

Development of a Food Security Management Model for Agricultural Community

DEVELOPPEMENT DU MODELE DE GESTION DE LA SECURITE ALIMENTAIRE POUR LE MILIEU D'AGRICOLE

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Abstract

Considering on the Food and Agriculture Organization (FAO) definition of food security, it is a state that is able to access by all people at all times to have enough food for an active and healthy life. The Food security includes at a minimum: 1) ready availability of nutritionally adequate and safe foods, and 2) an assured ability to acquire acceptable foods in the socially acceptable ways including, physical and economic access, at all times, to be the sufficient, safe and nutritious food to meet the dietary needs and the food preferences for an active and healthy life. In rural area, there is a tendency of food vulnerability. In Agricultural community, the food security is a condition in which all community residents can obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes a community's self-reliance and a social justice. The purpose of this research was to develop a food security management model for an agricultural community. The population was the people in agricultural area of Mahasarakham Province. The research design with the quantitative research was employed in this study. The questionnaire used as an instrument for the data collection was done as a quantitative approach and the Canonical Correlation was used for the data analysis.

The result of quantitative research, the finding revealed the best model of canonical correlation was the model had canonically correlated with .51355 between the set of independent variable of the land fertility, the vegetable production, the meat production, the food sources, and the community participation for the natural resource and the environment conservation and the set of dependent

variable of food quality, food quantity, and food safety.

Key words: Development; Food Security Management Model; Agricultural Community

Résumé

Considérant l'Organisation pour l'alimentation et l'agriculture (FAO) définition de la sécurité alimentaire, il est un état qui est en mesure d'accéder par tous les gens en tout temps d'avoir assez de nourriture pour une vie saine et active. La sécurité alimentaire comporte au minimum: 1) disponibilité d'aliments nutritionnellement appropriés et sans danger, et 2) une capacité assurée pour acquérir des aliments acceptables dans la façon socialement acceptable, y compris, l'accès physique et économique, à tout moment, d'être le suffisant, aliments sûrs et nutritifs pour répondre aux besoins alimentaires et les préférences alimentaires pour mener une vie saine et active. En zone rurale, il ya une tendance de la vulnérabilité alimentaire. Dans la communauté agricole, la sécurité alimentaire est une condition dans laquelle tous les résidents de la communauté peut obtenir un coffre-fort, culturellement acceptables, régime nutritionnel adéquat grâce à un système alimentaire durable qui maximise une communauté d'autonomie et d'une justice sociale. Le but de cette recherche était de développer un modèle de gestion de la sécurité alimentaire d'une communauté agricole. La population était le peuple de la superficie agricole de la province Mahasarakham. La conception de la recherche avec la recherche quantitative a été utilisée dans cette étude. Le questionnaire utilisé comme un instrument pour la collecte des données a été effectuée dans une approche quantitative et la corrélation canonique a été utilisé pour l'analyse des données.

Le résultat de la recherche quantitative, la recherche révèle le meilleur modèle de corrélation canonique a été le modèle avait canoniquement en corrélation avec 0,51355 entre l'ensemble des variables indépendantes de la fertilité des terres, la production végétale, la production de viande,

les sources de nourriture, et la communauté participation pour les ressources naturelles et la conservation de l'environnement et l'ensemble des variables dépendantes de sécurité de qualité des aliments, la quantité de nourriture, et la nourriture.

Mots clés: Développement; Modèle de gestion de la sécurité alimentaire; Agricole; Communauté

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INTRODUCTION

The Global food security will remain a worldwide concern for the next 50 years and beyond. Recently, a crop yield has fallen in many areas because of declining investments in research and infrastructure, as well as increasing water scarcity. Climate change and HIV/AIDS are also crucial factors affecting food security in many regions. Although agroecological approaches offer some promise for improving yields, food security in developing countries could be substantially improved by increased investment and policy reforms (Rosegrant, & Cline, 2003; World Resources Institute, 2007; Smith, & Edwards, 2008; Ericksen, 2008).

For every state in the country, its strengths and weaknesses relate to the five major dimensions considered in the analyses. These are: availability of food, which is a function of production, access to food, which is related to purchasing power, absorption of food in the body, which is determined by the availability of safe drinking water, environmental hygiene, primary health care and primary education, vulnerability to transient hunger, which is related to natural and manmade calamities and disasters, and sustainability of production, which is influenced by the extent of attention given to the ecological foundations essential for sustained advances in production. It is revealed that non-food factors, like livelihood and income-earning opportunities, health care facilities, education, sanitation and environmental hygiene are as important for food security at the level of every individual, as factors relating to the availability of food grains in the market and access to clean drinking water (FAO, 2003; World Resources Institute, 2007; GECAFS, 2008).

Most of the agricultural communities of Thailand locate in the rural area of the country and they are the people who produce the food to supply their own household, country, and other countries in the world. However, majority of them are still facing with poverty. This is a conflict that can be a reason to political instability such as the protection of NGO called "Samatcha Kon Jon" has continuously protested since B.E. 2538 until

now B.E. 2553. Because poverty is an essential factor of food insecurity due to lack of purchasing power, even though, once Thai government has claimed Thailand to be a world kitchen.

In order to develop food security management model for agricultural community, it should consider on the different factors whether in terms of culture, society, economic, environment, diversity of natural resource supply, and education system providing for agricultural area to develop better life quality for people based on the sustainable development concept. Particularly, in Thailand as agricultural country that is the major exporter of food for global community but the majority people who live in the rural area still face with the hunger and they are in the state of malnutrition. Especially, the North Eastern or I-sarn was indicated as poorest region of the country, even through, this region is also able to produce huge of rice which is a main grain food for Thai people. Food systems encompass (1) food availability (with elements related to production, distribution and exchange); (2) food access (with elements related to affordability, allocation and preference) and (3) food utilization (with elements related to nutritional value, social value and food safety) (FAO, 2003; World Resources Institute, 2007; Ericksen, 2008; GECAFS, 2008).

The food is an essential element of four basic needs to meet the healthy life quality in both physical and mental states for rural people to sustain their daily life. Even though, generally, there are different important elements to accomplish the food security for agricultural community people which are community characteristics and community food resources, food accessibility (affordability, allocation and preference), food availability (production, distribution and exchange), and food utilization (nutritional and societal values and safety), community food production resources, environmental hygiene, primary health care and primary education including the natural resources and environment conservation such as community forest conservation as source of food, drug, woodfuel, and housing but in the food security of agricultural communities in Northeastern (I-sarn) region, might be emphasized on food affordability, nutritional knowledge, poverty or purchasing power health care facilities, education, sanitation and environmental hygiene (Cohen, 2002; Gregory, Ingram, & Brkljacic, 2005; World Resources Institute, 2007; Ericksen, 2008). In order to meet the sustainable development, it needs to build the food system in aspect of food security in order to develop life quality for people in agricultural community, particularly, in districts surrounding Mahasarakham University.

Therefore, to achieve the better life quality of rural people with the sustainable development in term of food security, all community residents should obtain a safe, culturally acceptable, nutritionally adequate diet, and understanding nutritional knowledge for food

security management should be included in the research designed to cover for the aspect of problems, particularly, strengthening agricultural community capability that maximizes community self-reliance based on community natural resources and environment conservation and social justice through empowerment to people on building competency to increase their income through the sustainable agriculture such as New Theory Agriculture, and Agroforestry Agriculture to improve the land fertility of this area by using organic fertilizer (Thiengkamol, 2009). Additionally, they need to have nutritional knowledge, and appropriate food consumption behavior (Thiengkamol, 2010b; Thiengkamol, 2011c).

Methodology

The research design was implemented in steps by step as follows:

1) The quantitative research was done by using questionnaire as tool for data collection. The sample size was calculated with Taro Yamane formula to collect from 400 peoples. The simple randomization was employed for data collection from different districts in Mahasarakham Province. The number of sample was calculated by Taro Yamane formula. The completed 380 questionnaires (95.00%) were selecting as sample group by using simple randomization from all districts surrounding Mahasarakham University. The Canonical Correlation Analysis was used for statistical analysis (Hair et al, 1998).

2) Tools, the questionnaires for evaluation land fertility, vegetable production, meat production, food sources, community participation on natural resources and environment conservation, nutritional knowledge in food quality and food safety and proper food consumption behavior to meet food security management of agricultural community. Evaluation form to assess the participant practice during action research was implemented and Three Dimensional Evaluation and Round Dimensional Evaluation were constructed.

3) The questionnaires to determine the reliability of each question and the whole paper was determined with the alpha coefficient (α -coefficient) at .8082 (Sproull, 1988).

Results

Result of Food Security Management

The Pearson correlation between the set of independent variables was used in this study included land fertility (LF), vegetable production (VP), meat production (MP), sources of food (SF), and community participation for natural resource and environment conservation (CP) and the set of dependent variables included food quality (FQI), food quantity (FQn), and food safety (FS). The findings revealed that the correlation among these variables showed in table 1 and after testing with different techniques, it illustrated in terms of Pillais Hotellings, Wilks, and Roys

with highly statistical significance ($p < .000$), except only Roy technique illustrated with .26373 which was arranged in descending order of importance.

1. PEARSON CORRELATION AMONG INDEPENDENT AND DEPENDENT VARIABLES

From table 1, the results shows that land fertility (LF) correlated to food quantity (FQn) and food quality (FQI) with statistically significant at .05 while Vegetable production (VP) correlated to food quantity (FQn) with statistically significant at .01 and Meat production (MP) correlated to food quantity (FQn) and food quality (FQI) with statistically significant at .05. Moreover, Sources of food (SF) correlated to food safety (FS) with statistically significant at .05. Finally, community participation for natural resources and environment conservation correlated to food quality (FQI) and food safety (FS) with statistically significant at .01.

Table 1
Pearson Correlation Between Independent and Dependent Variables

	FQn	FQI	FS
LF Pearson Correlation	.123*	.139*	.028
Sig. (2-tailed)	.030	.015	.625
N	380	380	380
VP Pearson Correlation	-.191**	.029	-.003
Sig. (2-tailed)	.000	.613	.957
N	380	380	380
MP Pearson Correlation	-.136*	-.130*	-.109
Sig. (2-tailed)	.016	.022	.056
N	380	380	380
SF Pearson Correlation	.105	.092	-.134*
Sig. (2-tailed)	.063	.105	.018
N	380	380	380
CP Pearson Correlation	-.018	.363**	.476**
Sig. (2-tailed)	.756	.000	.000
N	380	380	380

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

2. MULTIVARIATE TESTS OF SIGNIFICANCE AMONG INDEPENDENT AND DEPENDENT VARIABLES

From table 2, the results of the different techniques of Multivariate Tests of Significance as Pillais, Hotellings, and Wilks showed that these are highly statistical significance ($p < .000$). Expected only Roy technique illustrated with .26373 which an alternative technique was called step-down procedure, it was a tests of significance and simultaneous confidence-bounds on a number of "deviation-parameters". The essential point of the step-down procedure in multivariate analysis is that the variates are supposed to be arranged in descending order

of importance (Hair, Anderson, Tatham, & Black, 1998).

Table 2
Multivariate Tests of Significance among Independent and Dependent Variables

Test Name	Value Approx.	F Hypoth.	DF	Error DF	Sig. of F
Pillais	.34824	7.85314	15.00	897.00	.000**
Hotellings	.44691	8.80900	15.00	887.00	.000**
Wilks	.67521	8.36046	15.00	820.29	.000**
Roys	.26373				

** Correlation is significant at the 0.01 level (2-tailed).

3. CANONICAL CORRELATION

Canonical correlation between the set of independent variables included land fertility (LF), vegetable production (VP), meat production (MP), sources of food (SF), and community participation for natural resource and environment conservation (CP) and the set of dependent variables included food quality (FQI), food quantity (FQn), and food safety (FS), the findings revealed that

Table 4
Correlations between Dependent and Canonical Variables Function No.

Type of Variable	Name of Variable	Canonical Variables Function No.		
		No. 1	No 2	No 3
Independent Variable	Land Fertility (LF)	.11511	.66087	-.49509
	Vegetable Product (VP)	.04447	-.64556	-.73301
	Meat Product (MP)	-.21092	-.59142	.05086
	Source of Food (SF)	-.22615	-.36542	-.34373
	Community Participation (CP)	.93987	-.14248	.10676

DISCUSSION

The findings revealed that the independent variables of land fertility (LF), vegetable production (VP), meat production (MP), source of food (SF) and community participation for natural resource and environment affected to food quantity (FQn), food quality (FQI), and food safety (FS). This was congruent to survey of Food and Agriculture Organization of the United Nations and Ministry of Agriculture and Forestry of Lao PDR (2007) found Some of the outcomes of these activities have been including capacity building of farmers and district authorities on forest and sustainable Non-Wood Forest Products (NWFP) management and domestication, and on the Market Analysis and Development(MA&D) approach for increased income generation. Regarding on the discovered results in table 2, land fertility (LF) and community participation for natural resources and environment conservation were the most important dependent variable that correlated to food quality (FQI), food safety (FS) and food safety. This was congruent to the real situation of land fertility of North Eastern of Thailand that most of lands were infertile due to the

they canonically correlated with .51355 and Eigenvalue was .3582. This is the best model to explain canonical correlation between two set of variate as show in table 3.

Table 3
Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct	Cum. Pct.	Canon Cor.	Sq. Cor.
1	.35820	80.15069	80.15069	.51355	.26373
2	.06004	13.43382	93.58451	.23798	.05664
3	.02867	6.41549	100.00000	.16695	.02787

Dimension Reduction Analysis was done, the findings revealed that every pair of roots was statistically significant at levels of .000, .001, and .037 respectively.

From table 4, the findings revealed that the highest weight of function number 1 was community participation for natural resource and environment conservation (CP) with .93987, the highest weight of function number 2 was land fertility (LF) with .66087, and the highest weight of function number 3 was vegetable product (VP) with -.73301.

dryness area and Mahasarakham Province which locates in this region also has problem of infertile with salty soil. Besides, majority of agricultural people are living dependence on community forest nearby their villages, therefore, the enrichment of community forest will related to community participation for natural resources and environment conservation. It also pertinent to the study of Saenpakdee, & Thiengkamol, (2011) that found the villager living depended on the community forest since their four basic needs of living depended on its such collecting mushroom, herb, vegetables as food and gathering firewood and wood as house fuel for cooking and wood for house building or repairing.

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