

GREEN Community: case study of community nearby industrial sector of Rayong province

Kraichat Tantrakarnapa* ,Amporn Buttrangsri**,Suthep Silapanunthakul*** ,Tassanee Silawan****
,Wissanupong Kliengchuay***** and Rattaphol Sillaparassamee*****

Abstract

This research aimed to strengthen the communities located nearby the industrial zone by using GREEN community approach. The sampling method is purposive sampling for three communities located nearby industrial zone. The Ta-Kuan and Nong Faeb community located nearby Map Ta Phut Industrial Estate and Ta-Pong community is located nearby IRPC Industrial Zone are selected. This article examines an alternative approach for community driven focusing on their environment by the participatory research design. GREEN approaching means the management of environment namely G-Garbage, R-Rest room, E- Energy, E-Environment and N-Nutrition. Bottom-up approach enables the collaboration among the varieties clubs in the society for driving the social change. The community members and social clubs joined all activities according to the GREEN components. The overall of satisficing in the implementing projects are in the ranges of 59-84%, 61-80% and 82-90% for Ta-Kuan, Nong-Faeb and Ta-Pong community, respectively. Almost of participants agreed on the GREEN project and mentioned the benefits of this project. They recommended to extend the project to other communities and the local organizations should maintain the concept including the implementation for sustainable development community.

* Department of Social and Environmental Medicine, Faculty of Tropical Medicine(corresponding author)

**Health Impact Assessment Division, Department of Health, Ministry of Public Health

***Thonburi University

****Faculty of Public Health, Mahidol University

***** Department of Social and Environmental Medicine, Faculty of Tropical Medicine

*****Nakorn Rajchasma College (Bangkok Branch)

Introduction

In 1981, Rayong Province was designated to be the location of Eastern Seaboard Development Project that was a new development center of the country. Map Ta Phut Industrial Estate is established with a Gas Separation plant, Petrochemical Industry Group, Oil refining industry, and Steel industry. The consequences of the above industries operation were the operation of various industries such as the downstream factory, community development and also urbanization. The industrial types located in this estate are mainly large industry with a large amount of investment. The concern issue due to the estate operation is environmental quality including water quality, air quality, waste management, chemicals and the worker construction camps. Refer to the air quality, the Pollution Control Department (PCD) has conducted the air quality monitoring in the communities nearby. Many air quality parameters were over the standard level including Volatile Organic Compounds (VOCs). Volatile organic compounds, acids and heavy metals were detected in soil and water. The chemicals exposure may lead to both acute and chronic diseases on human health. Exposure in polluted areas might induce health effects such as skin irritation,

respiratory system symptom, liver and kidneys, reproductive system, blood system, nervous and muscular, and others. Some pollutants are classified as carcinogenic agents. Especially volatile organic compounds, which are organic solvents. It was found that some volatile organic compounds were found to exceed the air quality standards in the atmosphere of the Pollution Control Department (1). Water pollution is also another issue that released from some plants. The buffer zone is designed to be located between the industrial estate and community. However, many places were changed to be commercial areas, residential areas and small business. The migration of people for working has been increasing, moreover their relatives also moved to study and work in the communities nearby. The migration is not only Thai people, it is also the migrant. The emerging problems are detected in various areas such as environment, sanitation, social problems and health. The major complaint from 25 communities located in Map Ta Phut Municipality was health effect particularly respiratory disease, and cancer. The above issues lead to the announcement of pollution control zone in Map Ta Phut areas (2).

Many organizations both government and non-government have worked together to

solve the problems. The pollution eradication and health problems solving project were initiated in Rayong Province since 2011. The aims of this project are to reduce the volume of pollution by means of control the air emission, wastewater control, waste and industrial waste management. All above wastes should compliant with the standard and/or regulation. The citizen health should be considered and taken care. In addition the community strengthen should be conducted in terms of health surveillance system and environmental monitoring system by the community.

Department of Health, Department of Disease Control under the Ministry of Public Health and Rayong Provincial Health Office have coordinated with Ministry of Natural Resources and Environment to initiate the pilot project for community model. They aims to develop the communities located nearby the industrial areas, strengthen the community members to work together for better quality of life. The GREEN concept was used as a pilot project for further sustainable community.

Methodology

The methodology for this study is participatory action research in 3 communities namely: Ta-Phong, Nong-Faeb and Ta-Kuan-Ao-Padu. The first approach is

project orientation to distribution of project background and objectives. The community members from various clubs joined the orientation program and share their ideas among their communities. After the orientation, many participation were carried out based on the GREEN concept as indicated in Figure 1.

1. Visit the key informants in each community
2. Project orientation
3. Committee selection by community member
4. Expected community by participatory approach based on GREEN concept
5. Data collection (Socio-economic, Environment and Health)
6. Data Analysis and Data summary back to community

The community members analyzed the collected data with the supporting from research team. The concern issues were economic aspect, health and environmental problems. After the analysis, the project prioritization was also conducted. The selection of proposed project was carried out based on the possibility, economic, allocated budget and the readiness of project implementation

7. Strategic approach and project

development for each community

The strategic and action plans were created that should respond to their community problems,

8. Project presentation and commendations by mentors

Project presentation carried out by the representatives of community. The invited commentators from academic institutes, staff from department of health, key informants in the communities and interested persons.

9. Implementation the proposed plan
The proposed projects were implemented according to their scope and time.

10. Follow up and evaluation
This process is the important step, it was performed to declare the goals achievement. The learnt lessons would be benefits for their community in the future. Limitation, strength and weak point were summarized and presented to the committee. This process was performed in the same time for three communities that they could share their experience and knowledge to other communities. The summarize report was submitted to the community administration team.

Results and Discussion

The results of the selected projects implementation were presented. The contents consist of goal achievement, project satisfaction, and a community involvement. The overall performance were in the range of 60.6-90.4 % as illustrated in Table 1 – 3 for different project and community. Moreover, it can be concluded in each project as follows:

Ta Pong Community

Project 1: Love your house by waste management

This project was classified into two sub projects namely; cleaning your house and community waste management. The community member who were selected as an evaluation team were very satisfied in this project with 93.05%. They also indicated in each aspect, 90% for goal achievement, 86% community participation, and 91.3% for the acceptance.

Regarding the community waste management, the project satisfaction was 89.8%, 89.3 of achievement, community participation with 86.7% and 91.3 % for project acceptance.

Project 2: Healthy can be done by

yourself

This project consisted of Household vegetation and herbs planting and avoiding the salty, oily and sweet food. They created this project since the increasing number of non-communicable disease in their community such as high blood pressure, diabetes and cardiovascular disease. The food consumption and individual behavior are the key roles for the above mentioned diseases. The first project of household vegetation and herbs planting was done as pilot projects in some households to demonstrate the community members. However, since there were many products that were available for community member. They were distributed and cooked for special activities in the community, furthermore, everyone can access and harvest after the permission from community members. It indicated the food security and safety in their community. The overall performance of this project was satisfied 95.6 %, goal achievement 92.6%, community participation 93.5% and 92.8% of project acceptance.

Concerning the second project, it was 91.1% satisfaction, 81.6 for their achievement, % of participation and 91.3 % of acceptance. The characteristics of this project was related to the elderly group particularly the non-communicable disease cases, it was supported from Ta Pong health center. The successfulness of this was the evidence from

health examination after participation, the overall health outcomes of aging groups were better.

Project 3: Clean water, trees maintaining and energy saving community

This project was categorized into 3 sub projects namely; water sources cleaning, tree maintaining and planting and energy saving project. The overall satisfaction of water sources cleaning was 92.3%, 87.5 % of achievement, 86% participation and 89.5% of acceptance. In case of tree maintaining and planting project, it was created since the disappearance of tree in their community including the increasing temperature. They needed more tree and the selection of tree type was debated, the criteria were used. The purposes of tree planting were not only for providing the green space but should provide food for community member. Overall satisfaction of tree planting project was 94.2%, 89.6% achievement, 88.5% of participation and 91% of acceptance. Concerning the energy saving project, the pilot project did the campaign by distribution of energy saving leaflet to the community member. The overall satisfaction was 91.6%, 87.1% of achievement, 85.6% of participation and 88.8% acceptance. If

compare to other sub projects, it was the lowest score since they found that the electricity cost for each house was not significantly different from the previous period. In addition, the other family member did not change their daily behavior. It needs longer time for evaluation. The project evaluation indicator should not only be electricity cost, it should include other aspects such as people knowledge and awareness on energy.

Table 1: the performance of project operation in Ta Pong

Project and sub projects	satisfaction of project	Achievement (%)	Coordination (%)	Project acceptance by community
Love your house by waste management				
1. Cleaning your house	93.05	90.35	86.00	91.25
2. Community Waste management	89.80	89.30	85.65	91.25
Healthy can be done by				
1. Household vegetation and herbs planting	95.35	92.55	93.45	92.75
2. Avoiding the salty, oily and sweet food	91.05	81.55	84.70	91.25
Clean water, trees maintaining and energy				
1. Water source: cleaning	92.30	87.50	86.00	89.50
2. Tree maintaining and planting	94.15	89.85	88.45	91.00
3. Energy saving	91.55	87.05	85.50	88.75

Ta-Kuan Ao-Pradu community

This community focused on the school and temple activities, there were 2 projects as illustrated in Table 1. The first project was the collaboration of school and community. It can be categorized into 5 sub projects namely; cat fish feeding for school lunch, organic vegetation in school, effectiveness

microorganism and composting, waste management and waste bank and school and community energy campaign.

The cat fish feeding project was carried out at the school, the overall satisfaction was 77.7% , 67.4 % achievement, 63.6% of community participation, 93.6% of acceptance. The organic vegetation was satisfied with 67.9% , 62.9 % of achievement, 60.7% of participation and 93.6% of acceptance. For the composting and effective microorganism, the overall satisfaction was 64.3% , 58.8% of achievement, 67.1% of participation and 94.3% of acceptance. This project was obstructed during the semester break since the teacher and student did not come to the school then it needed the support from community member. The committee had to take care the project. In case of effective microorganism and composting project, the overall satisfaction was 64.3% , 58.6% achievement, 67.1% participation and 94.3% acceptance. The community member agreed on the project concept, however some of them indicated that only a few community member did agriculture they did not want to implement this project. Regarding the waste management and waste bank project, 65.7% satisfied the project, 64.3% achievement, 67.1% participation and 93.6% acceptance. This project needs longer time to implement

and evaluate, the money return from the waste utilization was not completed yet. For the energy saving campaign project, overall satisfaction was 72.9% , 77.1% achievement, 74.3% of participation and 62.1% of acceptance.

The lower percentage in each aspect of the community project in this community was detected since the location was situated nearby the industrial estate, the land occupation is limited. The culture and daily life style were changed since there were many people migrated from different geography and culture.

The HAS public toilet and landscape project was categorized into two sub projects namely; HAS toilet for disorder people and Landscape in the temple. This project was initiated since the existing public toilet in the temple was not available. The existing toilets were not safe for general people and the disorder people could not access. Temple always was used for many occasions in the community, the improving the existing toilets should be benefits to all. Then the construction of new toilet with the criteria of HAS concept was conducted as pilot project. In addition, the energy saving light in the public toilet were replaced. The

overall satisfaction was 83.6% , achievement was 83.6 similar to satisfaction, 81.4% of participation and 91.4 % of acceptance. The landscape around the toilet areas were determined that 84.3% satisfaction, 81.4% achievement, 85.7% participation and 93.6% acceptance.

Table 2 The performance of project operation in Ta-Kuan Ao-Pradu

Project and sub projects	satisfaction of project committee	Achievement (%)	Coordination (%)	Project acceptance by community
· The collaboration of school and community				
1. Car fish feeding for school lunch	77.71	67.14	63.57	93.57
2. Organic vegetation in school	67.86	62.86	60.71	93.57
3. Effective microorganism and composting	64.29	58.57	67.14	94.29
4. Waste management and Waste Bank	65.71	64.29	67.14	93.57
5. School and community energy saving campaign	72.86	77.14	74.29	92.14
· HAS public toilet and				
1. HAS toilet for disorder people	83.57	83.57	81.43	91.43
2. Landscape in temple	84.29	81.43	85.71	93.57

Nong Faeb Community

This community had two projects with 5 sub projects. The first project was utilization of community waste, it consisted of sub projects namely; waste segregation, composting and effective microorganism and organic vegetation.

The overall satisfaction of waste segregation was 65.5%, 60.1% achievement, 63.1% participation and 91.7% acceptance. The purpose of this project aimed to manage the waste along the beach, every weekend the community member particularly young

generation always collected the waste along the beach. They gathered the recycle waste and sale for community funding. Furthermore, the waste generated from household was also segregated and sent to the waste collection center. The effective microorganism preparation project was conducted since they would like to use for vegetation planting and mangrove forest. The mangrove forestry preservation was launched in this community that they also preserve the variety of living things in the mangrove forest. The overall satisfaction was 70.8%, 70.3% achievement, 54.1% participation and 95.6% of community acceptance. In addition, during the green areas was created along the roadway in this community, the compost and effective microorganism were used for tree planting. The buffer areas connected to the industrial estate were designed for tree planting and eatable vegetable planting in this community. Poor people can access the land for their planting and obtain the income from the vegetables sale. Overall satisfaction was 76.9%, 69.4 % achievement, 68.3% participation and 90.2% acceptance.

The second project was landscape in Son Kra Sib beach that consisted of two projects namely; water management and HAS public toilet. There is a popular beach located in

this community so called “Son Kra Sib beach”, local people always visits particularly at the evening time. The public toilets in this areas were constructed for longer time, they were damaged. The improving of toilet facility was conducted and nearby this area was also the drainage channel of runoff water to the sea. The drainage channel was modified and improved. The overall of this project satisfaction was 75.6% , 76.4% achievement, 76.9% participation and 89.3% acceptance.

The improving of existing toilet was also performed, the overall satisfaction was 79.2%, 80.1% achievement, 90.5% participation and 90.0% acceptance. The response from the committee also indicated that this project could not give the benefits to the committee only small group of people who visit this place.

Table 3 The performance of project operation in Nong-Faeb community

Project and sub projects	satisfaction of project committee	Achievement (%)	Coordination (%)	Project acceptance by community
- Utilization of community waste				
1. Waste segregation	65.49	60.57	63.09	91.65
2. Composting and Effective Microorganism	70.78	70.29	54.14	95.54
3. Organic vegetation	76.80	69.41	68.33	90.16
- Landscape in Son Kra Sib beach				
1. Water management	75.63	76.40	76.87	89.34
2. HAS public Toilet in Son Kra Sib beach	79.21	80.13	78.71	90.53

The project development and implementation under GREEN concept in three communities were different based on their context, culture, occupation, socio-economic issue and the people

movement.

The surveillance system for health and environmental issue, it can be summarized as indicated in Figure 2.

Conclusion

The operation of projects in three communities respond the GREEN concept. The community can maintain and develop the relevant projects for their communities. The participation of community member are variety such as teen age group, working age group and elderly people continuously. The elderly transform their skill and experience to young generation by attending the community activities. The followings are the learnt lesson of this project.

1. The enhancing the community participation, the member jointed the activities and suggest their ideas in each activity. The young generation understood the background of community and had the sense of community belongings. Many studies reported the similar results that the community participation was the key success factor since it was the process created from the community members. The accepted ideas were implemented for their community, furthermore the project committee was the

play role in project operation and evaluation. The allocated budget was also important, it should be transparent to obtain the trust from community member as indicated in the study of Müge Akkar Ercan(2011).

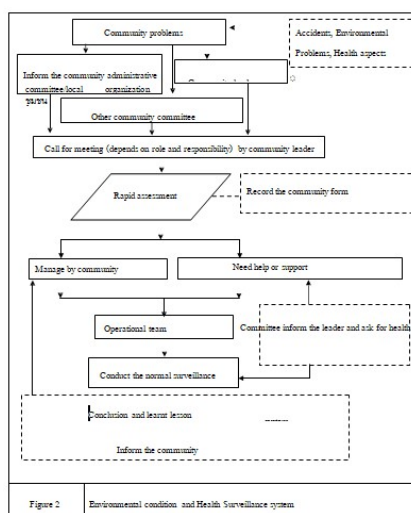
2. The proposed projects should declare the clear objectives and target, and were accepted from the community members. In case of any troubles during the project implementation, the community member should answer or clarify all concerns. The declaration of project benefits was also importance. The distribution of benefits should return to the community with the equity approach. The need assessment should be performed for each project prior to project operation, the bottom-up approach should be taken into account. The study of Gil Seyfang also indicated that the project should be started and initiated from local people need. Gill Seyfang studied on the community action for sustainable housing: building a low carbon future. Similar to the study carried out by Cecilia, concluded that the community development need the participation and support the results to the policy maker.

Gill Seyfang

Community action for sustainable housing: Building a low-carbon future Energy Policy 38(2010)7624–7633

3. The committee for all projects should be officially appointed including the providing the authority for them.

4. The key informant and community leader should moral support the committee and appreciated their efforts. The project evaluation should be performed regularly.



Recommendation

1) The common question was frequently asked “How can we do to maintain the project?” The evidence was the key factors for sustainable project. For example of vegetation planting project, they maintain the project since they can save their expense. In addition, their products are freely from chemicals contamination since the organic farming was performed. They also used the composting and effective microorganism for their vegetable and herbs planting. In addition, the more production can be distributed in the market, they can gain the extra income. The sustainable

concept is directly related to the community perception and participation. If it was created as public usage, the sense of partnership was the key role for project implementation.

2) The award from other organizations was the key role for maintaining the project. It can be used as learning center in their community particularly for young generation. The elderly group can be the mentor in their community.

3) The learning center for distribution knowledge should be promoted and supported from community administrative level.

4) The project promotion in each special event should be performed to the public and responded to the national and local policy. Application of the self- sufficiency economy philosophy should be encouraged and implemented to respond the dynamics of society and globalization (5).

Reference

Air quality and noise management bureau, Pollution control Department. Air Quality and Noise Status year 2008. His Company limited. September 2009.

The announcement of National Environmental Board number 32(2009). The Pollution

Control zone in Rayong Province(the whole areas of Map Ta Phut, Huaipong, Noen Pra, Tubma sub-district in Meaung district, some areas of Map Kha sub district, in

Nikhom pattana district, Ban Chang sub-district and the shoreline) 1 May 2009 (page 99). Published in the Government Gazette.

Mingkwan Thornsirikul. CSR in Green Industry for Sustainable Development. Thailand's Nature and Environment Journal. Volume 7 Number 2(April-June 2011).

Mark Deakin The case for socially inclusive visioning in the community- based approach to sustainable urban regeneration Journal of Sustainable Cities and Society 3 (2012) 13– 23

National Economic and Social Advisory Council. The comments and recommendation for preparation to ASEAN country under the sufficient economy philosophy. September 2012. Cabinet and Royal Gazette Publishing Office