



# Roles and effects of transformative social learning toward sustainable livelihood transformation to climate change adaptation in the Vietnam Mekong Delta: The VACB model case study in Can Tho

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## General Note



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## ABSTRACT

Sustainable livelihood transformation to climate change adaptation is an ongoing challenge worldwide. To cope with changing the climate, demographics, and market conditions in Vietnam, many livelihood models have been established in several localities in the Mekong Delta. This study aims to evaluate the effects of transformative social learning on the transition to the VACB (*V-garden/orchard, A-fishing farm, C-livestock farm, B-biogas*) livelihood model in Can Tho, confirming the needs and requirements to promote livelihood transformation more success for sustainability. This community was selected to conduct the study as it represents the entire nexus of climate change-water-food-energy-social justice and provides insights into the challenges of transformative social learning for sustainability in the Mekong Delta. Primary data was collected through in-depth interviews; focus workshop discussion, and semi-structured interviews. Descriptive statistics was used to analyze the roles of transformative social learning and its effects towards sustainable livelihood transformation to climate change adaptation. The findings showed that transformative social learning has been accompanied and positively impacted on the economic, social, and environmental development. In addition, this learning process also transfers awareness, beliefs, attitudes, and social relationships in the community.

**Keywords:** transformative social learning, sustainability, climate change, adaptation, agriculture

## 1. INTRODUCTION

Climate change has directly impacted on the living environment as well as the livelihood of people in Vietnam (Tuan et al. 2014). Changing livelihoods to adapt to climate change, towards sustainability have been an urgent issue for the Mekong Delta region. Many livelihood models have been established in several localities in the Mekong Delta, in which, VACB (VACB is the integrated agricultural model with four components including V-garden/orchard, A-fishing farm, C-livestock farm, B-biogas) is one of the livelihood model that is considered sustainability and overcoming the limitations of the previous VAC model (Phuong & Tuan 2018). This model has been developed in Can Tho with more than 400 households, and then up scaled in other localities such as Ca Mau and Hau Giang that have brought positive effects on economy, society, and environment (Bosma et al. 2005; Käkönen 2008; Tran et al. 2018). The ISSC project has been conducted in Can Tho in particular and the Mekong Delta in general during 2017 and 2018 about transformative learning shows that transformative learning is considered as a critical process for people learning and an important approach to adjust and transfer to new livelihood models (Phuong & Tuan 2018). How has the transformative social learning, thus, influenced the transition to a sustainable agricultural model of VACB in Can Tho is important research question for this study. Thus, this study aims to evaluate the effects of transformative social learning on the transition to the VACB livelihood model in Can Tho, confirming the needs and requirements to promote livelihood transformation more success for sustainability. It is also an issue that needs attention to improve the efficiency of transformative social learning towards developing sustainable agricultural livelihood models and adapting to climate change in Can Tho in particular and other communities.

After the introduction section, we present an overview of the theory background related to the roles and effects of transformative social learning toward sustainable development. Subsequently, we justify the study sites, introduction VACB model, and our methods for data collection and analysis. The findings of this study are presented in the next section. In the last section, we discuss our findings followed by our conclusions and recommendations for policymakers.

### Theory Background

#### ***Roles and effects of transformative learning for social change and sustainability***

The goals of sustainable development commit a society first and foremost to serious, long-term engagement, during which continual feedback and balance can be expected as semi-permanent conditions. One of the critical issue has to do for implementing sustainable development that is learning and learning processes (O'Toole 2004). Therefore, open and learning-oriented policy systems are necessary with decentralization, consensus building, and flexibility that promote the productive openness and social learning (Müller & Siebenhüner 2007). Learning process and long-term (sustainable) institutions are considered as the important factors to encourage involvement by stakeholders in relatively open-ended efforts (O'Toole 2004). For the processes of discourse, learning and problem-solving that gradually embrace large and disparate elements of the social order, and that extend over time rather than trapped in the occasional, episodic, and potentially incoherent spikes of the issues attention cycle (Downs 1972). The institutional implication of such a commitment involves not only a need for established and credible capacity for long-term, albeit

adaptable, decision-making, but also integrative mechanisms horizontally across policy realms, and vertically across scales (Bressers & Rosenbaum 2003). Thus, in the context of the climate change and sustainable development, learning to cope with uncertainties does not simply as mean gathering and processing information, but also creating institutions that provide capacity of continuous and long-term conceptual learning (Kemp et al. 2007; Loorbach 2010; Pahl-Wostl et al. 2007). However, sustainable development in the climate change context is considered as a “wicked” challenge of today (Head 2014; Moser et al. 2012). It needs to have possible solutions therefore demand more innovative approaches to motivate individuals and communities as well as organizations and institutions to actively cooperate in achieving long-term development (Krasny 2013).

Transformative social learning is considered as a potential solution for sustainable development in present and in the future (Wals 2010). Transformative learning theory has been growing and changing for almost three decades and it draws on sociology, philosophy, developmental and cognitive psychology, and psychotherapy (Percy 2005). Transformative social learning is understood by simply defining social learning with a socially critical orientation, and distilling key elements of social learning important to supporting social change (Lindley 2015; Wals 2010). Adapting the transformative social learning in the climate change context (Lotz-Sisitka et al. 2016), our research understand transformative social learning to involve psychosocial processes of cognitive (Mezirow 2000) and emotional, and potentially also social change (Reed et al. 2010). Therefore, the roles of transformative social learning can include transforming perspectives, habits of mind, and mindsets of individuals or communities to make them more inclusive, discriminating, open, emotionally capable of change, and reflective (Mezirow 2000), particularly it can facilitate reflexivity in social learning (Lotz-Sisitka et al. 2016; Vulturius & Swartling 2013; Wals 2007) and appropriate address of climate change adaptation strategies (Hampson & Rich-Tolsma 2015). As results, they change values (Lindley 2015), generate beliefs and options that are true and justified guides to actions (Henderson 2002; Kibwika 2006; Kiely 2005; Taylor & Cranton 2012) through collective participation (Lindley 2015).

In addition, the transformative social learning has other important roles in facilitating multi-stakeholder dialogues via several channels (Cliffe et al. 2016; Vulturius & Swartling 2013; Wals et al. 2008), guiding on discourse for learning process (Martha Chaves et al. 2016; Phuong et al. 2018), creating conditions for developing farmer organizations (Henderson 2002), facilitating joint learning and promoting agricultural innovation (M Chaves 2016; Kibwika 2006; Tran et al. 2018), and developing entrepreneurial skills and attitudes for smallholders (Le Coq & Trebuil 2005; Pittaway & Thorpe 2012). Therefore, the conditions for transformative learning occur identified following strong partner facilitation, communication, critical reflection in transforming partnerships, the presence of critical events, fundamental difference between partners bridged by a common purpose, and the retention of personal autonomy along with dependence on the other partner (Franz 2002; Kibwika 2006). In addition, openness to alternative points of view, willingness to seek understanding and agreement, and an acceptance of a resulting are considered as the factors that support to create and enable flexible environment for learning process (Cliffe et al. 2016; Keyser 2000; Percy 2005; Wolf & Moser 2011). The discourse requires accurate and complete information, freedom from coercion, an ability to weigh evidence and assess arguments objectively, greater awareness of the context of ideas, empathy, and concern regarding how others think and feel, and an equal opportunity to participate in various roles of discourse (Mezirow 2000; Taylor & Cranton 2012). Moreover, responsive design, implementation, and evaluation components are also critical conditions as well as factors influence on an effective transformative social learning process (Phuong 2017). Regardless, the ideal end result of transformative learning is that one is empowered by learning to be more socially responsible, self-directed, and less dependent on uncertainty changes (Henderson 2002; Percy 2005). Thus, transformative learning is believed to be important for flexible decision-making and autonomous thinking, making it advantageous for responding to changing environmental conditions (Kiely 2005; Tarnoczi 2011), particularly in the climate change adaptation context (Orderud & Winsvold 2012; Tarnoczi 2011; Vulturius & Swartling 2013).

## 2. METHODOLOGY

### Selection of study sites

The research was carried out in Can Tho city in Mekong Delta, Vietnam, which is one of the case studies of the ISSC project on the transformative learning identified after field visits in 2015 and 2016. We chose Can Tho city in Vietnam Mekong Delta as the case study site of transformative learning since it presents the nexus of climate change – water – food – energy – social justice and provide insights into the challenges of learning for sustainability. In this study, Mỹ Khánh, Giai Xuân, Trường Long, Thới Hòa, Nhơn Nghĩa (belong Phong Điền district); Nhơn Lộc 1A (belong Phong Điền town) and Thới An Đông (belong Bình Thủy township) of Can Tho city were selected to collect data. These are areas where many households have successfully converted to new livelihood models in the research period (1996-2018). The study selected these communities for implementing the sub-projects on the transformative social learning because of three main reasons. Firstly, they are a typical rural community of the suburban district in Can Tho city. These communities are in the process of transforming agricultural mechanics towards sustainable livelihood

development in the context of climate change. Secondly, these communities have established, maintained, and been on expansion and development process of initiatives (germ cell activities) which present possibilities of moving towards sustainability and transformative learning potentials (Tuan 2016). Amongst various sustainable livelihood models, the VACB model (V-garden/orchard, A-fishing farm, C-livestock farm, B-biogas) is a practical and effective solution for farmers to adapt to climate change. Thirdly, the VACB model has been locally promoted and replicated to other areas in Can Tho and some provinces not only in the Mekong Delta such as Bac Lieu or Hau Giang, but also in the central region (of Vietnam) such as Thua Thien Hue or Quang Binh.

### **Introduction of the VACB model**

The VACB model has emerged in Can Tho since the last decades of the twentieth century under the technical and financial support of the Rural Development Project based on the clean development mechanism funded by JIRCAS, Japan (Phuong & Tuan 2018). The VACB is a livelihood model combining three elements (V-A-C) with the construction and exploitation of gas from biogas digester (B). The combination of the factor "B" in the model has directly solved the problem of environmental pollution (waste and odor) in livestock, helped households feel secure to consolidate and expanded the breeding facilities and used efficient source of biogas energy for cooking, generating lighting for electricity, reducing investment costs for this issue as well as labor to collect firewood and other heat generating materials. Besides that, animal waste treatment also contributes to the reduction of diseases (because manure has been eliminated most of the disease sources after passing through the compost bags) and provides high value organic fertilizer for garden (V) of farmers, contributes to reduce up to nearly 50% of investment costs for chemical fertilizers, and environmentally friendly (shared by farmers in October 2017). In this model, people can also take advantages of garden, ponds and treated livestock waste ponds to feed suitable fish species, taking advantage of available food sources (A). The model of VACB becomes a sustainable model, complement each other of the elements according to the method of "short-term farming" (profit in a short time to invest in the garden), and "environmentally friendly". Thus, it becomes one of the highly sustainable livelihood models. It is important that the VACB model is easy to build and operate, does not require a high technical level, the investment cost is not too large, so the households have conditions for raising and growing agricultural crops.

### **Research methods**

The study used both qualitative and quantitative methods for collecting data. 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). A mixture of participatory methods including open, in-depth key informant interviews (n=11), focus workshop discussion (n=35), and structured interviews (n=40) was used, which allows farmers to participate by sharing their perceptions, experiences, and knowledge in various ways following transformative learning process.

Open and in-depth interviews were used to explore several topics related to the VACB model, climate-related agricultural production, transformative learning process, identifying the main roles of VACB model. The respondents were divided into three categories including learners (are called farmers) (n=5), stakeholders (are called staff in the projects or local authority) (n=3), and teachers (are called trainers or lecturers from university) (n=3). Totally, eleven respondents were interviewed. The face-to-face interviews (Kumar & Phrommathed, 2005) were also conducted using a structured guide and each interview took about 45-60 minutes.

Focus workshop discussion 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 sustainability. Moreover, the workshop also discussed to understand the sharing and reflection of different stakeholders on the role and impact of community learning on the implementation and development of adaptive livelihood models towards sustainability in Can Tho.

Semi-structured interviews (n=40) were the primary source of data collection. After collecting and classifying information and data from the in-depth interviews and focus workshop discussion, a semi-structured interview questionnaire was designed and implemented. Most questions were closed, however a few open-questions included to allow interviewees to explain (their answers) in greater detail. The important criteria for selecting the interview respondents are that they have had the VACB model and experienced at least 5 years in crop or livestock production. Each interview took around 30 to 45 minutes. The interview captured the following main topics: characterization of the household, the process the roles of transformative learning in developing process the VACB model. Data from the interviews were collected, synthesized, and analyzed using SPSS 22. Descriptive statistics were used to present farmer's assessment of the roles of transformative learning and contribution of VACB model for their life. This analysis was helpful to understand the sense of typology and outcomes of transformative learning as well as the germ cells supporting transformative learning in the Can Tho.

### 3. RESULTS

#### **Transformative social learning appeared and has expanded in association with the formation and the development process of VACB model**

Through the story of Mr. L.H.T (in My Khanh commune, Phong Dien district) - a typical farmer who witnessed the whole process of agriculture and economic transformation of Phong Dien district in particular and Can Tho city in general. And Mr. N.H.C (the lecturer of Department of Environment, Can Tho University) and households studied and generalized the story of transition from the VACB model and similar models took place when Can Tho people faced “the situation of losing direction” in the 1990s up to now. Climate change and environmental pollution not only have driven to irregular changes in weather and seasonal surges but also have directly affected the livelihoods of people. From the late 1980s to the early years of the 21st century, the VAC model (Garden - Pond - Animal Pen) - a typical agricultural model, faced many difficulties such as most of the fruit orchards suffered from Citrus Vein Phloem Degeneration (CVPD), fish farming activities negatively affected by many different types of diseases, and livestock activities had difficulties in not only unstable price but also the manifestation of environmental pollution drove by it. In this situation, the government of Can Tho city assigned the Department of Environment of Can Tho University to study a more sustainable new model that is able to help local farmers escape difficulties. With scientific knowledge and the ideas of environmental protection and sustainable development, the local scientists proposed a clean and sustainable agricultural model - VACB.

After obtaining a successful practical study at the farmer households in My Khanh commune, the scientists announced the results and collaborated with local government and funding project to develop and replicate the model (since 1996). The government (called transformative government) had the responsibility to select potential farmers participating and presiding over seminars, training sessions, and field visits at pilot models so that they know, understand, and have belief in the new model. In addition to scientists, typical farmers who had experience in successfully building model shared and guided local farmers in detail how to implement the model. Through this process, farmers knew about the VACB model (85% of them knew about the VACB through government, 10% through relatives, and 5% knew prior through media). Farmers participated in the discussion and sharing the various forms (such as workshops, training, and community activities) to clarify their thoughts and problems in the process of learning and implementing the model.

With the help of the scientists and key farmers and with the actual effectiveness of the model, more and more farmer households have trusted and participated in building the VACB model in Can Tho city (from few pilot households to 33 households in 1998, about 360 in 2008 and up to more than 600 currently). Learning and sharing knowledge and experience with together in the community to more successfully build a new family-scaled economic model showing that the process of transforming learning has been accompanied by the transition to the VACB model took by farmers.

#### **Positive contributions of transformative learning through the transition to sustainable livelihoods model VACB in Can Tho** **Promoting economic development and improving the quality of life for farmers**

In economic terms, the VACB model contributes to increasing income of 97.5% of farm households (table 1). The income increase has achieved by reducing the cost of buying cooking fuel (100% of farm households), reducing by 50% of the cost of using chemical fertilizers (replacing manure with compost bags), and increasing production scale at 30% of farm households (expanding the scale of raising, stocking, and gardens).

**Table 1** Promoting economic development through transformative learning towards sustainable livelihoods model VACB in Can Tho

Income increase/ year after implementing VACB model (unit: mil. VND)	Proportion %	Explanation
0	2.5%	Used to make profits but has been in loss recently due to the slump in pig prices.
0 – 1	67.5%	Not promoting the expansion of production but only cutting down on cooking costs and firewood collection.
1 - 50	20%	Promoting the expansion of crop production (V), livestock (C) or fish-farming (A)
> 50	10%	Promoting the expansion of crop production (V), livestock (C) or fish farming (A) combined with relating trading activities.

In social terms, the transition creates many new jobs with higher incomes for workers. A team of more than 30 technical staffs has been trained to install and maintain compost bag systems in communes and wards. These are also pilot models for farmers to visit and learn. The use of biogas instead of charcoal also saves a part of labor including the old labor force.

In environmental term, the combination of the factor "B" in the model directly solves the problem of waste pollution and odor of livestock activities, effectively uses energy sources -biogas for cooking, power generation and lighting supplying, daily living activities. The inclusion of waste into compost bags also contributes to minimizing disease (since manure is eliminated most of the diseases in the compost bags). VACB model is supported by the government, many farmer households and is applied because it makes the positive economic, social, and environmental effects contributing to improving the quality of life for the people.

### ***Increasing knowledge and raising awareness of the community***

Transformative social 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. After their learning process about the VACB model introduced by the local government, and their participation in training, contact, and discussion with scientists, typical farmers apply pilot models. Farmers have realized the negative impacts of production and living activities of their own families and people around to surrounding environment (they know that burning charcoal and cultivating intensive cultivation for a long time, improperly using chemical fertilizers, discharging domestic and animal waste into rivers and streams will drive to environmental pollution). More than 80% of households are clearly aware that typical characteristics of VACB are "multi-cultivation", "closed", and "mutual assistance". In particular, there are 5% of households having higher awareness that CO<sub>2</sub> emission reduction brought by the VACB has commercial value. In addition, transformative social learning through 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 (95%) said that their involvement in the extension clubs and the focus group discussions in the training courses or farm visits have increased their knowledge and awareness of environmental impacts, particular the climate change on their production activities.

### ***Fostering the values and beliefs of the community towards sustainable development***

After the learning process and direct participation in production under the VACB model, 97.5% of farmers affirmed their trust in VACB, of which 62.5% highly trust that VACB model "brings higher efficiency", "does not pollute the environment", "drives to more sustainable and adapting to climate change".

In Can Tho city recently there are more than 600 households (may be up to 675 households) have applied VACB model in their production, in which many households spontaneously participate as they realize this is a suitable model for economic development but is not because of the support of the project. Of the 40 surveyed households, 90% is funded by the project, 10% self-study and making the transition. In which only 55% of households said that they participated in the VACB model because of funding support of the project while 45% still participate whether they get support or not. "The model brings about cleanness. It does not negatively affect the environment and the surrounding people, as well as gas, is made from the model that saves my time. I, thereby, apply the model even in the case I do not receive any support from the project", Mr. N.V.N's in My Khanh commune said. Despite direct learning from scientists or neighbors and/or relatives, only if having the trust will farmers apply to their production. This implies that farmers have been equipped not only with knowledge but also a great belief in the compliance and feasibility of this sustainable model - VACB.

### ***Enhancing the ability of critical thinking, self-reflection, and creativity for community***

The learning process has helped the community to develop their critical thinking and ceaseless creativity. Table 2 describes the level of participation in critical learning by surveyed farmers (n=40). The level of participation in critical learning by farmers is divided five levels including never, seldom, sometimes, often, and very often.

**Table 2** The level of participation in critical learning by farmers

Types of participation	Levels				
	Never	Seldom	Sometimes	Often	Very often
Self-thinking and exploring solutions by themselves to solve challenges	5.0	2.5	7.5	7.5	77.5
Observing and directly sharing with together successful models	15.0	2.5	22.5	12.5	47.5

Self-approaching and seeking knowledge through mass media	22.5	5.0	17.5	20.0	35.0
Actively participating in relating courses and training and regularly contacting with scientists and experts for advice	22.5	12.5	22.5	17.5	25.0
Testing improvement measures created by themselves to solve facing problems	5.0	2.5	12.5	20.0	60.0
Appropriately applying to their family situation	5.0	7.5	7.5	10.0	70.0
Drawing lessons from their mistakes	7.5	0	7.5	15.0	70.0

Farmers often did self-thinking and exploring measures to solve their own difficulties (95% of them implemented), including observing successful models, seeking information from mass media, participating in relating courses, and contacting scientists. 85% of farmers regularly self-studied and created remedies when facing difficulties and actively tested these remedies in which some were successful (typically, Mr. L.H.T in My Khanh commune conducted incubation of *Pila conica* eggs for high productivity; Mr. L.V.T in Gai Xuan commune grew dragon fruits using organic fertilizer that achieves quality for exporting).

When the VACB model fell into crisis (in 2016), many households stopped to apply the model since they could not maintain the herd of pigs. While some households replaced industrial food to with other food sources to maintain the herd, (such as Mr. N.V.T's household in Nhon Nghia commune). Some moved to raise chickens for feces (in order to replace pig manure) or to raising snails with water hyacinth, (Mr. L.H.T's household in My Khanh commune, for example).

#### ***Promoting the activities of exchanging, sharing, and building good relationships in community***

Through the learning process, farmers have boldly opened up for exchanging and sharing their difficulties and experiences with together in the community from family and their own locality to other community-scales creating a good spread effect. The results show that the proportion of households that always exchange and share models and how to apply the model in production with family members is 100%. These exchanging and sharing activities were made in many different ways in the local community by 92.5% of farmers, in which 50% has made regularly. As for other communities, the proportion is 85%, of which 15% of typical farmers have frequently exchanged and shared through focused training sessions and then trained and guided for farmers in other localities. Not only confidently exchanging with farmers, but farmers also often keep in touch with scientists. According to the survey results, the transition to VACB helps 85% of households to build better relations in the community. "Since applying the compost bags, the surrounding people have no complaints about the bad smell anymore. Hence, I am confident to expand my production," said the wife of Mr. N.V.B in Nhon Nghia commune.

#### ***Strengthening the linkage of four stakeholders and building a typical model network***

In terms of social organization, the VACB model has contributed to strengthening the linkage of four stakeholders (including farmers - government - scientists - entrepreneurs). The VACB model initially derived from the desire of scientists that the model would be knew about and transformed by farmers. Then, local government in Can Tho city effectively analyzed and introduced the model to farmers and mobilized local farmers to apply and local enterprises for supports. The enterprises also started to have policies supporting farmers (including supports in seedlings, purchase of fertilizers and animal feed). Mr. B.T.N - Lecturer of Faculty of Environment, Can Tho University supposed that scientific projects that want to be able to deploy to farmers need to have the contact and with, and cooperation of government, otherwise it would be difficult. On the contrary, farmers reflected their requirements and difficulties so that scientists continue to study and the local government makes appropriate policies.

During the process of maintaining and developing the model, the scientists closely collaborated with the government to periodically evaluate the model through holding workshops twice a year and meetings in order to solve arising difficulties. The relationship of 4 stakeholders, therefore, becomes more and more closely and more effectively.

Currently, farmers can easily learn and exchange together information about pilot models implemented in their locality, which enhances the persuasiveness of models. In spite of still facing many difficulties, most of the key households piloting model, who have very high awareness and beliefs in the model, maintain and innovate the model to adapt to new conditions. They are good examples for other farmers to follow. Mr. L.H.T's household is one of those typical households, he ready to share his own experiences with every farmer in any community. "I do hope that more and more households will apply the model like mine for a better life", Mr. L.H.T shared. With mentioned typical positive impacts, it can be seen that transformative social learning is considered

as a strong driving force for sustainable agricultural transformation to adapt to climate change that ensures economic development associated with environmental protection and trained farmers to effectively self-study.

### 3. DISCUSSION AND CONCLUSION

Learning is motivated by its economic and social value to the learners in a sustainable agricultural development (Kibwika 2006; Rist et al. 2007; Tarnoczi 2011). Understanding how learning occurs is important for facilitating sustainability in agriculture (Röling & Jiggins 1998). The effects of transformative social learning can help us understand in more detail the learning processes and changes in meaning perspective that must take place if the shift from environmental changes (as climate change) or market changes (Percy 2005; Phuong et al. 2018). Therefore, the findings of this study can show that transformative social learning promotes farmers to understand market dynamics – demand and price trends, quality standards, business linages, and environmental requirements to sustain the business activity and appropriate with results of several previous studies (Le Coq & Trebuil 2005; Phuong & Tuan 2018; Tran et al. 2018). Particularly in sustainable agricultural development context, the results of this research provide insights into how extension workers (are called transformative teachers) can facilitate this critical shift and under what circumstances this is appropriate (Diduck et al. 2012; Kibwika 2006; Phuong et al. 2018). This has implication for the training of extension workers and scientists who may be involved in participatory activities in communities directly with farmers (Ojha et al. 2014; Percy 2005; Phuong & Tuan 2018; Tarnoczi 2011). Therefore, the findings of this study are appropriate with previous studies (Sharpe 2016; Tarnoczi 2011; Vulturius & Swartling 2013). The results can conclude that transformative social learning and its contributions to agricultural transformation to sustainability in context of climate change are identified as enhancing adaptive capacity of individuals and communities, shifting to more sustainable practices and adopting of the new practices, setting on a pathway for further premise-based reflection of farmers, enhancing communicative competence and social change, gaining insight into one's own learning style, and driving information for transformative social learning

The VACB model has been the transition consensus of the whole community from the people, local authorities, and businesses to be great success in the implementation of scientists, showing the relevance, thus, it needs to expand. The learning process of transforming into the VACB model has positively contributed to the socio-economic development of each household and community and contributing to environmental protection towards sustainable development. In addition to material results, transformative social learning also helps to achieve tremendous spiritual values in raising community awareness about climate change, environmental pollution, sustainable livelihood development; create trust, affirm the value of livelihood models; strengthening relationships, connecting, sharing in the community and especially the habit of self-study, critical thinking, self-criticism and proactively solving difficulties and challenges in life in a creative and effective way high fruit. These results show that transformative social learning is a positive learning process that needs to be disseminated and replicated in the community.

However, the learning process transferred to VACB model also showed many difficulties and challenges. The starting point and circumstances of the farmers are very different, so the government and scientists' invitation to participate and technology transfer activities face many obstacles. When farmers had faced with difficult conditions as typically the price of pigs plummeted in 2016 - 2017, 45% of households have measures to improve and maintain effective models, there are still 55% of households have temporarily stopped the model, no innovation measures yet. In addition, a large number of households in the region are still not aware of and have not been impacted to convert. Therefore, learning to transform is a requirement of social development and a need of people to promptly adapt, overcome difficulties in production and life. In order to learn how to transform and develop, multiply and achieve higher quality and impact, become a lifelong ability and habit of self-studying, there is a need for closer coordination among the parties related, especially enterprises to the technology transfer process, ensuring the output of products and the initiative, critical thinking and creativity of farmers.

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