Evaluating the Capacity of Community Readiness Prior to a Community Health Impact Assessment for the Biomass Power Plant Construction: A Case Study in Southern Thailand

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Abstract

Community readiness is important factor to consider before identifying potential assessment and implementing prevention efforts that contributes to developing community resilience and other changes. Thus for the current study, a descriptive, cross-sectional survey using mixed-methods was performed to examine the capacity of key informant community readiness that will be affected either negatively or positively by the biomass power plant construction before conducting community health impact assessment (CHIA) in communities, Southern Thailand. The data was collected from local stakeholders with a focus on the participation of indigenous peoples by semi-structured in-depth interviews, focus group discussions and observation during June-November, 2015.

Based on a community readiness, results indicated that pre-screening determined whether a CHIA—a social tool to promote mutual learning in communities and to support participation in decision making, project and activity for the biomass power plant construction, was appropriate, feasible and required. At baseline, all 7 communities (n=46) scored equal to 4.7 or a stage 4—pre-planning on a scale of 1–9 readiness level that needed to be well prepared in all dimensions. The preparing for a community assessment lack of knowledge of issues found in all parts of communities. This indicated that it might not have reached sufficient levels of readiness prior to the implementation of CHIA. However, the benefit of this study will help to scope out the problem and define it in community's context, help the community take ownership of the problem and increase the community's capacity to move forward.

Summary: The community readiness was insufficient to conduct a community health impact assessment for the biomass power plant construction in Southern Thailand. Thus, it needs to prepare well before an implementation of CHIA.

Keywords: Community Readiness, Community Health Impact Assessment (CHIA), Biomass Power Plant, Southern Thailand

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Introduction

For decades, biomass—agricultural residues from plant material and animal waste has been traditional energy source in agricultural countries. For example, it has been widely used in a rural Thailand for a long time. Nowadays, energy consumption, has continuously increased its utilization in all parts of Thailand, so it has been used as a choice of electricity generation for a renewable energy source (1). In addition, an increasing quota for biomass from 10 MW to 50 MW by Alternative Energy Development Plan (AEDP), Thailand by 2015- 2036 by increasing electricity capacity generated from biomass to 5,570 MW within 2036. The investment progress has been shown in southern Thailand such as Thungsang, Thungyai, Nakhon Si Thammarat (9.5 MW), Pabon Phatthalung (9.2 MW) and Khuankalong Satun (9.2 MW). In Thailand, biomass power plants that installed capacity less than 10 MW will be not under any regulatory control. On the other hands, for those with 10 MW or more, an EIA report is required and for those with 150 MW or more there must be both HIA and EIA reports (2). According to the ruling, the project does not need to undergo a public hearing in compliance with the constitution. To avoid of the rule, several biomass power plants have a favor to install a small power plant (less than 10 MW) in Southern Thailand. However, they always have to face with considerable opposition from local communities due to their health awareness and concern (3).

Accordingly, biomass is not unconditionally cleaner than fossil fuel—even dirtier than coal in some ways, several studies revealed the impacts of electricity generation from biomass. For instance, it affected not only global warming, but also have negative impacts on public health such as dioxins and ultrafine particles from biomass incinerators. Moreover, a burning biomass process could lead to significant increases in emissions of carbon monoxide, carbon dioxide, nitrogen oxides, particulate matter and sulfur dioxide that lead to severe impacts on the health of children, elderly and people with lung diseases. These cause of premature death, asthma, chronic bronchitis, and heart disease various cancers that result to an unacceptable risk to the public's health (4). Applying the process of Community Health Impact Assessment (CHIA)—based on social norm and belief oriented, has long been conducted in Thailand. Furthermore, it is highly relevant to the community health problems and risks in rural Thailand or as a social tool for healthy public policy since 2007. As CHIA needs to work is 4 procedures by (1) developing tools (2) assessing the health of a community (3) moving forward to decision making process and (4) monitoring and evaluation (5), so people in community have to well prepare before use CHIA to solve their problems.

Community readiness is one indicator that has been used to measure community perceptions and attitudes toward efforts targeting issues that were concerned. For this issue, the meaning of community readiness is the degree to which a community is willing and prepared to take action on CHIA guideline for the biomass power plant issue. All 7 communities around biomass power plants construction, it is expected that the CHIA process could empower communities realizing on individual and community rights in determining their own future. However, no research project had investigated whether they are ready to use CHIA to create the learning process in community. Thus, this study was conducted to probe the capacity of community readiness by using Community Readiness Model (CRM)—a structured interview guide and scoring system developed by the Tri-Ethnic Center for Prevention Research at Colorado State University (6), to assess community preparedness level to implement the steps of CHIA guideline for the biomass power plant construction in Southern Thailand.

Objective

To examine the capacity of community readiness that will be affected either negatively or positively by the biomass power plant construction before conducting the steps of community health impact assessment (CHIA) guideline in communities, Southern Thailand.

Conceptual Framework

An overview of the conceptual framework to evaluate a community readiness to a CHIA implement for the biomass power plant construction in Southern Thailand was shown as Fig. 1
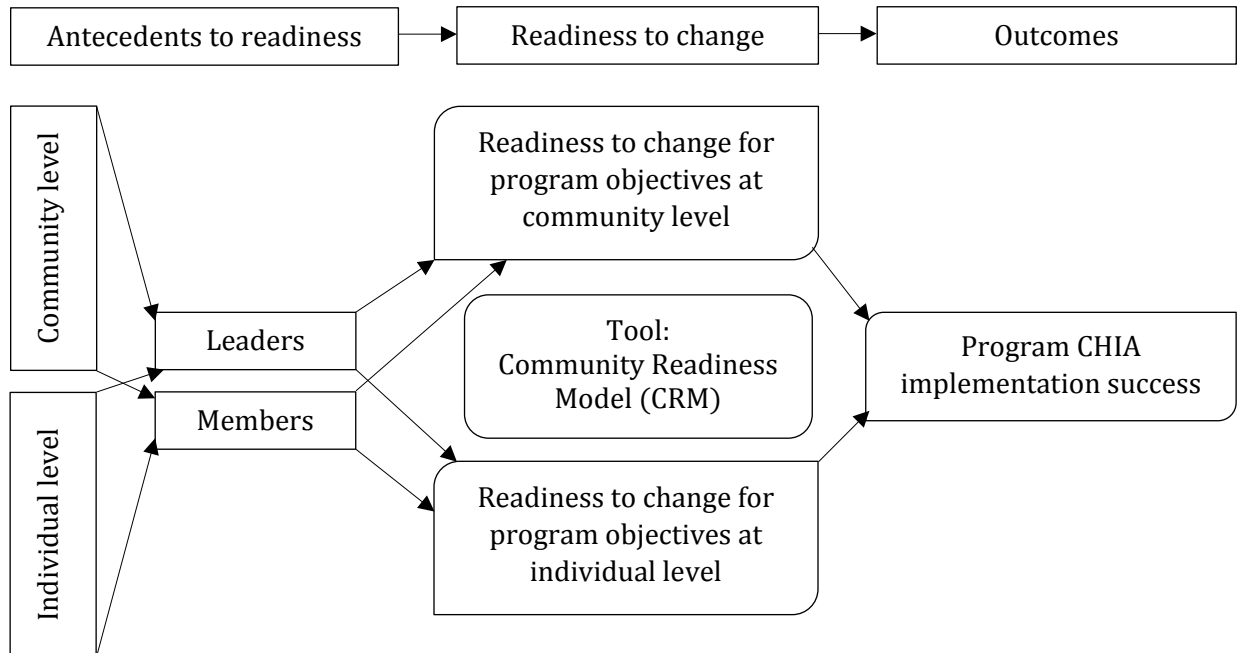
Fig.1 A modification of conceptual framework for community readiness to implement CHIA for the biomass power plant construction in Southern Thailand (7)

Methodology

1. Study design: A descriptive, cross-sectional survey using mixed-methods was performed to assess each community's readiness to engage in CHIA implement for a biomass power plant construction in Southern Thailand.

2. Research setting: The 7 participating communities were typical of regional centers in rural (Nakhon Si Thammarat province) Southern Thailand.

3. Population and Samples: 46 Residents who lived near by the biomass power plant construction in Nakhon Si Thammarat province, Southern Thailand. The purposive sampling technique was used to find samples that were community leaders including residents who lived around the proposed plant for at least one year.

4. Data collection and Research tool: Qualitative and quantitative data were collected by trained community interviewers and the academic researcher using a semi-structured questionnaire based on the CRM—a scale from 1 to 10 and the community's key informants in all stakeholders were identified through focus-group discussion during June to November, 2015.

The CRM tool (Handbook 2nd edition, 2014) (8) utilizes key informant interviews to assess stages of perceived community-level readiness across 5 domains as follows: 1) Community Efforts & Knowledge of Efforts 2) Leadership 3) Community Climate 4) Community Knowledge of Issue and 5) Resources. Each domain is assessed with a subset of interview questions that are scored and then the mean is calculated across domains resulting in an overall community readiness score and stage which range from 1 to 9 as shown in Table 1. (9)

Table 1. 9-Point Readiness Scale for Community Readiness Model

Score	Stage	Description
1	No awareness	Issue is not generally recognized by the community or leaders as a problem (or it may truly not be an issue).
2	Denial/ resistance	At least some community members recognize that it is a concern, but there is little recognition that it might be occurring locally.
3	Vague awareness	Most feel that there is a local concern, but there is no immediate motivation to do anything about it.
4	Preplanning	There is clear recognition that something must be done, and there may even be a group addressing it. However, efforts are not focused or detailed.
5	Preparation	Active leaders begin planning in earnest. Community offers modest support of efforts.
6	Initiation	Enough information is available to justify efforts. Activities are under way.
7	Stabilization	Activities are supported by administrators or community decision makers. Staff are trained and experienced.
8	Confirmation/ expansion	Efforts are in place. Community members feel comfortable using services, and they support expansions. Local data are regularly obtained.
9	High level of community ownership	Detailed and sophisticated knowledge exists about prevalence, causes, and consequences. Effective evaluation guides new directions. Model is applied to other issues.

Source: (10)

5. Data analysis: The analysis was based on the mean dimension and overall CRM scores measured as continuous variables in questionnaire, while data from focus group discussion with key informants were coded and analyzed using CRM methods to yield readiness scores for all communities.

Fig. 2 Overall of Biomass Power Plant Construction in Southern Thailand (Install Capacity 9.5 MW)

Results-Overall Changes in Community Readiness

In assessing overall change in community readiness to engage in CHIA implement for a biomass power plant construction in Southern Thailand, aggregate community readiness results were measure as a baseline. The total scores from 46 samples in 7 communities were demonstrated in Table 2.

Table 2. Community readiness scores (N=46)

Dimensions	Average (Mean±S.D)	Readiness Stage
1. Community Knowledge of Efforts	5.4±0.43	Preparation
2. Leadership	4.6±0.69	Preplanning
3. Community Climate	4.1±0.37	Preplanning
4. Community Knowledge of Issue	3.9±0.39	Vague awareness
5. Resources	5.5±0.35	Preparation
Overall Community Readiness Score	**4.7±0.27**	**Preplanning**

For all communities, scores ranged from 3.9 to 5.5 in each dimension. The mean overall readiness score was 4.7 (SD=0.27) on the 9-point scale (Table 2). This total score is firmly rooted in the preplanning stage of readiness and hints towards the preparation stage of readiness. In each dimension, the lowest scores (averaged for the 7 communities) among the 5 dimensions were those of knowledge of issue (mean 3.9, SD=0.39) which correspond with the vague awareness stage. On the other hands, the score of resources was highest (mean 5.5, SD=0.35) and the second high score was knowledge of efforts (mean 5.4, SD=0.43) that represented preparation stage. Similarity to overall readiness score, both community climate (mean 4.1, SD=0.37) and leadership (mean 4.6, SD=0.69) were preplanning stage.

Discussion

This study presented the results from an application of the Community Readiness Model (CRM) as part of a multi-stage community mobilization strategy to engage community leaders and members in implementing of CHIA for the biomass power plant construction in Southern Thailand. The resources, leadership, knowledge of efforts and community climate dimensions consistently yielded higher scores than the knowledge of the issue. The mean overall readiness score was preplanning of readiness stage. This means that the biomass power plant issue is important for them and they realize that what can they do or must be done. These results can be described in each dimension: (1) some community members have at least heard about local efforts, but know little about them. (2) Leadership and community members acknowledge that biomass power plant issue is a concern in the community and that something has to be done to address it. (3) Community members have limited knowledge about the biomass power plant issue or they have some awareness that this issue can be problem and why it may occur. (4) Current efforts may be funded, but the funding may not be stable or continuing. In other words, there are limited resources that could be used for further efforts to address the biomass power plant issue. These indicated that it might not have reached sufficient levels of readiness prior to the implementation of CHIA. A score represented that all communities could not be convinced to approach a CHIA guideline for a biomass power plant until they realized that this issue existed, and furthermore, that it finally affected the community. In addition, a community could not be forced into this action if it was not ready for, or that went against what most of their members believe. However, it could be set a new goal to raise awareness with concrete ideas to combat this condition. Finally, the benefit of this study will help to scope out the problem and define it in community's context, help the community take ownership of the problem and increase the community's capacity to move forward.

Conclusion

In conclusion, operation of biomass power plants in Southern, Thailand may definitely cause health impacts to nearby residents. However, this study suggests that a community has to be slightly ready to address a given issue before evidence-based practices for CHIA guideline can be introduced into and adopted by the communities.

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