

Research Article

**EXPLORING TRANSFORMATIVE LEARNING FOR SUSTAINABILITY
TO CLIMATE CHANGE ADAPTION IN THE MEKONG DELTA
OF VIETNAM: THE CASE STUDY IN THE VACB IN CAN THO***Tran Duc Tuan^{1*}, Nguyen Kim Hong², Vu Thi Hong Ngoc³**¹Institute of Research & Education for Sustainable Development (IRESD),
Vietnam Union of Science and Technology Association (VUSTA), Vietnam**²Van Hien University, Vietnam**³Department of Basic Education – Central College of Education, Vietnam***Corresponding author: Tran Duc Tuan – Email: ductuan.tran57@gmail.com**Received: May 14, 2019; Revised: June 02, 2019; Accepted: May 29, 2020***ABSTRACT**

In the time of globalization and global climate change, transformative and transgressive learning (T-learning) has been considered as a strong dynamic and an effective tool to speed up the transformation to sustainability in places that are vulnerable to impacts of climate change. Therefore, under the support and finances of UNESCO Paris ISSC (International Social Science Committee), researchers from nine countries (South Africa, Netherlands, Sweden, Vietnam, India, Ethiopia, Zimbabwe and Malawi) have co-engaged to carry out a research project called “Transformative learning for the social-ecological sustainability in times of climate change” funded by the ISSC of UNESCO Paris. The aims of the project are to investigate the nature, qualities, contribution and effect of transformative learning for sustainability at niche levels where wicked problems arise at the nexus of climate-water-food-energy-social justice. Transformative learning in the Mekong Delta of Vietnam has been chosen as a case study of this project. This article describes investigations about transformative learning in the VACB model (V: Garden-A: Pond- C: Cage-B: Biogas) in My Khanh Commune, Can Tho outskirts and outlines some important findings about T-learnings and its contributions to the formation and development of sustainable livelihood models for climate change adaptation in Can Tho.

Keywords: transformative learning; transformation to sustainability; sustainability Vietnam Mekong Delta; VACB model

1. Introduction

In the context of environmental change such as global warming, globalisation and population growth (Thomas Friedman, 2009), climate change, environmental pollution and

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population explosion have become serious problems of the modern world. Thus, the sustainable development has become a prime target that human beings have to achieve and an essential way that a modern world has to follow. In addition to the demand for innovation in policies and technology, the transformation of knowledge, actions and lifestyles in a sustainable way, it needs to develop a new approach to ensure sustainable development. Thus, the social learning-centered transformation in the time of climate change is recognized in the social-ecological sciences (Future Earth, 2014; IPCC, 2014; Wals AE, 2007) and a fundamental transformation of lifestyles and economic pattern is needed to achieve sustainable development (Balsiger et al., 2017).

Educational research has shown that learning can lead to the development of society and create social transformation (Engelström, & Sanniring, 2010). Social-ecological science research has witnessed the increasing need of transformation based on learning where transformative learning plays a crucial role in the transformation to sustainability (T2S). The intergovernmental committee of climate change has confirmed the importance of learning-centered approaches to adapt to climate change (Future Earth, & IPCC, 2014; Wals, 2007). Nonetheless, up until now, people have not fully understood the nature as well as the processes and types of transformative learning, especially in places where wicked problems exist in the climate-water-food security-energy-social justice nexus. Thus, scientists and activists are interested in finding answers to important questions such as: how can transformative learning be understood and carried out in climate change in many places and regions in the world? What are transformative learning's roles and how can it contribute to the transformation to sustainability in places where wicked problems originate and are prominent in the climate-water-food security-energy-social justice nexus? How can transformative learning initiate, expand and develop to reinforce the sustainability stakeholders at different levels? (Heila et al., 2015). Thus, the aims of the project are to investigate the nature, qualities, contribution, and effect of transformative learning for sustainability at niche levels where wicked problems arise at the nexus of climate-water-food-energy-social justice.

2. Reinforcement of research about transformative learning for sustainable development in times of the global climate change

Efforts of individuals or research groups in a country are not able to address the above questions and issues about transformative learning in times of global climate change. Consequently, the international cooperation of countries where climate change's impacts is severe is imperative. In that context, in accordance with the initiative of Rhodes University, South Africa, a network of academia, civil society and public researchers from nine countries: South Africa, Sweden, Netherlands, Vietnam, India, Zimbabwe, Malawi, and Columbia are found to carry out a project called '*Transgressive Social Learning for*

*Social-Ecological Sustainability in Times of Climate Change*¹. With nine case studies in nine countries, including Vietnam, the project aims to clarify the emergence and qualities of transformative learning processes as well as their roles and their contributions to the sustainability transformations in times of global climate change.

The first challenge researchers face is to clarify types and processes of transformative learning and transgressive learning for sustainability, especially at a niche level based on interdisciplinary perspective and approach. This is challenging, as the disciplinary research is still dominant in many places in the world. With the interdisciplinary approach, the project is supposed to answer questions as to how can transformative learning work in a standard frame, especially at niche levels? How to maintain and promote the innovative and potential reforms in different levels and scales to improve the transformative ability of local people for sustainable livelihood development and climate change adaptation in various scenarios around the world.

IPCC (2014) has affirmed the role and importance of local participants' involvement in transformative learning and reiterated that local organizations are vital in the changing of climate adaptation process and communication. Participation and democratic discussions are effective in connecting local people groups and organizations to put the sustainability transformation into practice.

Although acknowledging the importance of the participatory approach and discussion to learning and social change. The IPCC (2014) believes that the results of such processes are often 'mixed up' and require continued research. Thus, clarifying and explaining fully the role and importance of the participatory approach and democratic discussion in transformative learning processes is one of the crucial missions of international research groups. This is the second challenge for the project research group of the project.

Objectives of the project are to:

- 1) investigate and research the emergence, expanding, qualities and contributions of transformative learning processes in food-water-energy-climate-social justice nexus in nine typical case studies across nine countries involved;
- 2) investigate and identify germ cell activities on transformative learning for sustainability and participate in potential expansions within the multi-level perspective and find evidence as to how things are done;

¹ Project by TNK research group approved and sponsored by UNESCO Paris ISSC (International Social Science Committee) in three years called (2016-2018) "Transgressive Social Learning for Social-Ecological Sustainability in Times of Climate Change"(T-learning project of ISSC).

3) develop transformative learning methodologies and publish findings of transformative learning in the globalization era to extend the theoretical work on T-learning within social-ecological sciences.

Since 2016 transformative learning research teams from nine countries have effectively carried out various T-learning research activities. In a T-learning case study in Vietnam, the Mekong Delta has been selected for the main location and T-learning investigation and field have been focused on the sustainable livelihood models for climate change adaptation in Can Tho city and the Kien Giang Biosphere Reservation.

3. Research on transformative learning in sustainable livelihood models to adapt to climate change in the Mekong delta of Vietnam

3.1. Identifying locations for transformative learning in Vietnam

Transformative learning is a new concept and has not been fully studied in Vietnam. Nonetheless, transformative learning in the Mekong Delta has been chosen as a case study for the international research project about transformative learning because of the following reasons.

Firstly, Vietnam is considered as one of the ten most vulnerable countries in climate change and the Mekong Delta is the most affected area in the country. It is one of the world's three most vulnerable deltas (along with Nile Delta in Egypt and Ganges-Brahmaputra Delta in Bangladesh) that will be most affected by sea-level rise (Le Dang et al, 2014a, Le Dang et al, 2014b). The Mekong Delta has been suffered from climate change, including flooding, the increase of rainfall, extreme weather conditions and salinity intrusion. As a consequence, 90% of agricultural land will be affected by flooding and 70% of the delta will be covered by salinity intrusion (ICEM, 2009). Climate change has become an actual threat to agricultural productivity and will affect the livelihood of local people, especially poor people (Västilä, 2010).

Second, despite having been the biggest production and exportation place of rice and seafood in Vietnam, the Mekong Delta has been facing obstacles because of unsustainable agricultural development. Soil and water pollution are getting worse because of the overuse of pesticide and inorganic fertiliser. Exploiting sand is causing land subsiding and landslide. Aquaculture booming spread is causing salinity intrusion. In such a situation, sustainable development is considered as the priority target to adapt to climate change and bring over prosperities and social justice for Mekong Delta residents.

Third, research about the connections between food production and food safety has pointed out that in the Mekong Delta, the climate-water-energy-social justice nexus has

been affected more severely than ever (Le, & Trebuil, 2005). In such circumstances, residents have shown their concerns over nexus issues and want to have chances to approach social learning forms (Hirsch, & Lloyd, 2005), which include public media, civil society, community learning, NGOs or academic organisations or training organisations that would support residents to understand the climate-water-energy-social justice and develop their adaptation ability (Le, & Tran, 2018). The need for learning and innovation in times of climate change has been acknowledged in places that adapted successfully with climate change (Adger, 2000; Folger et al., 2003). The learning process requires the cooperation and sharing of knowledge among agencies (Berkes, 2009).

The target of transformative learning in the Mekong Delta is to investigate the role of transformative learning in the transformation to sustainable agriculture in the context of climate change. It identifies the quality and motivation of transformative learning in the Mekong Delta. The main question that needs to be addressed by the research is: Is transformative learning one of the motivations in maintaining and promoting the transformation of sustainable agriculture in Mekong Delta?

3.2. *The theoretical background of the study*

This study of transformative learning in times of climate change in Vietnam and in the Mekong Delta is one of the nine case studies of an international research project about transformative learning by ISSC. Similar to other case studies carried out in other countries, transformative learning research in Vietnam is operated based on the following theories (Heila, 2015a).

The theory of the social-ecological system and social-technological transformation is the initial theoretical background for transformative learning in the Mekong Delta. Ritter & Webber (1973), Bazzilian (2011) and Bierbau and Matson (2013) are representatives of social-ecological theory and they have raised the necessity of considering ‘wicked problems’ and nexus. The multi-level transition theory represented by Geel (2002, 2010) and O’ Brien (2012), and the theory of political ecology as displayed in the work of Leff (1996) and Latour (2004, 2013) have raised important concepts, out of which the key concepts are about regards to technological and social transitions and transformations.

The theory of reflective, communicative and expendable social learning is one of the most important theories in transformative learning research in Mekong Delta. Paolo Freire (1975, 1998), Bell Hook (1994, 2010) and Sheets-Johnston (2011) are representatives of critical education theory. They believe that transgressive learning exceeds the transformation in awareness to become a reflective and social learning form, Vugotxki and successors have extended the learning theory based on the activity theory and the

historical-cultural viewpoint. According to them, the crucial question is: *how can learning lead to the development at micro/niche levels?* They also provide tools to identify and analyze collective learning. Moreover, the extended learning theory has shown that multi-level interactions in the multi-level system are done by developing the potentiality of core activities. Also, other theories that are considered in the research about transformative learning in the Mekong Delta are theory about environmental education and education for sustainable development especially the reflexive social learning theory by O'Donoghue 2014 and Wals 2007, transactional learning theory by Ostman (2010) and social learning theory by Reed (2010).

The third theoretical background for research on transformative learning in the Mekong Delta is the theory of competency, the theory of social justice and theory of citizenship. Research about social justice by Sen (1999), Nussbaum (2011) and Robeyns (2005) have theoretically confirmed that social justice is reflective thanks to the emergence of subjects and regular learning, *transformative and transgressive learning.*

Other theories are sustainability competencies and collectivity by Kronlid 2014, Steward 2005 with the democratization of education and learning process by Unterhalter 2005, Walker 2006. Theories on citizenship include ecological citizens (Mc. Garry 2014, Orr 1992, Reid & Taylor 2003), citizen science (Dickensen et al. 2010, 2012), global citizen (Eistub 2010) and citizen as a subject (Neocosmos 2009, 2012). Although there are some differences in these theories, they are useful for transformative learning research in the Mekong Delta.

Besides that, we also take into account the theory on a multi-level transition system and its argument about the cooperation between organizations to solve the problems through learning, communication, and transitions. Geel (2010) believes that the nature of environmental concerns is disputatious, complex, global, future-oriented and standardized. Thus, social movements need the support from scientists who are concerned about environmental issues and sustainable development.

3.3. Exploring and identifying transformative learning for sustainability to climate change adaptation in the VACB at My Khanh commune in the Mekong Delta

3.3.1. Selection of study site

To study a real situation and potentials of transformative learning for sustainability to climate adaptation in the Mekong Delta, since 2016 until now Can Tho city has been chosen as a case study site of transformative learning for ecological and social sustainability in the Mekong Delta. The main reasons are that the climate – water – food – energy - social justice nexus is presented in this area and insights into opportunities

and challenges of transformative learning for sustainability can be provided. Moreover, germ cell activities and evidence of basic kinds of transformative learning such as instrumental learning, communicative learning, and emancipatory learning can be observed in this study location.

To exploring and identify the real situation and potentials of transformative learning in Can Tho, My Khanh commune has been selected as a case study, The main reasons for this case study selection are as follows (Le, & Tran, 2018):

- My Khanh commune is a typical rural community of the suburban district in Can Tho city
- In My Khanh community, there are several sustainable livelihood models. They have been expanding and developing, among them the **VACB² model** is considered to be more prominent
- This community has appeared, maintained, and been on the process of expansion and development of initiatives (germ cell activities) of transformative learning which present possibilities of moving towards sustainability,

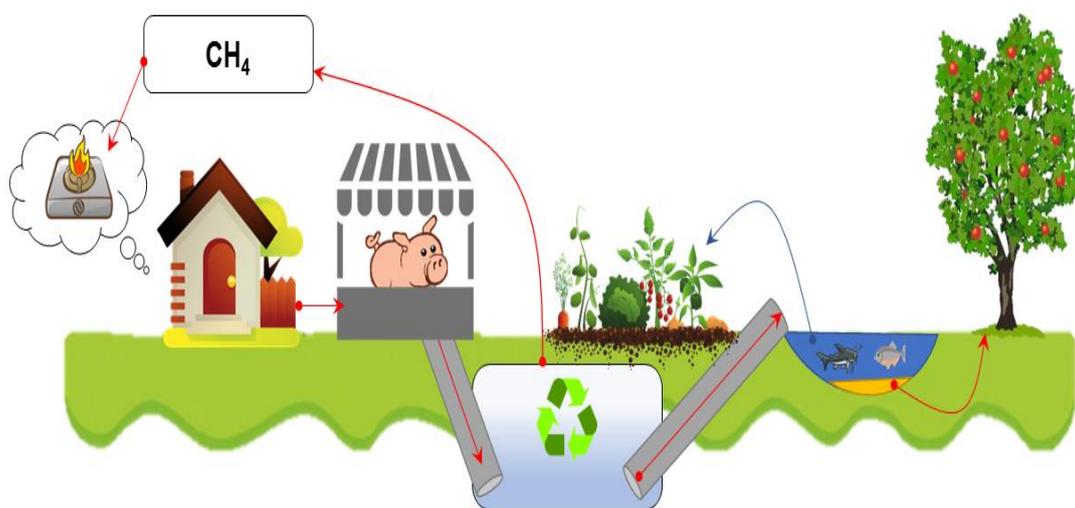


Fig 1. A VACB model in My Khanh commune, Can Tho

Source: T-learning team from the Department of Education, Can Tho University (2017)

² VACB: V-garden/orchard, A-fishing farm, C-livestock farm, B-biogas

Box 1: Brief introduction of the VACB in Can Tho, Vietnam

The origin of the VACB model has appeared in Can Tho in last decades of the twentieth century under the technical and financial support of the Rural Development Project based on the clean development mechanism (CDM) funded by JIRCAS, Japan. The VACB also has received the support from the authorities at all levels in Can Tho city through the sustainable development policy in agricultural production. During exploring process, the local farmers explained that “in the last 20 years, the garden-pond-barn-biogas project arose from collaborations between farmers and scientists and has contributed towards household economic wellbeing”. In addition, the VACB model has been locally promoted and spread to other areas in Can Tho and some provinces not only in the Mekong Delta such as Bac Lieu or Hai Giang province, but also in the central provinces such as Thua Thien Hue or Quang Binh province.

The local authority and key informants in the communities identified that the VACB model has been an important model for their sustainable livelihood in context of climate change and has been substantially contribution to the environmental and social condition improvement in the communities. Their main income has come from the pig production, fruit from garden, and fish cultivation. They have experienced through the good environment around their communities, diversified income sources, reduction in energy use, and combination elements of system production (for example farmers use manure from livestock production for crop production and fish cultivation; use water from fish cultivation for crop production and create the humidity for the system production; use manure and water from livestock production to create gas, etc.).

The VACB model applied in Can Tho has been locally promoted and spread to some provinces not only in the Mekong Delta such as Bac Lieu or Hau Giang province, but also in the central provinces such as Thua Thien – Hue or Quang Binh province”.

Source: Le, & Tran (2018)

3.3.2. Research methods

Collecting and analyzing data, especially primary data as much is considered as one of the most important tasks to be completed during the implementation of a transformative learning case study in Can Tho. To do it, both qualitative and quantitative methods for collecting data have been used in the field trips and surveys³ taken from September to December 2017.

³ The 2017 field trips and surveys have been conducted by the T-learning team including research experts and partners from Center for Rerearch and Promotion of Education for Sustainable Development (CEREPROD) at Hanoi National University of Education and Department of Education at Can Tho University.

First of all, data collection started with a rapid rural appraisal to gain an overview of the significant social and physical features of the selected study site (Chambers, 1994). After those participatory methods including open, in-depth interviews, focus workshop discussion, and structured interviews with questionnaires used to promote and enable farmers to reflect and share their real shifts and transformation in experiences, knowledge, perceptions, values, beliefs, and lifestyles in various ways when they actively participate in transformative learning processes occurring in the VACB in Can Tho.

In the next step of data collection, 9 respondents (n=9) divided into three categories including T-learner (n=3), T-stakeholder (n=3) and T-teacher (n=3) have been invited to attend in open, in-depth interviews. Each face-to-face interview took between 45 minutes to an 1 hour. The aim of these interviews is to explore respondent's understanding, perception and perspectives to various issues that farmers interested in such as climate-related agricultural production, climate risks and their impacts, farmers capacities to deal with environmental changes (climate, market, policies) and planned adaptation measures in the VACB model.

After collecting and classifying information and data from the in-depth interviews, a focus workshop discussion with 35 participants was organized to explore the concerns and perceptions of learners, stakeholders, and teachers on the difficulties and challenges of implementing and developing sustainable livelihood models (VACB) in response to climate change. During this workshop, different stakeholders were promoted and given good opportunities to share, discuss and critically reflect the role and impact of community learning on the implementation and sustainable development of adaptive livelihood models to climate change in My Khanh commune.

A semi-structured interview questionnaire including a majority of closed questions and a few open-questions was also designed and implemented. The questionnaire covers the following four topics: characterization of the household, interactions between climate change and sustainable livelihood, sustainable livelihood models, and the roles of community learning. The farmers, who have been selected to be the interview respondents, must be people that have had the VACB model and had at least 5 years of experience in crop or livestock production. Each interview took between 30 minutes and 45 minutes. Data from the interviews were collected, synthesized, and analyzed by using SPSS 22. Based on descriptive statistics analyzes were conducted to explore and understand outcomes of transformative learning as well as the germ cell activities supporting emerging transformative learning in the My Khanh commune.

4. Results: Findings on T-learning for sustainability in My Khanh commune in Can Tho

4.1. The emergence and convergence of processes and types of transformative learning in the VACB model in Can Tho

After a long-time observation and investigation of adopting and accessing the VACB model of farmers in My Khanh, we explored that main processes and types of T- learning such as instrumental learning, communicative learning, and emancipatory learning have been emerged and converged in the VACB model in Can Tho.

Instrumental learning can be observed by looking into the shifts in the ways of thinking, doing, and re-organizing the production activities of farmers in the community as well as into their changes of knowledge and understanding of climate change that effect on farmer's awareness of urgency about climate change and adaptation (Le, & Tran, 2018). Instrumental learning outcomes of VACB farmers in the community involved obtaining local farmers' change in knowledge and awareness of climate change. The majority of VACB farmers (82.6%, n=38) said that their involvement in the extension clubs, the focus group discussions in the training courses or visiting good VACB practices had a positive impact on their knowledge and awareness of climate change impacts on their production activities. "The local extension workers and teachers (from Can Tho University) raised questions and we gained a better understanding and knowledge about how temperatures and other things are expected to change. It raised my knowledge level" (a VACB farmer, Truong Thuan village).

Commune communicative learning has been taking place simultaneously with instrumental learning in My Khanh commune. 76.1% of respondents (n=35) said that discussing with neighbors and friends, informal talking and sharing had increased their interests in media coverage of climate change and significantly changed their knowledge and awareness of climate change that had impacted their farm production. Particularly, 69.8% (n=33) said community learning via group discussions, sharing, informal talking, and individual farm visits predominantly dealt with specific benefits associated with the adaptation practice identified. By emphasizing the significance and values of communicative learning, VACB farmers in My Khanh said "All of us together watch and share what we do. People keep track of what one does and observe what is working. We are also visiting demonstrations to a certain extent looking for better ways to do things. If any person in the community has something (new), every person in the community will watch and discuss together wherever we can such as on the road, in coffee shops, wedding parties, local markets, etc., (a VACB farmer, Truong Thuan A village). Most of my knowledge would gain from a couple of neighbors, and I follow their experiences when they have a successful demonstration. (A VABC farmer, Truong Tho 2 village)".

Notably, emancipatory learning in the My Khanh community was implemented by creating networks and learning interactions. There were several rounds to set up the emancipatory learning among individuals in the community. The first round of emancipatory learning has been created for creating networks and learning interactions among different stakeholders (the scientists of Can Tho University, the researchers of the CDM project and JIRCAS project and local authority and the key informants in the community and the VACB farmers) to understand and explore the research contexts and matters of concern in the region. The second round emerged is formed during the first round of learning interactions. In the second round the networks of teachers and stakeholders, including key farmers in My Khanh community (so-called “scientist farmers”) who were trained and self-studied to be the trainer of VACB model for other farmers have been formed to facilitate VACB farmers to understand and to find the appropriate solutions to climate change adaptation. The third round of emancipatory learning has been created through the interactions among “scientist farmers” and agriculturalists (teachers) and is critical to improve and increase new knowledge as well as build trust together. The solutions were co-developed including stabilizing the market, training how to use the finance efficiently, supporting climate change adaptation policies through adaptation strategies and finance, learning community via cooperative and collaborative production (inputs and outputs – market issues). “I think that emancipatory learning should emphasize dialogues among “scientist farmers”, agricultural extension workers, and facilitators (from universities) for transforming knowledge, techniques, and experience in VACB model and how to enable social learning for farmers and other stakeholders” (An agricultural extension workers, My Khanh commune).

4.2. *The best ways of transformative learning in the VACB model in Can Tho*

Our study explored that there were three main forms of learning: self-learning and self-thinking, community learning, and training (Le, & Tran, 2018). Every local farmer has learnt via self-learning such as self-reading books, newspapers or technical handbooks, self-watching television, self-listening to the radio, self-enrolling in training courses, and self-reflecting through personal experience. Several farmers have learnt via community learning such as their daily activities, neighbors, community meetings, extension club meetings, successful pilot demonstrations, and mass media (commune loudspeakers). Whereas some have learnt via training from universities and institutes such as training courses, visiting tours, and support from extension workers or researchers. These learning ways/channels play an important role in enhancing local farmers’ capacity to respond to climate change impacts and fluctuating market conditions. Informal or self-learning is a significant way in which farmers work towards solutions to their concerns. Formal learning (courses from university and institutes) has provided the basic and science knowledge for key farmers who are the most important actors for expanding learning in the communities.

Notably, experiential learning is considered one of the best ways for approaching and applying the VACB model. Mostly, respondents (69.8%, n=33) reported that participating in traditional training courses had only a modest effect on their views of the changes in effectively applying effective adaptation practices. Great changes were noted through self-learning or sharing experiences and knowledge among learners (called scientist farmers) than among teachers or stakeholders and especially through their experiential learning in which “knowledge (technical, communicative and emancipatory) is created through the transformation of experience” (Kolb, 1984, p. 38). To accept, maintain and develop the VACB as a sustainable livelihood instrument, local farmers in My Khanh have to carry out an experiential learning cycle with the four-stages such as *Experiencing-Critically Reflecting the VACB- Choosing to apply an appreciated the VACB model-Actively implement the VACB* (Figure 2).

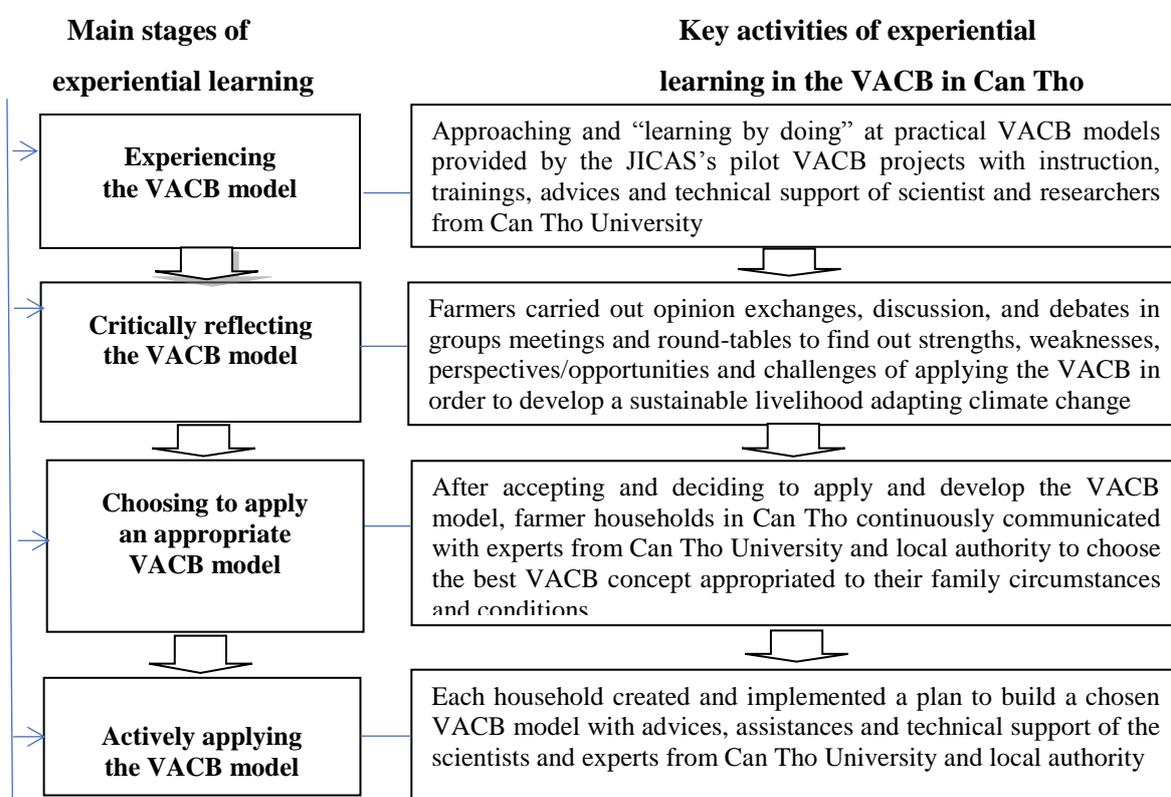


Figure 2. Experiential learning cycle to approach and apply the VACB in Can Tho

4.3. Benefits from the VACB models considered as real dynamics of transformative learning in Can Tho

Most of the respondents (91.3%, n=42), who adopted the VACB model, considered the VACB as the best way to adapt to the context of climate change and indicated that various benefits coming from the VACB are real dynamics of transformative learning. By answering a question on benefits of the VACB model for transformative learning in Can

Tho, farmers in My Khanh and experts from Can Tho University have expressed the following opinions:

Diversifying income sources is a critical strategy to ensure sustainable livelihood for my family. That is why I have applied the VACB model. This model was encouraged from Can Tho University and local authority". Another farmer, Mr. Binh answered that "in the past, only one kind of fruit was grown in my garden, orange for example. As market conditions are now fluctuating and climate has been very uncertain, more than five kinds of fruit are growing. The disease and insects have increased due to the changes in temperature and humidity, therefore I must have some adjustments in my garden. I have learnt these strategies from Mr. Hai Thanh. (a woman in Truong Thuan 2)

Pork raising with hundreds of pigs like me without making biogas smells bad. From animal waste will affect the habitat of neighbors. Biogas help increase the efficiency of home economics, gas for cooking and lighting for pig farms... (a farmer in My Khanh Commune)

The more this model is multiplied, the more benefits the farmers receive. Each month they do not have to spend money on gas, electricity in cooking, lighting because of the closed model garden, fish ponds, Biogas pigsty. Also, their income is increased by selling fish (one per year), selling pigs (2 times/year), selling fruit or vegetables. (A expert from Can Tho University analyzed)

Farmers in Can Tho indicated that they learned the benefits of the VACB's only after their adaptation practice have been adopted. Results from group workshop discussion showed that local farmers often concern the economic benefits of the practice leading to their adoption initially. They considered the economic benefits as the most important trigger and dynamic of transformative learning and understood that environmental benefits are critical for ensuring the economic benefits in the long term. Our survey indicates that currently, economic benefits (87.0%, n=40) and market price (82.6%, n=38) were considered the primary reasons for the change in practices, while the environmental benefits were secondary and not usually the only factor driving the change, even if most of the responses (78.3%, n=36) knew and understood that environmental benefits are critical for ensuring the economic benefits in a long term.

By emphasizing the VACB's benefits as real dynamics of transformative learning in Can Tho, local farmer expected that by reducing greenhouse gas emissions through the VACB model hundreds of farmer households in Can Tho can be able to sale carbon credit from biogas production Dr. Chiem from Can Tho University added: "For the sale of carbon credits, we will support households to build water purification systems, use solar energy equipment, support agricultural cultivation and regularly hosts workshops with farmers to listen to their reflections, as well as to provide useful suggestions. Because the project included economic and environmental benefits, farmers were very enthusiastic to learn together to apply and to develop the VACB as a sustainable livelihood solution adapting climate change challenges in Mekong Delta".

5. Conclusion

The Mekong Delta is critically important to Vietnam's national agricultural production and dominates the largest agriculture and aquaculture production in Vietnam and facing big challenges of climate change and sustainable development. With rising sea levels near low-lying land/area at the mouth of the delta and the (current) increase in rainfall, average temperatures, number of extreme weather events, and saltwater intrusion, the Mekong Delta is considered as one of the world's three most vulnerable deltas (together with the Nile Delta in Egypt and the Ganges Delta in Bangladesh) affected by sea level. Moreover, excessive use of chemical pesticides and fertilizers, as well as the waste of too much water in production, has led an agriculture in the Mekong Delta to an unsustainable development. In this context, local people have great concerns on agricultural transformation to sustainability to climate adaptation and want to have opportunities to approach different forms and processes of social learning to understand the climate-water-food-energy and social justice nexus and to develop their competence in adapting and overcoming big challenges of climate change and sustainable development. *The need for transformative learning and knowledge sharing for agricultural sustainability amongst various stakeholders is increasingly recognized in the Mekong Delta and transformative social learning for sustainability (T-learning) seems to become one of the most important dynamics of transformation for sustainable transformation in agriculture in the Mekong Delta.*

❖ **Conflict of Interest:** Authors have no conflict of interest to declare.

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**ĐIỀU TRA-KHÁM PHÁ VỀ HỌC TẬP CHUYỂN ĐỔI VÌ SỰ PHÁT TRIỂN BỀN VỮNG
NHẪM THÍCH ỨNG VỚI BIẾN ĐỔI KHÍ HẬU Ở ĐỒNG BẰNG SÔNG CỬU LONG
VIỆT NAM QUA NGHIÊN CỨU ĐIỂN HÌNH TẠI MÔ HÌNH VACB
(VƯỜN- AO- CHUÔNG- BIOGAS) Ở CẦN THƠ**

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TÓM TẮT

Trong thời đại toàn cầu hóa và biến đổi khí hậu toàn cầu học tập chuyển đổi (*T-learning*) được xem là động lực và công cụ hữu hiệu để đẩy nhanh quá trình chuyển hóa theo hướng phát triển bền vững ở những nơi đang và sẽ bị tổn thương bởi biến đổi khí hậu. Vì vậy, được sự hỗ trợ và tài trợ của ISSC (*Interntional Social Science Committee*) của UNESCO Paris tập thể các nhà nghiên cứu từ 9 nước (Nam Phi, Hà Lan, Thụy Điển, Việt Nam, Ấn Độ, Ethiopia, Zimbabwe và Malawe) đã và đang hợp tác chặt chẽ với nhau để thực hiện dự án nghiên cứu “Học tập chuyển đổi vì sự bền vững hệ sinh thái xã hội trong thời đại biến đổi khí hậu”. Mục đích của dự án là tìm hiểu và làm sáng rõ hơn bản chất, chất lượng và tác động của *T-learning* đối với sự chuyển hóa bền vững ở những điểm “hóc” tại cấp cơ sở, nơi nảy sinh và tồn tại các “vấn đề tồn tại” của chuỗi “khí hậu - nước - lương thực - năng lượng - công bằng xã hội”. Học tập chuyển đổi ở đồng bằng sông Cửu Long của Việt Nam được lựa chọn là một trong các nghiên cứu điển hình (*case study*) của dự án. Bài báo này mô tả các hoạt động điều tra – khảo sát về học tập chuyển hóa trong mô hình VACB (*Vườn-Ao-Chuông-Biogás*) tại xã Mỹ Khánh, ngoại ô Cần Thơ và trình bày khái quát một số phát hiện quan trọng về các đặc trưng của các quá trình học tập chuyển hóa và những đóng góp của học tập chuyển đổi đối với việc định hình và phát triển các mô hình sinh kế bền vững thích ứng với biến đổi khí hậu ở Cần Thơ.

Từ khóa: học tập chuyển đổi; chuyển đổi sang phát triển bền vững; phát triển nông nghiệp bền vững; đồng bằng sông Cửu Long; mô hình VACB