

Farmer Development in Thailand 4.0

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Key words: Farmer Development, Farmers's quality of life development, Ban Na District, Nakhon Nayok Province, Nawatwithi Agricultural Learning Center

Abstract: This research aims to develop agriculture in the area of Ban Na District, Nakhon Nayok Province with innovation and agricultural technology. It is a mixed methodology research between qualitative research and quantitative research. The survey was distributed to 237 farmers, interviewing 579 farmers, creating a community forum, group discussions with farmers, community leaders and agricultural scholars, also observation of agricultural areas. In addition to bring the quantitative statistics were analyzed by frequency, percentage, mean and standard deviation. The qualitative data were analyzed by inductive interpretation and logical analysis and presented the results of the data analysis, description the results of the research were as: problems of farming for farmers in Ban Na Sub-District, Ban Na District, Nakhon Nayok Province consisted of high cost of production, water resource problem, problems with soil resource, degradation chemical use problems. Nawatwithi Agricultural Learning Center, Ban Na District, Nakhon Nayok Province, suitable and practical. It was found that the Nawatwithi Agricultural Learning Center was designed to have special characteristics that differ from the general learning center, namely, it is a living learning center that uses 2 characteristics: learning center by gathering knowledge to create 3D models, documents, slides and video clips and learning base by using the area that has gathered knowledge. It is a living learning base all the time. As it belongs to farmers who use to carry out activities every day, so there is no need to hire and look after and those interested in three cars request to visit and study at any time. Quality of life of farmers in Ban Na Sub district, overall before the development of the philosophy of the sufficiency economy New Theory agriculture, integrated agriculture and organic agriculture were at high level ($\bar{x} = 3.65$) and after development at high level ($\bar{x} = 3.99$). Farmers life quality Farmers have changed the quality of life in 4 areas:

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Psychological aspects, farmers have a great attitude towards farming, proud and adheres to the principle of traveling in the middle of the concept of the sufficiency economy philosophy and have a feeling of generosity to the community groups, also praying to the Buddha for more peace of mind. Farmers are cherishing of the plan and want their children to come back to inherit their farming practices. Farmer society has an exchange and knowledge together, know and cherish local resources. They are determined and want to conserve and disseminate knowledge to the community to be known. There are more activities to exchange knowledge and produce together. There is cooperation in

community development. In terms of economy, farmers are educated to develop agricultural products. There are many types of agricultural cultivation and raising many kinds of animals in order to bring their produce to eat and to distribute which can circulate the product sales throughout the year. Products can also be privatized and sold as additional income, continuously generate additional income. In terms of health, farmers are healthier and happier. There is an exercise from agriculture and find ways of modern farming to combine happy minds, resulting in a healthy body. There are growing more organic plants, causing continued physical health care.

INTRODUCTION

With the royal strategy of King Rama 10 for the Ban Na district, Nakhon Nayok Province is the area responsible for mission to provide academic services and technology transfer to local and society of Phranakhon Rajabhat University. To improve the quality and standard of life of the people for the better with the main occupation people in the area. Ban Na District, Nakhon Nayok Province, most of the population does agriculture. It is >70% of the rice farming and has a relatively low income from farming, an average of 20,000-60,000 baht per household per year. It depends on the number of production times per year, rainfall and whether it is in the irrigated water area. With the context of farming that makes farmers in Ban Na district poor, have a relatively low income that is relatively volatile, resulting in the quality of life of the people. This is partly due to the farmers in the area still using the Farmer 1.0 farming method which is characterized by monocultural crops that require large-scale yields according to the capitalist economy. The use of chemical fertilizers, pesticides, technology and innovation is not used in production. There is no processing to increase the value of the product, etc. Therefore, this research project series aims to develop agriculture 4.0 in the area of Ban Na District. By adopting agricultural innovations and technologies that have been recognized to develop agriculture in the area such as smart farm management, technology production, agricultural product management and develop it into a community learning center in the form of Nawatwithi Farmers Learning Center.

Tackling poverty and improving the quality of life of farmers in Ban Na District, can be implemented with Agricultural Development 4.0 (System Development) is the introduction of agricultural innovations and technologies that have been accepted to develop agriculture in the area according to the king's science that is "understand, reach and develop". Participatory Action Research (PAR) methods are: understanding current

climate problems (understanding), training, educating and finding solutions or developing jointly (study) and development (experiments, used to solve problems or develop) is a characteristic of the development of robots in the Thailand 1.0+4.0 (traditional community approach+social business). And it is the integration of normal farming along with the advancement of technology to enable farmers to continue their traditional way of life but have a better quality of life. With the introduction of agricultural innovations that have been recognized, including smart farm management, technology production development, agricultural product management is adapted to suit the agricultural context of Ban Na District with participation from all sectors. To strengthen the farmer group, then bring the success of that development to develop a farmer learning center and develop it as a tourist attraction for the OTOP farmer's way of life that can improve the quality of life of farmers in Ban Na district sustainably.

Research objectives: To develop agriculture in the area of Ban Na District Nakhon Nayok Province with agricultural innovation and technology, including smart farm management, production technology, agricultural product management and develop it into a community learning center in the form of the Nawatwithi Farmer Learning Center, Nawatwithi.

To improve the quality of life of farmers in Ban Na District Nakhon Nayok Province with sustainability through experimentation and evaluation of driving the model for the development of quality of life of farmers according to the philosophy of sufficiency economy, new agricultural theory, Integrated agriculture and organic farming.

MATERIALS AND METHODS

Survey of farmer's quality of life and agricultural conditions with the distribution of questionnaires, interviews and observations in the Ban Na Sub-district 8 Communities.

Survey of farmers applying the concept of sufficiency economy philosophy adopting new theories of agriculture and integrated agriculture, organic farming agricultural areas that are feasible and suitable for smart farm development, agricultural production management and knowledge agricultural wisdom, traditions and cultures in the Ban Na sub-district area suitable for the development of farmer's learning center by distributing questionnaires, interviews and observations in the Ban Na District 8 communities.

Establishing a community forum to develop a smart farm management model. The use of agricultural production technology, agricultural production management and the development of farmer learning centers that are suitable for the area. The development of farmer's quality of life development model, a model for applying the concept of sufficiency economy philosophy, a model for applying the new agricultural theory and integrated agriculture approach and a model for adopting an organic production system that is suitable for using in Ban Na Sub-district.

Establishing a community forum to assess the effect of driving the quality of life development model for farmers. A model for applying the concept of sufficiency economy philosophy, a model for applying the new agricultural theory and integrated agriculture approach and a model for adopting an organic production system driving Smart Farm Management Model. The use of organic production technology, agricultural production management and the development of farmer learning centers that are suitable for the area.

Sample population and the research area is 237 farmers, interviewing 579 farmers, creating a community forum. Group discussion with farmer leaders, community leaders, 8 communities and agricultural scholars. The data collection tools and methods included:

- Collecting information from related documents
- Forums and group discussions
- In-depth interviews
- Observation of farmland
- Questionnaires

Data analysis and presentation: The qualitative data analysis, the relevant documents for making a group discussion forum in-depth interviews and observation of the project implementation area by analyzing summarized content, interpreting and presenting the analysis results with descriptive information. The quantitative data analysis, the questionnaire with descriptive statistics: frequency, percentage, mean and standard deviation. A]and present the analysis results by descriptive.

RESULTS

Farming conditions and farmer's quality of life

Farming conditions: Agricultural problems for farmers in Ban Na Sub-district, Ban Na District, Nakhon Nayok Province consisted of high production costs, water resource problem, problems with soil resource, degradation chemical use problems

Agricultural development

Integrated farming: The integrated farming characteristics of farmers in Ban Na Sub-District. It is agriculture where crops and/or raising animals in the same area where production activities can be utilized support each other.

Agricultural product management: Because agricultural products are diverse, enough for consumption within the family. The agricultural product memorization of the local population is the self-distribution or setting up a small shop in front of the house, some fruits are sold to the middleman who comes to buy and sell to where farmers cannot negotiate the price. And part of it may come from farmers in Ban Na sub-district can not join together in agriculture. Thus causing the condition of agricultural product management of local people There is no widening as it should be.

Sustainable farming: Sustainable farming in both economic, social and environmental aspects, considering the agriculture that improves the well-being, peaceful society and the environment in agriculture is still the same environment in the days of grandparents, parents, inheritance of agriculture and can improve the well-being and Sustainable happiness

Organic farming: Focus on health safety, ecology, fairness to nature, does not destroy nature and takes care of the environment in all aspects as follows:

Dimension of health: Farmers have agriculture without using chemicals. Both pesticides or chemical fertilizers to reduce residues in crops, vegetables, fruits and animals by agriculture using composted fertilizers mixed with cow dung, buffalo, rice bran and eggshell substances to make fertilizers for use in plant maintenance.

Ecological dimensions: Agriculture farming in Ban Na sub-district gives importance to the coexistence of living things. Emphasize on improving the soil without using chemicals so that living organisms in the soil can survive, does not allow chemicals to enter the pond. Because not using pesticides by using some plants grown in the area to repel insects instead, soil preparation, especially, rice

fields, is not burned but use the fermentation of rice cobs in the field as fertilizer, improve the soil instead of burning or destroying.

The dimension of fairness: It is farming with future generations in mind, value the suitability between nature and man, contributes to conservation Farmers of Ban Na Sub-district have agricultural practices that take into account the future generations. Agriculture is carried out while maintaining the fertility of the land, not damaging the soil, water and preserving the conditions of gardens and plants for future generations to learn and use.

Dimension of care: It is a careful agriculture, caring for the environment with the introduction of local wisdom. There is a consultation on agriculture that does not affect groups or communities together.

Production technology: Divided by agricultural activities as follows:

Cultivation: Cultivation is the use of a natural crop system, is the use of knowledge about the distance between the trees and distance between rows, to grow each plant to make the most of the area yield the most crop cultivation details can be divided into: soil preparation, planting and plant propagation and plant breeding.

Plant maintenance and pest control: Plant maintenance is a stage of the plant treatment, to have good growth Has the least amount of damage and pest control In order to prevent or eliminate pests, the details of plant maintenance and pest control can be divided into: fertilizing and watering, trimming and wrapping and pest control and pests.

Harvesting and production management: It is the use of knowledge and appropriate methods for handling in order to keep the produce of quality that meets the needs of consumers, harvesting produce for consumption, to distribute, to produce good quality, it requires tools or various equipment to help harvest. The details of harvest and production management can be divided into: harvesting, processing and distribution.

Farmers according to the philosophy of sufficiency economy: It is agriculture that emphasizes food security, family sufficiency, economical, self-reliant with details as follows:

Reducing expenses: Reducing expenses by growing vegetables, fruit to eat, raising animals for consumption, production of fertilizers for agriculture. Farmers make organic fertilizers to maintain the soil in their gardens,

using manure and self-made fermentation, product processing by bringing the remaining produce to process in different ways.

Increasing income: The products that exist are mainly used for consumption, such as growing vegetables, fruits, raising animals and the leftovers from consumption that are sold and processed for sale, such as morning glory, gourd, zucchini, lime, etc.

Self-reliance: When applying the philosophy of sufficiency economy as a way of living which when there is a reduction in expenditure, increase income, earn extra income, save, save, spend more economically.

New theory farming: By applying to suit the context of the area because Ban Na sub-district has water problems as well Farmers have adapted to new farming practices. There is digging a water well, divide the gardening area, divide the farm area and raising animals also there are groups to do activities in selling products and increasing productivity.

Smart farm management: Agricultural problems for farmers in Ban Na Sub-District, Ban Na District, Nakhon Nayok Province. The key is the problem of insufficient water resources for farming. Because, it is an area without dam irrigation system, causing the rain to wait and using the well that was dug by itself which is not enough for agricultural use. Therefore, managing a smart farm that is suitable for Ban Na sub-district is to use an automatic moisture meter that can be sent to a mobile farmer or a water pump to water when soil moisture is low, to save water, do not water more than necessary, will make water available all year round.

Nawatwithi agricultural learning center: Ban Na District, Nakhon Nayok Province, suitable and practical, found that learning characteristics, learning process of farmers and people in the community, participation in activities of Nawatwithi Agricultural Learning Center, Knowledge and learning readiness of farmers and people in the community. Community leaders in the management of the operation of the Nawatwithi Agricultural Learning Center. Learn about Agriculture Nawatwithi. Have places, materials, equipment, teaching materials Model farmers with knowledge, abilities and experience in the transmission of agricultural knowledge.

The design of the Agricultural Nawatwithi Learning Center has special characteristics that are different from the general learning center, that is, it is a living learning center that uses 2 characteristics:

- Learning center by gathering knowledge to create 3D models, documents, slides and video clips

- Learning base by using the area that has gathered knowledge It is a living learning base all the time. As it belongs to farmers who use to carry out activities every day, so there is no need to hire and look after and those who are interested in three cars request to visit and study at any time

Quality of life of farmers in Ban Na Subdistrict:

Farmer's quality of life Overall, before the treatment was at the moderate level ($\bar{x} = 3.65$) and after the treatment at the high level ($\bar{x} = 3.99$). When considered individually, it was found that after development had better quality of life in all aspects as follows:

- Psychological development at a high level ($\bar{x} = 3.74$), after development at a high level ($\bar{x} = 3.95$)
- The social aspect of pre-development was at a very low level ($\bar{x} = 3.59$) and after it was at a high level ($\bar{x} = 3.99$)
- The economy before development was at a high level $\bar{x} = 3.55$) and after development at a high level ($\bar{x} = 4.00$)
- Health aspects before development were at a moderate level ($\bar{x} = 3.72$) and after development at a high level ($\bar{x} = 4.00$)

Developing the quality of life of farmers according to the sufficiency economy philosophy, New Theory Agriculture, Integrated Agriculture and Organic Farming Farmers have changed the quality of life as follows:

Psychological: Before the development, farmers were concerned about their livelihoods. Working to be sufficient to sustain life, some neglect of their neighbors and sometimes lack the confidence to have a career as a farmer.

After development, farmers have a very high attitude towards farming. Proud and adhere to the principle of traveling in the middle of the concept of the sufficiency economy philosophy and have a feeling of generosity to the community groups and praying to the Buddha for more peace of mind Farmers are jealous of the plan and want their children to come back to inherit their farming practices.

Social: Before the development of farmers in the community, if there is a problem among the neighbors, there is some attention and support but not much, transcribing knowledge and wisdom, there are some parts that want to share knowledge with each other, to and from specific things, there are traditional activities. The product is shared when there are activities together.

After the development, farmers have to exchange and learn together, know and cherish local resources. They are very determined and want to conserve and distribute

knowledge to the community to be known. There are more activities to exchange knowledge and produce together. There is cooperation in community development.

Economic: Before agricultural development, there were few agricultural deposits, uneven income, have more expenses than income, sustenance not yet expanding to generate much income from a systematic processing and distribution. They have agricultural expenses including fertilizers, pesticides and agricultural wages and there are expenses to hire Less labor in the community.

After the development, farmers have a feeling of attachment to the farmer profession. There is knowledge to develop agricultural products. There are many types of agricultural cultivation and raising many kinds of animals in order to bring their produce to eat and to distribute which can circulate the product sales throughout the year. Products can also be privatized and sold as additional income, continuously generate additional income. After the university took care of agriculture, to develop agriculture and bring more agricultural products to generate income.

Health: Before the development, some farmers bought food to eat. There are mainly subsistence plants. Farmers have health problems such as insomnia, income concerns and concern for their children.

After the development of farmers, more and more vegetables were rotated for eating and processing for sale, more health, happiness. There are exercises in agriculture and find ways of modern farming to combine happy minds, resulting in a healthy body. Understand the philosophy of sufficiency economy and sustainable agriculture for self-sufficiency, peace of mind, elderly, longevity and good health. After the university came to promote and stimulate agriculture of growing vegetables and raising non-toxic animals, causing continued physical health care.

DISCUSSION

The Development of the NawatwithiAgricultural Learning Center, Ban Na District, Nakhon Nayok Province. It was found that learning centers were designed with special characteristics that were different from conventional learning centers, namely, it was a living learning center using 2 characteristics: learning center by gathering knowledge to create 3D models, documents, slides and video clips and a learning base by using the area that has gathered knowledge It is a living learning base all the time. Because it belongs to the farmers who use to carry out activities every day. Such characteristics are consistent with Thalang^[1] describes the natural learning process of human beings. This is a real practice

(Learning by Doing) and teaching demonstration by telling and the creation of knowledge in writing Knowledge gained through experience and trial and error. Transmitted to the generations to come by a popular method is Demonstration Tradition, Oral Tradition. Which can be found in the form of proverbs, aphorisms, lullabies. For the creation of knowledge in writing (Literary Tradition) will record knowledge and wisdom into a textbook. This method is used when the subject is to convey a profound complexity, such as astrology texts, herbal medicine textbook, home planting texts, etc. And the exchange of knowledge and experiences among people in families, communities and different groups, resulting in further learning of new things, the exchange of knowledge and experiences in this manner facilitates the expansion of the learning process, wider in terms of ideas, attitudes, methods, innovation, knowledge is blended and the creation of new knowledge without boundaries and no end. According to Wasi^[2], the community's learning must be interactive learning through action or learning by doing. It produces sufficient quality intelligence for overcoming poverty for social development. That is, the learning process that is coupled with the practice or activity itself. This is in line with Pusurinkham^[3] which outlines the principles of participatory learning that empowerment learning is required (Experiential Learning). In addition, Kolb Learning^[4] describes an element of learning as concrete experience, a process wherein learners apply their own knowledge and hands-on experience and experimentation. Learners bring the concepts that have been tested and used or applied in situations where different processes.

Farmer's quality of life improvement: Farmers had quality of life changes in all 4 aspects. It was found that farmers had positive attitude. Take pride in your career and have a feeling of generosity to the community groups, social farmers exchange and learn together, know and cherish local resources. In terms of economy, farmers are educated to develop agricultural products. There are many types of agricultural cultivation and raising many kinds of animals in order to bring their produce to eat and to distribute and health, farmers are healthier, happier. There is an exercise from agriculture and find ways of modern farming to combine happy minds, resulting in a healthy body. There are growing more organic plants. In line with the 3rd National Economic and Social Development Plan (1972-1976), the 5th National Economic and Social Development Plan (1982-1986), the 11th National Economic and Social Development Plan (2012-2016) and the 12th National Economic and Social Development Plan (2017-2021)^[5-8]. Putting emphasis on good quality of life is so important that it affects not only the individual.

If but still affects the nation, having a good quality of life both physically, mentally and intellectually, when having a good quality of life, will also make society and the nation even better. And the World Health Organization^[9] say that the quality of life of an individual depends on the social, cultural context and values of that time and is related to the goals, expectations and standards that each person sets. Which consists of 4 dimensions as follow: Dimension of physical health is the perception of the physical condition of a person. Which affects daily life, dimensions of mental health is the perception of the mental state of the self, the social relationship dimension is the perception of one's relationship with others and the environmental dimension is perception about the environment that affect life.

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