emitted into the atmosphere, manage the resources efficiently, reduce global warming, decrease LPG import, and achieve sustainable energy consumption as well as become a model for other communities accordingly.

Ruampornmitr Farm can efficiently solve water and odor pollution problems. Chicken manures are transported to biogas channel digester. The organic matter in the wastewater is then broken down by anaerobic bacteria and releases biogas, a mixture of mainly methane with some carbon dioxide. Biogas system not only helps solve wastewater discharge and odor problems, but also reduces chemical insecticide use, and reduces global warming resulted from wastewater discharge.

Along with biogas, the other primary byproduct of anaerobic digestion is nutrient rich solid sludge commonly regarded as "quality biofertilizer". Ruampornmitr Farm has also distributed the produced biofertilizer to agriculturists in the village in order to reduce the cost of buying expensive chemical fertilizer. The farm owner and the villagers have a much better quality of life without odor and water pollutions caused by farming activities. Moreover, Rongwua villagers have realized the importance of a clean and environmentally friendly CBG as a replacement of LPG in household sector, which can help reduce their energy costs, and improve their quality of life.



Agriculture

"Korat Chicken" from Demand to Theories, from Theories to Thai Farmer's Occupation

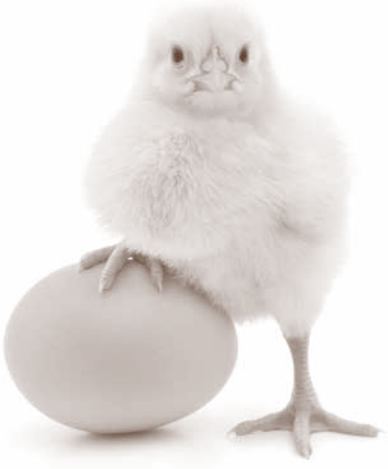
Author: Asst. Prof. Amonrat Molee, Ph.D
Institute: School of Animal Production Technology,
Institute of Agriculture Technology,
Suranaree University of Technology

Duration: November 2008 - October 2015
Keywords: Farmers, Korat chicken, Chicken farming

"Korat chicken research: creating human resources and professional freedom from indigenous chicken genetic base"

A collateral meeting was held between researchers from Suranaree University of Technology (SUT) and farmers' representatives from Srikhiew district, Nakhon Ratchasima province, which is the main chicken supplier of the province. The underlying aim of the meeting was to acquire information regarding market demands of chicken meat quantity and quality which gave rise to the following reasons why indigenous chicken raising has become a local household occupation:

1. Raising of indigenous chicken is investable by famers.
2. Raising of the chicken gives a certain amount of freedom to farmers. There is no bondage with private companies or contract farming.
3. There is a continual demand for indigenous chicken because its meat is a main ingredient of many northeastern regional dishes.
4. There is a market demand for soft and tender chicken meat with yellow skin and shank.



However, indigenous chicken has its limitations, i.e., it has slow and inconsistent growth, resulting in discontinuous supply to the market. Furthermore, indigenous chicken has low feed conversion efficiency, meaning that much feed is needed in order to increase 1 kilogram of body weight, therefore requiring high operational costs. These are the motivations to improve Korat chicken breed to support local chicken raising occupation.

Partnership

In order to meet chicken meat demands of soft and tender meat with yellow skin and shanks, knowledge and genetics theories as well as breeding improvement are necessary to create a solution to the problem and opportunities for the farmers. Therefore, research was conducted as a means to resolve and develop these outstanding issues. Research was carried out with the collaboration of 4 organizations, including, Suranaree University of Technology (SUT), Thailand Research Fund (TRF), Department of Livestock Development (DLD) and a group of farmers' representatives (Lad Bua Khao Farmers Group). SUT contributed half of the research budget, provided a team of researchers and facilitate all necessary facilitations for the research, whereas TRF contributed the other half of the research budget and technical expertise for consultancy. DLD provided the indigenous chicken breed and their research team, while the farmers' representatives volunteered to raise the chicken and evaluate the suitability for occupation. In addition, the Nakhon Ratchasima Chamber of Commerce has played a role in providing marketing perspectives. The mutual aim of the collaboration between these organizations is for the betterment of farmer's occupation.

The collaboration between Suranaree University of Technology (SUT), Thailand Research Fund (TRF), Department of Livestock Development (DLD) and Lad Bua Khao Farmers Group

Mutual benefits

Academic benefits The establishment of SUT breed, dam line of Korat chicken, and Korat chicken breed as well as the study of feed and meat quality are based on the hypothesis from various disciplines. Therefore, in proving those hypotheses, 40 graduate and undergraduate students have been working on such research problems. As such problems are dynamic, new research problems arise along the way. It is a good opportunity for these students to base their research problems on these issues. In addition, the participation of volunteer farmers in the research enables potential development from every research parties involved.

Social benefits Korat chicken become a new tool for farmer's occupation. More than 150 farmers have raised the chicken for their occupation. It is also instrumental in market exploration which is key to the farmers' empowerment. Furthermore, consumers also enjoy the additional choice of unique chicken meat which is supplied in 5 local shops in Nakhon Ratchasima, and 1 shop in Bangkok that use Korat chicken as the raw ingredient in their chicken dishes.

The collaboration between Suranaree University of Technology (SUT)
and Lad Bua Khao Farmers Group

Knowledge sharing and scholarship

The development of Korat chicken is based on the breeding theories to solve and respond to need of farmers. Breeding theories such as additive gene effect, non-additive gene effect or theory of composite breed establishment were implemented to develop Korat chicken. Indigenous chicken was used as a Korat chicken's sire to maintain the tastiness and springy meat texture. SUT breed was used as a Korat chicken's dam which was genetically constructed to yield high egg production and transfer the meat tenderness to Korat chicken. The fact that Korat chicken need to be a crossbred is because we want to use non-additive gene effect to generate hybrid vigor, which will make the chicken have better growth rate than their parents. Such advanced genetic improvement resulted in lower costs than the indigenous chicken. The taste and springy texture of the meat is still maintained. All these factors were outcomes of scientific knowledge. The technology was transferred to farmers, disseminated and shared the knowledge to other farmer groups themselves. In terms of academics, the genetic improvement theories were included into teaching lesson materials as well as research publications which have been widely disseminated to society and community.

Measurable social impact

Throughout the 6-year duration, this research has continuously extended and enabled collaborations. Presently, Korat chicken has become part of the strategic plan of Nakhon Ratchasima, as well as Huay Tub Tun district of Srisaket province. From a modest beginning of 5 participating farmers, the number has grown to 100 farmers located in various provinces such as Nakhon Ratchasima, Khon Kaen, Lopburi, etc., with a continual increasing trend. The expansion among farmers enabled a sustainable preservation of indigenous chicken, Luang Hang Kao, since it is needed as a sire of Korat chicken. In terms of collaboration, the Bank for Agriculture and Agricultural Co-operatives (BAAC) has been involved in suggesting Korat chicken to its clients since 2014. BAAC aims to implement Korat chicken as a means to improve financial wellbeing and sustainability among farmers which is one of the bank's missions. The university will play a role as academic mentor while BAAC will take part as business and marketing mentor. Such collaboration has enabled increased participation from other groups of farmers in Srisaket, Surin, Yasothorn, and other groups in the near future. Apart from BAAC, the research has also collaborated with Synchrotron Light Research Institute to use the technology for studying elements of the chicken meat and creating unique meat characteristics for further marketing.

Adding value to Cassava Distribution by Transfer of Technology to the Phu Thai Patana Community Farmers, Pak Chong District, Nakhon Ratchasima Province.

Author: Mr. Pongnarin Pitjaturath
Institute: Business Administration Department of Marketing, Rajamangala University of Technology Isan

Duration: October 2013 - September 2015
Keywords: Value creation, Distribution, Cassava, The technology transfer

"Processed Cassava: adding value through participatory research and technology transfer"

In Baan Phu Thai Patana, Village no. 14 of Wang Sai sub-district, Pak Chong district of Nakhon Ratchasima province, approximately 70 percent of the villagers are cassava growers. The cassava has high production costs but the return from the sale of cassava has lately slumped, and the revenues are not even sufficient to cover expenditure such as fresh roots. One reason was that, the farmers are unable to process fresh roots into chopped root products; therefore they have to sell the fresh roots immediately after harvest, and suffer from the uncertainty of the market. From the above mentioned problems, the researcher has the aim to create value-added products for cassava farmers in Phu Thai Patana community as well as to reduce the transportation costs in the distribution of cassava product, thereby increasing incomes for the farmers. It is proposed to use new methods of cassava processing by turning fresh roots into chopped cassava-to provide farmers with alternatives, and increase the revenue from sales of cassava.

Partnership

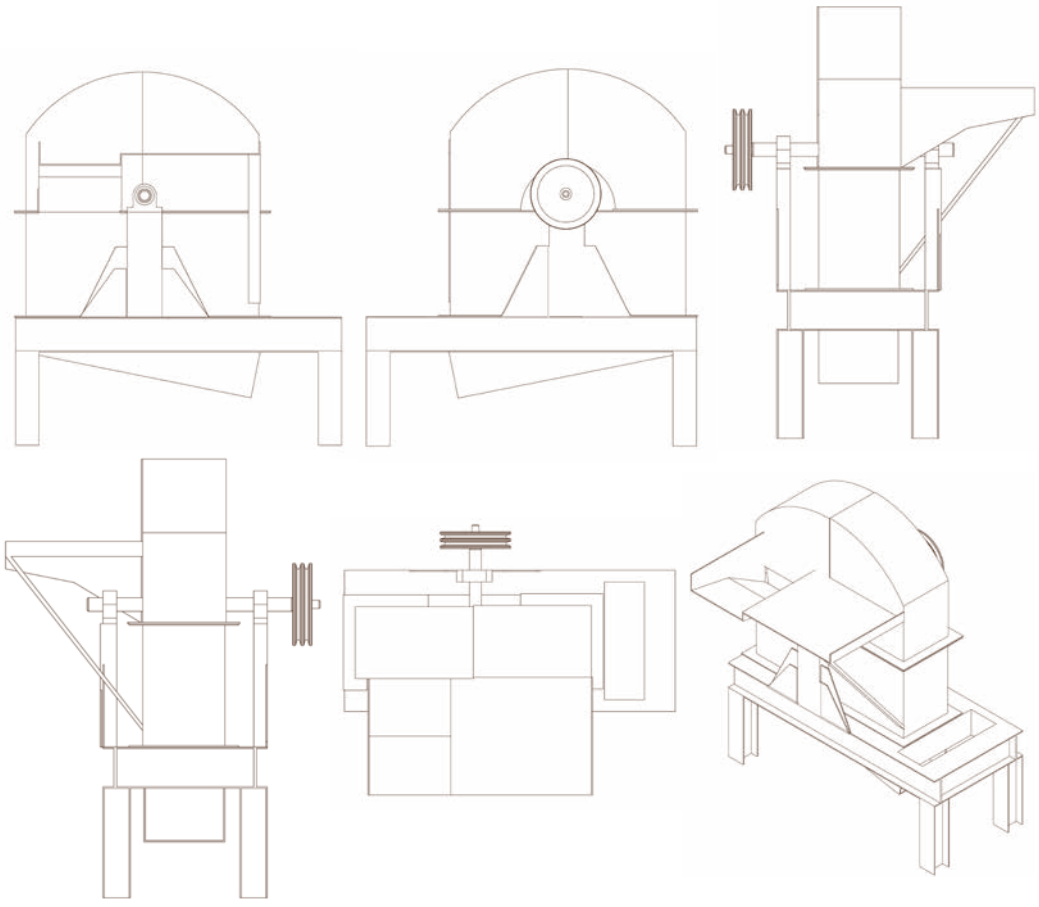
Preparation. From the monthly meeting of the village of Phu Thai Patana, held on the sixth of each month, the researchers have been aware of the problem among cassava growers and keen to find a solution to solve the problem together with community. The preferred solution was increase the value / price of cassava product so the farmer can slowdown their sale as long as they wanted to. Also, better means of transport for the distribution of cassava at lowest cost should be developed. Subsequently, researchers conducted a survey of community needs through questionnaires and personal interviews with a group of farmers. The study includes in-depth information on the farmers' willingness to form a cassava processing group, from fresh roots to chopped product, and direct selling of cassava to the factories/industry. The study was funded by the Faculty of Business Administration Rajamangala University of Technology Isan.

Action. The researchers, together with the community, designed / produced and tested cassava-processing machine to ensure that its features meet the needs of the community users. The design of the machine came from the courtesy of the Chunhawan Technology Training Center. The Ratchamangala University of Technology Isan provided facilities, equipment, and labor to produce the machines, and test the machine's quality. The co-advisor provided advice in tuning and quality testing of the machine closely. Subsequently, the-technology was transferred to the community by bringing the cassava-processing machine to make a demonstration and used it in the community. Information on processing and distribution of cassava was also disseminated to the farmers. Monitoring and evaluation were made on 30 cassava farmers to compare findings from three aspects: the value added, cost reduction, and increase in the farmers' income, after the transfer of technology was completed.

The follow-up. After the community has operated the new cassava chopping machine, with close consulting from the researchers to address the issue of machine's performance in case things did not go as planned on their specific goal, the researchers collected data on the users' satisfaction and conducted an interview with the farmers in order to inquire more about the barriers that arose from the use of cassava chopping machine. The researchers also inspected the machine condition to make sure that it was ready to be used consistently.

Knowledge sharing and scholarship

A survey of the problems and the situation with the cassava farmers found that the prices of cassava root is around 2 - 2.50 baht per kg (data of 2014) and, when after harvest the cassava must be sold within three days, otherwise it will rot. This was one reason that the farmers could not negotiate fair prices with the buyer in the Phu Thai community area or-near-by Pak Chong district. The cassava chopping machine enabled the famers to sell their crops at higher prices at 7-9 baht per kg (data in 2014) and they do not have to immediately sell their chopped cassava; the product can be stored for a longer time and the famers can delay the distribution of products until the prices are favorable.



The cassava chopping machine

The special features of the machine are as following: 1) it is small so it can be moved easily to different locations, 2) the machine is durable because it was well designed and made from the quality parts, and maintenance is easy,3) the price is quite low compared to the quality of the machine. The budget for the design/production of the machine was approximately 40,000 baht. It is suitable for the processing of cassava in the households with an area of cassava growing not exceeding 20 rai (about 3.2 hectares). The researchers have filed a patent for the machines after the design/production, and testing of machine has been completed, and the application is begin processed.

Mutual benefits

Farmers in the Baan Phu Thai Patana community, according to data collected from the users of cassava chippers machine during the three months trial period, starting from January to March 2015, showed two important results: 1) the income of the cassava farmers increased to the amount of 528,758.10 baht. This value was calculated from the sale price of cassava fresh root, compared to sale of chopped cassava, to determine the added value from using the machine. In March 2015 the

price of fresh cassava was 2.15 baht per kg, and the price of chopped cassava was 7.20 baht per kg, the transport costs for the distribution of cassava decreased by 60,054.68 baht, because for transport of fresh cassava roots the farmers need to contract private trucks company, whereas for the chopped cassava, the buyers will come to buy it at the farm. The costs of transporting are based on the weight of fresh cassava at an average of 10 satang per kg, the processed cassava has no transport costs; however, there is and additional cost from electricity needed to operate the machine. The cost can be calculated-as follows from: three bath per unit (kW-hr) equals to 0.112 baht per minute; the machine capacity is 40 kg per min. 3) therefore, the net income of the cassava farmers increased by 588,812.72 baht, calculated from the price of fresh cassava root, deducting the cost of transportation, compared with price of chopped cassava and the cost of the electricity used.

Dairy entrepreneurs Eighty percent of the chopped cassava was bought by dairy enterprises around the area; these buyers will purchase chopped dried cassava in bulk directly from cassava farmers. The dried cassava is used to feed dairy cows. The key benefit for the dairy entrepreneurs is to save the cost of transporting products, instead of having to buy it from the factories located in the town of Pak Chong.

University researchers The knowledge and experience from teaching courses in Business management research, Industrial quality management, Industrial Operations, Marketing principles, and Human resource management were integrated with the research and technology transfer services to the community.

Measurable social impact

Economic impact. This project helped economic development and standardization of management of cassava production, in order to increase the value of cassava and to reduce transport costs in the distribution of cassava. As a result, farmers are earning more so it can lead to a better quality of life.

Social impact. Community farmers have a new way to sell and distribute cassava more effectively, as a means to create social and community self-reliance.

Environmental impact. Chopped Cassava is not harmful to the environment; it is environmentally friendly, called “clean cassava chips”

Fishery: the Process of Service Learning between the University and the Community, A Case Study of Mahasarakham University and the Agriculturists at Yang Noi Village, Kosum Phisai District, Maha Sarakham Province

Authors: Wipavee Thaimuangphol, Ph.D and Mr. Phanat Preewatsana
Translation: Sarika Harnpratum
Institute: Mahasarakham University

Duration: 2014 - 2015
Keywords: Fishery cooperative, One curriculum one community, Yang Noi village, Mahasarakham University, Aquaculture

"Recovering Kosum Phisai' s fishery crisis through service learning between the university and the community"

Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd. was founded on March 17, 1993. It is 7 kilometers away from Kosum Phisai district, 35 kilometers from down town Maha Sarakham, and 40 kilometers from Mahasarakham University (Khamriang Campus). Once it was recognized as one of the most well-known cooperatives doing a fish breeding business, in Isan region and even in the whole country. In 1999, it was selected as an "Excellent Co-Op" of the country. During 2000-2007, a number of fish farms were set up in the community as well as in nearby communities by many groups of investors who had played a crucial role in fish species distribution and fish production

across the areas. Consequently, the people in these communities became more competitive, but the fact was that the members of the Cooperative lacked knowledge and understanding about cooperative management system, and they even had insufficient knowledge about "economic fish" culture and marketing management. The cooperative finally arrived at a crisis as the number of its members had been decreasing due to their lower incomes. Thus, it was undeniably at risk of being shut down. Such situations led to a service-learning project between the University and the Community, which was run parallel with a research project titled "The learning process for the security of an aquaculture profession of the agriculturists at Yang Noi village, Kosum Phisai district, Maha Sarakham province" which was initiated in 2014 from cooperation between Mahasarakham University and Thailand Research Fund (TRF). This project, conducted by the Bachelor of Science Program in Fishery, Faculty of Technology, was aimed to: 1) study the development of aquaculture in the community and problems associated with aquaculture including their impacts on the community, 2) look into techniques, methods and local wisdoms related to aquaculture, as well as the community's need for the improvement of techniques and methods in aquaculture farming 3) find out factors or conditions that influence the community's risk from making a living from aquaculture, and 4) study the creation of a learning process for the security in the aquaculture profession, which is suitable to the community.

Partnership

The operation of the present study consists of 3 main processes including: upstream, mid-stream, and downstream. It is based upon the principle of participatory learning performed in parallel with participatory action research and knowledge management, in order to reduce educational disparity and to make development through cooperation between the University and the Community, as can be explained below:

The first step It refers to all stakeholders who got to work together, namely members of Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd., aquaculture producers at Yang Noi village, scholars form Kosum Phisai Fishery Office, scholars form Center for Community-based Researcher Promotions Maha Sarakham, and scholars from Mahasarakham University. Other important processes in this phase consisted of building research team capacity in terms of techniques and research instruments, knowledge management through storytelling, and knowledge management through photographs. All of these processes were organized for scholars, local research teams and students in order to enhance their knowledge and skills necessary for local context learning, data collection, data analysis, data return to the community, and designing participatory activities.

The second step This stage has something to do with participatory action research conducted by the University, the Community and associate networks in accordance with the system, the mechanic or the type of activities they had mutually designed. It also deals with a study visit, lesson-learned with scholars, communities and students, as well as lesson-learned with other study programs and other communities, so as to empower learning experiences of all involved people in various dimensions and in a borderless way.

The final step This stage focuses on evaluation of achievement which was carried out five times (once every month). Other processes involved in this stage include lesson-learned, media production (documentaries, video clips, posters, manuals, and storytelling), seminars for knowledge management, and giving commendations to role model communities and study programs.

All activities had been driven through the integration of teaching and learning, academic service, and conservation of arts and culture. These activities were mutually designed by the University and the Community based on the "All for Education" concept presented in a combination of "local wisdom and technology," e.g. technology for Striped Catfish culture, technology for Nile Tilapia culture, red mite culture for fish nursing, hormonal injection for induced spawning of fish, water quality maintenance, producing leading/model households, building a learning center including Center for Transferring Aquaculture Technology to Communities, and providing managerial guidelines for Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd.

Mutual benefits

Yang Noi community and Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd.

1. Aquaculture famers have gained more skills and knowledge about fish culture through the use of new technologies such as sex reversal of Nile Tilapia, Striped Catfish culture, hormonal injection for induced spawning of fish, production of low-cost feed (red mite culture).
2. Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd. has systems and ideas for the standard systematic management of its organization.
3. The members of Fishery Aquaculture Producers Cooperative Kosum Phisai Ltd. were reunited as a group which is stronger than ever before, and based on the principle of sufficiency economy its members can rely on one another more than ever before, too.
4. Aquaculture Producers Cooperative Kosum Phisai Ltd. overcame the crisis that once it was going to be shut down.

Maha Sarakham province

1. The province has created a development plan for and also allocated budget for an establishment of the "Fish Market" at Yang Noi community.
2. It is a model city (as one of the four provinces in Thailand) that has ever received the Creative Economy Award given by the Department of Intellectual Property. Besides, freshwater fish farming at Yang Noi community was one of the main activities exhibited at this event under the name of Maha Sarakham province.
3. It has developed the 2014 Provincial Development Plan (academic services for communities by educational institutions).

Mahsarakham University

1. The University has integrated learning inside and outside classroom through real mutual practice of instructors, students and local people, in such subjects as Breeding and Nursing of Freshwater Animals, Freshwater Animals Culture Technology, Aquatic Animal Management Technology and Fishery Business, Culture and Local Wisdom in Fisheries, including field experience.
2. Instructors and students have currently produced three research studies including: (1) The effects of feeding types on sex-reversed Nile Tilapia, (2) A study on sex reversal of Nile Tilapia raised in cages suspended in earthen ponds at small-sized fish farms, and (3) A comparison of types of benthic zone animals and the amount of total organic matter in sediments under fish ponds with different management patterns.

3. A new site for field experiences has emerged for the purpose of teaching and learning as well as for research to be conducted by both instructors and students.

4. A new site for out-of-class experiences (extracurricular activities) is available for students who are members of Fish Lover Club which is operated by the Faculty of Technology Student Club.

5. The University has created an educational reform which is aimed at raising public awareness (service learning) of instructors and students in accordance with MSU's motto, the identity of MSU, and the identity of MSU students.

6. The University has created an educational reform by means of learner-centeredness, team-based learning, and an integration of local wisdoms and new technologies.

Knowledge sharing and scholarship

Participatory work generates an integration of the locals' prior knowledge and new technologies from the University, and it also contributes to mutual learning aimed at reducing the contributing cost and the production cost of fish. For instance, red mite culture together with sex reversal of Nile tilapia through the use of technologies based on the philosophy of sufficiency economy, reduced the cost from a hundred thousand to around 50,000 baht. Besides, the contributing cost decreased due to the community's ability to produce a wider variety of fish species than it ever did in the past.

Moreover, crystallized knowledge through mutual learning also led to the development of a Handbook for Sex-reversed Nile Tilapia Culture (local version), a learning package through student's perspective, which was presented in the form of fiction and storytelling, as well as registration of intellectual property rights regarding "Transferring Technologies to Fish Producers" made jointly by Mahasarakham University together with Maha Sarakham province (an educational city for community development), to the Department of Intellectual Property.

The learning outside classroom

Measurable social impact

Yang Noi community has three model households who have been the main resource persons in the community as well as in Learning Center for Transferring Freshwater Fish Culture Technology in a dimension called “Community for Community”. Yang Noi community has transferred technology in Nile Tilapia culture to two households at Mamo village, Nong Son sub-district, Kusum Phisai district. Besides, in conjunction with Rakkaew Projects (by The Royal Initiatives Institute), the Community has become a learning source regarding the power of students and community service for a number of educational institutions in the Northeast. It is also one of the very first areas where Mahasarakham University joined hand with TRF in carrying out community–based research. An official operation of the Fish Market through cooperation among communities, the Cooperative and the Province is indeed to strengthen the governance system for freshwater fish farming business across the areas.

Collaboration in Promotion of Good Agriculture Practices (GAP) in Rice, for Food Security and Increased Household Incomes in Accordance with the Philosophy of Sufficiency Economy, Nakhon Ratchasima Province

Author: Asst.Prof. Wassana Phanuruk, Ph.D

Institute: Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University

Duration: March 2012 - September 2013

Keywords: Cooperation, Food security, Sufficient economy philosophy

"Collaboration in GAP Rice production for security, wealth, and sustainability"

Nakhon Ratchasima Province has 43.45 percent of its planting area or 3.78 million rais for planting rice. There were 189,753 households planting single-crop rice, yielding 1.60 million tons of gross product worth 19,975 million baths per year. (Nakhon Ratchasima Provincial Development Plan of Fiscal year 2010-2013). Consequently, there was a collaboration among state agencies, academic institutes , and community groups in Nakhon Ratchasima province area on GAP Rice Promotion project, for food security and increased household incomes in accordance with the Sufficiency Economy Philosophy. This action was successfully conducted by using the Area-Based Collaboration or ABC research and development concept. The project's objectives were to increase the knowledge and understanding of GAP rice production among farmers, so that the farmers could combine the new knowledge with their local wisdom to improve their traditional rice plantation;. to enable them to become GAP rice families and produce sufficient rice for their own

household consumption, to promote GAP Rice Learning Centers, in accordance with the Sufficiency Economy Philosophy, in the sub district targeted areas, and to establish centers of GAP rice information transferring the knowledge to the farmers or people who were interested. Nakhon Ratchasima Provincial GAP Rice Learning Center gathered information of GAP rice, studied the value added to the products, and studied the marketing channels to serve the farmers and others. The project was carried out, by emphasizing the area based mechanism, to create collaboration in problem solving, to gather the information, to develop knowledge in trouble shooting and to record the rice production. The trouble shooting management was carried out by the community-plan process which was a key to solve the problems and respond to the needs of the people.

Partnership

The project was carried out with the area based research and development concept, emphasizing participatory action from various sectors. The target groups were farmers' households in 30 sub-districts of 15 districts (covering 50 households in each sub-district with the total number of 1,500 households in Nakhon Ratchasima province). The tools for gathering the data were the survey forms of rice situation, the GAP02 forms, the household accounting forms, and the evaluation and monitoring forms. Then, the data was analyzed with the statistical analysis program; SPSS V16.

- **The major parties in the area** included the governor, the vice governor (Mr. Chayawut Janthorn), Nakhon Ratchasima Rajabhat university, Nakhon Ratchasima Provincial Agricultural Extension Office, Nakhon Ratchasima Provincial Rice Seed Center, Nakhon Ratchasima Rice Research Center, Nakhon Ratchasima Provincial Land Development Station, the district officers, the officials of District Agricultural Extension offices and the officials of sub-district Agricultural Extension offices, local leaders and the farmers attending the project.
- **The supporting parties** included the provincial team, the district team, the government sectors, Suranaree University of Technology, and other organizations in the province.
- **The network parties** included 1) the network projects covering 14 provinces in the country: Ubon Ratchathanee, Kalasin, Yasothon, Chaiyaphum, Nakhon Ratchasima, Phitsanulok, Chainat, Uthai Thani, Kamphaeng Phet, Nakhon Sri Thammarat, Phatthalung, Songkhla and Satun provinces. 2) The network parties of 5 provinces in the northeastern part (Nakhon Ratchasima, Ubon Ratchathanee , Kalasin, Yasothon, Chaiyaphum), conducting projects on safety in rice and vegetable project. 3) The project on relieving impoverishment and enriching happiness in Nakhon Ratchasima province 4) Other projects promoting quality rice production in Nakhon Ratchasima province.

The collaborative mechanism moving the work among parties was categorized into 3 levels;

Provincial level Integrated teams and provincial project teams were the highest level government sector, with secretariat teams working to coordinate activities.

District level Integrated teams and district project teams were the highest level government sector. There were 15 meetings, with 324 attendants, driving the work in 15 districts of Nakhon Ratchasima province.

Sub district level The project joined the sub-district working team meetings. Thirty trainings were hold in 30 sub districts. There were 1,472 farmers attending the trainings.

Analyzing the change occurring during the development of the collaboration mechanism, it was found that participants' satisfaction gradually increased after 6 months, 12 months and 18 months of the project. The satisfaction was rated as shown in the table below (the highest level was 4)

Satisfaction	6 months	12 months	18 months
Collaboration	2	3	3.5
Management	1	3	3
Mechanism/Parties	1	3.5	4
Knowledge/Tools	1	2	4

The research team agreed that the collaboration movement, solving the area based –problems, must be continually managed. Even after the project is terminated, the collaboration among parties must continue.

Mutual benefits

There was a development in **the area:** 1) three sub-district "Learning Centers of GAP Rice under Sufficiency Economy Philosophy" were established in Nakhon Ratchasima province (out of 15 sub-districts which participated in the project): Khu Khad sub-district in Khong district, Chang Thong sub-district in Chalermprakiat district, and Ngiew sub-district in Huay Thalaeng district, 2) a Provincial Learning Center of GAP Rice under Sufficiency Economy Philosophy was set up at Nakhon Ratchasima Farmers' Service Center. The room exhibited the knowledge and the wisdom of GAP rice production, and the digital data base of rice geographic information system in Nakhon Ratchasima province. The center was managed by Nakhon Ratchasima Rice Seeds Center with Nakhon Ratchasima Rajabhat university and Nakhon Ratchasima Provincial Agricultural Extension Office as the secretariats. Farmers and academics continually visit the center.

The university has integrated the research with teaching in the courses entitled "The research for Geographic information and GIS 1" and "Geography under Royal Thoughts". These subjects were in Geographic Information System Program, Faculty of Science and Technology. Moreover, results of the research was linked to university social engagement activities such as knowledge management of the geographic information system of the rice situation in the province, the collaboration among the university, Nakhon Ratchasima Provincial Agricultural Extension Office and Nakhon Rtachasima Provincial Rice Seeds Center in the knowledge transfer of the GAP rice production process and rice research in the province.

Knowledge sharing and scholarship

As a result of the project, there was a mutual learning among the major parties and the university such as Nakhon Ratchasima Provincial Agricultural Extension Office, Nakhon Ratchasima Provincial Land Development Station, Nakhon Ratchasima Provincial Rice Seed Center, and Local Administration Organizations. The courses of the GAP rice production were continually held for farmers in the network.

The collaboration mechanism and the tools of data collection were used in the lectures on "Research Methodology" and "Individual Study". The research was also referred to in the books and documents of the subjects entitled "Geography under Royal Thoughts", "Geography in Human and Economy" and "Research Methodology in Geography". Moreover, the article entitled "The Collaboration to Promote Good Agriculture Practices in Rice, for Food Security and Increased Household Incomes in accordance with the Philosophy of Sufficiency Economy, Nakhon Ratchasima Province" was presented in the "ASEAN Community Knowledge Networks for the Economy, Society, Culture, and Environment Stability" conference during May 8-12, 2013 at Mandalay Hill Resort Hotel, Myanmar. Furthermore, an article entitled "Community Participation in Good Agriculture Practice Rice to Strengthen the Food Stability and Increase Family's Income under Sufficiency Economy Philosophy: Case Study of Agriculturists at Khukad sub-district, Khong district, Nakhon Ratchasima province" was presented in "The SIBR-RDINRRU 2014 Hong Kong Conference" during September 27-28, 2014 in Hong Kong Special Administrative Region of the People's Republic of China. In "The 3rd Rajabhat International Research and Academic Conference", hold during May 20-22, 2015 at Nakhon Srithammarat Rajabhat University, the researcher was awarded "The Best Researcher of R & D Research to Strengthen the Community" from the research entitled "The Collaboration of the GAP Rice Production Promotion for Food Stability and the Increase of Household Income in Accordance with the Sufficient Economy Philosophy in Nakhon Ratchasima Province"

Measurable social impact

The result after the end of the research work was the continued collaboration among network parties, i.e., Nakhon Ratchasima Provincial Agricultural Extension Office, Nakhon Ratchasima Provincial Land Development Station, Nakhon Ratchasima Provincial Rice Seed Center, and Local Administration Organizations. The work was congruent with Nakhon Ratchasima provincial strategic plan. The knowledge of GAP rice production was continually transferred to the farmers. The university received a budget in the fiscal year 2014, for the Faculty of Science and Technology, to hold 2 trainings of "The rice seeds production network foundation" during January 15-16, 2014 and January 28-29, 2014. There were 90 attendants. In the fiscal year 2015, a project entitled "Mobilizing Collaboration in Food Stability and Value Added Creation to Thoungsumrit Jasmine Rice in Nakhon Ratchasima Province to International Standard" was financed. The project included 3 sub projects; 1) study of local knowledge of Thoungsumrit jasmine rice production and the geographic information system development of rice community products to international standard. 2) nutrition value analyses of Thoungsumrit jasmine rice to Medical rice in accordance with Geographical indicator in Nakhon Ratchasima province; 3) value added to Thoungsumrit jasmine rice products via marketing communication to ASEAN markets. These 3 projects caused continued research works and the collaboration with the network parties in the area. Furthermore, Nakhon Ratchasima Provincial Agricultural Extension Office was given a budget from the Nakhon Chaiburin Provincial Group to undertake the project "Good quality jasmine rice to international

standard". The project involved training activities for the farmers to increase rice production, field trips to observe how to reduce rice production cost, promotion of organic fertilizers and concentrated probiotic substances for soil improvement, jasmine rice bed inspection as GAP standard, the exposition of Thai farmers to AEC in 2014, training for the officials of Agricultural Extension Office, and project evaluation. The project helped more than 400 farmers to achieve the GAP standard in the targeted area.

Nakhon Ratchasima Provincial Agricultural Extension Office also allocated a budget of the fiscal year 2014 to Nakhon Rachasima Rajabhat university as the consultant of a research project entitled " The production potential increase and the processing of Thoungsumrit rice products". This could continually further this area based research. Nakhon Ratchasima Provincial Land Development Station also supported a project on the ponds in the fields for interested farmers, and sponsored rice seeds, green manure, etc., to the farmers. The university also cooperated with the Marketing Organization for Farmers and Nakhon Ratchasima Agricultural Council Office to hold "An exhibition of Rice in Nakhon Ratchasima province", as part of a research project entitled "The Collaboration of the GAP Rice Production Promotion for Food Stability and the Increase of Household Income in accordance with the Sufficiency Economy philosophy in Nakhon Ratchasima Province." during March 5-9, 2014 at Suranaree Monument, Nakhon Ratchasima Province. This research project was also exhibited in "The National Research Exposition 2014" organized by the National Research Council of Thailand (NRCT) during August 7-11, 2014 in Bangkok.

Rice Bank: Managerial Processes and Reduction of Rice Production Cost in Communities: A Case study of Mahasarakham University and Hin Poon Community, Kantarawichai District, Mahasarakham Province

Authors: Nuanlaong Attharangsun, Ph.D and Mr.Panat Preewassana
Translator: Sarika Harnpratum
Institute: Mahasarakham Business School, Mahasarakham University

Duration: 2012 - 2015
Keywords: Rice bank, Management, Hin Poon village, Reducing rice cost production

"Managerial processes and reduction of rice production cost in Hin Poon community"

To alleviate problems encountered by his people, His Majesty the King has given a royally-initiated idea of "Rice Bank" as a center from which rice seeds can be loaned for consumption and cultivation. In 2011, Hin Poon community, Kantarawichai district, Maha Sarakham province, experienced a severe drought. As a result, villagers had inadequate rice for consumption and insufficient seed stock supplies for cultivation. It was around that time that Mahasarakham University was arranging a "One Curriculum One Community" project to provide academic services to the society. In 2015, the instructors in the Management Program from Mahasarakham Business School got a chance to know the community and recognize its problems. That was the beginning for an establishment of "Lao Khao Baan Hin Poon" or Community Rice Bank, whose name was given by the villagers. The community members selected committees, issued rules and regulations of the bank, searched for rice seeds in preparation for an establishment of the bank, and

initiated the borrow/return service for bank members. The results of the bank's operation in 2015 revealed that the rice seeds for cultivation the members returned to the bank were often low in quality. The bank solved the problem by selling the poor seeds and instead buying quality seeds to be lent to the members for the next growing season. On the other hand, no problem with the quality of the rice seeds for consumption was found and all the loaned seeds plus interest were given back to the bank. Apart from flooding and problems associated with the management of the bank, every year the community encountered problems with the cost of rice production. So, it decided to develop solutions to such problems with academicians from Mahasarakham University, scholars from Thailand Research Fund (TRF) and associate networks within the community. The purposes of this research were: 1) to study the context/situation of Hin Poon community, along with their problems and their impacts 2) to look into the history and the managerial system of the rice bank in Hin Poon community, and 3) to study a process for reducing the cost of rice production that is suitable for Hin Poon community.

Partnership

The operation of this project was divided into 3 phases. Phase 1 was the preparation stage, aimed at developing the capacity of the research team as well as studying relevant data; phase 2 was the operation stage; and phase 3 was the conclusion and evaluation of the project. The research tools included an interview form and discussions. The research team consisted of the village headman, assistants to the village headman, members of the Subdistrict Administrative Organization, academicians including Hin Poon Community itself, Khao Yai sub-district, Kantarawichai district, Maha Sarakham province. Major activities, arranged according to the principles of participatory learning (service learning), participatory action research and the philosophy of sufficiency economy, consisted of studying local contexts, selection of rice bank committees, issuing rules and regulations of the rice bank (borrowing/returning), seeking for rice seeds in preparation for an establishment of the rice bank, revitalizing traditions and culture associated with rice, and learning about accounting marketing and management, and particularly, the activities related to reducing the cost of rice production that involved so many interesting processes such as learning how to make organic fertilizers, herbal pesticides, and training workshops on production cost so as to reduce the cost of rice production. Besides, local villagers were encouraged to learn about the production of, for instance, Jasmine Rice 105 and Kor Khor 6 Rice, for household consumption according to the philosophy of sufficiency economy. The main objective of these activities is to reduce production cost by working with related networks in order to develop bodies of knowledge about the relevant issues—from theory to practice—as can be described below:

- Khon Kaen Rice Research Center: provides basic knowledge about rice, e.g. types of rice seeds, production of rice seeds, rice certification, inspection of rice seed standard, and inspection of rice quality.
- Phichit Agri-Nature Learning Center for the Drive of the Philosophy of Sufficiency Economy: provides knowledge about producing microorganism from termite chamber, producing organic fertilizer from termite chamber, and producing plant desiccant from herb.
- Mahasarakham Business School: gives an insight in administration, accounting, marketing and finance, as well as producing a community resource person.
- Bank for Agriculture and Agricultural Cooperatives: provides rice seeds in preparation for an establishment of the rice bank.

- Wung Saeng Community in Wang Saeng sub-district, Kae Dam district, Maha Sarakham province: arranges knowledge management and shares love together with knowledge (the Rice-Fish Exchange)

Lao Khao Baan Hin Poon office,
Kantarawichai district,
Maha Sarakham province

Mutual Benefits

The community level

1. The community has acquired new bodies of knowledge about effective management of the rice bank, the processes for reducing the cost of rice production through systems and mechanisms relevant to the philosophy of the sufficiency economy, organic agriculture (chemical-free), including skills in production of rice seeds, selection of rice seeds and inspection of the quality of rice seeds.
2. The community has quality rice seeds for both consumption and cultivation.
3. The rice bank has stability, thus able to provide loaning service to the members within the community and even other communities based on the concept of reliance and sharing.
4. Community members earn extra income from selling organic fertilizers made from termite chambers, as well as from selling organic vegetables.
5. Development of a manual on the management of the rice bank, which is concrete and effective within the community, and which serves as a learning asset or a case study for interested people.
6. Accounting systems have been implemented in the rice bank, e.g. a Central Book held by the bank, and a standard Borrow/Return Book held by each household.
7. Community members are able to analyze the cost of rice production. That is, they have learned that rice cultivation using chemical fertilizers costs 4,920 baht per rai, while rice production with cost reduction initiatives is merely 4,350 baht per rai.
8. The community has formed up a strong group that has effective learning management of its own. Also, it has become a learning source for its members and people from other communities. Some of the group members have been resource persons at the community level who transfers to others bodies of knowledge about the rice bank and other issues.

The university level

1. There is an integration of research and class instruction in various subjects such as Organizational Management and Behaviors, Principles of Marketing, and Seminar in Management.

2. There is an emergence of an educational reform that places an emphasis on raising awareness in participatory public services of the instructors and the students.

3. There is an emergence of a process for the learning management in the 21st century that places a primary focus on the learner and the community as the centers, and team/group-based learning.

4. There is a site available for student apprentice where villagers or local scholars can do co-teaching or learning management for both instructors and students

The associate network level

There is a cooperation for community development among the University, communities, government sectors and other organizations such as Khon Kaen Rice Research Center, Phichit Agri-Nature Learning Center for the Drive of the Philosophy of Sufficiency Economy, and the Love Cherish and Care for Mahasarakham People Group.

Learning space “Rice Bank” and community product

Knowledge sharing and scholarship

Knowledge sharing was mutually performed **in Hin Poon community** by the members of the rice bank and a volunteer group who used their lands as pilot sites in order to reduce the cost of rice production. The group consisted of four important people: the village headman, an assistant to the village headman, a member of the rice bank, and the chairman of the rice bank. There was an emergence of a Borrow/Return Book held by each household, and a knowledge domain in the form of "Rice Bank Management Manual”. Additionally, Hin Poon community’s knowledge in bio-organic juices produced from termite chambers has been extended to other sites. At the same time, **the University** has integrated different sciences with various study programs operated by Mahasarakham Business School, namely Management, Finance, Accounting, and Marketing. Moreover, a knowledge domain in the form of storytelling was initiated by the students. Currently, one article has been published in the Area Based Development Research Journal.

Measurable social impact

Methods of rice cultivation in Hin Poon community, Khwao Yai sub-district, Maha Sarakham province have currently been changed. In the past, villagers usually burned rice stubbles. At present, they turn over the upper layer of soil and pour bio-fermented juice all over rice stubbles so as to convert them into natural fertilizer. Moreover, in the past urea fertilizer was normally used while rice plants were growing. Consequently, their leaves increased in number but this resulted in leave blight disease. Now the villagers use urea fertilizer when rice is at the booting stage. So, the plants increase in height and become free from leaf blighting. Besides, the product symbol "Baan Hin Poon" has been initiated. The village has become a model village in Maha Sarakham in various ways, i.e. being a community of knowledge management as well as being a model community following the philosophy of sufficiency economy. A number of government sectors, private sectors and educational institutions of all levels have carried out a study visit to the community and shared knowledge there regularly. A learning network based on "Reliance and Sharing" between the two communities (Hin Poon village in Khwao Yai sub-district, Kantharawichai district, Maha Sarakham province and Wung Saeng village, Wung Saeng sub-district, Kaedum district, Maha Sarakham province) was built up from a traditional activity called "The Rice-Fish Exchange".

Sustainable Development of Farmer Union: Cattle Feed Production of Farmers in Tandeaw Sub-District, Kangkoy District, Saraburi Province, Thailand

Author: Waripas Jiumpanyarach, Ph.D

Institute: School of Agricultural Resources, Chulalongkorn University

Duration: January 2014 - December 2014

Keywords: Backgrounding cattle, Total mixed ration, Roughages, Napire Pakchong 1

"Farmer union and community economy"

There are approximately 1.3 million Beef cattle farmers in Thailand (DLD, 2012). Most of the cattle farmers are small-hold farmers who have no more than 50 cattle, raising them in the open fields. This method is called "Backgrounding cattle" (DiCostanZo, A., 2014). Before selling the cattle to the feedlot, the farmers will feed them total mixed ration (TMR) to develop more muscles. These farmers faced problems such as high costs of animal feeding because of lack of access to animal feeding market, bargaining power, and knowledge in feed nutrition. Also, the opening of international markets such as the ASEAN Free Trade Area (AFTA) was another factor. Export of live cattle from Thailand suffered a deficit of approximately 380 million baht against import of high-quality beef because of quality of beef in the year 2010 (DLD, 2012).

Saraburi province, located in the northeast of Thailand, has both agriculture and industry. The study area was located in Tandeaw sub-district, Kangkoy district with 20 percent of the population working in agriculture. (Agricultural Office, Saraburi province, 2008; Tandeaw sub-district administrative organization, 2014). In this Tandeaw there were 12.10 percent of cattle which was of the third-ranked in Kangkoy. The cattle farmers purchased cattle, aged not over 6 months and weighing no more than 300 kg and feed them for 2-6 months by allowing them to graze in the area near the farms, such as Sengkheng

Chinese cemetery and Hungkung cemetery, then feeding them additional protein and nutrient. After the desired weight was reached, the cattle were sold to the feedlot where they would be further fattened.

Backgrounding cattle farmers relied on nature. They usually allowed the cattle to wander around the grass and paddy field. They did not have farm management plan, such as quantity and nutrient of feeding rations, marketing, revenue and profits planning. A livestock extension programme would therefore be a good way to reduce production and farm management problems, and increasing sustainability. The extension program could also be a model for improving economic and social conditions in communities in a sustainable manner.

Partnership

The study on the feasibility of production of total mixed ration (TMR) by cattle farmers, has the objective to equip farmers with knowledge to choose alternative raw materials to produce animal feeding ration, to understand animal nutrition, and to be able to produce total mixed ration (TMR) by themselves. Costs of animal feeding ration are recorded and compared in different seasons. This can be a model for other communities. The project was conducted with cooperation from the following:

- **People:** Teachers, researcher, and students of School of Agricultural Resources, Chulalongkorn University; researchers of Nakhorn Ratchasima Animal Nutrition Research and Development Center; Kangkoi District Livestock Officers; and Tandew cattle farmers
- **Knowledge from the University:** 1) animal nutrition 2) quality of cattle farm 3) cost reduction of rations by community 4) backgrounding cattle farm accounting
- **Materials and equipment:** School of Agricultural Resources of Chulalongkorn University, Nakhorn Ratchasima Animal Nutrition Research and Development Center, and local production resources
- **Budget:** Saraburi Strong Community Project, Chulalongkorn University, Thailand

Mutual benefits

- **Tandeaw Community:** farmers understand how to prepare total mixed rations by themselves; they can produce roughages and reduced costs of cattle rations. The community becomes a model and learning center for other communities.
- **University:** the project was integrated with teaching to make students learn about real farm conditions and farmers' grouping; the community has thus become a social lab for the students. On research and service, this community will be a field research site, offering researchers and academics an opportunity to learn how to work with communities, as well as a source of new research topics.

Knowledge sharing and scholarship

Survey: The project conducted a training for the 22 households joining this program. A survey found that the participating farmers were aged between 36-45 years, with an elementary education, and had annual incomes from cattle backgrounding between 5,000 – 15,000 baht, which were relatively low. Other incomes came from activities outside agriculture and from their relatives. This community was a strong community and had varieties of natural resources, but they have had little support in agricultural knowledge, and their being in debt caused them to live in poverty.

Preparation: Farmers received knowledge about animal nutrition, and how to prepare the roughage or grass such as Pangola and Napier Pakchong 1, by planting grasses as raw materials for the total mixed ration. The farmers also learned about nutrition for backgrounding cattle and how to substitute cheaper ingredients for the rations to reduce costs of animal feeding in different seasons. Then, total mixed ration production was demonstrated to the farmers, and the recording of costs was taught, to compare the benefits before joining the program and after the program.

Action: The community came together every Saturday to mix rations and distributed to the participants for use during the week. We had two similar farms, named "Winai-Tiwa farm" and "Manop farm", for comparison based on the number of cattle and the farm's characteristic. Winai-Tiwa farm allowed the cattle to graze in the cemetery while Manop farm grazed their cattle in paddy fields. They had similar problems in the lack of roughages during the dry season, thus forcing them to use straw and additional nutrition to feed the cattle, which raised costs of animal feed.

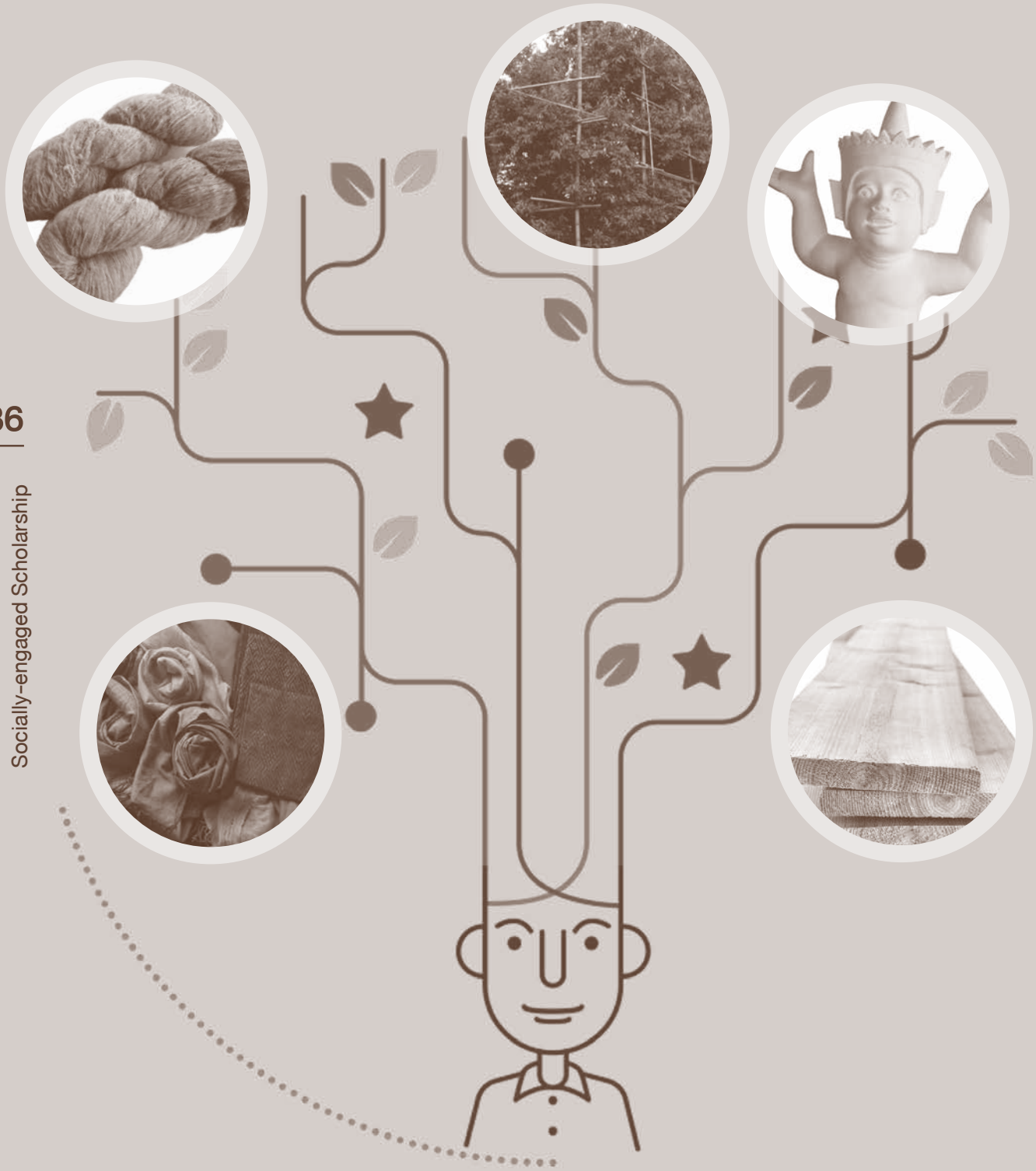
Conclusion: Comparison between conventional and total mixed ration feeding system found that the roughages was a major problem of costs of feeding. Promoting planting of Napier Pakchong 1 grass was an important solution to develop feeding supplement based on nutrition. Costs of TMR feeding system were lower than conventional feeding system, assuming the same labor costs and same seasons. In Winai-Tiwa farm, the cost of feeding decreased 8.10%, and in Manop farm 53.80%. In addition, the activities of this group helped each other in term of reducing costs of inputs and labor, as well as strengthening social relationship in the community.

Accounting and nutrition training to cattle farmers
at Watmai Temple, Tandeaw sub-district, Kaeng Khoi district, Saraburi province

Groupings of farmers for Total Mixed Rations (TMR)
in Tandeaw sub-district, Kaeng Khoi district, Saraburi province

Measurable social impact

The success of this group of farmers resulted from helping each other to produce animal feeding ration, with a committed leader and well-organized management, supporting by academics and government officials. The cattle farmers can reduce costs of animal feeding production, by approximately 5-80 percent compared to the previous year. This group of cattle farmers is likely to develop to become a small enterprises in beef production, which is the beginning of the beef supply chain in the market. The knowledge received in this project encouraged the farmers to develop quality of their products and negotiating power in the market. Also, the community became leaders in total mixed ration producers, and a learning center for other communities.



Product & Process

Process Improvement in Industrial Rubberwood Lumber Production

Authors: Asst. Prof. Nirundorn Matan, Ph.D and team

Institute: Materials Science and Engineering,
School of Engineering and Resources, Walailak University

Duration: 2005 - 2015

Keywords: Rubberwood, Log sawing, Lumber impregnation, Kiln drying

"The center of excellence on wood science and engineering"

Rubber trees, widely grown in Thailand for production of latex, are generally cut down for replanting after 25-30 years of age when the production of latex is uneconomical. Rubberwood logs, the by-product obtained, are usually transferred to local rubberwood sawmills around the area. The production of rubberwood lumber consists mainly of sawing of rubberwood logs, chemical impregnation and kiln drying of rubberwood lumber. Until recently, know-how and expertise for manufacturing of rubberwood lumber rely primarily on experience of the operators. This could lead to an uncertainty in process operation and deterioration in quality of the kiln dried lumber. The research team at the Center of Excellence on Wood Science and Engineering, Walailak University (WRWU) has developed several tools to assist the operators to improve the lumber production efficiency and to control quality of the kiln-dried lumber in rubberwood sawmill industries.

Partnership

Research team at WRWU has continually studied and developed techniques to improve manufacturing process of rubberwood lumber. In 2005, in a cooperation with the Japan International Cooperation Agency (JICA) and Department of Industrial Promotion, the research team investigated the existing practices in 5 rubberwood sawmills. Technological reasons of losses in lumber production processes were identified. The research team then carried out in-depth research and

made suggestions to reduce losses in 8 rubberwood sawmills under the funding from the Governor's office of Suratthani. In 2006 under a support from the Thailand Research Fund (TRF), the research team developed a high-efficiency rubberwood drying process which is suitable for implementing with existing drying kilns used in Thailand. From 2009-2014, under a support from the office of the National Research Council of Thailand (NRCT), the research team developed tools to improve the lumber production efficiency and to control quality of the kiln-dried lumber in rubberwood sawmills. Throughout the projects, the industries have contributed hugely on testing of the equipment and software developed. Various suggestions received have been used to improve the equipment and software to be more robust and more user-friendly.

Mutual benefits

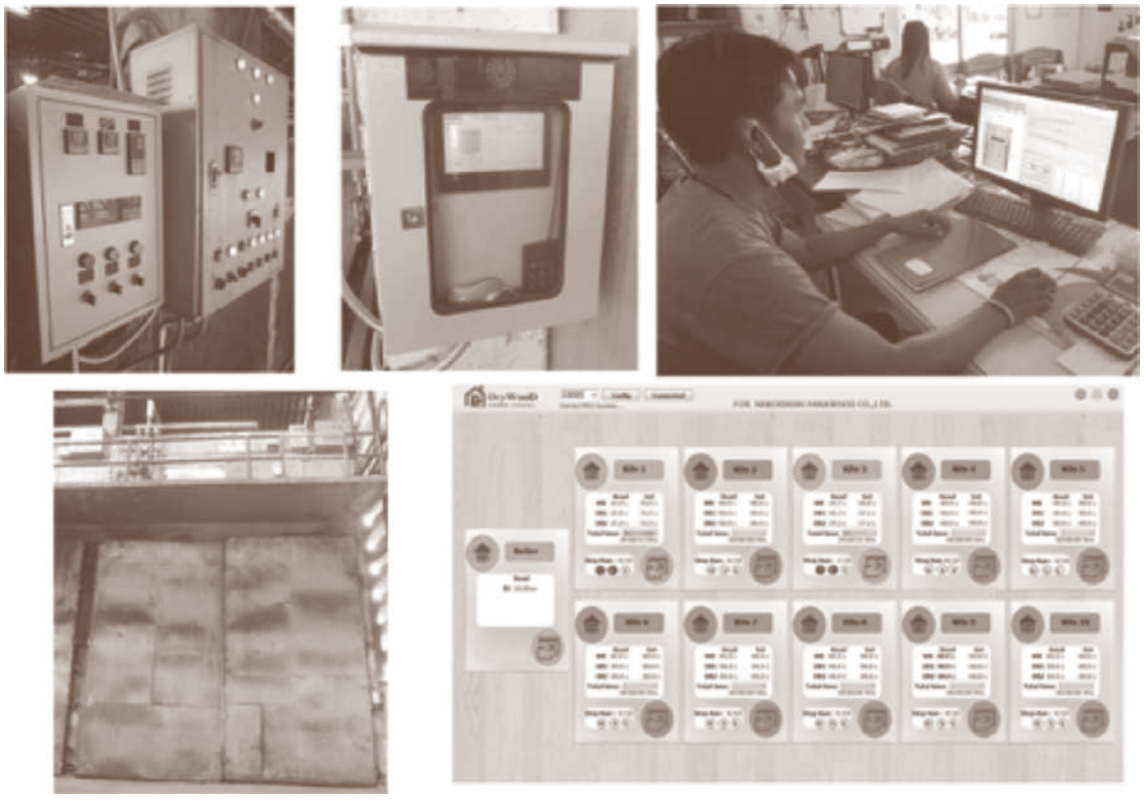
Several tools developed have been successfully implemented in rubberwood sawmill industries to improve the lumber production efficiency and to control quality of the kiln-dried lumber. At the same time, the researchers in the university have a chance to carry out in-depth studies on rubberwood lumber processing, the research topic that meets the local industry demand. The results have been published in various leading journals in wood science and technology. This ensures that technologies and knowledge given to the industries are up-to-date and are accepted by experts in the field. The Center of Excellence on Wood Science and Engineering, Walailak University (formerly known as the Wood and Engineering Research Unit) has been endorsed by Walailak University since 2004 to provide a leadership in research and development of wood, to conduct a programme of continuing education and training in collaboration with the wood-using industry and to facilitate academic research and to distribute knowledge of wood science and engineering to the society.

Knowledge sharing and scholarship

To assist the operators in rubberwood sawmill industries to improve the lumber production efficiency and to control quality of the kiln-dried lumber, the research team at WRWU has developed and transferred the following software and tools.

- **SawWooD** is a computer software capable of calculating yield of lumber which would be obtained according to various sawing patterns of rubberwood log. Calculation can be made with elliptical cross-section and tapered rubberwood logs. In addition, amount of sawdust and waste wood together with energy used in each sawing pattern are displayed. The software has been distributed to about 30 rubberwood sawmill industries and a training course incorporation with NRCT has been arranged for about 80 personals.
- **ImPregWooD** is a system designed to measure and to maintain concentration of boron in water at a required level in the rubberwood lumber impregnation process. The system consists of an in-house made high resolution hygrometer and a computer software for calculating amounts of chemical and water to be mixed for each treatment cycle. This ensures that the concentration of boron in water used in the impregnation process is kept at a required level for every impregnation treatment performed. The system has been in stalled in 17 rubberwood sawmill industries.

- **DryWooD** is a semi-automatic kiln control system developed for an effective control of drying condition within the industrial drying kiln. The unit, connected using wire-less links, consists of kiln control units, microcontroller and controller software on computer. The system can control several industrial drying kilns simultaneously. Drying schedule could be set either at the kiln control unit, microcontroller or computer. Changing of the drying schedule could be performed at any stages if the drying step has not yet been executed. The unit also collects and stores information on drying conditions within the kiln in real-time mode which allows users to later continuously improve their drying strategies. The system has been successfully installed in 6 rubberwood sawmill industries.



DryWooD: the semi-automatic kiln control system

The National Research Council of Thailand No.283837 (27 November 2012)

Measurable social impact

The following information has been provided by Mr.Jesada Angvittayatorn, Managing director of Nakornsri Parawood Co.Ltd. Nakhon Si Thammarat province, Thailand, one of the end-users of the systems developed by the research team.

Case study : ImPregWooD

No.	Topic	Before	After
1	Concentration of boron in solution	Unable to detect concentration of boron during the impregnation process.	Concentration of boron in the solution can be detected and controlled anytime during the impregnation process.
2	Color of boron solution	Can be examined only by draining of the solution from the storage tank which is inconvenient.	Can be easily examined anytime as a result filtration of the solution to remove contaminants can be performed at the right time.
3	Chemical substance used	Chemical substance is mixed with water at a constant amount for every impregnation cycle.	The amount of chemical substance is calculated for each impregnation cycle using the software leading to a reduction of the chemical substance used.

Case study: DryWooD

No.	Topic	Before	After
1	Color of kiln-dried lumber	Bright but not uniform within each piece and throughout the lumber stack.	Bright and uniform within each piece and throughout the lumber stack.
2	Moisture content of kiln-dried lumber	Moisture content is not uniform with the difference within each piece of 3-4%.	Moisture content is more uniform within each piece and throughout the kiln.
3	Warping and splitting of kiln-dried lumber	Warping of 5-6% and splitting of 2-3% are usually obtained.	Losses as a result of warping and splitting were reduced to about 1% which increased the value of kiln-dried lumber by about 200,000 baht/month.
4	Drying time	Total drying time of about 5-7 days is usually required.	Total drying time is reduced to 3.5 days which reduced the electricity bill by about 300,000 baht/month.
5	Kiln control	Depends mainly on skill and experience of kiln operators leading to various errors in the controls of temperature and humidity within the drying kiln.	Temperature and humidity within the drying kiln is accurately controlled by the system with automatic controls, according to the set point, of heat, steam and air venting.
6	Kiln drying evaluation	Drying condition is recorded by the operators.	Drying condition is displayed in real-time and all drying data are recorded and stored in computer for later uses.

Case study: DryWooD

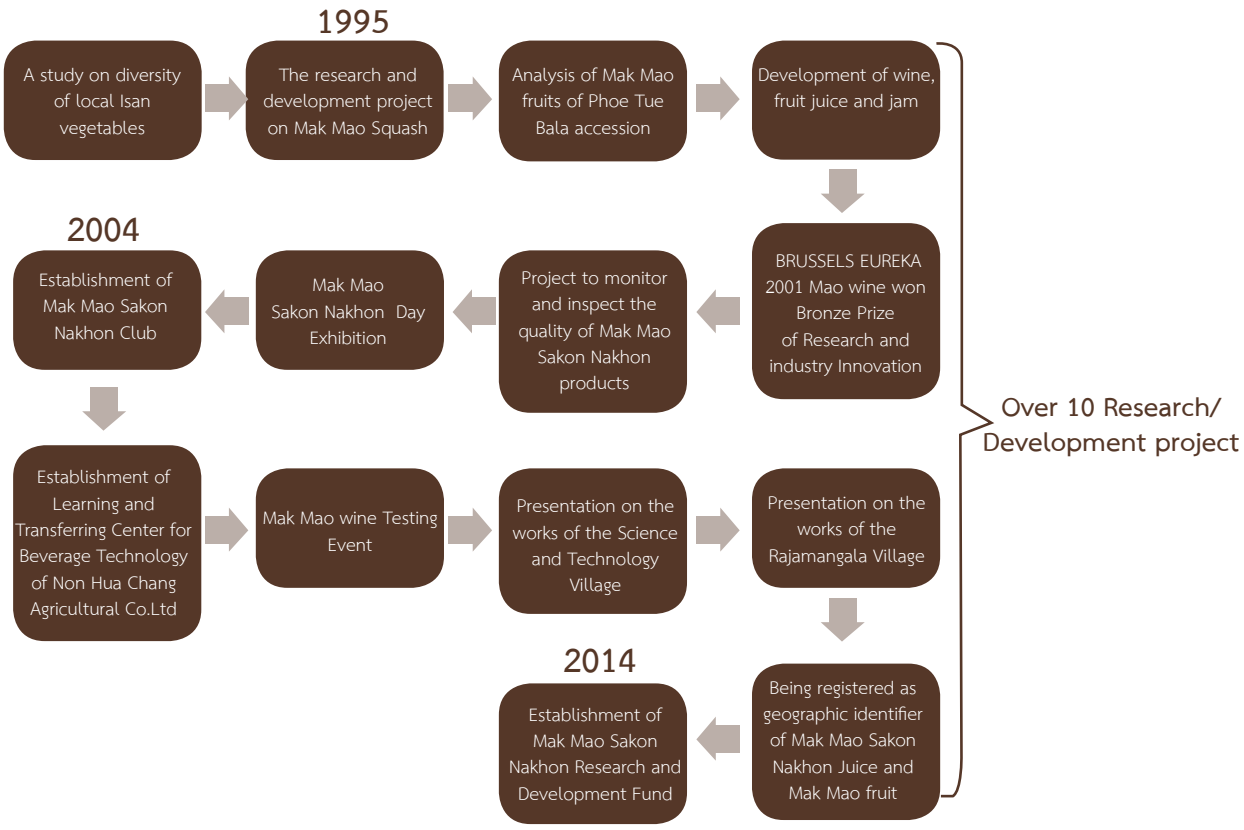
No.	Topic	Before	After
7	In process control	Difficult to perform especially when many kilns are operated at the same time.	The system allows the control of many kilns to be performed from one computer.
8	Failure of fan blades	Failure of fan blades or rotors during operation is hard to quickly detect and repair.	Failure of fan blades or rotors during operation can be quickly detected by an abnormal temperature reading. Failed components could then be fixed in a short time.
9	Boiler control	Steam pressure is recorded by the operators.	The system continuously monitors pressure of steam generated by the boiler.
10	Amount of steam used	Without an automatic control, steam used to generate heat for the lumber is largely wasted through air venting.	With an automatic control, the amount of steam used to generate heat for the lumber is reduced.

Mak Mao Sakon Nakhon: From Research to Community Business

Authors: Ms. Kannika Sombun and Ms. Sudarath Sakhunkhu
Institute: Natural Resources Faculty, Rajamangala University of Technology Isan, Sakon Nakhon Campus
Duration: 1995 - 2015
Keywords: Integration, Local fruit, Participation

"From local fruit into Sakon Nakhon's Identity"

According to the study on diversity of Isan vegetables and plants under the cooperation between Rajamangala University of Technology Isan, Sakon Nakhon Campus (formerly-known as Sakon Nakhon Agricultural Research and Training Institute) and Land Reform Office of Sakon Nakhon together with the Inpaeng Group, Mak Mao (Antidesma thwaitesianum Müll. Arg.) was seen to have potential to be developed into value-added products to benefit local community, as well as an iconic plant for Sakon Nakhon Province. From then on, Mak Mao and its products have been developed in several dimensions into local businesses generating large income to the community. The development of Mak Mao fruit juice then started to take shape in 1995. The whole developmental path is illustrated in the Diagram of Mak Mao Sakon Nakhon Development below.



The diagram of Mak Mao Sakon Nakhon development

Partnership

Internal engagement

This work has integrated the expertise and effort of university personnel from various fields including plant science, animal science, food science and technology, economics, and business management. These experts have different roles in the whole chain of Mak Mao production. Upstream, the multidisciplinary experts help cultivate knowledge among farmers and lay people who are interested in high-quality Mak Mao varieties and how to grow, maintain and develop them. Midstream, these experts not only act as advisors and instructors transferring knowledge on processing technology of fruit juice and wine to Mak Mao product manufacturers, but also provide advice and suggestion to the entrepreneurs to produce high-quality, standardized, and safe Mak Mao products. Downstream, they also act as advisors and coordinators in marketing.

External engagement

Natural Resources Faculty, Rajamangala University of Technology Isan, Sakon Nakhon Campus, works as main organization to carry out Mak Mao Sakon Nakhon development in collaboration with several organizations and government agencies in Sakon Nakhon Province, namely the Provincial

Public Health Office, the Community Development Office, the Excise Office, the Provincial Commerce Office, the Agriculture Office, and other related organizations and stakeholders, and those in some other provinces. Established in 2004, Mak Mao Sakon Nakhon Club was joined by those interested in Mak Mao development including farmers, product manufacturers, processed-product distributors and scholars. The Club has a working committee set up by vote, and meetings have been held for information sharing and opinion exchanging in order to develop Mak Mao products of Sakon Nakhon province.

Mutual benefits

All stakeholders along Mak Mao production chain including farmers upstream to entrepreneurs midstream received great benefits from the initiation of businesses of value-added Mak Mao products, especially juice and wine. This progress led to more employment in the local community. **Farmers** are encouraged to invest in Mak Mao plantations or buy Mak Mao fruits from other fellow farmers in the community, thus creating business of collecting Mak Mao raw material to feed manufacturing plants. More businesses were created to distribute Mak Mao processed products to consumers downstream. In addition, **governmental organizations** also provided support to stakeholders for sustainable growth and development of Mak Mao businesses. Findings from researchers have been used to enhance efficiency in farming, processing, and business management. Mak Mao Sakon Nakhon Club played an important role to consistently promote Mak Mao businesses.

Rajamangala University of Technology Isan, Sakon Nakhon Campus, has also given its full support to Mak Mao product development by linking it to various tasks carried out by the university since 1996. These initiatives have received cooperation from external organizations as well. Regarding technical services, the campus joined the Science and Technology Village Project and the Technological Clinic Project of Ministry of Science and Technology to develop products that utilize technologies made accessible to local communities. The campus's research and development projects can also receive funds from various sources such as National Science and Technology Development Agency (NSTDA), National Research Council of Thailand (NRCT), Office of the Higher Education Commission (OHEC), etc. Regarding education, the campus supports its students to conduct research projects or field visits to manufacturing plants. The campus' personnel are encouraged to conduct study and theses about Mak Mao for their graduate studies. Mak Mao is also incorporated in learning activities for students of various fields such as projects done by students in Special Problem subject of Food Science and Technology and Plant Science. Regarding research and development, the campus provides financial support to enhance knowledge and research concerning development of Mak Mao Sakon Nakhon so that it can be further developed and simultaneously integrated into teaching and learning.

Mak Mao tree

Knowledge sharing and scholarship

The longitudinal and continuous work on Mak Mao leads to expansion of partnership. In the early stage, the key partnership remained only at the local level, which included farmers, entrepreneurs, governmental organizations, and the university. Learning was limited only to people in Sakon Nakhon province. However, in the growing stage when Mak Mao products became well-known to consumers countrywide, they would attract people and businesses outside the province including food entrepreneurs and funding sources to develop Mak Mao products. Cooperation would be promoted mainly by Mak Mao Sakon Nakhon Club as the center for knowledge sharing especially for key partners. Mak Mao Sakon Nakhon Research and Development Fund has been recently established. Over a 10-year period, work based on body of knowledge together with parallel operations in academic services and research and development of the university has resulted in over 10 academic projects conducted on Mak Mao. These projects cover **upstream topics** such as appropriate Mak Mao breeding, genetic diversity, zoning and coordinates, pests, natural pest insects; **midstream topics** emphasizing Mak Mao products processing and development such as wine, fruit juice, liquor, Mak Mao leaf tea, and jelly for food and drink products, soap and lotion for cosmetics products, and herbal products jointly developed with Thammasat University, and lastly **downstream topics** such as marketing study and strategic planning.

Measurable social impact

The development of Mak Mao Sakon Nakhon via technology transfer from researchers to community members has led to Mak Mao businesses in the community that generate financial turnover of over 300 million baht per year. These businesses have created a great number of jobs for local people and all parties concerned, including farmers, fruit and seedling sellers, and workers in manufacturing and processing plants. They can even benefit elders and children who can work in sorting the fruits, as it requires little physical effort. Young people are also needed in order to perform harder jobs such as harvesting Mak Mao fruits from the trees, and several manufacturing procedures. Up until now, Mak Mao has received great interest from both public and private sectors. So many business persons become interested in distributing Mak Mao products that the fruit supply becomes insufficient to serve the market demand. Mak Mao manufacturing plants have been improved to have greater production capacity and to meet legal standards. Governmental organizations have also lent their due support by registering Mak Mao Sakon Nakhon and Mak Mao Juice Sakon Nakhon as geographic identifiers. Moreover, Mak Mao Research and Development Fund was established with financial support from business persons and processing entrepreneurs who directly benefit from the work of the Natural Resources Faculty, Rajamangala University of Technology Isan, Sakon Nakhon Campus.

The past 20 years of continual endeavors has seen Mak Mao Sakon Nakhon Club meet its objective in developing Mak Mao to become a symbolic plant of Sakon Nakhon province. However, there are still problems to be solved, which require much work to do, such as how to develop and grow Mak Mao to get enough yield, and how to produce a greater variety of Mak Mao processed products with high quality for the sustainability of Mak Mao businesses.

The Innovative Development of Rice Seedling Scattering Machines for Paddy-Sown Fields

Authors: Mr. Saran Krachong and Ms. Ratchada Kamching

Institute: Faculty of Industrial Technology, Uttaradit Rajabhat University

Duration: October 2012 - September 2013

Keywords: Rice scattering machine, Rice seedlings for paddy-sown fields

"Rice seedling scattering machines for paddy-sown field reduce capital, increase productivity for farmers, and are really suitable for community."

Paddy-sown farming incurs high production costs because it needs a large amount of rice seeds to scatter in fields as well as much chemical substance to control weeds. For this reason, agriculturists have been promoting to grow rice with the seedling-sown method to reduce the capital and chemicals. However, the process of preparing the seedlings was complicated because it needs at least three to five laborers to drop rice seeds in 434 holes. Unfortunately also, the rice seedlings that are spreaded thus by the laborers are not even and need more time to be sprinkled. Based on this problem, researchers collected data to design a rice seedling scattering machine for paddy-sown fields in the areas of Phichai district, Uttaradit province, by focusing on practical convenience and operation modes of the machine as in standard paddy-sown farming.

Partnership

The research, design, and development of rice seedling scattering machines for paddy-sown fields was based on the process of participation by integrating the research with learning and teaching and academic services to community through processes as follows:

Research proposition development: To develop the research proposition, the university provided a forum to exchange knowledge and ideas with the representatives of organic rice farmers in Uttaradit province, comprising Namrit sub-district, Wangdin sub-district, and Khorum sub-district until the proposition was developed to lead to solving the problem as the community requires. The resulting research problem was the innovation of a scattering rice machine to produce seedlings for growing rice in paddy-sown fields, to reduce the capital and increase productivity that will lead to production of organic rice.

Data collection The researchers discussed with rice scattering field farmers in Rai Oil sub-district in Phichai district, Uttaradit province on the details of the problem with the rice seedling scattering machine application, and learned the primary conditions of the design and development for the farmers to use the machine effectively. Specifically, the machine must minimize rice seedling damages, reduce working time, and reduce the number of the labors. Moreover, it must also be convenient to use, and work with an automatic system.

Design and development The project researchers exchanged the knowledge and ideas with the paddy-sown field farmers and the network and collaborated together to design, experiment on the machine's efficiency, and improve it until they gained the prototype innovation used to scatter rice seedlings in paddy-sown fields to minimize the capital, to maximize productivity for farmers, and to be truly suitable for community. The farmers allowed the researcher to use their fields for doing this research, for exchanging the knowledge and opinion, and for transferring technology supported by Phrae Rice Seedling Center.

Dissemination The researcher transferred the technology to various interested farmers such as the paddy-sown field farmers in Rai Oil sub-district in Phichai district, Uttaradit province, the organic farmers in Hat Kruat sub-district in Tron district, Uttaradit province,. other paddy-sown field farmers, attendees at the 2015 Science Week Affair Network, and the instructors and staff of the Faculty of Science and Technology in Chiang Mai Rajabhat University. Furthermore, the researcher presented the research results on various occasions, such as the promotion of the rice cultivation in Baan Kong Kho in Phichai district, Uttaradit province and the Northern Championship Rotary Wing Craft Competition Program broadcasted via the Thai PBS Channel.

The fieldwork for exchanging knowledge of innovative invention with the farmers

Mutual benefits

Rice Organic Farmer Network This group received the prototype machine that was used to scatter rice seedlings to cultivate the seeds in paddy-sown fields and that could reduce the capital and increase the productivity of rich organic.

Paddy-sown Field Farmers The paddy-sown field farmers in Rai Oil in Phichai, Uttaradit learned and designed the innovation used to solve the problem with rice scattering for paddy-sown fields, until they were able to minimize the steps and the processes in growing the rice seedlings in the paddy-sown fields. Subsequently, they applied the innovation to reduce the capital and increase the productivity. The farmers won an award for outstanding farmers regarding the application of innovation for rice farming that can minimize the capital and maximize the productivity at the provincial level, because Phipat Chinthang, the leader of paddy – sown field farmers in Rai Oil sub-distirct in Phichai, Uttaradit, participated in analyzing the issues, finding the solutions to them, disseminating the information, and supporting his network with the innovation. Moreover, they were also selected to be competitors in Outstanding Agricultural Work Competition at the regional and national levels.

University This research is part of the program that studied and developed the agricultural enterprise management conducted by Uttaradit Rajabhat University, agricultural networks, local organizations in Uttaradit, and other parties that received funds from the Thailand Research Fund (TRF).The program's successful results led to its being selected to be the Best Research in 2015. The research brought reputation to the university and helped the interested parties throughout the northern part of Thailand realize the benefits of the innovation via television programs and newspapers. The researcher gained knowledge on area-based research, and on design and development of innovation in which the community participated and that is a real need of the community. Additionally, the students who went to the fieldwork had a chance to learn how to design and create innovation for community. The participation of community indicated that letting community participate in innovative design, creation, and application for its advantages would make it accept and adapt for use various types of technology.

Knowledge sharing and scholarship

The research proposition development, data collection, design, development, and feasible dissemination resulted from the cooperation of main parties comprising scholars, rice organic farmers' networks, and paddy-sown field farmers' groups. They integrated computer engineering with farmers' knowledge and experiences in scattering rice seedlings for cultivating them in the fields, to invent a prototype rice scattering machine that assists farmers in saving their farming time, labors, and rice seedlings. To apply the research for his academic works, The researcher wrote two articles based on the research: Design and Development of Rice Dropping Machine for Cultivating Rice Seedling in Paddy-Sown Field through the approach of community participation, presented at the Area-Based Development Research Conference at Phayao University, and Rice Seedling Cultivation for Paddy-sown Fields with a Rice Dropping Machine controlled with a microcontroller to increase productivity, presented at the National and International Academic Conference held jointly by Uttaradit Rajabhat University, Lampang Rajabhat University and the Graduate Network of Northern Rajabhat Universities. The two articles were submitted to qualify for an academic position promotion.

Measurable social impact

The rice scattering machine for paddy-sown field can solve farmers' problems because it is efficient in reducing the need for three laborers to one laborer, decreasing the previous labor costs by 66.67 percent, reducing 90 percent of the farming time, reducing the production costs from losing rice seedlings by 94 percent. The machine uses eight hours of electricity per day, and the resulting electricity charge is 4.033 baht per day. It helped reduce the paddy-sown field farmers' capital and increase their productivity, and is also an innovation that encourages the farmers to be more interested in planting organic rice. The plant can help reduce chemical use and preserve the environment resulting in farmers' and society's better health.

Thung Mok Model

Author: Kanlaya Jumpathong, Ph.D
Institute: School of Science, University of Phayao

Duration: 2010 - 2015
Keywords: Thai-Leu weaving group, Thung Mok, Natural dye, Thai-Leu Textile Learning Center

"Science Empowers Community"

Several textile industries use synthetic colors in the dyeing process of cotton, silk or wool, in which synthetic dyes are manufactured from different kinds of chemical substances. In some conditions, synthetic dyes can change forms and release hazardous chemicals to producers and consumers, which cause several diseases in humans especially cancer, and also damage the environment. An awareness of these problems encourages people to use natural dyes in order to protect themselves from toxic chemicals, save the environment, and reduce the cost of production. These advantages bring the Thai-Leu weaving group to focus on applying natural dye coating on cotton fibers before weaving the fabric products. In addition, the natural dye fibers give soft colors, making the fabrics look more gentle and relaxed compared with synthetic dyes. However, an observation of the natural dye products found some drawbacks, such as non-permanence of colors, durability after washings, lack of sunlight resistance, and complicated and time consuming dyeing process. Furthermore, the reproducibility of color is a major problem of this dyeing process.

The above problems were uncovered during a community needs survey in 2010 at Chiang Ban sub-district, Chiang Kham district, Phayao province. It was reported that the Thai-Leu weaving group requires more knowledge and techniques to improve their products by using the natural dyeing process. Therefore, the Department of Chemistry, School of Science, attempted to overcome these problems by using the knowledge

from the research project entitled “Development of Cotton Dyeing Process using Natural Dyes”. The basic knowledge from this study was then applied to train the members of the Thai-Leu weaving group under the “Thung Mok Model” which is a part of the University of Phayao project called “One faculty one model”.

Partnership

The aim of this project is to apply scientific knowledge to control and optimize conditions for cotton dyeing process using natural dyes from local plants. At the beginning of this project, the members of Thai-Leu weaving group and BSc students of Chemistry Department who studied in the course “Heterocyclic Chemistry” had an opportunity to exchange their knowledge during a field trip in 2010. Our students described and transferred to the weaving group the dyeing technology from a research project entitled “Development of Dyeing Process from Indigenous Plants in Genus Cratoxylum (Clusiaceae) Grown in Northern Thailand”. All participants learned the techniques, methodology, and optimum conditions for cotton dyeing process using natural colors from plants in the family of “Teaw”. Then, they conducted experiments about dyeing process.

The basic chemistry of dissolving, mole fraction and ratio, organic structure, and inorganic substance immobilization can be applied to overcome all the problems mentioned earlier. This training project increased the dyeing skill and improved the overall ability of group members and product quality, and also paved the way for further developing their products in the future. There are many benefits from this field trip including students becoming a part of the community, using knowledge of natural dyes to train the members of Thai-Leu weaving group, and also exchanging knowledge between the two generations. Furthermore, this field trip encouraged a preservation of the original weaving process.

The Thai-Leu weaving group was very satisfied with the first field trip, and they asked for more knowledge about the techniques of fabric design in order to create new patterns of their products. Therefore, the second year of the project included a part on fabric design in the training program, coupled with experiments on natural dyeing process. This part of the project was generously assisted by Mr.Charuphan Lumpungkit, a representative of Mr. Phaopinyo Chimpanao’s research group, University of Rachamungkala Lanna, Chiangmai province, who is a lecturer on contemporary fabric design. Local plants in Phayao province were extracted to use in this training program. Additionally, all the conditions that BSc students in Chemistry observed from their senior project were applied to train the members of Thai-Leu weaving group. The ultimate targets of our project are to promote Thai-Leu weaving product, to expand the market of fabric product manufacturing for this group, and to create new gorgeous designs along with preserving the outstanding identity of Thai-Leu woven fabric.

Mutual benefits

An assessment of this project from 2010 to 2015 by questionnaire survey found that: 1) 63 people participated in this project, 2) there were 89.85% satisfaction rate from the participants, 3) more than 50% of participants could apply this knowledge to improve their products and educate other people, and 4) natural dye was able to provide different shades of colors, such as black, brown, green, pink of lotus flower, and soft yellow. Generally, Thai-Leu fabrics have 8 different colors including

black, purple, green, pink, yellow, white, red and blue. Our department highlights that woven fabric of Thai-Leu should be an environmentally friendly product, which is also good for human health; therefore, we encouraged the group to plant natural color cottons (brown and green), which need no dyeing. The members recognised the importance to produce natural products that can reduce the cost of production and increase their incomes, according to the speech of His Majesty the King about "Sufficiency Economy". This project also received good responses from the weaver's sub-groups including Ban-Tad-Sob-Wan weaving group at Chiang Kham district, and Thung Mok weaving group at Chiang Muan district in Phayao province.

Economic Output

The income of each member increased about 2,000-3,000 baht per month, due to the fact that the selling price of natural - dye fabric is 50-80% higher than synthetic-dye fabric. For example, the synthetic dye fabric sells at 350 baht, while the natural dye fabric sells at 700-750 baht; and the price will increase depending on its design. The price of a large size of the synthetic dye fabric is around 700 baht, but the price of the natural one is about 1,500 baht. For contemporary fabric design, its price can increase two folds; and customers need to place orders in advance. An estimate of economic values, supported by Science and Technology Village Project in 2014 in cooperation with King Mongkut's University of Technology Thonburi, reported that the benefit over cost (B/C ratio) of this project was 20.89 .

Social Output

Introducing science and technology knowledge to develop and improve the community is a way to preserve Thai-Leu culture and tradition for the next generations, and it also encourages the cooperation of many generations in the community. There are many steps in the natural dye woven fabric production including planting, harvesting, spinning, dyeing and weaving, that the cooperation of all members in the village is necessary. The quality of and relationships in the community become stronger and more sustainable.

Knowledge sharing and scholarship

With the intention of making "Thung Mok Model" an example of sustainable development for other villages; the members of Thai-Leu weaving group, Baan Thung Mok garment group, teachers of Thung Mok school, people of Thung Mok village, and Chiang Ban Sub-district Administration Organization corporated to establish the "Thai-Leu Textile Learning Center of Thung Mok" in 2014. This learning center aims to educate people about traditional and culture of cotton spinning, and integrated weaving process following Thai-Leu traditions. Besides, there are demonstration of natural dyeing process, and exhibits of of Thai-Leu textiles such as "Pattern of Tum Kwao" which is an ancient pattern of folk wisdom of Thai-Leu village, Chiang Khum district, Phayao province. This pattern is always used in wedding ceremonies , and special events in the Thai-Leu community. The University of Phayao also applied this pattern on its academic gowns for the graduation ceremony, which is an effective integration of the folk wisdom value, academic missions, and cultural preservation.

Thai-Leu Textile Learning Center of Thung Mok

In 2015, the Department of Chemistry, School of Science, conducted a training project called "Technique and Optimize Conditions for Dyeing Process using Natural Colors Extracted from Various Plants", which aimed to increase the different shades of natural colors to the products of Thai-Leu weaving group, Thung Mok village. In addition, this project supported the group to transfer dyeing technology, planting process, and textile design to other groups, including Baan San Poo Lei, Thai-Leu weaving group, Baan Huang weaving group, and Baan Thad Sob Wan weaving group. An important objective of this project was to establish the members as local experts, who can disseminate these technique to people who are interested.

From the survey in 2010, new research topics were also identified by researchers and lecturers of Division of Chemistry, School of Science, University of Phayao. Therefore, researchers provided this opportunity for students who are interested in natural dyes to participate in this project. The students have explored various topics in their senior projects based on the weaving group problems as follow: 1) Research project title: "Development of Dyeing Process from Indigenous Plants in Genus Cratoxylum (Clusiaceae) Grown in Northern Thailand"; 2) Senior project titles: "Study of Chitosan Influence for Improving Dye Absorption on Cotton Fibres Dyed with Cratoxylum (Clusiaceae) in Phayao Province", "Study of Protein from Soybean Influence for Improving Dye Absorption on Cotton Fibres Dyed with Cratoxylum (Clusiaceae) in Phayao Province", "Study of Natural Dye Properties from Cratoxylum (Clusiaceae)", "Study of Natural Dye Properties from Chrysophyllum Cainito (Sapotaceae)", "Study of Natural Dye Properties from Caessalpinia Sappan Heartwood", "Study of Natural Dye Properties from Mangifera Indica Linn. Bark", and "Study of Natural Dye Properties from Tectona Grandis Linn.f.".

Measurable social impact

The project of “Thung Mok Model” received many awards including 1) “One faculty one model” project in the symposium of “Phayao Research 2014”, which was held by a cooperation between University of Phayao and The Thailand Research Fund, 2) the outstanding award for cultural promotion volunteering models project, in the Volunteering in Education Fair 2014, supported by the Ministry of Education. Furthermore, several mass media were interested in this project, and kindly promoted it as follows: “Green Plus” TV program from Thai PBS as “Research for community to commercialization”, TV channel 7 as “Nature Dyes Increases Value of Woven Fabrics by University of Phayao” and “ Academic Gown from Thai-Leu Woven Fabrics”, and Thai Rath newspaper as “Thung Mok Model, Students of University of Phayao in the Field to Conduct the Research at Community”.

The success of this project came from understanding of existing problems of the weaving group, and the cooperation between university and community. including providing new knowledge based on the community, conducting the experiment with the community to overcome their problems, and developing the community according to our faculty’s philosophy, “Science Empowers Community”.

Community Participation in Trademark Creation: A Case Study of Baan Fak-None Sumran Silk Product, Sida District, NakhonRatchasima Province

Author: Assoc. Prof. Netchanok Khongthon
Institute: Faculty of Management Science,
Nakhon Rachasima Rajabhat University

Duration: October 2014 - July 2015
Keywords: Baan Fak–None Sumran silk, Community participation, Trademark creation

Work together to create Baan Fak – Noan Sumran silk trademark"

Nakhon Ratchasima province is an important source of silk production, generating incomes of more than 4,000 million bahts per year. The silk of the province has the highest market share among the four provinces of silk production called "Nakhon Chaiburin" group: Nakhon Ratchasima, Chaiyabhum, Burirum and Surin. Thus, one of the strategic objectives of the province in 2012- 2015 was to develop the province into the centre of silk production industry in the northeast. Baan Fak – Noan Sumran, the area of the study, is an important silk production village in Sida district, Nakhon Ratchasima province. People in the village have practiced silk weaving for generations, and gained stable incomes from silk. Their silk cloth has received more than 50 awards together with the Silver Peacock award for the Hang Karok Silk.

These awards can certainly testify to the quality of their silk. However, Baan Fak–Noan Sumran silk group also faces the same problem as other silk groups, i.e., there was no trademark expressing the identity of their products and differentiating their products from many others. Thus, Nakhon Ratchasima Rajabhat University initiated a project to study the unique context of this community product and create a trademark with the community collaboration, thereby strengthening the community economy and the community identity.

Partnership

At first, the research team interviewed 2 silk scholars and studied the relevant documents. Then the team held a training on "The Importance of the Trademark" for the silk group, followed by focus-group meetings with the silk group members and the stakeholders. The objective was to search for silk identity with the collaboration with the silk scholars, Baan Fak–Noan Sumran Silk group members and other community alliance, Sida district Development Office, Nakhon Ratchasima Chamber of Commerce, Thai Camber of Commerce, and the academics and an official of Intellectual Property Department of Nakhon Ratchasima University. It was agreed that the trademark must include the following: the temple as the spiritual center of the community, a mulberry tree and a silk-worm, the vetiver grass commonly seen in the community, rice as the village is famous for rice seed production, golden color as the prosperous color, and a rope-knot pattern as the origin pattern created by the scholar. Thus, the research team used this agreement to create the trademark as shown in figure.

The trademark

After having created the trademark, the research team rechecked the trademark with the community. The representatives of the silk group were invited to consider the trademark if it was congruent to the identity. During the focus group, the meanings of the trademark were explained. The silk group was greatly satisfied with the trademark because it clearly demonstrated their identity and their products. Consequently, the silk group asked the research team to design a scarf package with the trademark. Then, the group printed 1,000 scarf-packages, financed by Community Development Provincial Office, as shown in figure.

Scarf-package of Baan Fak – Noan Sumran silk group

Mutual benefits

After Baan Fak–Noan Sumran silk group had the trademark, the consumers could better perceive their identity. Mrs. Lamun Kaewnork, the leader of the group, said on December 3, 2015 that their income had increased by 50 percent during 5 months, as a result of the trademark and the silk packaging. She added that the trademark made the consumers more aware of the silk products and buy the scarves as souvenirs. Most clients said that the packages were beautiful and appropriate as souvenirs or presents. The silk group also could be a model for other groups to develop their community trademarks to reach the national market and even international ones. Moreover, government organizations such as Bua Yai Community District Office, Department of Agricultural Extension, Sam Muang sub-district Administration Organization, Nakhon Ratchasima Provincial Office for Local Administration, Community Development Provincial Office and silk entrepreneurs, could use the research result to plan the marketing to increase the income of villagers.

Apart from this, the research team integrated the work with teaching and learning in various subjects such as Research for Advertisement & Public Relations, and Advertisement & Public Relations for Local Knowledge. The students in these subjects were assigned to study the silk context and create the trademark. Also, an official of Intellectual Property Department of Nakhon Ratchasima University was invited to train the group about the importance of community product trademark.

Knowledge sharing and scholarship

Apart from sharing knowledge of marketing communication and the importance of the trademark to the community, the research team also searched local knowledge for product identity. The identity of this silk group was the rope-knot pattern created by the silk scholar. After coming back from the rice field, she saw the robe-knot on a hook. Day by day, she absorbed its beauty, and finally she created the rope-knot pattern which later became their identity. Moreover, the group also had a traditional knowledge of dying silk with natural products, for example, brown color from dried pods of drumstick tree, tamarind seeds and barks of Burma Padauk, bright yellow color from fresh pods of drumstick tree, green color from Indian almond leaves, and red color from lac insects.

The research result and the research process were explained to the local stakeholders during workshops. The workshops also provided students with opportunities to use their research skills for developing the community. Moreover, the research was disseminated as a model of community marketing communication to Hin-Dad Sub-district Administration Organization and other government organizations, such as Chalermprakiat Community Development District Office.

Integrating activities of research and teaching and learning

Measurable social impact

As a result of the project, the silk group not only knew the importance of the trademark differentiating their products in consumers' perception, but the group also was proud of the trademark. They asked the research team to register the trademark and the design of the package in order to protect them. This action caused other community product groups which were informed by the research team to create their own trademarks. For example, Hin-dad Sub-district Administration Organization needed a trademark for Baan Takraw silk product, GAP Rice Group at Baan Toey, Phimai district asked for a trademark and a package design.

Mudmee Silk of Prasat Phanom Rung Floor Plan: the New Design of Mudmee Silk Patterns of Buriram Province

Author: Assoc. Prof. Sombat Prajonsant

Institute: Faculty of Industrial Technology, Buriram Rajabhat University

Duration: 2013 - 2015

Keywords: Silk, Mudmee, Design, Patterns, Phang Phanom patterns

"...Weaving Mudmee silk is one of the ancient arts of the world. Mudmee silk from different countries have different patterns and beauty. Thai Mudmee silk alone comprises at least 200 patterns that have been collected by the Foundation for Promotion of Supplementary Occupations and Related Techniques (SUPPORT), and there may be more patterns being created every day because Thai artists are great thinkers and inventors..."

Translated from
Her Majesty Queen Sirikit's speech on 4 August 1992
at Dusidalai Hall, Dusit Palace.

In Buriram province, mulberry plantation, silkworm cultivation, and silk weaving are a way of life that has been handed down from generation to generation for a long time. The first actual promotion was done in the reign of King Rama the Fifth (1868-1910) by establishing the mulberry plantation and silkworm cultivation station in Buriram province and sending the King's 38th son, Pichaimahitrodom (who was also the first Director-General of Silk Sericulture Expert Department), to inspect silk of Buriram province at Phutthaisong office. Silk reeling stations were also established at the district offices and pavilions at temples in Napho and Phutthaisong area in order to teach the complete silk production process to the local children. The Silk Sericulture Department's silkworm cultivation experiment was moved from Bangkok to Phutthaisong office, and Buriram silk became famous ever since. In 1977, Her Majesty Queen Sirikit accepted Napho silk weaving group as a member of Foundation for Promotion of Supplementary Occupations and Related Techniques (SUPPORT) under her royal patronage. In 1999, there was also the establishment of Napho District Local Handicraft Center to serve the occupational development plans under Her Royal Highness Princess Maha Chakri Sirindhorn personal projects, to alleviate drought impact problems in Napho district. H.R.H. Princess Maha Chakri Sirindhorn visited the area 5 times resulting in significant improvement in weaving skills of the Buriram people.

Buriram silk is full of colors with various patterns according to the 4 ethnic groups: people from the Thai-Korat group love soft silk called "Hangkrarok" and plain color silk; the Thai-Khmer group love soft silk with "Hangkrarok", "Allaprom", "Hol", and "Lukekaew" pattern; the Kouy group love "Kraniew" soft silk with stripes, and the Thai-Laos group love Mudmee silk. The silk that is widely accepted as representing the uniqueness of Buriram province is "Phasinteendaeng" or Red-footed Sarong. The production sources of this silk are in Phutthaisong and Napho districts. However, besides Mudmee silk with the traditional patterns that are popular among conservative consumers, there are also consumers who prefer new patterns. Therefore, the promotion and development of Buriram province's unique silk patterns are continuing. In 2003, there was the emergence of "Hangkrarokkhuu" pattern silk, and later in 2012, "Hangkrarokkhuu - Phasinteendaeng" pattern silk was designed by using the combination of "Hangkrarokkhuu" pattern and pattern of "Phasinteendaeng" In 2013, Buriram Community Development Office asked Associate Professor Sombat Prajonsant to design new Mudmee silk patterns to represent Buriram province's Mudmee silk.

Prasat Phanom Rung is the major symbol of Buriram province

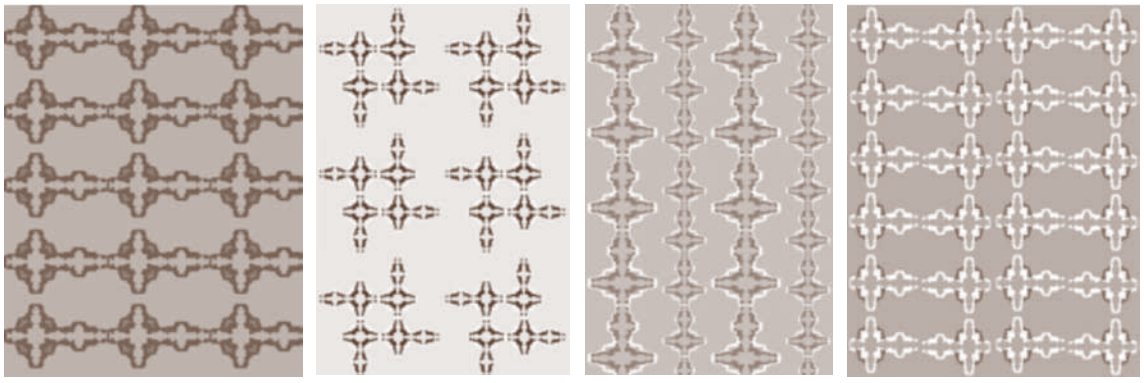
Partnership

Data exploration Prasat Phanom Rung is the major symbol of Buriram province. It is well known among people in Thailand, especially the main building that has the symmetry and beauty of Khmer arts. The building's features have never been used in the designs of local textile products before. The data were collected from previous research of local textile scholars in Buriram, and from surveying textiles of local weavers' groups from 23 districts that have registered with the OTOP project of the Buriram Community Development Office.

Designing From the physical feature of the main sanctuary of Prasat Phanom Rung, Associate Professor Sombat Prajonsant has designed 2-dimension graphic patterns with the contemporary and international looks, by subtractive transformation of the main sanctuary floor plan and composition with repeating technique to create the rhyme of patterns. Then the designs on color scheme were made, using monochromatic colors, harmony colors, contrast colors, complementary colors, intensive colors, tonality colors, together with neutral colors. The designs were presented to the groups of skilled weavers in Napho district, for their technical advices in terms of the sizes of the patterns (the amount of rows) until the designs of the patterns can be used in Mudmee silk weaving as shown in figure.

Product prototype development The newly designed patterns were used together with the local wisdom in blenching, dyeing, and tie-dye, and the skills in silk weaving of the silk weavers in the production of handicraft products. These products convey the aesthetics which reflect the cultural heritage of Buriram province. Ten prototypes were developed of the Prasat Phanom Rung floor plan patterns or "Phang Phanom" patterns for making Mudmee silk, and the products were called "Burairam's Mudmee Silk with Phang Phanom Patterns".

Knowledge transfer to local communities from the prototypes, the knowledge regarding the production of Mudmee silk with "Phang Phanom" was transferred to the people in the community, supported by Buriram Community Development Office. Groups of weavers from 23 districts of Buriram province came to participate in this knowledge transfer, as shown in figure.



The main building floor plan of Phanom Rung Castle, the designing of graphic design,
Mudmee silk patterns and the Mudmee silk prototypes

Mutual benefits

The development of "Phang Phanom" patterns for Buriram's Mudmee silk created benefits to the following people involved:

- **Social aspect** All local textile weavers from 23 districts of Buriram province received support to produce Buriam Mudmee silk with "Phang Phanom" patterns by the Buriram Community Development Office. This leads to further development in weavers' potentials and products.
- **Economical aspect** Buriam Mudmee silk and cotton with "Phang Phanom" patterns have become One Tambon One Product (OTOP) of Buriram province, endorsed by the national government. Also, a policy was launched to encourage people to use Thai textiles, to stimulate the economy, create jobs, generate incomes for communities and establish market acceptance through the public relations activities in "2014 Buriram Charming Silk under Royal Graciousness Festival".
- **Educational aspect** The project was aligned with the Mission of Buriram Rajabhat University: the University for Local Development. It integrated the research contributions to academic services in the form of knowledge transfer to the textile weavers from 23 districts of Buriram province. Moreover, the results from the study can be used in teaching Basics of Design which the researcher is the lecturer. This will result in the conservation of local weaving textiles culture in Thailand, an important cultural heritage.

Knowledge sharing with Mudmee silk weavers from 23 districts of Buriram province

Knowledge sharing and scholarship

The results from the research study of designing Mudmee silk design of "Phang Phanom" patterns were presented in the form of an oral presentation in the 6th International Conference "ASEAN in The Next Decade" at Surindra Rajabhat University. The article was published in the proceedings of the International Conference: Sombat Prajonsant. (2014). "Unique Mudmee Silk Design from Khmer Temples Plan in BuriRam Province". proceedings in The 6th International Conference "ASEAN in The Next Decade". Surin: Surindra Rajabhat University, page 65-69. Moreover,

based on the results of the research and the impact of the research work, the researcher received the outstanding researcher award under the category of research for developing and empowering communities in the "International Academic & Research Conference of Rajabhat University: INARCRU III", during 20-22 May 2015, organized by Rajabhat University Network and the Office of Higher Education Commission (OHEC).

Measurable social impact

Buriram province by Buriram Community Development Office has expanded the use of Mudmee silk with "Phang Phanom" patterns to develop the potentials of OTOP product producers. Associate Professor Sombat Prajonsant and local experts in textile weaving transferred the knowledge in training workshops to the silk weavers/silk producers from 23 districts of Buriram province. Later, the patterns were endorsed as the provincial Mudmee silk patterns. Then, products were developed by using the local wisdom in natural color dyeing. Consequently, Mudmee silk with "Phang Phanom" patterns separating "Hangkrarok" pattern as well as the Mudmee silk with "Phang Phanom" patterns with the floral etched brocade-red bottom edge silk were developed. These products became the unique cultural products of Buriram province. The products are different from other local textiles in Thailand and those in the neighboring countries. They were launched officially in the "2014 Buriram Charming Silk under Royal Graciousness Festival". They have been produced continually up to the present, resulting in the creation of jobs, occupations, and incomes for communities in Buriram province.

Nora Sandstone Sculpture in the Form of Community Industry to Promote Tourism in Klong Dan Community

Author: Mr. Palagorn Panmanee
Institute: Faculty of Architecture, Rajamangala University Technology of Srivijaya

Duration: 2009 - 2010
Keywords: Sculpture, Nora, Sandstone

"Folk art product with community market"

"Klong Dan community", located between Songkhla province, Nakorn Srithammarat province and Pattalung province, used to be a prosperous port town in the past. It was a trading center from the Gulf of Thailand to the community and from the community to other communities. With high population density, there were a lot of shops, 3 stories high hotels and temples in the area. However, with the expansion of the 408 highway from Nakorn Srithammarat to Songkhla, Klong Dan's role of being the trading center and significant port town declined. In 2008, the monk, community leaders and Rajamangala University Technology of Srivijaya studied and conducted a pilot project on revitalizing the habitation and local community in the Southern Region of Thailand, which was funded by National Housing Authority (NHA). The project was aimed at integrating the idea of living, art and culture (Nora dancing), career opportunity, Buddhist tourism (home stay) and local handcraft. The research project on producing Nora sandstone sculpture as a community industry also developed the idea from the prior project. The purpose of the project is to create a second source of income for the locals apart from their main job. Since the sandstone products in the local area come from Baan Daan Kwien, Chokchai,

Nakorn Ratchasrima Province, they cannot represent the uniqueness of the Southern Region, such as Nora dancing. It was believed that the product would be another approach in presenting the local art as well as supporting the King's theory about "self - sufficiency".

Partnership

Nora sculpture working group in Klong Dan community has been established for some time. At present, there are 3 types of blocks, which are 1) high relief in Khun norn gesture with the height of 1.20 meters 2) low relief of 3 different Nora gestures 3) round relief with the height of 30 – 45 centimeters. However, with the limitation of rubber block, the local community is not able to make the block themselves because of lack of knowledge. For that reason, it was tough for the group to develop and integrate the idea in real business or even increase the number of the group members.

The process of finding basic information

From the unofficial talk with the working group, it was found that the rubber block tends to shrink and twist easily. The main sculpt material was "cement" that has a high level of alkali. The alkali in cement corrodes the rubber block, which reduces the detail of the sculpture sharpness. Although the rubber block has a shorter useful life, its strong point is lower cost compared with other materials, which will reduce the cost of the product and can be sold at reasonable prices. With the reason that the rubber block useful life is quite short, members of the group hope to create the rubber block themselves so that they can continually produce and sell their product.

Technology relaying

According to the meeting with the group, it was decided that the transfer of the technology and knowledge will be in 3 steps, which are;

- First step is "Making the rubber block and plaster mold" for the member to earn knowledge and can make the 10 types of rubber block to replace the expired rubber block. There were 20 members, who were interested in the activity. The activity started from informing and teaching the knowledge and principle of the process of producing rubber block, selecting the prototype, practicing and concluding the activity. The research team also gave the basic tools to the group as well.
- Second step is "Molding the prototype". The process started from selecting the representatives from the group. The process took about 2 week long. The representatives from the group were 1 adult and 1 youth. The process started from introducing materials, molding technique, designing, molding and molding instruments that can be used in the real practice. From the process, the representatives of the group can produce 7 pieces of Nora rubber block, which were youth Nora, low relief Nora mask, Nora Khao Kwai round relief, low relief Phran Bun's mask, Phran Bun Chee Niw as well as the sculpture base.
- Third step is "Knowledge expanding". This step provided members, who join the 2nd training to be a part in expanding knowledge to other members in the group. In the process, there were 3 members who expressed interest and wanted to be the assistant in the early period.

Klong Dan floating market

Making the product presentation

Research team had designed and built the display shelf for the sculpture group at Mr.KritsanaNamsorn's house. He is the member in the group, whose house is located in Klong Dan floating market.

Mutual benefits

Klong Dan floating market opens only on Saturdays. It was first opened in March, 2010 and on the first day received a total income about 4,700 Baht. However in June, 2015, the total income was increased to 250,000 baht per day. The floating market also received an award for being an environmental friendly market that does not use foam packaging, and the Kinaree award in the field of community tourism in 2005. The floating market is now well known at the national level. With the idea of creating the uniqueness and significance of the market, the sculpture working group also decorated the market with Nora sculpture. Today, tourists can purchase the sculpture in Klong Dan floating market as well.

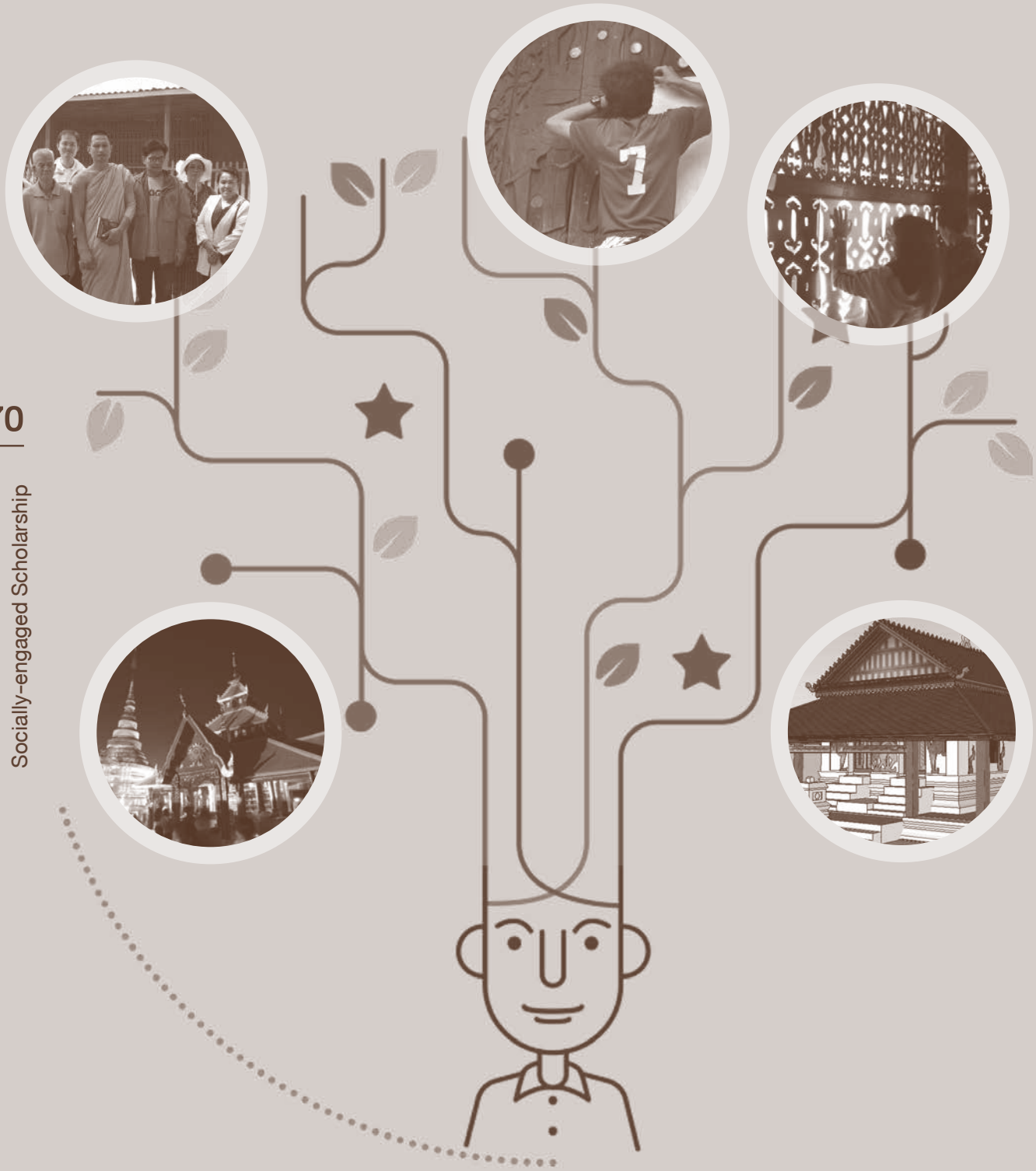
Knowledge sharing and scholarship

Klong Dan community is located in the Southern region of Thailand. It also have well known performing art called "Nora". According to the idea, the sandstone sculpture group was established with the idea of representing the identity of the local area. The sculpture is a 3 years old boy wearing some of Nora garments, such as crown, loincloth and belt. The gestures of the doll must be considered as well. The research project was presented in the 5th Rajamangala University Technology of Srivijaya academic meeting and received the excellent award in the field of architectural and work of art: design building and knowledge relaying.

Measurable social impact

"Klong Dan community" used to be a deserted community with 30 households left. At the present time, more than 120 households have moved back to the community. Moreover, there are several agencies which support and work on revitalizing the community. The sculpture group is one part of the activities in which both youth and adult can participate.

Nora sculpture group



Cultural & Urban Development

Stimulating Awareness to Conserve Architectural and Cultural Heritage; Pongsanuk, Pratupa and Puak Taem Communities

Author: Assoc. Prof. Woralun Boonyasurat, Ph.D
Institute: Faculty of Fine Arts, Chiang Mai University

Duration: 2003 - 2013
Keywords: Awareness, Conservation, Academic efforts to serve community, Wat Pongsanuk, Cultural heritage

"To realize, explore and collaboratively build identity preservation mechanism"

After an extended period of economic and social development promotion, the Thai society seems to be struggling from fragmented visions and actions which generate a closed system as opposed to its true nature of coexistence.This, if continues, would possibly lead to a civilization crisis where conflicts simultaneously arise in different areas such as economic, psychology, social, culture, politics or environment. To avoid this pitfall, there is a need to build one's dignity, ability awareness and self-esteem while maintaining deep respect for other human beings.

Stimulating the power of awareness, this article describes a lesson taken from a process taking some 10 years long beginning from an effort to find the best approach to safeguard the future of community's cultural heritage.These heritages, being both communities' architecture and original works of art, create a dilemma for the monastery and villagers to choose between restoration and development. Conclusions were drawn from 3 case studies:

1. Pongsanuk community, Lampang province; the task is to find a restoration/renovation approach for Viharn Phra Chao Pun Ong.

2. Pratupa community, Lampang province; the task is to choose between restoration/renovation approach for Tai Yong Ubosod.

3. Puak Taem community, Chiang Mai province; the task is to adopt an approach to manage the traditional bronze craft (Kua Tong)

Partnership

In all 3 cases, the process carried out can be summarized as 'to realize, explore and collaboratively develop an identity preservation mechanism'. All tasks given are problems facing tangible heritage i.e. architecture and artifacts; however, solving these problems requires putting efforts in intangible heritage i.e. ideas, understanding through awareness building among community members. In other words, the results were obtained by aiming at the people, not the objects. Applying architectural techniques to solve the problem is not a priority since the researcher and her staff are fully aware that they are 'visitors' whose role is to provide answers only when the community is unable to find one. If the 'hosts' i.e. the owners of these cultural heritages do not take part in problem solving, after the work is completed, the community which did not collaborate or make decisions would not possess dignity or understanding in the work process. This could lead to future conflicts in the community In all 3 cases, the researcher was able to give emphasis to the 3 main approaches namely 'realize, explore and collaborate'. The tasks require the researcher and community to spend time together to build understanding, share and exchange their opinions until mutual agreement can be reached. Only then can the approach for community heritage be finalized. The process can be summarized as follows:

1. **Realization;** applicable to both the researcher and community.To define the task assigned by the community, the researcher needs preparation i.e. conducting a preliminary study on history, culture, economy and social aspects of the community. On the other hand, realization for community members means creating 'realization point' where their ideology can be balanced , allowing either openness or diversified alternatives. The process is extremely important at the beginning of the tasks.

2. **Exploration;** to assess the community's capacity. All 3 cases are communities with the elderly as the majority since working adults are absent due to job pressure. To create the balance required to tackle the task, the 'Little People in Conservation Group' invites school and college students to join them. As a result, 2 of the latter cases were presented at management of arts and culture graduate classes by Department of Thai Art, Faculty of Fine Arts, Chiang Mai University. This introduces the younger generation to applying their academic performance to serve the community. At the same time, preferable properties such as generosity and ability to collaborate with the community can develop among the students.

3. **Collaboration;** to realize one's potential as well as to understand the importance of architectural and arts heritage. Every sector of the community should take part in decision making regarding the task and share responsibilities. When the working team completes data collection, it was processed and presented to the community. The results are similar i.e. a collaboration to preserve the community's heritage for their children. Community heritage is not restricted to a single building but also covers customs, ceremonies and livelihood.

4. **Creating mechanism;** this is the key to linking the working team's individual potentials including people from inside or outside community, monks, novices and volunteers. What the community is lacking are: 1) academic knowledge and basic rights 2) opportunities 3) financial supports 4) successors 5) proper guideline for their context. The task was conducted in a form of volunteer camps, meaning the researcher, volunteers and students prepare activities related to cultural heritage with the community to stimulate mutual learning as well as encouraging community members to join the volunteer group in problem solving. The problems are analyzed while the gap found on the community side is filled, for example, knowledge and transfer of skills in Pongsanuk, knowledge and traditional piper of Puak Taem which used to participate in the city's important Buddha images drum parades but has stopped doing so in the past decade after the leader of the ensemble "the piper" passed away. When the researcher finds out, she assigns a student who specializes in this traditional pipe to hold practices with youths in the community.The activity proved to be successful in revitalizing the community's spirit, prompting many former drummers to repair and bring their equipment to join in. Subsequently, it leads to resurrection of traditional dance called 'movement of the rice grass nail dancing' which eventually bring both male and female members of the community to resume their former roles in city parades and, as in the past, become a model community on traditional dances. Another significant mechanism includes financial tool to manage funds raised through merit making ceremonies. The community gives their consent to a system designed to share responsibility, maintain transparency and promote trust among its members.

5. **Identity preservation;** another important aspect is 'learning and transferring knowledge among community members' based on the notion that the best way to learn is 'to see and join others in doing' not lecturing or memorizing. This Learning-by-Doing approach was included in the futuristic skills in Thailand, suggested by Prof. Dr. Vicharn Panich in his work 'Learning in the 21st Century'.

Knowledge sharing and scholarship

Regarding community's heritage, creative knowledge and resources sharing can be obtained through;

Use of integrated **knowledge** comprises history, arts, architecture, psychology, science, laws, city planning and religion is essential. The most important factor is to take the new approach that encourages the monastery and community to take part in resurrecting collective memories. This is done while different activities were conducted to allow community members to familiarize themselves with conservation approaches e.g. compiling painting and artifact directory, restoring old buildings in temple to be used as community's living museum. Every project holds similar concept of **"preserving**

and using original items as much as possible". Any introduction of new elements must be jointly considered, as Pra Kru Panithan Pisit, the abbot of Wat Puak Taem once stated "accept the new while never throw away the old" a vision shared by all parties including the local administrative office.

Financially, all 3 projects are run by funds raised through annual Kathin ceremony and other fund raising activities e.g.project exhibition during related events. In general the budget was spent very effectively since it is a combination of merit making, labor and financial donation, resulting in deep satisfaction. It is estimated that the amount spent was 7 times lower than generally use, for example, 1.5 million baht for restoration of a building compares to the usual 10-12 millions.

Stakeholders: the underlying concept is to create activities that allow 3 generations of stakeholders to take part. This includes 1) children 2) adult and young adult 3) middle age and elderly. The purpose of these activities is to create opportunity for all age groups to collaborate, which will result in sustainability of the community's local wisdom.

All 3 cases show continuity of efforts, beginning from Pongsanuk community. After completion of the project, its achievement is conservation of the architecture and assorted artifacts. This gives the community a chance to become a learning source for conservation among various agencies in Northern and other regions of Thailand. The project does not end there since the "seeds of cultural heritage conservation by community" was planted in every stakeholder's mind.They voluntarily formed a working group to conduct surveys on other communities' conservation needs and initiate more collaboration. These 3 temples/communities become centers for information and technical knowledge dissemination e.g. Wat Pongsanuk has become an ever expanding wisdom heritage learning source in culinary, banana leaf craft, ceremonial decorating objects and dance. Demands from schools and other communities near and far to learn from their experiences are always increasing. Pongsanuk community was also chosen by UNESCO's Museum Capacity Building project to be their pilot project of South-East Asia, so it keeps lecturing and training monks and novices in other 3 provinces. This eventually led to another project namely the "Wat Pratupa Tai Yong Obosod Conservation" by Phra Patipan Phuripanya, the vice abbot who was selected to participate in the previous project, so the knowledge gained was applied to conservation and restoration of traditional and architectural heritage in other communities.

After years of efforts, the community was recognized by both national and international institutions, including the Princess Maha Chakri Sirindhorn Anthropology Centre, Ministry of Culture, Municipalities, ICOMOS, the US Embassy, SEMEO-SPAFA, and UNESCO. Under the GCI-UNESCO-SEAMEO-SPAFA Directors' Retreat Built Heritage Conservation in Asia and the Pacific: Advancing Education project, 4 June 2008, multinational guests were invited to literally visit and learn from the community. The activity greatly boosts the community members' dignity and awareness of their heritage, and eventually help them become the recipient of the 2008 UNESCO Asia-Pasific Heritage Award of Conservation.

The Museum to Museum Capacity Building was a follow-up activity assigned by UNESCO to the Faculty of Fine Arts and Pongsanuk community in collaboration with Deakin University, Australia. The project reaches out to many other related agencies i.e. the Northern Thai Center of Archeology, Chiang Mai University, Inter-Tech College and Lampang Buddhist College.

Subsequently, many presentations were given at international level including lecture in Malaysia during the 2nd ASEAN University Network Thematic Network on University Social Responsibility and Sustainability (AUN USR&S) Steering Committee Meeting, 13 June 2013, lecture for Conservation Government and Non-Government Organizations in Taiwan at the opening ceremony of Futai 1910 Historical Building on 19 April 2014. The project was again chosen as a case study for conservation by Ministry of Culture, France, and represented Thailand at Intangible Cultural Heritage meeting held by UNESCO in China.

Mutual benefits

Carrying out the tasks creates opportunities for stakeholders, researchers and community members alike, to share their experiences and knowledge. While community members learned about history, architecture, Buddhist arts and modern technology, they automatically assumed new roles. Elderly become ones who transfer local knowledge. Monks become community leaders. Even the volunteers received a chance to learn about the community while the children whom they worked with get a chance to observe their systematic work. In conclusion, Government agencies, local administrative organizations, schools and monasteries all benefit from the project because in all 3 cases, the actual results i.e. the architecture or artifacts themselves are restored using traditional techniques with obvious identity; they were well-recognized both in Thailand and internationally.

Measurable social impact

Results from the project were published in many journal and technical publishing. A number of lectures were given in Thailand and elsewhere. This helps promote the concept of "Community Collaborative Conservation" among different stakeholders e.g.monks community. Those who take part in the project continue to apply similar approach to their agencies' tasks. All 3 cases successfully created new cultural tourists attractions which generate both direct and indirect income for their communities and provinces. Most importantly, the project also helped promote Thailand in the global arena.

Viharn Phra Chao Pan Ong: after restoration

Strengthening the Community in the Context of Changes: Case Study of the Mae Chao Yu Hua Community, Chian Yai District, Nakhon Si Thammarat Province

Author: Lertchai Sirichai, Ph.D
Institute: School of Liberal Arts, Walailak University

Duration: 2001 - 2015
Keywords: Sacred space, Cultural capital, Identity, Merit bank, Learning center

"Create a shared memory space: Driven into a strong community"

The School of Liberal Arts, Walailak University, collaborated with the "Mae Chao Yu Hua" Community, which is located in Chian Yai district, Nakhon Si Thammarat province. "Mae Chao Yu Hua" in "Mae Chao Yu Hua sub-district" and "Mae Chao Yu Hua Temple" was another name of "Phranang Lueat Khao" (White Blood Queen), a legendary heroine for the southern Thais (she was so religious that her blood became white). According to a legend, Mae Chao Yu Hua was a local person in the area that is Mae Chao Yu Hua sub-district today. In the past, local people transmitted her story by oral tradition and respected her very much, but her story disappeared and it stopped being told.

The leaders and members of the Mae Chao Yu Hua Community realized this and agreed that the community had changed. Originally, they had an anchor, which resulted in them having a shared memory and a sense that they were in the same group which resulted in their strong synergy. The change resulted in the local people losing their ability to rely on themselves and to establish the right options for

themselves. Thus, the community leaders consulted with instructors from the School of Liberal Arts, Walailak University, to identify and revive the community's original capital to serve as a driving force to strengthen the community. They started with requesting support from the Thailand Research Fund (TRF) to utilize the community-based research process to drive to achieve the goal. Based on the research, a folk version of the history of Mae Chao Yu Hua was developed, which led to the establishment of the sacred space at the Mae Chao Yu Hua Temple, the implementation of which involved a lot of people. This created a common space that could create a shared memory for people in the community and directly contributed to the revival of cooperation and synergy in jointly solving problems and planning for the future.

Partnership

The research team, which was composed of instructors and leaders of the Mae Chao Yu Hua Community (village research team), had the following work process consisting of multiple phases:

2001-2012; Establishment of the sacred space: The research team agreed that a space at the Mae Chao Yu Hua Temple had to be created for people in the community to perform ceremonies and participate in traditional activities on a continual basis. This place was aimed at serving as a sacred space and common place that could bring people to create a shared memory. The generation of a shared memory would allow them to identify who they are, good things they have, and how they will use what they are and what they possess in order to create choices and relationships with different groups of people. It was believed that if this was achieved, the community would be able to move forward in a way that they could rely on themselves and develop their own options to a greater extent.

In the research, the community leaders involved many people to work on the research team, which consisted of local savants, school teachers, seniors, district cultural officers, local academics, monks, and even ordinary villagers. The research process was used to drive and revive Mae Chao Yu Hua's story and create a folk version of her history, which could link places, villages, and stories of the lives of local people to her history. This made Mae Chao Yu Hua's history become a story consistent with the community's real life. During the study and development of her story, the research team organized a forum to periodically report on the progress to allow people in the community to participate in acknowledging the progress and expressing additional comments. There were many groups of people who joined the forum, such as school directors, school teachers, local authorities, provincial cultural officers, correspondents, as well as representatives from television and radio stations in the province. The event was broadcast live on TV and radio, which resulted in the process of reviving Mae Chao Yu Hua and her history becoming recognized by, and interesting for, the community, province, and other higher levels. This process made people in Mae Chao Yu Hua sub-district feel greatly impressed by, and have great faith in, Mae Chao Yu Hua, because of their perception of her goodness and concern about her subjects. There were many people outside who also had faith in her when they learned about her story.

The research team and the community decided to create a space at the Mae Chao Yu Hua Temple to be a sacred space, by raising funds from people in the community and the general public, to build a statue of Mae Chao Yu Hua and a cultural square, as a major component. This gained the

interest from all groups of people in the community-they came here to worshiph, make wishes, and make merit. Students visited this place to learn about her history and virtues. Local politicians came here to make wishes and take an oath to her that they would be politicians with integrity; they prepared election campaign posters that showed the pictures of their oath-taking. Non-local people were interested in learning about and worshiping her. The Provincial Administrative Organization funded the annual festival for Mae Chao Yu Hua, which changed this quiet temple to become a temple where local people and non-local people participated in activities closely.

Later, the people were of the opinion that they should make this sacred space become even greater and more honorable by linking it to the fact that she was King Si Thammasokarat's consort (based on the villagers' beliefs). Then, all parties raised funds, both in the community and outside, so that 10 million baht was collected as a result of their faith. They agreed that there should be construction of a model relic pagoda (named Si Thammasokarat) at the Mae Chao Yu Hua Square with a statue of King Si Thammasokarat. Finally, the community and different parties could make the dream come true. HRH Princess Maha Chakri Sirindhorn graciously presided over the ceremony of enshrining Buddha relics in the Si Thammasokarat Chedi at the Mae Chao Yu Hua Temple on 31 July 2009.

Today, apart from the fact that local people often come here to perform ceremonies, non-local people visit here for pleasure and worship, and students come to learn. In addition, the research team and the local people jointly organize traditional events at the cultural square to allow people to meet and perform ceremonies together on a continual basis. This helps transmit the shared memory more strongly, such as the ceremony of robe procession to the pagoda, Songkran, the Chak Phra Festival, and other traditions that community leaders recognize as being appropriate and which should be held each year.

2013; Merit bank: The University and village research teams extended the community's power by implementing the Merit Bank Project to solve the problem of drugs and gambling, which were spreading in different communities, based on the principle that good persons and goodness need to grab a hold of the drug use and gambling areas. First, the Project made good people in the community be recognized, have social identity, and be proud of being good people. Second, the Project allowed good people to be taken care of in terms of welfare, both in normal life and sickness. This aimed to make local people, including the youth, to realize that good people will be praised and taken care by society and to motivate them to be good people. Third, the Project made good people play a direct role in reducing and stopping drugs and gambling in the community by serving as role models and giving some ideas and warnings. The Project was supported by the Thailand Research Fund, which began with studying the meaning of "goodness" in the sense given by the community, selecting good people based on that meaning, and coordinating with government and private agencies to establish the fund to support good people.

2015; Capacity-building and preparation for the AEC: The community leaders recognized the importance of entering the AEC and would like to prepare the local people to enter the AEC with potential, so they agreed with the university research team that instructors and students from the School of Liberal Arts, Walailak University, should work with the community to prepare the community for entering the AEC.

- The ASEAN Study Program, in collaboration with the community, conducted a comparative study between the story of Mae Chao Yu Hua and the stories of heroines from other

ASEAN countries that share a similar theme. This aimed to result in the local people understanding community cultures among ASEAN countries and to translate the story of Mae Chao Yu Hua and the community into different languages in ASEAN countries to establish a better understanding among people in the ASEAN community.

- The Political Program supported the Merit Bank Project by joining the activity to ensure the Project would achieve its goal more clearly and it persuaded the Merit Bank to serve as the base for brainstorming among local people and people concerned about the way in which the com
- The Law Program encouraged the villagers to learn about new laws related to the launching of the AEC.
- Other programs, such as the English Program, encouraged children in the community to improve their English.The Thai Study Program worked with local people to identify the community's prominent features to enable the community to become more self-reliant under the ASEAN framework and to export them.Preliminary, they jointly began to study herbs and vegetables available in the community.The Chinese Program encouraged children in the community to become interested in Chinese and Chinese culture because China will be a very important country in the ASEAN community.

Mutual benefits

- The fact that a common area and shared memory were established in the **Mae Chao Yu Hua Community** has resulted in a peaceful coexistence among people in the community, generosity to each other, and more choices for community development. At the same time, it has resulted in the community being known and recognized in good aspects, and its identity has been recognized. This has helped to make people in the community build relationships with people outside with respect, in terms of occupations. In addition, this has equipped them with immunity to drugs and gambling, as well as experiences for stepping into the AEC, or at least better than other communities with similar characteristics. At the same time, local politicians have a reminder to be good authorities, as witnessed from the fact that all chief executives of the Mae Chao Yu Hua Sub-district Administrative Organization have been high-quality politicians. Local authorities have utilized the Mae Chao Yu Hua Temple to organize activities or meet people because local people have faith in Mae Chao Yu Hua. People from other communities use the Mae Chao Yu Hua Temple as their anchor and a cultural attraction. The government sector has encouraged other communities to visit the community to learn about it as a model community for problem-solving and community development. Local schools have used the Mae Chao Yu Hua Temple as a space for learning about local history and community culture.
- **Walailak University** has used the Mae Chao Yu Hua Community as an area for providing academic services, art-cultural preservation, research, and teaching. Both instructors and students from many programs have used the temple area and Mae Chao Yu Hua sub-district for field study. Community leaders have served as speakers to consistently educate students, while many instructors have used the Mae Chao Yu Hua Community as a research area. For example, an English instructor who was interested in feminism studied Mae Chao Yu Hua in the feminist perspective and presented her paper in an international conference.

Knowledge sharing and scholarship

The research team and the community have learned from both people within the community and outside about how to work to revive the old capital of the community to create new meanings in accordance with the present society; to possess the ability to think and mobilize in order to strengthen the community so that it can solve its own problems tangibly; and to apply knowledge and innovations to solutions, e.g. knowledge about local history, cultural capital, and identity through different types of learning spaces.

In addition to learning spaces, different learning forums in the Merit Bank Project were created to serve as an area for good people and drug addicts and gamblers to meet and talk and share and learn from each other, which will become an example for people from other areas to study. The community can learn to build its capacity to be prepared for entering the AEC through academic work with instructors and students from different academic programs, aimed to allow the community to learn and enable it to be strong and adaptive to changes appropriately.

After the research was completed, the research team widely publicized the research results via forums, teaching in schools, publications, as well as radio and television. There were three papers published: 1) Article "Mae Chao Yu Hua: Faith, Goodness, and Mental Strength ... to the Community Power," 2003, by the Community Based Research Division, under the Thailand Research Fund; 2) Final Report on "Project on Participatory Learning the History of Mae Chao Yu Hua," 2002, submitted to the Community Based Research Division, under the Thailand Research Fund; and 3) Article "Phranang Lueat Khao: A Legendary Royal Figure of Southern Thailand, Who Took an Outstanding Role in Community Building," which was presented at an international conference at Walailak University in 2011 (published in proceedings).

Measurable social impact

Since 2001, Mae Chao Yu Hua Temple has become a sacred space, which has been increasingly important for people in Mae Chao Yu Hua sub-district. It is a common space where people sharing the same respect and faith come to perform ceremonies and activities together constantly. This has resulted in their creating a shared memory that they are descendants of Mae Chao Yu Hua and are like brothers and sisters – they should help each other and not hurt each other; they must behave well as Mae Chao Yu Hua did; and their relationships with other groups of people, either in work or other activities, must be based on goodness and integrity. People in the community have been active in implementing projects to solve problems, to develop the community, and to prepare themselves for entering the AEC.

The School of Liberal Arts, Walailak University has a policy to cooperate with the community and networks to support moving the community forward on a continual basis, especially in terms of academics. The sub-district administrative organization, community leaders, community members, and Nakhon Si Thammarat are raising funds to build the community's learning center at the Mae Chao Yu Hua Temple in honor of HRH Princess Maha Chakri Sirindhorn on the occasion of her 60th birthday.

Thus, the social impacts are: 1) The Mae Chao Yu Hua Community is a strong community with great self-reliance and potential to develop; an 2) The Mae Chao Yu Hua Temple is a sacred space, learning space, and cultural attraction for a widespread society.

Vernacular Architecture Conservation in Buriram Province: Integration between Instruction, Academic Services, and Arts & Cultural Preservation of Faculty of Industrial Technology, Buriram Rajabhat University

Authors: Assoc. Prof. Sombat Prajonsant and team

Institution: Faculty of Industrial Technology, Buriram Rajabhat University

Duration: 2012 - 2015

Keywords: Architecture, Vernacular architecture, Conservation

"Value awareness and motivation for vernacular architecture conservation of communities can be created through the integrated instructional process"

Most of the communities in Buriram province are agricultural communities.The communities have utilized the local wisdom in their living. From the past to the present, the local wisdom that has been accumulated throughout their living as the cultural heritage includes local wisdom in terms of food, clothing, medicines, and shelter. In terms of shelter, today, the world is moving towards the extinction of vernacular architecture wisdom. Therefore, the integrated project as integration between the instruction, academic services, and arts & cultural preservation of Faculty of Industrial Technology was conducted in order to solve the problems of destruction of old buildings, and to conserve

and utilize the buildings.This is a way to empower the communities to maintain their local identities under globalization. This project places its emphasis on the higher education level's learning by developing the undergraduates through instructional activities, motivating the students to focus on the resources in the communities. The students should understand that placing their emphasis on the communities does not only mean having the good consciousness, but it also means taking the problems found in the communities into account and use the problems in problem - based learning throughout the course, and in their own higher education research. In this study, the students had a role in learning by doing practical work (active learning) so the students were developed to obtain skills facilitating systems thinking, analysis, and synthesis through the research methodology. The students participated in learning outside the classroom, searching for knowledge, and presenting the knowledge found from conducting this project by working with other students from different classes. This brought people with different talents or skills together in studio learning manner via the integrated instruction of 6 courses: Architecture and Community Conservation, Architectural Research Preparations, Construction Drawing 2, Computer for Architectural Presentation 1, Computer for Architectural Presentation 3, and Web Design for Architectural Presentation.

Partnership

The working team consisted of 4 instructors, namely Associate Professor Sombat Prajonsant, Mr. Visar Fangviang, Mr. Piyachon Sungsakda, and Mr. Krit Pitathasang, under the 6 courses and students from the second year to fourth year working together with communities such as building owners, building care takers, abbots, seniors, and community leaders in the areas where the vernacular architecture are located:

First Year

- Khun Kong temple, Nang Rong sub-district, Nang Rong district, Buriram province.
- Chai Mongkhon temple, Prakhonchai sub-district, Prakhonchai sub-district, Buriram province.
- Nong Bua Chao Pa temple, village number 5, Sa Tuk sub-district, Sa Tuk district, Buriram province.
- Huai Rat Market Community, Huai Rat district, Buriram province.
- Non Kaew village's Saint Theresa Church, Huai Thalaeng district, Nakhon Ratchasima province.

Second Year

- Maneechan temple, Ma Phueng sub-district, Phutthaisong district, Buriram province.
- Khuen Khongkha temple, Khok Sa Art sub-district, Lamplaimat district, Buriram province.
- Tha Riap temple, village number 10, Na Pho Sub district, Napho District, Buriram Province.
- Borom Khongkhatemple, village number 1, Baan Waeng sub-district, Phutthaisong district, Buriram province.

Third Year

- Tha Riap temple, village number 10, Na Pho sub-district, Napho district, Buriram province.
- Borom Khongkha temple, village number 1, Baan Waeng sub-district, Phutthaisong district, Buriram province.
- Sa Kae temple, Baan Pao sub-district, Phutthaisong district, Buriram province.

The focus was placed on the participation of the communities in the students' working process, who also acted as the audiences in the presentations of the students so the communities can help check the information, evaluating the outputs, and giving suggestions. The project was conducted in steps as follows:

Site surveys; Instructors went to do site surveys in communities to find the valuable vernacular architecture, as well as to meet with the community leaders and building owners to perform basic community evaluation for considering the possibilities in successful collaboration. The project was then introduced. The objectives including the expected results of the project were explained, so the communities could make their decisions whether to participate in the project.

Establishing understanding towards the goals of the project to the students; The normal 6 instruction courses were dissolved and replaced by the selected courses that were in line with the project. The students were divided in groups. Each group consisted of the students from the second, third, and fourth year. This aimed to create the studio learning atmosphere. The meeting for giving the project's explanations to the students was organized so the students had the same understanding towards approaches and goals for the project.

Onsite operation; Each group went to conduct onsite operation to examine the community context, community history, and building history, by interviewing people in the communities. The related literature was reviewed. And then the actual survey and the measurement of every part of the buildings with the measurement tools were conducted. After that, 2D architectural Drawings were drawn. Each plan consisted of lay out, floor plan, roof plan, elevation, section, and 3D architectural drawings such as perspectives including the models, which were later constructed. Lastly, the reports, VDOs and posters were made.

Restoring information back to the communities; The forums for restoring the information back to the communities were organized, for hearing the opinions and suggestions from the communities. This step was considered the step for the communities to check and evaluate the outputs of the students. Moreover, the exhibitions were held in the communities. After receiving the suggestions from the communities, the students used them to improve their works and delivered the improved works back to the communities, to be utilized in future building conservation. Meanwhile, the instructors conducted the follow ups on the progress of the student's work, in order to give academic advices on the works.

Figure 1 Operational procedure showing the participation of instructors, students, and communities in vernacular architecture conservation

Recording the history and making documentation of the buildings; Instructors, students, and communities joined hands to record the history and make the architectural documentation of the buildings, in order to conserve the vernacular architecture and propose them for the Best Architectural Conservation Building Awards from the Association of Siamese Architects under the Royal Patronage of His Majesty the King.

Mutual benefits

1. **Communities:** Having the awareness in the vernacular architecture conservation and utilization. The results from this project can be developed as the approaches for working and to be the community development plan. The results can be extended and further used for conserving other vernacular architecture buildings in the areas in the future.

2. **Instructors:** Having happiness at work, establishing good relationships between the instructors, the students, and the communities which is the development of a participatory learning instruction. The instructors can be developed to become the scholars who work to serve the needs of the society through the authentic experiences received when working in the areas. The knowledge and experiences gained can be used in writing textbooks, academic or research presentations, and research articles which later can be utilized for granting the academic title. From the aforementioned project, the results were used in the 7 further research projects of the instructors from 2012-2015. The research results got published in national and international journals.

3. **The program, the faculty, and the university:** Buriram Rajabhat University is the University for Local Development. This concrete development resulted in the confidence of the communities in the instructions of the university.The communities understand the roles of architectural profession. The results were presented to the Northeast region's architectural higher education institute network in 8 institutes, and to professional organizations such as Isan Architecture Committee and Association of Siamese Architects under the Royal Patronage of His Majesty the King.

4. **Students:** Having awareness and realizing the importance of their home towns, understanding personal values, knowing occupational values in terms of local community development, creating good relationships between students from different university years, having learning process in terms of research conduct skills which is the meaningful learning. It is the experience for creating happiness as the givers for the communities. The results of the project can be used further in the architectural research of the fourth year students.

Figure 2 Outputs derived from the work between instructors, students, and communities

Knowledge sharing and scholarship

This project was carried out since 2012 until the present time. After the completion of the project in the first year phase, the project was selected by the Faculty of Industrial Technology as the best practices project in terms of integrated instruction in the 1st LNN SHOW & SHARE: Knowledge Exchange and Best Practices in Internal Quality Assurance in Higher Education Presentations EXPO, during 22-23 May 2013, to 200 higher education teachers from inside and outside the university. Again after the completion of the second year phase of the project, the program had

a chance to present their best practices for the 2nd time during 13-14 May 2014 to 150 higher education teachers from inside and outside the university. At the internal university level, the Construction Technology program took the operational pattern of the project to use in academic year 2014. And later, the two programs joined hands to present their works to the communities together. Besides the aforementioned project, there are 2 more academic articles derived from the results of the project as follows:

1. "Integrated Instruction Pattern as Integration between Research, Academic Services, and Arts & Cultural Preservation of Faculty of Industrial Technology, Buriram Rajabhat University" Published in **Journal of Community Development and Quality of Life**, Volume 2, Number 2, May-August 2014

2. "Integrated Instruction Pattern as Integration between Research, Academic Services, and Arts & Cultural Preservation of Faculty of Industrial Technology, Buriram Rajabhat University"Published in **Academic Journal of Home of Proudness**, Volume2, Number 2

Measurable social impact

The project had notable social impacts as follows: it led toconservation of vernacular architecture other religious buildings inside the temples, such as a bell tower in Nong Bua Chao Pa temple and a refectory in Borom Khongkha temple. In the past, before organizing this project, the people in the communities had thought of demolishing the buildings, but after the project was conducted, the people have changed their minds and tried to find the ways for conserving the buildings as well as the conserved vernacular Buddhist holy temples. Moreover, the people also have extended ideas to design tourist routes to guide the tourists to come into the area.

From the participation of the communities in recording the history and making the documentation of the buildings, the project received the Best Architectural Conservation Building Awards from the Association of Siamese Architects under the Royal Patronage of His Majesty the King, which were given by Her Royal Highness Princess Maha Chakri Sirindhorn. This is considered the royal grace of HRH Princess towards the communities which are the owners of the cultural heritage. This will affect the existence of the vernacular architecture since the communities participate in finding the ways to conserve and utilize the buildings sustainably. From the aforementioned work conducted, the results are as follows:

1) Vernacular Buddhist Holy Temple of Nong Bua Chao Pa temple was awarded the 2012 Best Architectural Conservation Building Award.

2) Vernacular Buddhist Holy Temple of Tha Riap temple was awarded the 2013 Best Architectural Conservation Building Award.

3) Vernacular Buddhist Holy Temple of Borom Khongkha temple was awarded the 2014 Best Architectural Conservation Building Award.

150th Anniversary of Maha Sarakham Province: A Consequence of Service Learning Regarding Academic Services for Communities by Mahasarakham University

Authors: Mr. Methee Piriyakarnnon and Mr. Panat Preewassana
Institute: Mahasarakham University

Duration: 2012 - 2016
Keywords: City identity, Network, Tracing the 150th anniversary, Sustainable development

"Driving networks and uncovering the identity of Maha Sarakham for sustainable development"

From a One Curriculum One Community project according to the policy of Mahasarakham University (MSU), under the name as "Promoting city identity through street fixtures of Maha Sarakham Municipality, Maha Sarakham Province" in 2013 together with two research projects, namely the "Guidelines for conserving and developing earthen buildings in ancient urban areas in Maha Sarakham" project in 2007, and the "Promoting the identity and value of the cultural street, worship of Chinese gods and Chinese opera in Maha Sarakham" project in 2008, it was found that there were still some limitations that hindered processes for uncovering and building the identity of the city. That is, it took a certain amount of time to study and build up a process that could involve participation from all groups of related people so that their mutual awareness in the history of Maha Sarakham would be enhanced. However, the amount of time, the people involved,

the processes for uncovering and building identity, and building up participation involved by all groups of related people could still not efficiently promote acknowledgement, recognition or mutual awareness in the history of Maha Sarakham.

Therefore, a research project entitled "Building historical identity of ancient areas in Maha Sarakham Municipality through public participation" was carried out to further expand the projects mentioned above. It was aimed to study mutual identity of the ancient zones in Maha Sarakham covering 10 communities: Samakkee Community Sections 1 and 2, Nak Wichai Community Sections 1, 2 and 3, Phosri Community Sections 1 and 2, and Aphisit Community Sections 1 and 2. It was done mainly through historical issues to acquire information and knowledge for the development of Maha Sarakham in various dimensions, to prove that it deserves to be named as The City of Education, whose 150th anniversary was just around the corner -- by placing a greater emphasis on "People Participations" than ever before.

Partnership

Drive by means of the "participation process" is the heart of every process involved by different groups of people. Many networks were involved in this, e.g. the elderly, heads of village sections, experts, general people, academicians and local organizations. Such drives went through a number of methods appropriate for each of the target groups, which consisted of interviews, surveys, meetings, discussions (So-lae), culture map regarding certain issues in the site, together with aerial photographs, cultural pictures and drawings through mutual investigation and creation by the people in the community, and initiation of timelines to exhibit time orders and events related to cultures, as a consequence of mutual investigation. The participation process can be summarized as follows:

- Participation in term of building up recognition through learning media, giving information, activation of learning, and consciousness, all of which would further expanded to be as civil society organization networks
- Participation in term of mutual acts, mutual thoughts, brainstorming, collection of data, and analysis of data by the working team under the name as the "Love & Cherish Tracing the 150th Anniversary Group Network"
- Participation in term of mutual acts, collection of data, and analysis of data under the name of Love & Cherish Tracing the 150th Anniversary Group Network
- Participation in term of accepting consequences--by joining to operate something on the occasion of Counting Down 365 Days to Celebrate the 150th Anniversary of Maha Sarakham on August 22, 2015

Such processes and networks led to the formation of teams that shared mutual thoughts and mutual acts to drive activities within the city forward. The working teams consisted of 6 different groups including 1) Thailand Research Funnd (TRF), 2) Faculty Of Architecture, Urban Design and Creative Arts, Mahasarkham University, 3) members living in different sections of Maha Sarakham Municipality, 4) the Love Cherish and Care for Maha Sarakham People Group, 5) Research Institute of North-eastern Art and Culture, Mahasarkahm University, and 6) Maha Sarakham Municipality. They all participated in developing historical identity of the ancient zones for urban development though the three phases as the following: First, civil society work at the upstream stage: working as spatial coordinators; Second, work at mid-stream the river stage: expanding the number of networks in a clearer way, unofficial

unification under the same work ideology named “Tracing the 150th Aniversary of Maha Sarakham Network”, being a pillar of the working teams responsible for Chinese opera festival, Songkran festival and New Year events, officially joining with the Activities Network of Maha Sarakham Municipality, and then creating a Facebook account to communicate with interested people and children/youths, and forming up a group called “New Generation Loves Cherishes and Cares for Maha Sarakham”; Lastly, Work at the downstream stage: having a clear concrete working team with the same work ideology, yet unofficial operational patterns.

Figure 1 Participate to build up mutual identity with community leaders on May 28, 2013

Mutual benefits

At the community/associate network level

Due to a restatement of the history of Maha Sarakham through mutual participation, the role, status and importance of local scholars in urban areas are better recognized in various aspects than ever before. This has led to discourse or a provincial development plan regarding “Tracing the 150th Anniversary of Maha Sarakham”. Besides, there is an emergence of a wide range of interest in recognition of “the identity of Maha Sarakham” in many dimensions such as architecture, history, ethnic, etc. Additionally, a learning asset with updated information has been initiated through the acknowledgement of different sectors in numerous dimensions, e.g. recognition of the spatial identity at the provincial level -- namely, the state of being Takasila Nakhon, Phrathat Nadoon, Mealy crab and City Pillar Shrine; at the municipal level -- namely, Clock Tower, Pra Put Tha Kantharawichai, Kut Nang Yai, Somtawin Canal, Chaloem Phra Kiat Health Park and Kaeng Leng Chan; and at the ancient community market/ancient urban level -- namely, earth houses, wooden houses and Chinese opera festival. These have become as a corpus available for the general public in a variety of forms such as photographs, stories, exhibitions, books, IT systems and products. Moreover, children and youths from the Loving Hometown Group have initiated a group called “New Generation Loves Cherishes and Cares for Maha Sarakham”.

At the University level

Research has been integrated with the University's missions. For instance, Academic Services for Communities consist of the Guidelines for Architectural Preservation to Enhance People Recognition in the Identity of Maha Sarakham Municipality project (by the City and Urban Design Program), the Design and Development of Graphic Design to Promote Urban Identity: A Case Study of Maha Sarakham Municipality project (by the Creative Arts Program), and the Management of Landscape Architecture in Urban Communities, Activity Spaces and City's Open Spaces to Enhance People Recognition in Identity of the Municipality project. Furthermore, Conversation of Art and Culture has been performed through such projects as Dissemination of Landscape Imagery and Urban Architecture through Aerial Photographs to Enhance People Recognition in the Identity of the Communities in Maha Sarakham Municipality (by the Architecture Program), Guidelines for Cultural Landscape Study to Promote the Identity of Maha Sarakham Municipality (by the Landscape Architecture Program), and A Study of Wisdoms in Local Handicrafts for the Design and Development of Souvenirs to Provoke the Identity of Maha Sarakham Province. Additionally, there is an integration of learning and out-of-class activities performed by students who are members of the "Youth Coffee Club", which belongs to the Student Club Faculty of Architecture, Urban Design and Creative Arts, through the project entitled "One Club One Community". This could be regarded as a model of perfectly integrated curricular activities with extracurricular activities. The students made Maha Sarakham Municipality's "Food Map" that serves as a reflection of the "ancient-building site" composed of both wooden and earthen buildings that are worth conserving and revitalizing. This has led to a process of building identity of students (as a society/community helper) by applying knowledge into community services where instructors, local scholars and communities take a role as both teacher and classroom—from a profession subject to a humanity subject. Besides, new sites have emerged which are available for research as well as for student apprentice on the Basis of Culture. Also, the "Favourite Children" phenomenon has arisen in communities.

Knowledge sharing and scholarship

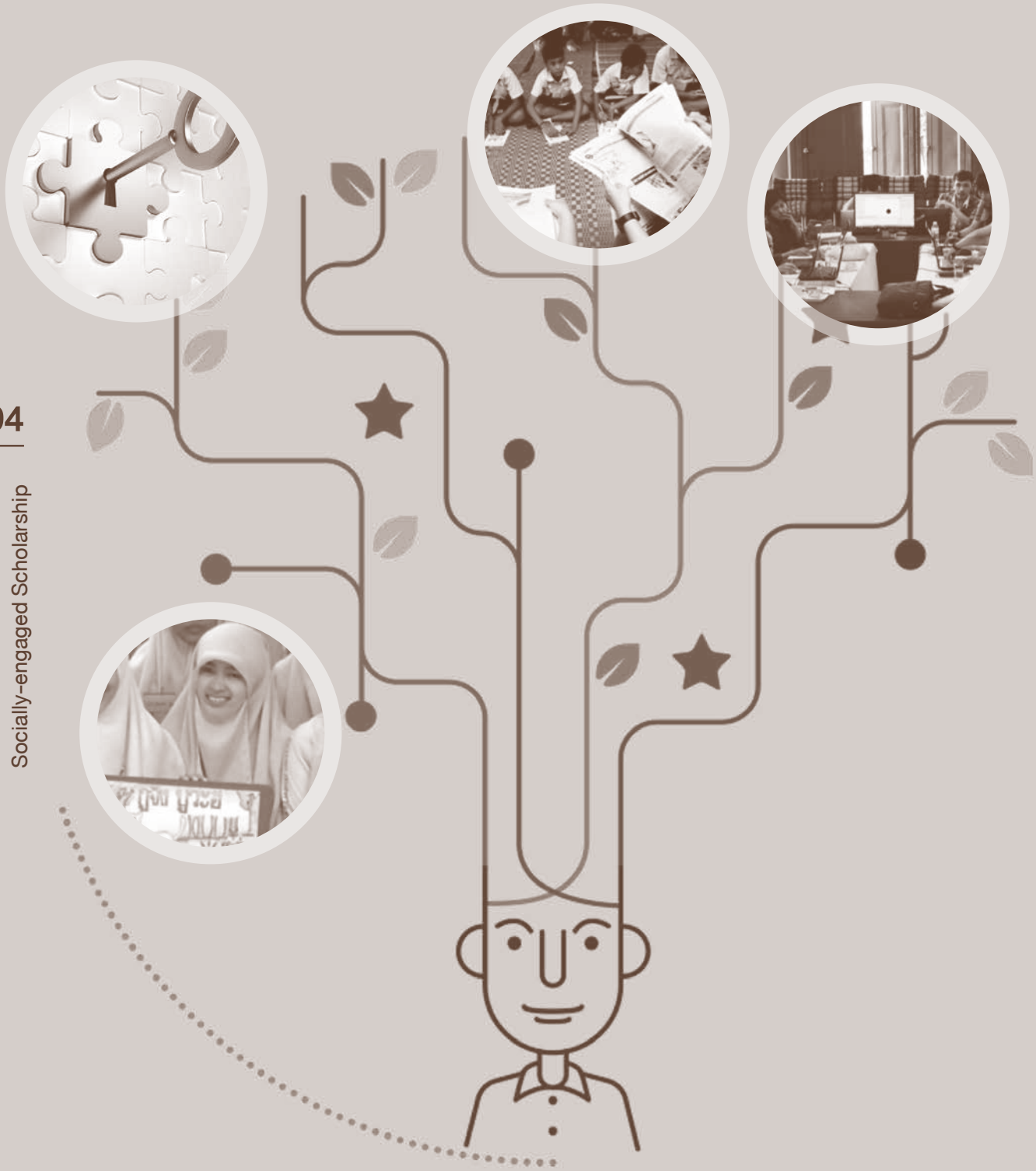
All the working teams have learned about value, identity and cultural heritage. And this resulted in mutual development of all systems in the province on the occasion of "Tracing the 150th Aniversary of Maha Sarakham" through a wide variety of activities and projects such as Good Ctizens of Maha Sarakham, Good Things in Maha Sarakham, Important Sites in Maha Sarakham, and Traditions and Cultures of Maha Sarakham. Besides, the civil society sector and the youths have shared knowledge and opinions with one another, thus leading to acknowledgement and understanding among them. The youths have obtained new perspectives and taken precedence to new activities in everyday life, as well as to the identity that is visible and touchable. According to the view of communities, more importance is placed on experiences, memories and impressive stories.

Other works originated from such activities include a book entitled "365 Days 365 Stories of Maha Sarakham: Stories for Knowledge and Love", a movable exhibition concerning the histories and memories about Maha Sarakham entitled "150th Anniversary of Maha Sarakham: days and time here are still going so slowly", a documentary book/promotional video regarding "Good things throughout 150 years of Maha Sarakham", MSU Newsletter, the academic service for the community entitled "MSU: Investigating With Grandpas and Retelling Their Words on the Occasion of the 150th Anniversary of Maha Sarakham Province", and the academic discussion stage regarding "150th Anniversary of Maha Sarakham Province" held at the provincial level.

Measurable social impact

Sustainable development in today's age aims at developing environment, economy and society at the same time. The consequences of research project entitled "Building historical identity of ancient areas in Maha Sarakham Municipality through social participation" together with teaching-learning missions, academic services for communities and conservation of art and culture, have led to widespread

recognition in "the identity of Maha Sarakham". This has become an agenda or a development plan of Maha Sarakham concerning "150th Anniversary of Maha Sarakham"which attempts to enhance public participation on the occasion of the 150th Anniversary of the city. All related organizations were encouraged to get involved in organizing an activity for this notable event. Strategic policies regarding investigation of good things/deeds deserved to be praised at the provincial level included Good Citizens on the 150th Anniversary of Maha Sarakham, Good things on the 150th Anniversary of Maha Sarakham, as well as Pra Kantharawichai Gold Pouring Ceremony (special edition on the occasion of the 150th Anniversary of Maha Sarakham) in support of the reconstruction of Phrathat Nadoon and the establishment of Mahachulalongkornrajavidyalaya University in Maha Sarakham province. Besides, a database or an IT system regarding Good Things on the 150th Anniversary of Maha Sarakham was initiated. Additionally, the University has integrated a number of student learning activities through popular traditions held in educational institutes, such as the Loy Krathong project entitled “Floating the Krathong in worship of Water Goddess, Celebrating the 150th Anniversary of Maha Sarakham, MSU carries on the legend of the full moon night”.



Education & Learning

Patani Malay - Thai Bi/ Multilingual Education in Thailand's Deep South

Author: Prof. Suwilai Premsrirat, Ph.D
Institute: Research Institute for Languages and Cultures of Asia, Mahidol University

Duration: 2007 - 2016
Keywords: Bi/Multilingual education, Thailand's Deep South, Language and identity

"Bilingual and Bicultural Education: A Path to Peace"

Language represents the speaker's identity and is a tool for communication including as the medium of instruction for youths. As a result, the choice and appropriate use of language of education is extremely important, especially in the southern border provinces of Thailand (Patani, Yala, Narathiwat and four districts of Songkhla), where 83% of the population are muslims and speak Patani Malay. In this region, two basic issues underlie the political unrest: 1) language identity of the people is not accepted and only Thai is allowed to be used in the government schools, and 2) the chronic underachievement in school because of language barrier and teaching methods that are not related to the local language and culture. The students are therefore not prepared and not ready to learn Thai in school. This results in their scores being the lowest in Thailand. Almost 50% of Grade 3 students are still illiterate (OBEC, 2551).

The research project on Patani Malay - Thai Bilingual Education in Thailand's Deep South has been implemented in four primary government schools. The objective is to develop the curriculum and lesson plans that utilize the students' local language and culture as the base for cognitive development, critical and creative thinking. It will also strengthen the ability of the Patani Malay (PM) students in Thai

language learning by using both Thai and PM as the medium of instruction. This applies only to schools with 100% PM speaking students, which is the characteristic of most schools in Thailand's Deep South (or more than seven hundred schools except those in the urban areas). The goal is to help PM speaking students to be successful in school and be quality citizens of Thailand with good working prospects and a good quality of life in Thai society. They will be literate in both PM and Thai, and able to act appropriately according to both Malay culture at the local level and Thai culture at the national level. We believe that this is a way leading to peace in the long run.

Partnership

Since this research is a participatory action research, all parties are involved such as school teachers, language specialists and linguists, educators, local academics and academics from Bangkok, communities, and various relevant private and government agencies. The project is conducted under the supervision of two committees.

1. **Steering committee** consists of representatives from Ministry of Education, universities and other academic institutions, Internal Security Council (both in the local and central area), research team, funding agencies, and technical advisory agencies. The steering committee supports and pushes the project forward according to the objectives, by providing funds, opinions and being involved in problem solving, networking, advocating to the public, and monitoring and evaluation.
2. **Implementation committee** consists of researchers from Mahidol University and local academics such as local linguists, Malay language specialists, former teachers, Patani Malay language and local culture specialists, religious leaders and university lecturers. The committee is divided into subcommittees responsible for various parts of the program such as the academic and research, curriculum, instructional materials, teaching techniques, monitoring and evaluation, as well as Malay language and local culture.

By using local language and culture as the foundation, the language speakers can be involved in every step of the work such as preparation, decision making, implementation and problem solving. There are nine components to a strong Multilingual Education program: 1) base line research such as survey of language use attitude and literacy, the study of differences between PM and Thai, the study of local knowledge and local wisdom such as folktales, songs, poetry, proverbs and teaching instruction; 2) PM orthography: developing and standardizing; 3) raising awareness and advocating to stakeholders at all levels; 4) recruiting research teams and capacity building for research teams and teacher training workshops on teaching techniques; 5) curriculum development and lesson planning; 6) instructional materials development and reading materials development; 7) monitoring and evaluation continuously and a longitudinal study of students in the experimental schools and those in the comparison (regular) schools from grades 1 to 6; 8) networking and cooperation among various agencies; 9) working on the national education policy that supports the use of mother tongue as a foundation of education.

Mutual benefits

In this research project, schools will develop effective education innovation that can solve the students' illiteracy problem and lack of creative thinking. **Teachers** learn and apply teaching techniques and use a number of instructional materials for teaching L1, L2 and foreign languages. **Students** are happy and have better cognitive development. They are encouraged to think and act. They can read and write and have better skills in Thai and better academic achievements. **The community and parents** are satisfied with their children's development. They can read and write and have a good knowledge of Thai. At the same time, they are able to preserve their language and cultural heritage. The community, therefore, has more confidence in the government schools. **Government agencies** such as the Office of Basic Education and Office of Private Schools, at the Ministry of Education, can benefit from educational innovations that are supported by sound research throughout the process. The success and challenges can be identified and as a result the program can be fully prepared for implementation into the Ministry's national system. For **the university,** the knowledge gained from this research leads to new curricula for teaching and learning at university level, such as a course on Multilingual Education being offered at the Faculty of Education at Yala Ratjabhat University. Apart from that, subjects on Educational Linguistics and Multilingual Education have been added to MA and Ph.D. program in Linguistics at Mahidol University since 2013, now a M.A. / Ph.D. program in Multilingual and Multicultural Education. **An international organization** dealing with fundamental human rights in education also considers this project as an educational innovation being successfully implemented in a zone of political unrest, by using the student's mother tongue in the educational system and bridging to the national and other languages. This is an example of a good practice for other countries.

Knowledge sharing and scholarship

Since this research uses the local language and culture as the basis for student's cognitive development in learning the national language and other subjects, the community can therefore be actively involved at almost every step. This enables all parties to learn together and results in valuable academic output such as research papers. Examples of the academic benefit derived from this project include: planning and implementing PM as a medium of instruction together with Thai, PM orthography development and standardization, how to effectively bridge PM to Thai, the importance of language and script, principal and practice of how to teach Thai as a second language to the ethnic minority children, methods of teaching critical thinking, manuals for teacher training

(using various teaching methods for in-service training for teachers in schools and teaching assistants in MLE education, how to teach PM, Thai, English, and how to teach mathematics and sciences using the sandwich technique. Such productivity will be in the form of research reports, books, academic papers in Thai and international journals, training manuals, teaching methods, VDO and exhibition advocating the project in academic conferences, television documentary about MLE approach such as Phansaengrung, Tawanyim etc., television or newspaper interviews with project and school personnel. Apart from that, MLE schools will become sites for study visits by both Thai and foreign institutions.

Measurable social impact

The result of this research can effectively solve educational problems such as illiteracy. According to the academic assessment by Yala Ratjabhat University's Institute of Research and Development, the score of students in the experimental schools are in the range of 70 –100%, whereas the students at regular schools are in the range of 20 – 40%. Also, at a higher level, the study shows that students whose scores are over 50% outnumber the students in regular schools. This can have a long term positive impact on sustainable peace in the Deep South. It strengthens the cognitive knowledge of students in the area, leading to great academic and work success, a better quality of life, and quality citizens who can contribute positively to the development of Thailand.

From an economic perspective, this project has been implemented within the frame work of assessable research. It will raise the academic achievement of those students at the middle and low levels. It can therefore help reduce the education budget for Thailand's Deep South where the cost of educational innovation is especially high but poorly monitored and evaluated. This project, however, will surely provide the highest value and return for the invested budget. Moreover, during the implementation, instructional materials are being continuously produced and developed and are available for wider use within the Thai education system.

On completion of the research component of the project, the MLE implementation will continue and expands to other communities and teacher training institutions, as follows

1. Expansion of MLE to additional classes in the pilot schools apart from the experimental class.
2. Expansion of MLE to another 15 schools in the Deep South, thereby increasing the number of targeted students.
3. Expansion of MLE from schools in the southern border region to schools in other regions such as Lavua in Maehongson province in the north, and Thai-Khmer in Surin province in the northeast. Assistance with teacher training for OBEC, Ministry of Education will also be provided.
4. The transfer of MLE knowledge to teaching educational institutions such as Faculty of Education, Yala Ratjabhat University.
5. The expansion of government schools to private Islamic schools.
6. The establishment of Training of Trainers Centers for those who are responsible for MLE at the national and regional levels with the cooperation of Mahidol University, UNESCO (United Nations Educational, Scientific and Cultural Organization), UNICEF (United Nations Children's Fund) and SIL International.

ICT Toward Community Involvement: The University's Integrating Sciences Toward Communities and Schools

Authors: Asst.Prof. Chanthana Wech-o-sotsakda, Ph.D and
Mr. Phanat Preewatsana

Institute: Mahasarakham University

Duration: 2014 - 2015

Keywords: ICT, Baan Don Champa Don Sawan School, Integrated sciences

"Development of problems, increase of capability, combination of wisdom and technology"

Extended from research for community service titled **"Towards the development a learning community for lifelong learning and community involvement : A study of Nong Bua Sub- District, Kosumpisai distrist Mahasarakham province"** which was carried out in 2013 by Mahasarakham University (MSU) in Nong Bua subdistrict, Kosum Phisai district, Maha Sarakham province, the project "ICT toward Community Involvement" was initiated in 2013 at Baan Don Champa Don Sawan School, Phon Ngam subdistrict, Kosum Phisai district, Maha Sarakham province, which is an educational opportunity extension school of a medium size, offering study programs from Kindergarten 1 to Mathayomsuksa 3. However the school has been experiencing disparity in access to ICT resources. That is, there are limitations for teachers and students in using ICT to the highest extent possible for teaching-learning development, academic promotion of teachers, and community development. Besides, the

school's surrounding community has been influenced by some external inducements. For instance, without media literacy many students skip class just to hang around or to play computer games, while some are prone to imitate inappropriate behaviors. A proactive policy of the school is that it needs to improve an ICT system that will foster learning and, at the same time, serve the purposes of educational performance indicators. The policy led to the initiation of the University's integrated sciences consisting of 6 programs: Information Science, Communication Arts, Information Technology, Computer Science, Geoinformatics, and Computer Animation and Game-in the community in which Baan Don Champa Don Sawan School is located. The objectives of the present project are 1) making use of technology for the school's development as well as for better life quality of villagers, particularly in social dimensions related to education, traditions and cultures, 2) improving attitudes of children and youth including their skills in using ICT in creative ways, and 3) increasing the capacity of teachers through ICT to enhance both teachers' learning and students' learning, and also for locality and community development.

Partnership

Under the principle of non-separated movements that place an emphasis on participation and reduction of disparity, the process of developing solutions to problems in the designated area was originated from the full cooperation of all related parties including Maharasakham University, communities, local organizations, Thailand Research Fund (TRF) and Thai Health Promotion Foundation (THPF). All study programs together held each of the curriculum meetings with communities, local organizations and related sectors to reflect problems, refine expectation and design activities in response to both community needs and MSU's capacity. This truly emphasizes the concept of combining **"Wisdom and Technology"** as one, through systems and mechanics of **"Education for Public Services"** by means of a variety of activities or meetings to brainstorm ideas on issues such as library development and student learning enhancement, media literacy of the youth, participatory development of instructional media, web development by using a dynamic database system, development of network systems and IT systems, using GIS to develop a model associated with the school's service areas and commutation risks of students in Phon Ngam sub-district, techniques and tools for learning enhancement and participatory community development, production of learning media (short movies), provision of IT equipment, etc.

Building a **"stage to brainstorm ideas"** is a process in investigating "problems" between the University and communities for the sake of students' learning and community development. The problems needed to be solved were all about that the community was being threatened by modern technology. With the financial support from THPF, the short movies in which teachers and villagers accepted to play were produced and disseminated to the public. Similarly, the activity **"Development of a library system and student learning"** and the activity **"Development of teachers' instructional media"** were arranged with the engagement of students and teachers. Consequently, the school has obtained a wider range of instructional media that are made from materials found around the community and where individuals will participate in a community-based learning placement without having to depend upon media contributed by the government or other sectors as frequently as in the past.

Mutual benefits

All related parties have benefited from the present project as can be described below:

University: integrating research into classroom, academic service for community, and conservation of arts and culture.

Faculty: integrated sciences within the Faculty, improvement of teaching and learning with the engagement of students and communities by means of practice and academic service for community.

MSU student: putting theoretical knowledge into real practice, understanding the characteristics and identity of each study program in the Faculty, innovation and creative production by MSU students together with the community (students, teachers and villagers) in various forms such as short movies and electronic instructional media, more sites/organizations available for student to do apprenticeship rather than just in Bangkok or huge labor markets.

School: being a model school in using ICT to enhance learning, short movies produced by the students, teachers' production of e-books, animation and games as instructional media; improved IT system associated with library (library loan system, decoration of the library), website and Internet network; Risk Area Model, students forming up groups to do something creative such as the Little Librarian Group.

Community: discovering risk areas associated with students' commutation in various dimensions; having Spatial Database System associated with risk areas, children and youth problems, and important sites in the community which are beneficial for the development of the school and the community.

Knowledge sharing and scholarship

The research team, MSU students, teachers, students and villagers have acquired knowledge on how to create learning innovation and instructional media in numerous forms such as **"Production of Short Movies."** The entire movie making process was done by the students. Besides, the students could successfully convince some teachers and villagers to play in their short movies. Moreover, they got to learn about processes in investigating **"problems"** to move forward the work in the designated area. They also learned about **"development of a library system and student learning"** that placed an emphasis on building students' awareness in preservation of their school, good values about reading and reading skills, and creative ways to use library services and IT. A wide range of activities were arranged for "development of teachers' instructional media" with a goal to increase teachers' knowledge and skills in e-books, animation and game.

MSU students also got involved in the learning process related to education for public services in which students and communities are referred to as being the centers, both in self-learning and team/group-based learning.

Various forms of knowledge have emerged as follows:

1) Participatory media production (short movies) in the form of **"Community for Community"** based on the information and situation which is threatening the community's well-being

2) Production of electronic instructional media (animation and games) through participation of the teachers (both as an individual and as a team within a particular department)

3) A research project (MSU Research for Community) at the faculty level titled "A study of systems for developing the processes involved in academics for community service by Faculty of Informatics, Mahasarakham University, carried out by Asst. Prof. Dr. Chatklaw Jareonpon and an academic paper entitled "Engaged Learning and ICT for Development in the University Curriculum" (3-5 June 2014 Concorde Hotel, Selangor, Malaysia)

4) A learning package regarding systems and mechanics in academics for community service through engagement in integrated sciences, a learning package in development of the library system for the purpose of engaged learning, a learning package in student dimension that is presented in the form of storytelling and Creative media covering 6 stories for learning in the school as well as in its surrounding community, which are produced from the creativity of MSU students and the students, with the financial support of 80,000 THB from Thai Health Promotion Foundation for the purpose of moving forward the project **"Creative youth with media literacy for community strength"** at Baan Don Champa Don Sawan School, Phon Ngam subdistrict, Kosum Phisai district, Maha Sarakham province. These stories include "Curiosity," "Threats of Facebook," "Disorder," "Almost die because of love," "Cell phones and a modernized world of game addicts,".

Measurable social impact

Communities

- The library at Baan Don Champa Don Sawan School was awarded **"Best School in Promoting Reading Habits and 3D Library Developments for Fiscal Year 2014"** by Maha Sarakham Educational Service Area Office 3.
- The "Librarian Group volunteer " has been initiated within the school and its surrounding community.
- Constructive reading and creative use of library has increased.
- Reading has been encouraged in household settings through the activity called **"Book satchel toward community".** In this regard, students have been urged to put some books in their satchels so that they can carry them back home to read with family members.
- Participatory development of a Curriculum in Media Literacy for both primary and secondary levels.

Local policies

- A local development plan at the sub-district level: Data obtained from Service Learning have been utilized in management of public utility, solving children and youth problems, risk areas for children and youth, and also in agricultural lands contaminated with chemical residues.

Networks

- **Learning networks at the international level:** For instance, Professor Royal Donald Colle from Cornell University, USA, visited the Community Learning Center run by Nong Bua Sub-district Administrative Organization, the site in which "MSU research for Community" has been conducted. Consequently, the main person in charge of this center was invited to give a presentation on "Development of a community learning center through the use of ICT" at **The International Conference/Workshop on Engaged Learning & ICTD in the University Curriculum,** held in Selangor, Malaysia from 3- 5 June, 2014.
- **Learning networks at the community level:** a learning network between communities in Nong Bua and Phon Ngam sub-districts, Kosum Phisai district, Maha Sarakham province.

An Integrated Participatory Sex Education Learning Model for Preventing Teenage Pregnancy in Uttaradit Province

Author: Vajee Panyasai, Ph.D
Institute: Educational Faculty, Uttaradit Rajabhat University

Duration: July 2012 - July 2013
Keywords: Sex education, Teenage pregnancy

"Sex Education is more than just a biological understanding; one needs to understand changes and be able to adapt"

Statistics from the Bureau of Reproductive Health, Ministry of Public Health, showed that there were 355 births per day from Thai women under 20 years, and 10 births per day from girls under 15 years. These women were called "Teen Moms". This rate is increasing rapidly. The main reasons are the changes in social and economic conditions, together with a lack of knowledge about sex education among teens, who do not know how to cope and protect themselves. In addition, their parents are not able to teach sex education to them, and in some areas there is still a belief that teenage girls's duty is only to marry, not to learn anything. (Department of health, 2556: as cited in United Nations Population Fund, 2557, p.1)

Many reports said that "teen mom" is premature pregnancy and not advisable, even in wedlock or by intention. The only ways for prevention is to give knowledge to teens to understand the consequences of unprepared pregnancy and inappropriate sexual intercourse, and the main channel is through the teaching of sex education in schools (Benjaporn Panyayong, 2553, p.119). This teaching

should be done openly, not surreptitiously, which would arouse more curiosity and the desire to try sexual intercourse. The teachers must also be properly trained, and the sex education curriculum revised to suit the context of the teens' life skills. PATH of Thailand, an NGO working to improve public health, said that "the function of sex education is to make people understand themselves and others, by providing the facts about human nature and understanding human nature in sexual context" (Chanuanthong Tarasukara and others, 2555, p.1). Therefore, sex education is not only about biological understanding but also about reinforcing learning about "change" and "adaptation" to the impacts of change, in order to live happily and be successful in social life. It is therefore important that teachers, students, administrators and community members all join in the network of Integrated Sex Education to help prevent teenage pregnancy in Uttaradit province.

Partnership

The sample for this research is composed of five schools, which constituted the pilot sex education learning centers: 1) Lap Lae Pittayakom school, Sex Education Learning Chai Chumphon sub-district Administrative Organization Center, Lap Lae district 2) Taplapracha-Utit school, Sex Education Learning Tapla Subdistrict Administrative Organization Center, Tapla district 3) Trontrisin school, Sex Education Learning Ban Kaeng Sub-district Administrative Organization Center, Tron district 4) Thairath Wittaya 5 school, Sex Education Learning Phra-Sadet Sub-district Administrative Organization Center of Tambon Thung Yang 5) Tha-It Municipal school, Sex Education Learning Center of Uttaradit Municipality. The research team first gained understanding about the problems of teenage pregnancy and the needs for teaching sex education in school, by visiting and observing teaching and training in the six sex education centers. Monthly visits to the school centers were scheduled to reinforce their work and obtain their feedback, and all five centers participated in this activity (A Development Model Learning to Participatory Integration for Sexuality Education for Teenage Pregnancy Prevention in Uttaradit Province Project, 2555). The main research method employed was the participatory research and development, to promote learning between the researchers and the local administrators.

In addition, data were collected from five local communities on their views on effective teachings of sex education in schools, and capacity-building activities were conducted for the three groups of actors. i.e. 1) teachers' training in three groups, with 5 lead teachers from each school being trained first, and after 8-10 weeks all teachers in the schools were trained in sex education teaching, with study trips to other schools to learn about successful experiences in sex education, 2) student training in two groups, with 90 students and 70 students in each group respectively, to be volunteers who would take care of their friends and expand the knowledge of sex education to the community. 3) school principals, who met to exchange experiences once a semester. Subsequently, lessons drawn from all three groups were used to develop the basic sex education curriculum for the school network, the local representatives, leaders in the community, and youth leaders.

Knowledge sharing and scholarship

From the research, the researchers and partner schools have come up with two forms of sex education learning which avoid disrupting management within the school, as follow;

1. **as supplementary learning in Health and Physical Education**, with 0.5 credits and 1 period per week. Four schools elected to use this model: Lap Lae Pittayakom school, Taplapracha-Utit school, Thai-Rath Wittaya 5 school, and Tha-It Municipal school. This model led to continuity and sustainability, as there was an activity each week, with concrete evaluation. Many parents realized that sex education is important and could learn with their children.

2. **as periods of guidance counselor**, eight periods per semester or sixteen periods per year, with additional activities outside the classroom. The teachers were those who taught in health courses and guidance counseling. These teachers were trained on sex education and prepared the learning content of sex education. In addition, the advisor teachers helped to introduce the sex lesson in home-room periods. Only one school, Trontrisin school, used this model, due to lack of teachers.

The following results were obtained;

1. **A curriculum for training sex education teacher**, which was adapted from the sex education course of PATH Organization of Thailand in 2555, and tested with teachers in school networks and communities. Subsequently, the curriculum was widely disseminated to the network of Uttaradit Primary Education Service Area 1.

2. **Sex education curriculum for the public**, with data obtained from lessons of the network school and the needs of the community leaders, who wanted the local population to understand sexual education correctly and to help prevent teenage pregnancy.

3. **Innovation in sex education learning management**, in the form of district-level resource centers on sex education, for example Trontrisin school created many innovation such as Outdoor learning, One student One paper, Let's talk about sex, Did you know your junior, Care of you and just a minute.

Mutual benefits

At the community level, there were learning resources and appropriate sex education by sex education learning centers. They also organized community activities, which led to cooperation with other agencies such as Tambon Administration Councils, hospital and village volunteers (A development Model Learning to Participatory Integration for Sexuality Education to Teenage Pregnancy Prevention in Uttaradit Province Project, 2556). Also the introductory sex education curriculum could be used by people in the community.

At the school level, there was a model of integrated and participatory sex education which caused behavioral change in students to prevent teenage pregnancy, consistent with the needs and context of the school, as well as training courses for teachers.

At the individual level, the school administrators, teachers, community leaders, community representatives and youth leaders had better understanding of sex education and learning management to prevent teenage pregnancy, and had a role in transferring this knowledge.

Measurable social impact

The cooperation among researchers and network schools, local government, community representatives and parents created the following social impact,

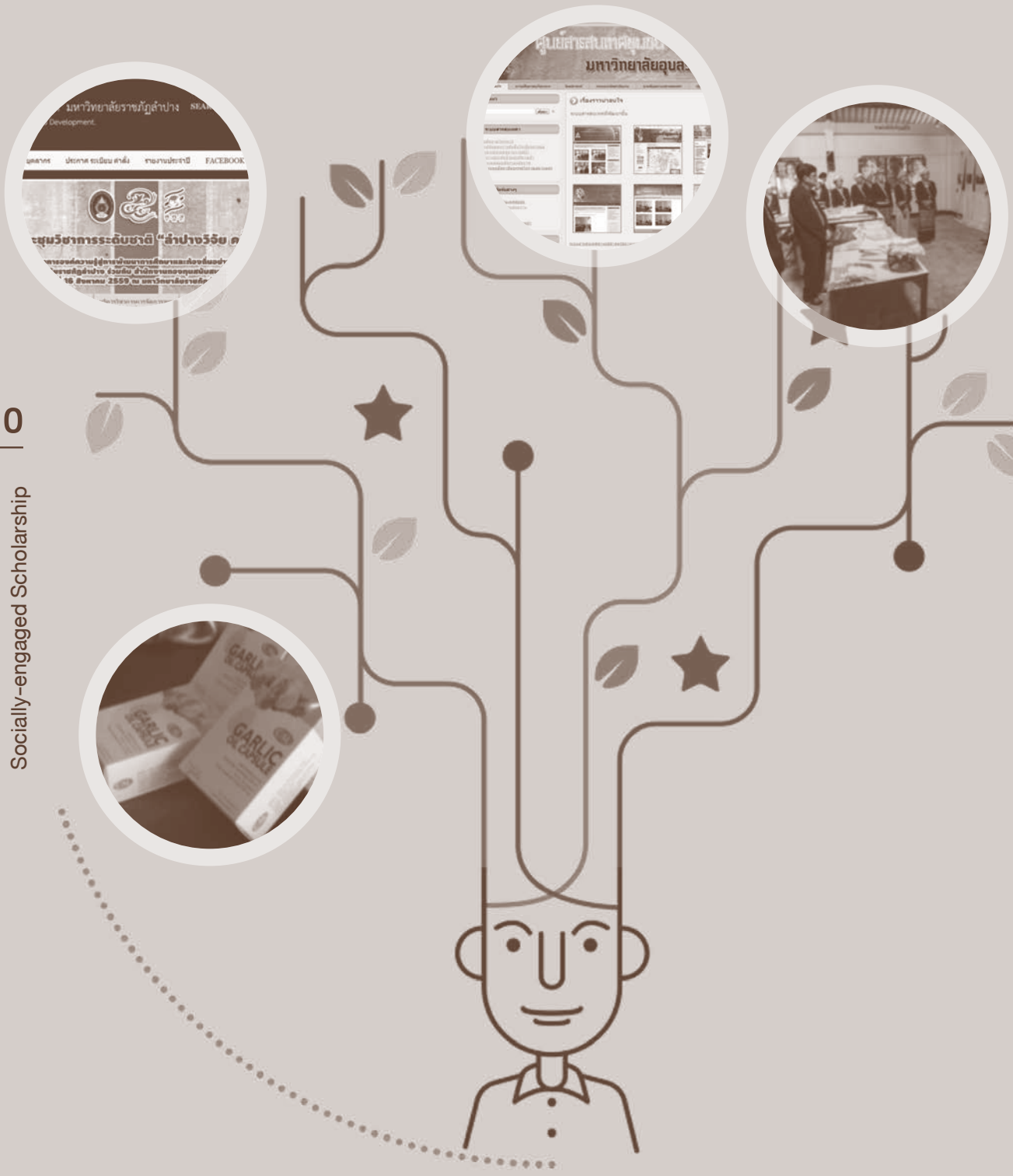
1. The number of students with sexual problems and pregnancy decreased in all schools, due to increase in sex education community learning and better cooperation with local government, community leaders and parents.

2. Six schools in the network received national awards for being model schools in teaching sex education, on September 9, 2557. They were Lap Lae Pittayakom school, Taplapracha-Utit school, Trontrisin school, Thai-Rath Wittaya 5 school, Tha-It Municipal school and Thong-Sankhun Wittaya school.

3. Cooperation occurred in all sectors at all levels, from the province, local administration, hospitals, schools, youth networks, parents' networks, and university. This is an important condition in tackling teenage pregnancy and healthy living.

4. Result of the research was widely disseminated to all 19 secondary schools in the province, and 39 schools of expanded opportunity in the Office of Education Uttaradit Area 1. Currently, it is also likely to expand to the Office of Education Uttaradit Area 2 as well.

In addition, it was found that the network was being expanded to schools near the district sex education centers, by an annual ratio of 1:1, covering 17 new schools and 14 local government schools. Personal networks among agencies and organizations are also increasing, for example teachers, local government, local hospital, community representative and supervisors in Office of Education Uttaradit Area 1 and Area 2.


มหาวิทยาลัยราชภัฏลำปาง
FACEBOOK
มหาวิทยาลัยอุบล
GARLIC
GARLIC

Engage Management for Institute:

Community Strengthening in Cham Phak Paew Sub-district, Tarn Diew Sub-district, and Huay Haeng Sub-district, Kaeng Koi District, Saraburi Province : Chulalongkorn University Case Study

Authors: The working group prepared the book "Socially-engaged Scholarship"
Keywords: Saraburi community strengthen project

"Establishing a substantial sustainable university community engagement"

Chulalongkorn University's Saraburi Community Strengthen Project is a key mechanism in driving the university engagement strategic plan under the "support" strategy. The purpose is to sustainably and continuously strengthen the communities both inside and outside the area of Chulalongkorn University in Kaeng Koi district, Saraburi province, focusing on learning processes together with the area-based and community centered practice through Participatory Action Research (PAR), and on the cooperation of every related sector since the beginning of the process including planning to form a mutual learning, a work paradigm shift, and create integrated resolutions for the communities' fundamental problems with the existing resources and potentials of the communities. The long-term 3-year goal is to establish a substantial sustainable university community engagement and generate mutual benefits through integration into every aspect of the university missions.

The purpose of the first phase operation, from October 2013 to September 2016, is to establish a good relationship between Chulalongkorn University and the local residents in the communities in Cham Phak Paew sub-district, Tarn Diew sub-district, and Huay Haeng sub-district, Kaeng Koi district, Saraburi province.

Mechanism of management

The start-up mechanism was to collaborate the "integrated subprojects", which were conducted by multidisciplinary-university faculties, under four conditions; 1. Relevant to the needs of the communities. 2. Emphasizing on community strengthening. 3. Integrating the operations of the units. 4. Student engagement. This internal mechanism engagement shows in Table below.

	Responsibilities
Steering Committees	Supervise and drive the project under the conditions.
Subproject Applications Subcommittees	Select the subprojects according to the criteria.
Saraburi Strengthen Project Team Members	Consist of directors and coordinators. Coordinate and support with the subproject teams.Organize a public stage and knowledge market. Evaluate the overall project and subprojects.
Subproject Team Members	Cooperate with the local communities and organizations in the area according to the subproject proposal. Cooperate with the local residents, local bodies, and Saraburi Strengthen Project Team Members to organize a CU – Saraburi academic stage and knowledge market.

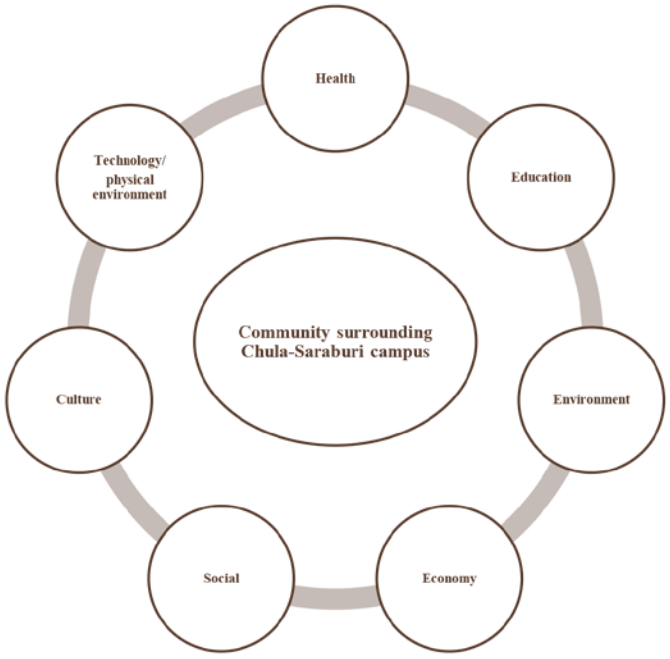
Operation results

The areas of operation during the first phase were Cham Phak Paew sub-district, Tarn Diew sub-district, and Huay Haeng sub-district, Kaeng Koi district, Saraburi province. There were three target groups; 1. The local residents, and the local bodies in Kaeng Koi district, Saraburi province. 2. Faculties, institutes, departments, personnel, and students of Chulalongkorn University. 3. Related external organizations. The processes are as follow;

Relationship Establishment Process

The project's team members explained the purpose of the project to the local community leaders and the related organizations in the three districts and organized a community relation activity in order to find a cooperative working guideline and analyze the problems in the area

together so that the framework to publicize the scholarship community-strengthening knowledge and initiation could be developed. It could be concluded from the activity that the framework of the knowledge and initiation publication would be an integration in seven aspects including health care, education, environment, economy, social, culture, and physical science.



The framework of the scholarship community-strengthening knowledge and initiation publication in seven aspects

Preparation Process

The project's team members and the Faculty of Psychology, Chulalongkorn University have surveyed the real fundamental needs of the community in each sub-district accordingly in order to obtain the basic information. Then, the information was published to the faculties in the University for interests and subprojects application. After the study and brainstorming, the team members organized a seminar to inform the participants of the possibility to develop the integrated projects among university scholars, community leaders, and representatives from the communities in the three districts.

Operation Process

The operation of the integrated subprojects was collaborated by the university scholars from seven faculties, one school, and one institute, including Faculty of Education, Faculty of Medicine, Faculty of Allied Health Science, Faculty of Science, Faculty of Pharmaceutical science, Faculty of Psychology, Faculty of Nursing, School of Agricultural, and Environmental Research Institute, aiming to solve the problems of the communities based on their needs. There were 13 subprojects, covering four out of seven aspects of the communities' fundamental needs, including education aspect, health care aspect, occupation and economy aspect, and environment aspect. University students and representatives from the community were participated in every subproject.

1. **Education subproject.** The subprojects were the integration among the Faculty of Education, Faculty of Nursing, Faculty of Pharmaceutical Science, and Faculty of Psychology. The subprojects carried out were health care reinforcement project and the students, teachers, and school administrators' potential development project. Initially, there were 260 students, 50 teachers and administrators from four schools participated. The subprojects' achievement was the students' O-Net and A-Net scores were higher, compared to the scores prior to the participation. In addition, the subprojects also succeeded in reinforcing the university operation and the local policy.

2. **Health care subproject.** The community basic information showed that the local residents had health problems including diabetics, hypertension, hyperlipidemia, and gout accordingly. Therefore, Faculty of Medicine and Faculty of Allied Health Science were focusing on increasing the local residents' capability to take care of and protect themselves and other people from chronic diseases. As a result, the residents gained more knowledge about health care and were able to better take care of and protect themselves from NCD diseases

3. **Occupation and economy subproject.** Subprojects from Faculty of Science, Environmental Research Institute, and School of Agricultural aimed to support the locals and increase the values of local products such as food product development, food processing acknowledgement, packaging development, fuel generation from agricultural waste, and ruminant food production. As a result, the local residents were able to use the concept and knowledge from the seminar to create more part time jobs.

4. **Environment subproject.** Drought problems were the real fundamental needs of the communities in the three districts. Environmental Research Institute, the local residents, and the local organizations have run a sustainable water supply development and management project in Kaeng Koi district, Saraburi province. This activity started out by analyzing the situations, internal and external factors that impact the water management in the area. The analysis showed that people in the three sub-districts were aware of the problems and willing to cooperate with the team to solve the problems based on the existing natural water resources. The local residents had already tried to tackle the situation by themselves. However, it was not successful due to the lack of coordination from the relevant government departments. Therefore, firstly, the subproject has aimed to establish an association between the local communities and the relevant government departments. As a result, the association between Sub-district Administrative Organizations in the three sub-districts, Kaeng Koi district, Royal Irrigation Department, Department of Groundwater Resource, and the local communities was successfully established. The water supply management plan was developed and added to the community development plan of the three sub-districts. The project team members would supervise and evaluate the operation every six months.

Evaluation Process

The team members have evaluated the Saraburi Community Strengthen Project, prepared a report, and presented it to the Chulalongkorn University administrator, and the community leaders, hoping for continual support during the next phase of the project. Overall, the goal of the first phase was accomplished; thirteen integrated subprojects was successfully carried out based on the existing knowledge of the community and the advanced academic skills and technologies; the knowledge was passed to the local residents in the communities and turned into actions, the local residents were

also participated in the subprojects, mutual benefits were obtained, and the problems of the communities were initially solved. The satisfaction survey results showed that the residents were satisfied with the involvement of the subprojects, equivalent to the score of 66 percent. Moreover, the team members have analyzed the strength, the weakness, and the problems of the operation in the first phase, and the opportunities to develop the project in the second phase and plan a strategy that could decrease the working difficulties and problems in order to obtain short-term and long-term mutual benefits.

However, the operation of the thirteen subprojects did not meet all the targets in the 33 villages in three sub-districts. Therefore, the project team members, with the collaboration of the university scholars, personnel, students, and the local residents in the three sub-districts have organized the "From Heart to Heart : CU – Saraburi" activity to create a knowledge market for local residents. There were 1400 participants, including Chulalongkorn University administrators, scholars, personnel, and students (220 people), Saraburi province governors (30 people), local residents in the three sub-districts (450 people), students from fourteen elementary schools and three high schools in Kaeng Koi district, Saraburi province (700 people), and representative from two organizations. From the activity, it was found that all sectors involved were very satisfied, equivalent to 85 percent.

Reference

Hiransuthikul N, Hengpraprom S, Sangduan N (2015). Community Strengthening. Cham Phak Paew sub-district, Tarn Diew sub-district, and Huay Haeng sub-district, Kaeng Koi district, Saraburi province Case Study.

Management of Area Research Lampang Province: Case of Lampang Rajabhat University

Author: The working group prepared the book "Socially-engaged Scholarship"
Keywords: City of Joy and Honesty, One Faculty One Model

"Driving under the theme One Faculty, One Model"

Lampang province is one of the Upper North provinces located in basins surrounded by high mountains which is 268.80 meters above sea level. The area is oval shaped, and the terrain is generally flat, with high mountains everywhere and in the central part of the province, with some lowlands along the river banks. There is the area of approximately 12,533.91 square kilometers which is ranked the fifth largest province in the North, after Chiang Mai, Tak, Mae Hong Son and Phetchabun. In 2014, there was a population of 753,013 people, ranked 33rd in the country. Gross Provincial Product in general at prices for the year 2012 amounted to 50,152 million baht. Gross Provincial Product per head currently is at 61,161 baht. The majority of revenue depends on agriculture, wholesale and retail, industry, mining, education and electricity management, gas and water, respectively. The growth of the economy and tourism strategy of Lampang province to be "City of Joy and Honesty" has caused problems in the area. Those problems are environmental management, development of Small and Medium Enterprises, and Community Enterprise, production and sales of agricultural products and agricultural processing. The quality of life problems of individuals and how to strengthen Lampang society to create immunity to outside forces, to prepare the physical personnel structure and management in developing areas of the province to move to be the central logistics of the Upper North etc. The province needs the cooperation of all sectors in the development of the province.

Lampang Rajabhat University has the main mission to focus on producing quality graduates, building research, distributing academic service to community as well as art and cultural preservation, and is ready to be a source of knowledge in the Upper North region. With a commitment to be a "university for local development", it is aimed at creating proactive research strategies to serve the local community. In the years 2005 – 2007 the Thailand Research Fund (TRF) has a proactive policy development in research and management of university research of Rajabhat University group to provide a mechanism for the technical development of the area. It has extended the area to do research outside the university with the community to contribute since then.

Mechanism of management

Development of Management Research of Lampang Rajabhat University uses the mechanism management of faculty research as the main driver, under advice and feedback from the Working Group of Project Cooperation to develop researchers and research to improve the area of Lampang province (ABC), supported by the TRF. This is to develop researchers and academic managers at faculty level, and to build the management team for Lampang Rajabhat University to have the skills to handle academic work to serve society properly. This meets the needs of the area as well as to guide the work of the Academic Board of the University to create and make changes to the area of Lampang province.

The recent work has found that working with TRF makes the university able to build an academic system that helps the work of university to be comprehensive to develop researchers from the source, intermediate and advanced levels, namely the enhancement process from the identification of the research topics, the research performance focusing on the impact on the area, as well as the publication of research articles courtesy of commentaries by experts from the Fund. The research quality is acceptable and research has led to practical use. Therefore, Lampang Rajabhat University has the idea to expand the development of research groups to the faculties, based on competition to obtain research funding for creating research quality and to the achievement of the objectives set. This project uses the research process as a tool by focusing on creating knowledge and opportunities for alternative careers. Elevating the level of life quality for residents in the area, building a sustainable and balanced management of natural resources and the environment, the empowerment of local communities to manage their own ability, and building a democratic foundation, and using the concept of "Cooperation" and "Learning Together" emphasizes working reinforcement between people with different strengths (state, local, private, academic community). The scoping area is determined for researchers to do research in Lampang only and to obtain Active-learning. Thus by requiring researchers to obtain funding under this program, a competitive activity is created with the selection of the research proposal as a series of four faculties from all six faculties, as well as to stimulate the potential research in the field of Research Services and solving research with knowledge and each faculty of the research process. Project proposals contested must focus on the development and or solve the problem of the Lampang area. There are integrating research, academic services and teaching management as well as the creation of a research management system in the faculty. The faculty board can choose issue of research problems of interest together with the area to study, test solutions, and development research management of the faculty. The dean is the project leader and is responsible for research projects in the sub-set of projects which must participate in all processes and is the recipient of the contract.

Each faculty will have to establish a working group containing faculty management of the research team and teams of researchers. Both the Dean and the faculty management of research teams must join the stage of research operations at all times including participation in development activities on research needs, research problems and project proposals, together with experts from TRF or qualified people that the Institute of Research and Development provided. Obtaining funding for this research also required the faculty to participate in research support, both in terms of budget (In cash) and utilities (In kind) which covers the policy, strategy, research team, personnel, place, the equipment, chemicals and so on.

The initial performance was the meeting to discuss with the Board of Promotion Research and presented to the Dean of the six faculties the principles, and to create the research framework together. The creation and development of the research is scheduled to work in the series of project and to participate in the development of an area in Lampang province. Then from the announcement of project proposal development to manage the research area in Lampang province under the theme "One Faculty One Model" by the proposal of six faculties, four faculties will be selected through the presentation of the proposals in which there are experts from the academic support of the project and experts from TRF. Then the track runs through the stage to present the progress in three months, six months, and presentation of a draft report on the complete research. In addition, there is also a platform developing researchers organized by the Institute of Research and Development periodically, such as a workshop, "Technical Participatory Action Research", "Writing and Program Evaluation", "Writing Research Papers for Publication", and projects applying for intellectual property. Moreover, the project also encourages researchers to participate in a forum to present research including the National Symposium "Phayao Research 2015," the National Conference, "Rajabhat Research 3rd", national academic conference "Lampang Research 1st" and "Lampang Research 2nd" in the current year 2016.

Operating results

In the early stages of learning, the research area is shared among researchers, research executives, local governments, and communities by having research fund in various forms as an alternative and an incentive to do the research for local projects such as Area-Based Collaborative Research for Undergraduate and Master Students; ABC-PUS / MAG, Master Research grants; MAG, a series of capital projects Innovation Business Plan Grant; IBPG, Project of Research and Development Enterprise for Undergraduates in Science and Technology (EnPUS), a project co-funded research for a thesis of Master degree (Window II) in science and technology and so on.

In Phase 2 of the year 2014, TRF and Lampang Rajabhat University has a collaboration agreement for the development of researchers and research to develop area for a two-year term, with the goal to develop the research for the needs of Lampang, develop researchers, management system to support research for quality, and consistent with the context of the university. There is research development and new researchers for the University totaling 13 projects and 44 researchers. The distribution of research results covers 4 of the 13 districts of the province with the supporting team work from the upstream, intermediate, and advanced levels in raising quality of research and researchers through mentoring, the academic platform within and outside the university.

By managing research areas in Lampang Province under the theme "One Faculty One model", the research management system of each faculty has been strengthened and running smoothly. The researchers have a better understanding of research-oriented space. The paradigm has changed, and how research can also work with others to help solve problems for the community, be a good listener, be able to listen to criticism and opinions of others as well, and understand working in the communities better. In fiscal year 2014 there are more research done than the fiscal year 2013, representing 59.30 per cent and the resulting research paper that has been selected for publication, up from the original as well 37 percent. The Faculty of Management Science is to publish research results in papers the most all over the other faculties both two years (2013 - 2014).

All the proposals can be developed as a number of research projects funded research over the fiscal 2014 total of 732 projects under the program, and the trend of all of the faculties in published research papers is increasing in the fiscal year 2015.

Reference

Pimpaka Potilangka and Jareerat Suwan. 2015. Lampang Rajabhat University Article: Management of Area Research in Lampang Province under the theme 'One Faculty One Model' En route to the university to serve the area: 15 Case Studies Thai University, DeeChai Printing Company Limited: Nakhon Si Thammarat. Page 36 - 43.

Research for Area Based Development, Nakhon Si Thammarat: Case Study, Walailak University

Author: The working group prepared the book "Socially-engaged Scholarship"
Keywords: Integrated services-coordination mission, Research policy 3L, Center of excellence"

Proposition development, researchers development into the development of research management system

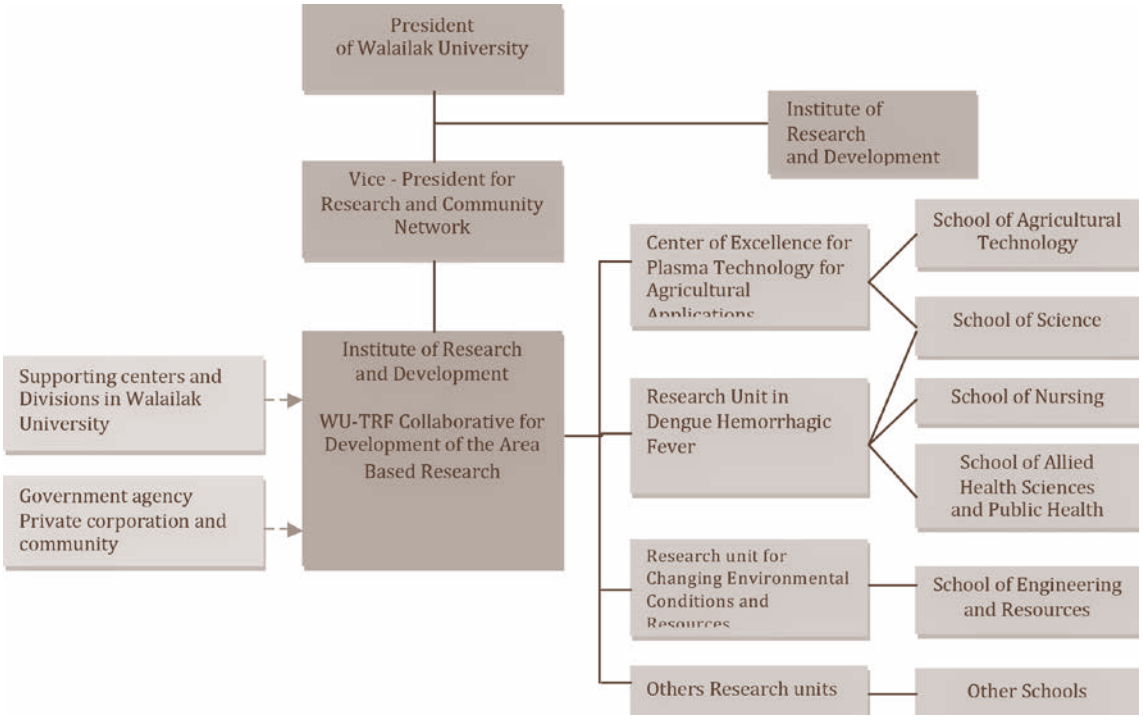
Nakhon Si Thammarat is the sixteenth largest province in Thailand, and the second largest province in the South of Thailand. It has abundant natural resources. The Nakhon Si Thammarat Mountains are the source of the Pak Phanang and Luang rivers, and 6 cities have marine resources. The province has a population of more than 1.5 million, which includes a labor force (76%), the unemployed (1.23%), and business owners (with more than 1,600 enterprises). The average income per capita per month is equal to 8,091 baht. The average expense is 20,755 baht per month per household, and the revenue per household is 296,970 baht. Economy in general depends on the agricultural sector. The main occupations are rubber gardeners, rice plantation gardeners, fruit gardeners, fishery workers, and animal farmers. Such a context means that Nakhon Si Thammarat has a high development potential, due to the abundance of the natural resources and the rich culture. However, there are many problems, such as the low productivity price, the lack of good academics, the lack of good management, and natural disasters. It will require the cooperation of the parties/ networks and knowledge from the research process in order to solve these problems.

Walailak University, located in Nakhon Si Thammarat, has a unique vision, with the high aim of "being a reliable, community based, resourceful learning organization, fully committed to rendering good governance" There are 3L research policies, including those aiming for being a resourceful learning organization, being a reliable community based organization, and having world class academic practices, to strike a balance between the creation of new knowledge and of area based research, integrated with the academic services that are utilized by communities. The Institute of Research and Development, the Center for Academic Services, and the Southern Science Park Project have a shared duty in supporting all the faculty members in the format of an "integrated services-cooperative mission" for the whole research process. In 2004, the Office of the Higher Education Commission tasked Walailak University to act as the host for the Research and Technology Transfer Network to Community foundation in the upper Southern region, which is consistent with Walailak University's area-based research policy and of the policies of 11 higher education institutions in Nakhon Si Thammarat, Surat Thani, Krabi, Phang Nga, Phuket, Ranong, and Chumphon. During the same period, Walailak was a host for the Regional Research Network, with responsibility for research strategy planning and coordinating research, with support from the National Research Council of Thailand (NRCT) until 2014.

Additionally, the Thailand Research Fund (TRF) has been reinforced, which sparked the development of research issues and area-based researcher management systems in Walailak, starting with the series research and development Pak Phanang river project (2004-2005) and the local research coordination center, Nakhon Si Thammarat (2001-present), and which led to the signing of a memorandum of cooperation (MOU) for "the development and support of area-based research, Nakhon Si Thammarat (2011)", which, in turn, led to a contract of research grants titled "WU-TRF Collaborative for Development of the Area Based Research". The Institute of Research and Development is a research unit that works with the TRF in order to manage area-based research of Walailak University.

Mechanism of management

In order to reach the needs of the people and truly resolve the problem of the area, a mechanism to develop area-based research and research support in Nakhon Si Thammarat was created, in order to act in coordination with relevant agencies and peoples to enhance their capacity to collect and link existing resources (whether these be the resources of the University, the TRF, or the related government agencies in Nakhon Si Thammarat). Such coordination operates under a stable working system, and has constantly evolved producing results in accordance with the university mission (social engagement), through a small, but highly effective, number of personnel. The way to use the mechanisms and resources to maximum benefit is by ensuring that all elements reinforce each other. The project office works with the Institute of Research and Development through the coordinators for area-based research upholding the University's core mission, and through coordinating access to varied faculty expertise in many different schools, in order to solve problems and promote development through the mechanism of a research unit, as shown in the figure below.



The management structure of "WU-TRF Collaborative for Development of the Area Based Research"

The process of developing a research proposition aims to produce research projects and research results, which occur in tandem with the development of researchers, who are the university's key resources, and Thai higher education. The development of a research management system is a control mechanism and supports the use of research resources. The stability of this system passed testing at the end of 2014,; of the when there was a change of Vice President determined for area-based research policy and research affairs, foundations of the university. but the research management system has continued to work without interruption up to the present.

Besides assisting the coordination of researchers in obtaining grants, the collaborative project has served to facilitate cooperation between the community, government agencies, and the private sector, including research units and researchers who are expert in those issues that create knowledge exchange in lessons in joining the practical development research proposition. This is a strong network consortium that will enable positive changes in this area in the future, such as the Research and Development in Solving Mudslides on Steep Inclines Problem project, which is conducted by the Chaipattana Foundation. The staff of "WU-TRF Collaborative for Development of the Area Based Research" is involved in the process of developing research propositions. For individual research projects which are not considered through the research unit, there is a new mechanism : the development of area-based research propositions for funding project aiming to respond to Walailak's strategic planning, such as the design of suitable packaging for community products, and the development and management of a learning center concerning farmer community lifestyle. In addition, the research unit has the task of supporting the publication of scholarly documents at the international level, such as the Walailak Journal of Science and Technology, of reinforcing the mechanism for publishing area-based research, and of finding new avenues for deploying research results.

Operation results

After combining the collaborative project with the main task of the area-based research which is undertaken by the Institute of Research and Development, a primary mechanism drives research that responds to the needs of people and provides solutions to problems faced by the local community. In order to promote academic excellence on matters that concern the upper South area of Thailand, or towards international standards, Walailak established "research units" by leveraging the integration of service-coordination mission to overcome obstacles in doing research, sharing responsibility between departments or faculties. In 2009, Walailak University declared their support of research groups, which operate in the same way as research units, but are smaller and have smaller budget. In 2014, the research units that could create positive social impacts was were raised in status to "Centres of Excellence", as per the following.

1. Center for research excellence in science and wood engineering; allowing study from the basic level, including the textures of wood which is different from the more expensive varieties, innovative methods of tree cutting, and a method of baking which is appropriate to all types of wood. This includes technology transfer through providing processes and control systems applicable to wood and rubber factories in the southern area.
2. Center for research excellence in shrimp; allowing solutions to farming and prawn export problems and supporting the Seafood Valley in the South of Thailand, by the selection and development of shrimp species, through continuous research and through the transfer of technology and management of shrimp habitats, recipes, and disease prevention guidelines (EMS).
3. Center for research excellence in innovation, sustainable agriculture industry in physics; promoting drying using microwaves, an energy-saving process able to be used with a wide variety of agricultural products.
4. Center of excellence in Ecoinformatics; climate change and environmental conditions directly affect natural resources, the tourism industry, agriculture, and fisheries. Thus, research is conducted in testing sensor systems, using coral reefs, the wild, and Smart farms, in order to collect vital information leading to a process for managing the balance between conservation and the generation of income.

There are also various research units, as follows:

- Tropical fruits research unit; The School of Agricultural Technology provides academic services in parallel with ongoing research in the quest for new knowledge of the fruits rambutans, mangosteens, lemons, and grapefruits.
- Sustainable economic and consumption research unit; The School of Management cooperates with Bureau agencies and private sectors in Krabi and Surat Thani in order to develop tourism guideline management to promote balance between conservation and utilization.
- Research and academic services unit for Dengue fever; The School of Nursing uses sustainable solutions by emphasizing s on the participation of the community, an research results, such as an index of mosquito larvicide, the incidence of the disease, and the risks in supporting the working process and of those associated with the development of health and environmental health.

- Archaeological research unit; processing evidence of empirical archaeology covering every period until the present, in order to guide the research of the School of Liberal Arts, and for understanding the roots causes of ASEAN identity throughout history, allowing cultural maintenance and cooperation in ASEAN.
- Research Unit for changing environmental conditions and resources; The School of Engineering and Natural Resources is responsible for water management planning in southern Thailand, in conjunction with research on solving flooding, drying, and water uses in the agricultural sector, using a community participation model. In addition, the school provides academic knowledge about local resources, warnings, and disasters, which is what the communities expect from the University.

Reference

Chitnarong Sirisathitkul and Sujinda Yongjeen (2015) Walailak University article: Research management for area-based development, Nakhon Si Thammarat “Route of University to Serve the Community: 15 Case Studies of Thai University”, Deechai Publishing Limited: Nakhon Si Thammarat. Page 69-79.

A research Organization for a Spatial Development of UbonRatchathani: A case of UbonRatchathani University

Authors: The working group prepared the book "Socially-engaged Scholarship"
Keywords: the Community Information Center, WarinChamrap district

"Participatory process from associated networks to the goal of a distinct spatial research"

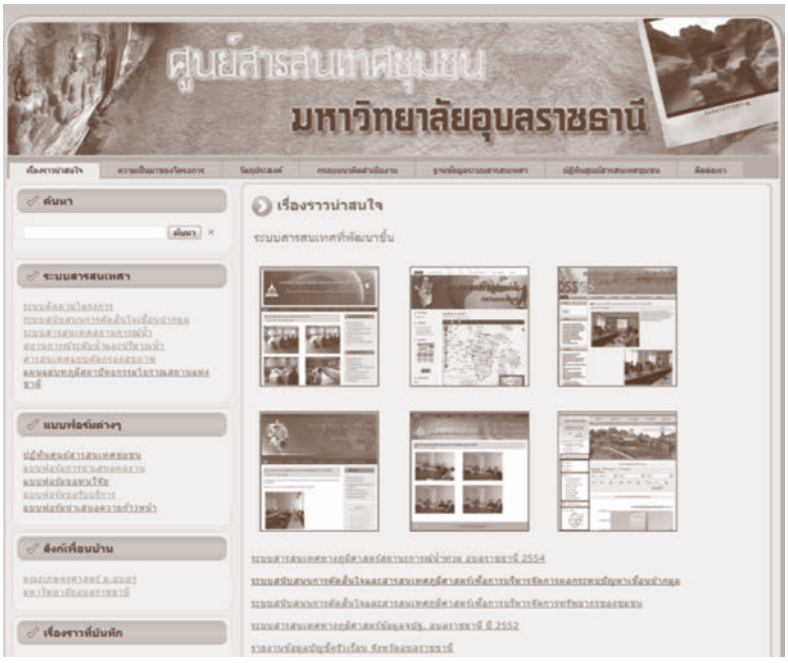
UbonRatchathani is located in the northeastern most border of the Northeast of Thailand in the area of Korat Basin which has 16 million hectares(9.5%) of the areas in the northeastern part. The province is 68 meters above the sea level and most of the area is a plateau sloping. It has Mekong River, a border between some parts of the province and the Lao Peoples Democratic Republic. It is the confluence of Chee River and Mun River. The Mun River flows along the center of the province and runs through Mekong River at KhongChiam District. The southern border of the province is surrounded by mountain ranges some of which are Banthat mountain range and PhanomDongrak mountain range which are the boundaries between UbonRatchathani, the Lao Peoples Democratic Republic and the Kingdom of Cambodia. The majority of the people's job related to agriculture. They transplant the rice fields and field crops such as kenafs, cassavas and peanut. They also raise livestock and catch the fish in natural pond and in a fish coop along the Mun River. In addition, there is a tourism industry which is connected to neighboring countries. The important industry of the province is rice trading which the person has a license to trade and the factory of ethanol produced from cassavas to be exported in China.

In 1987, UbonRatchathani University was founded at WarinChamrap district, UbonRatchathani province starting from UbonRatchathani campus of KhonKaen University. Later in 1990, it was established by a Royal Charter by the reason of "at that time, there were many people who wanted to further their studies in bachelor degrees, however, the remain public universities accepted limited numbers of students and for spreading academic resource for local people which would lead to the improvement of agricultural products and others and it would make northeastern people have more incomes. Therefore, UbonRatchathani Campus of KhonKaen University should be established as UbonRatchathani University according to this Royal Charter." Apart from having graduates, the important dusty of university is to raise the local people's life quality by sharing knowledge through academic services on education, occupations, local products improvement, the support of concept of democracy and human rights and etc. which are connected to vision of UbonRatchathani Province which says "Harmonious community ,pleasant city, commercial door, potential tourism and agriculture."

Mechanism of management

UbonRatchathani University has a management structure of Office of Research led by Vice President for Research and Social Engagement and the Office of Research, Academic Services and Art and Culture Preservation under the President Office, the supportive office. Similarly, the university has many scholars who are interested in conducting various kinds of researches but lack of the evaluation of the research effects on academic and local fields. Many pieces of academic researches are in-depth and have been presented in both national and international conferences and also they have been published in many academic journals but they cannot be used as concrete. The university has done many academic services and they are a part of collecting database of the organization and other government bureaus. Therefore, the university organized the project called "Community Information Center" which was one of the academic service plans on information and technology for Isan studies and development which were divided into 2 stages

- **Pilot stage** (proceeded from March to September 2008)to study the database system which made by the organizations and other government bureaus. Then provide the framework of management development on information which anyone can access to interact and connect to one another effectively.
- **Second stage** (October 2008 - September 2010) Developed the management and proceeding structure to be an information resource for the people in a community to learn and improve themselves by operating in 4 provinces: UbonRatchathani, Yasothorn, Si Saket and Amnat Charoen. Once the Community Information Center proceeded for a moment, it was en trusted by many government bureaus to develop the information and database in economy, society, environment, sanitation and etc.



While the Community Information Center was on process, the Thailand Research Fund (TRF) subsidized the research fund and made the scholars to be a researcher for community like Community Base Research or CBR by having coaching and mentoring system to give a suggestion in working with society and community which could create some spatial researchers. Later, the university shared investment with TRF on "Research development project and spatial research enhancement in UbonRatchathani" to make Area-Based Collaborative Research more effective by having distinct purposes of a research to make the excellent development under the strategic issues for community in 3 ways: natural environment issue, society, education culture issue and occupation and economy issue. To truly correspond with the spatial research, the committee of research management was established to make a plan and specify working frameworks and meeting with other government bureaus including presenting information to related government bureaus to create guidelines to work together.

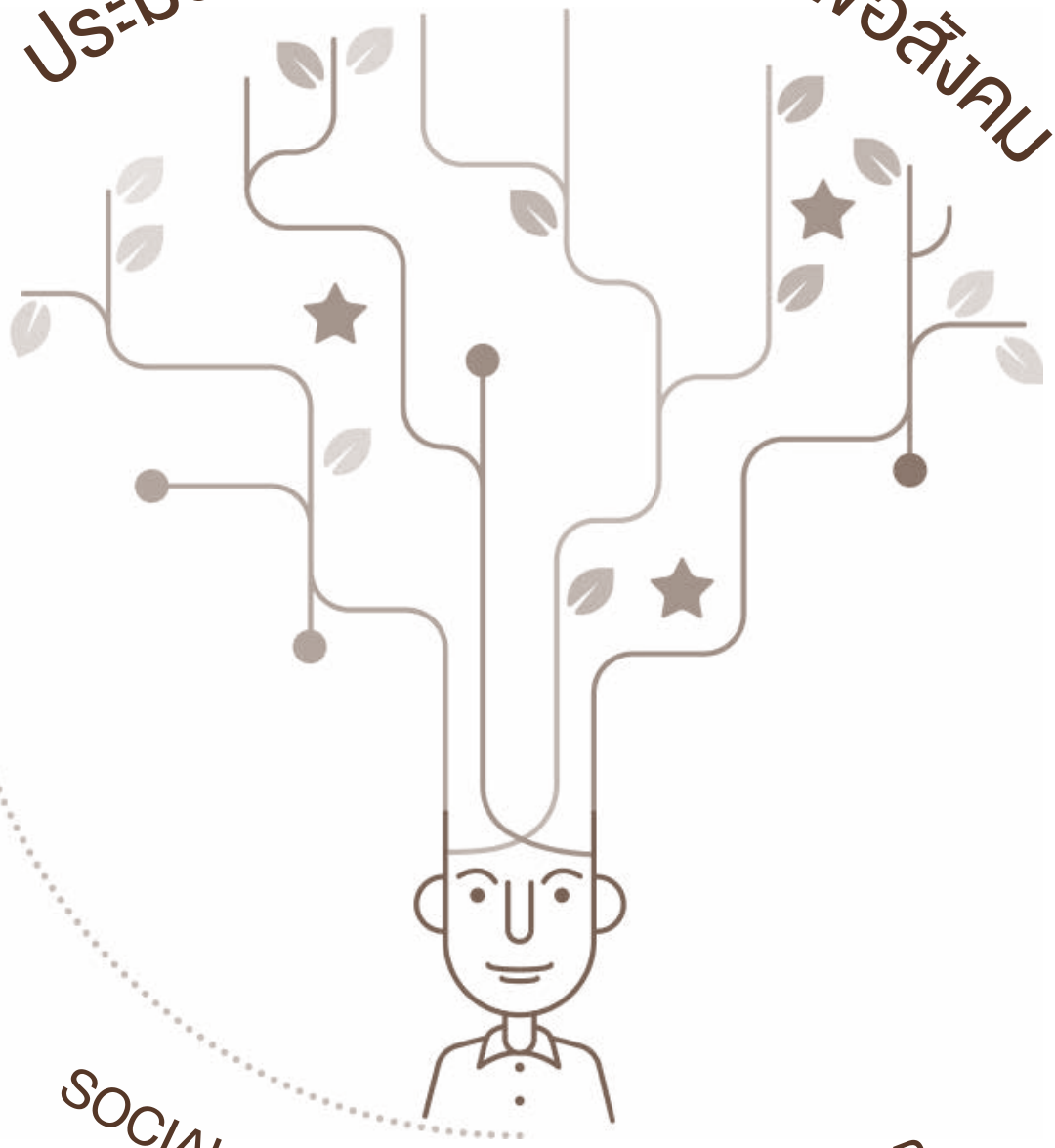
Operation results

The research development project and spatial research enhancement in UbonRatchathani stage 1 aimed to construct beneficial knowledge and information which would drive UbonRatchathani development. The collaboration and information and knowledge integration of other government bureaus were expected which the community could adapt intheir community improvement in 3 ways: natural environment issue, society, education culture issue and occupation and economy issue which 20 spatial research projects occurred from this. These researches were gathered in information database of UbonRatchathani University for anyone interested in them. Now, there are 255,463 visitors on the website. Many projects were collaboration between government bureaus, community, community enterprise which benefit from the researches both in economy, society and environment, for example, “Information system of the newborns’ development” which was designed to access online like adding and editing the information which is easily accessible by using decision making timetable to guide parents. Also, there was a reminding system for parents who were in charge of the children who joined the development check up and being vaccinated as appointed. “ Value-added utilization of recycled in RiangTaew Tai village” which created many new products for community like transforming a worthless wood dust into a torch and charcoal that made a lot of income for the community and decreased pollution from recycled utilization. NongWaed stream preservation which influenced the NongWaed preservation group. Also, there was a policy advocacy at a local level for water pollution management from community. And once the proceeding of 1st stage had ended, the university, started the Research development project and spatial research enhancement in UbonRatchathani 2nd stage” by adding two more issues: water management and neighboring countries relations.

Reference

Inthira Sahee (2005) UbonRatchathani University article: A research organization for a spatial development of UbonRatchathani: A case of UbonRatchathani University. "Route of University to Serve the Community: 15 Case studies of Thai University", Deechai Publishing Limited: Nakhon Si Thammarat. Page 82 - 91.

ประมวลบทความวิชาการเพื่อสังคม



SOCIALLY-ENGAGED SCHOLARSHIP

ร่วมคิดร่วมทำแบบพันธมิตร
และหุ้นส่วน Partnership

เกิดประโยชน์ร่วมกันแก่ผู้เกี่ยวข้องทุกฝ่าย
Mutual benefits

เกิดการเรียนรู้ร่วมกัน
และนำไปสู่ผลงานวิชาการ
Knowledge sharing
and scholarship

เกิดผลกระทบต่อสังคมที่ประเมินได้
Measurable social impact

ISBN (E-book) 978-616-395-806-8