

## **Piloting of the Concerns-based Adoption Model: Farmer Concerns About the Participatory Guarantee System in Cambodia**

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### **Abstract**

*While there is a large body of adoption and agricultural extension literature on the process of introducing a new technology, agricultural development projects are often expected to produce immediate results that do not always allow for the integration of these theories into practice. The Concerns-based Adoption Model (CBAM) is a framework that places participants at the center of the change process to identify their concerns and challenges, providing a roadmap for projects to guide individuals with the correct support for their particular stage of adoption. CBAM has typically been used for the introduction of new curriculum in formal education. But this study assessed the potential for CBAM to be applied to agriculture innovations. In this study, we adapted and piloted the CBAM “Stages of Concern” model to assess adoption of an agriculture innovation. The innovation is the Participatory Guarantee System (PGS) for Cambodian vegetable farmers. We assessed the potential for CBAM as a tool for agricultural development project management. We found that the adapted survey consistently placed farmers in the anticipated Stage of Concern. Identifying users’ Stages of Concern can inform program designers and practitioners, assisting in tailoring support across the adoption process. CBAM has the potential to inform participatory project design and give project administrators an evidence-based, systematic protocol for assessing the adoption process, adding another tool to the development practitioners’ toolbox.*

**Keywords:** Diffusion of Innovations, adoption, project design

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## **Introduction**

Within the context of international development, there is renewed interest in participatory programming and increased pressure for development project practitioners to produce rapid results with significant, evidence-based impacts (Ticehurst & Cameron, 2000; Woolcook, 2011). However, these two strategies can be contradictory. Participatory development usually takes extra time, and project results are often incremental. In this environment, there is a need for tools that systematically help development practitioners to integrate participant feedback and concerns into programming and evaluation (Ticehurst & Cameron, 2000).

Agricultural extension and experiential education scholars recognize change is an ongoing process, moving individuals through stages of learning, adoption, and finally integration into a community (Baker, Robinson, & Kolb, 2012; Dewey 1938; Kolb, 1984; Rogers, 2003). In the education sector, the Concerns-based Adoption Model (CBAM) is a framework for critically assessing the adoption process when introducing new teaching curricula or educational tools to instructors. It acknowledges that new users go through a cycle of concerns, and levels of use of an innovation, as they engage with new material, try new skills, and integrate these into their existing schema (Hall, Wallace, & Dossett, 1973).

Participatory agricultural development often involves a similar presentation of new tools or systems that farmers might want to incorporate into their ongoing activities. CBAM has the potential to be a useful tool for participatory agriculture programs to monitor the change process at the individual level and to aid in supporting communities throughout the adoption process. While there are studies on CBAM in the broader field of education and teacher training (Kelly & Staver, 2004; Tunks & Weller, 2009), the literature indicates two studies applied this method in the agriculture setting (Cashman, 1990; Myers, Barrick, & Samy, 2012).

One study was in Egypt, where Myers et al. (2012) used CBAM to evaluate the introduction of active learning into agriculture technical schools. Their study applied CBAM to agricultural education, and it was conducted in a traditional educational setting, focusing on classroom tools and curriculum, as most CBAM applications do. The other study was in Nigeria, where Cashman (1990) evaluated the adoption process of alley cropping by farmers using an adapted version of CBAM. Cashman (1990) demonstrated “CBAM provides a diagnosis of farmers’ needs, as well as prescription for action” (p. 102). CBAM has only been adapted and implemented once in the context of agriculture innovations. For this reason, we conducted an assessment of CBAM as a tool for assessing farmers’ concerns and then incorporated those concerns into project design.

Our three-month study takes place in Cambodia, where the Safe Vegetable Value Chain project (SVVC) helps farmers meet market demands for safe, domestically-produced vegetables by introducing production and postharvest technologies to improve phytosanitary quality, and by creating new marketing channels. This USAID funded project first operated in Kandal province from 2010 to 2015 and thereafter moved to Battambang province. In Kandal, SVVC introduced net houses to protect crops from pests, and partnered with a wholesale vegetable supplier to introduce a Participatory Guarantee System (PGS). In 2015, SVVC received further USAID funding to conduct similar work in Battambang province.

Because, in Cambodia, there is a demand for technical training in value chain development and topics such as food processing and food safety (Gill, Ricciardi, Bates & James, 2017), this project introduced a PGS. As an alternative to conventional marketing systems, locally-defined standards and certification programs such as the PGS emphasize building confidence and trust between stakeholders, offering a way for smallholder farmers to reach

higher standards, and enhance safety of agricultural products (Nelson et al., 2016). Buyers, growers, and other stakeholders set production and handling standards based on organic principles that are realistic and relevant to that unique community and market. Of particular importance is the development of a participatory community evaluation process to ensure compliance.

### **Theoretical Framework**

The process of change and adoption of innovations has been extensively studied since the 1930s. Central to this work was experiential learning (Dewey, 1938; Baker et al., 2012), and its focus on a circular process led by an individual's desire to solve immediate problems. Dewey (1938) posited learning is an individual process based on "the organic connection between education and personal experience" (p. 25). Dewey (1938) and Kolb (1984) acknowledge prior experiences of individuals, quality of experiences, and integration of that experience through reflection, as central to learning.

Change-theorists describe the change process through stepwise models. Lewin (1947) and Chambers (2007) focus on the importance of involving participants in the planning phase and group dynamics. Havelock found deficiencies in other models and introduced the concept of the "linkage model" that develops users' transferable skills and builds collaborative relationships to help solve problems (Havelock, 1971). The theory was built on a six-phase model: 1) pre-contemplation of the need for change; 2) diagnosing the problem; 3) acquiring the resources for change; 4) identifying the solution; 5) implementing; and, 6) maintaining the change (Havelock, 1973).

The diffusion of innovation theory (Rogers, 2003) describes agricultural technology adoption. Based on experiences in Iowa, Rogers (2003) recognized the importance of a social network of peers in innovation uptake and adoption. Like experiential learning theory, diffusion of innovations theory includes a behavior-change framework rooted in the idea that change is a process where individuals adopt new concepts through a predictable social process (Rogers, 2003). According to Rogers (2003), the rate of adoption is influenced by the attractiveness of the innovation's positive aspects, positive communication during the uptake of a new innovation, and the strength of an individual's social system.

The Concerns-based Adoption Model (CBAM) framework was developed as a way to "understand the personal side of the change process" and to model the adoption of new curriculum and educational tools (George, Hall, & Stiegelbauer, 2006, p. 2; Hall, Wallace, & Dossett, 1973). Based on the theories of Rogers and Havelock, the CBAM model focused the change process on the individual and created a framework for integrating individual users' conceptions and concerns into the adoption of a technique or tool (Hall et al., 1973). The CBAM is composed of three elements: a) innovation concerns; b) stages of concern (SOC); and, c) levels of use of an innovation. To expand: first, program designers articulate a clearly communicated vision of each element of the new innovation (innovation concerns); next, they monitor new users' concerns (SOC); and finally, they practice with the innovation (levels of use) to better tailor support as adopters move through the cycle of change.

In CBAM, an individual's Stages of Concern are grouped into three categories: self, task, and impact. These are based on empirical evidence from the adoption process in Table 1.

Table 1  
*Stages of Concern about an innovation*

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	6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making changes or replacing it with an alternative.
Impact	5	Collaboration	The individual focuses on coordinating and cooperating with others regarding use of the innovation.
	4	Consequence	The innovation focuses on the innovation's impact on their immediate sphere of influence.
Task	3	Management	The individual focuses on the processes and task of using the innovation. Issues related to efficiency, organizing, managing, and successful functioning of the innovation dominate.
	2	Personal	The individual is uncertain about the demands of the innovation and his/her/their adequacy to meet those demands. The individual is analyzing their financial or status implications of the innovation and the implications of the innovation on their personal situation.
Self	1	Informational	The individual is generally aware of the innovation and is interested in learning about it. Interest is confined to the general characteristics, effects, and requirements.
	0	Unconcerned	The individual indicates little concern about the innovation or is unaware of it.

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*Note.* Adapted from George, Hall, and Stiegelbauer (2006).

A user's initial concerns about a new technique or tool are focused on their own use or the self. In Self stages, individuals are concerned about their awareness of a technique, how its adoption impacts them personally, and whether they have the ability and means to successfully adopt. The next stage deals with learning to successfully use the new processes, or the task. In this stage, challenges and frustrations may occur as people learn to use a new technique or tool. The final set of stages, Impact, are characterized by technique mastery and an outward shift of perspective towards understanding how the technique impacts a user's immediate sphere of influence and their ability to share the technique with others and make improvements to the technique itself.

CBAM theorists believed they identified "a developmental process of [the necessity] easing earlier concerns before later concerns are developed" (George et al., 2006, p. 8). They found the resolution of concerns along the stages of adoption holds true for most process- and product- innovations. Extending CBAM from education to agriculture would follow a similar process. Project leaders would identify farmers' concerns, then categorize them into Stages of Concern, moving from *unconcerned* all the way to *refocusing* experiences, along the adoption continuum.

Given the conceptual and theoretical frameworks above, and the SVVC project's participatory approach, this study used CBAM theories to assess Cambodian farmers' adoption of PGS. Reflection and assessment are also embedded in CBAM's SOC. The CBAM suggests

change is a process that has predictable stages as individuals try to adopt innovations within social contexts. The CBAM SOC may offer international agriculture development practitioners a tool to classify the progress of farmers in the adoption of an innovation.

### Purpose and Research Objectives

The purpose of this study was to explore the potential of the Concerns-based Adoption Model (CBAM) as a tool to enhance the adoption of agricultural innovations. Specifically, the research objectives were to: (a) adapt and pilot the CBAM Stages of Concern (SOC) instrument to an agriculture innovation context and (b) determine if CBAM's classification system is a useful tool for international development projects.

### Methods

The CBAM manual prescribes the CBAM methodology, survey tools, and analysis frameworks (Hall et al., 1973). Guided by this manual, the SOC instrument was adapted to assess farmers' concerns about the Participatory Guarantee System (PGS) and included two sections: the SOC questionnaire and open-ended questions. In the SOC questionnaire, a series of statements were presented to respondents where each statement corresponded with one of the Stages of Concern. These statements were adapted to align with the expressions of typical expressions of concern identified in CBAM literature (Cashman, 1990; George et al., 2006). For each statement, respondents ranked their level of agreement on a Likert-type scale from zero to seven where zero indicated that the statement was "irrelevant" to the respondent and seven indicated that it was "very true". Open-ended questions were used to validate the SOC responses and provide additional context. Surveys and interview questions were translated and administered in Khmer (Table 2).

Table 2

*Expressions of Concern about the Participatory Guarantee System (PGS) prior to translation*

Stage of Concern		Expressions of Concern
Impact	6 Refocusing	I have some ideas that would work better or improvements that could be made to PGS.
	5 Collaboration	I would like to know how others use it. I would like to coordinate my effort with others to maximize our impact.
	4 Consequence	How is my use affecting the output of my farming system and my family?
Task	3 Management	I seem to be spending all my time on PGS. PGS is too tedious.
	2 Personal	How will using PGS affect me? What will others think if I use it?
Self	1 Informational	I am aware of PGS and would like to know more.
	0 Unconcerned	I am not concerned about PGS or have little information. I don't know anything about it.

Survey respondents were selected based on past and current involvement with SVVC. Given time and resource limitations, respondents came from groups of farmers with varying levels of experience and exposure to PGS to represent the maximum number of predicted SOCs as possible. The adapted CBAM SOC questionnaires were administered to a selection of farmers ( $n = 76$ ) from the SVVC project target regions of Kandal and Battambang. Kandal farmers who participated in PGS were surveyed ( $n = 15$ ), as well as a comparable group of farmers who live in the same community as the PGS-users but did not use PGS ( $n = 16$ ). Battambang farmers ( $n = 30$ ) from the SVVC-supported cooperative were selected to assess their interest in PGS. The final group, also from Battambang, had participated in a PGS training ( $n = 15$ ).

Stage of Concern data were analyzed at the individual- and group-level, according to the CBAM SOC manual (George et al., 2006). Each question in the SOC questionnaire corresponded to a particular stage. At the individual-level, mean scores for questions of the same Stage were calculated, resulting in a relative intensity score (zero to seven) for each stage. A high relative-intensity score indicated that a participant's concerns aligned more closely with a given stage, while a low score did not. At the group level, mean relative intensity scores were calculated for each of the four sample populations.

Qualitative data from open-ended questions were analyzed using content analysis and analytic induction (Merriam, 2009). Composite SOC scores for each respondent were generated from the raw Stage of Concern data and the open-ended survey data. As discussed in more detail in the findings, the SOC scores and qualitative survey responses were cross-referenced to develop a full understanding of the adoption process, and farmers' concerns about PGS.

Validity and reliability were approached by designing the study to allow for cross-checking, and by triangulation between the SOC scores and qualitative survey questions (Merriam 2003). Surveys were reviewed for content validity by experts in survey design, education, and agriculture. Survey drafts were piloted with an initial test group for face and content validity and consistency. Reliability was analyzed using Cronbach's alpha, understanding the critiques and limitations of this method (Cronbach, 1951; Tavakol & Dennick, 2011). Cronbach's alpha scores between 0.70 – 0.95 are considered ideal for group uniformity (Tavakol & Dennick, 2011), and all SOCs scored within this range.

## Results

### Stage of Concern Survey Tool Adaptation

The Concerns Based Adoption Model (CBMA) framework and Stage of Concern (SOC) tool proved adaptable from the education to the agriculture setting for measuring innovations. Questions were adjusted to fit a farmer's context; however, re-wording the questions was a challenge, given the level of nuance between the questions associated with each stage and the need for translation. Through analysis of the raw Stage of Concern scores, we found that participants who did not have experience with the Participatory Guarantee System (PGS) responded positively to statements aligned to the Consequence and Collaboration stages that normally represent individuals who actively used the innovation and were beginning to think about how it is impacting them, and how to work with others. For example, some of the farmers from the Battambang, No Training group who had never been introduced to PGS scored highly in the Impact stage.

To address this, modifications were made to the processing of the raw Stage of Concern scores. The standard CBAM SOC model assigns users with a particular Stage of Concern by ranking their top two relative intensity scores (George et al., 2006). The user's lowest intensity

score is also used to give a better understanding, to identify where that individual might be in the adoption process (George et al., 2006). We followed a similar procedure but also included the results of the open-ended survey questions to generate a composite Stage of Concern Score for each individual. By doing so, we corrected for some of the survey word choice issues that resulted in farmers who did not yet have experience with PGS to similarly give high rankings to both the Self and Impact stages. In the case where an individual who had not used PGS scored the Consequence stage highest and the Personal score the second highest, the composite score was adjusted downward to the Personal stage to generate the composite score. All adjustments were cross-referenced with open-ended survey responses to ensure that verbal responses aligned with the overall expressions of concern rubric for each Stage of Concern category.

Feedback from enumerators about the survey process was also documented as a way to assess the revised SOC tool. Lead enumerators who translated the survey noted that the Stage of Concern questions were challenging to translate into Khmer due to their level of nuance and complicated sentence structure. This remained a challenge, even after streamlining some questions for clarity and simplicity. To clarify the translated survey with enumerators, lead enumerators organized a full-day training to discuss each question and practice survey administration. Following the training, enumerators said they felt more confident in understanding the questions. While most of the enumerators had not administered a Likert-type questionnaire before, they noted it was fairly easy to use. Enumerators also noted that farmers with limited exposure to PGS, such as the Kandal, Non-PGS farmers, had trouble understanding the Stage of Concern questions, but were more comfortable answering open-ended questions. However, given these documented challenges with the process of adapting CBAM, the resulting Stage of Concern data aligned with expectations.

### Relative Intensity Scores

In the Stage of Concern survey, farmers responded to a series of questions. Each correlated to one SOC on a scale from zero to seven with zero representing “irrelevant”, and seven “very true”. Responses were then grouped by SOC category and averaged for each individual as well as each group of farmers. The average scores of each stage represent the relative intensity of a particular individual or group. Higher relative intensity scores denoted a strong positive response to that stage while low relative intensity scores indicate a low association with that stage (Table 3).

Table 3  
*Stage of Concern relative intensity scores for all farmer groups*

Stages of Concern	Farmer Group				
	Battambang, No Training	Battambang, With Training, Users	Battambang, With Training, Non-Users	Kandal, Users	Kandal, Non-Users
Unconcerned	3.30	2.29	6.50	1.48	3.13
Informational	4.53	4.44	4.25	3.95	3.52
Personal	5.22	5.10	3.50	5.13	3.56
Management	2.01	2.56	6.75	2.52	2.50
Consequence	2.53	4.98	1.25	5.72	2.22
Collaboration	2.99	4.90	1.25	5.83	1.61
Refocusing	1.72	4.06	0.25	5.17	1.70

**Composite Stage of Concern Scores**

The composite SOC score aimed to present a clear picture of the respondents’ stages by taking into consideration both the raw SOC scores and the open-ended survey questions. We illustrate the distribution of survey respondents across the SOC grouped by location and experience with PGS (Figure 1).



Figure 1. Stage of Concern Composite Scores for Each Farmer Group

**Stage of Concern Scores**

Overall, the findings from adapting and piloting the CPGS BAM SOC were consistent with each group’s level of exposure to PGS. The most experienced PGS farmers had higher relative intensity scores for the Impact stages which are typically associated with more advanced use of a new innovation. Conversely, those farmers with less exposure to the PGS aligned more closely to the Unconcerned and Self stages which characterize individuals who are either uninterested in the innovation or would like to know more about it.

The SOC scores (Table 3 and Figure 1) demonstrate support for the concept that farmers move through a series of adoption stages, and that the tool was effective at identifying SOC. We compared and contrasted all survey groups that did not use PGS. For example, Battambang, No Training, and Kandal, Non-PGS groups followed a similar pattern of high relative intensity scores for the Unconcerned, Informational, and Personal stages followed by a declining response to the remaining stages (Figure 1). The highest relative intensity score in the Kandal, Non-PGS group was the Personal stage, which aligns with their level of exposure to PGS. Most farmers

cited their lack of knowledge and experience as the primary concern. “No one has asked me to join” and “no one has introduced PGS to me” were frequent statements. Because these farmers live in close proximity to the Kandal, PGS farmers, the non-users had the opportunity to learn about PGS and expressed high readiness and interest in continuing to learn. Many expressed they would like to participate in the PGS because there were “stable prices”, while others were concerned that there were “high requirements and a lot of labor.” While the Battambang, No Training group followed a similar pattern to the Kandal, Non-PGS group, the Battambang farmers had lower relative intensity scores in the Self stages compared to Kandal, and the Battambang farmers equally ranked the Informational and Personal. This is consistent with the fact that the Battambang, No Training farmers had not heard of PGS prior to the survey. Additionally, more farmers in this group ranked the Unconcerned stage higher than the Kandal, Non-PGS farmers. Given that most of Battambang horticulture cooperative members decided not to pursue PGS, this finding is consistent with expectations. Even though Battambang, No Training farmers had less exposure to PGS than Kandal, Non-PGS farmers, the Battambang farmers ranked the Collaboration stage the highest among all non-PGS users. Some of these farmers had much higher Impact relative intensity scores compared to the Self stages that could not be explained by survey wording issues alone. The Battambang cooperative had more exposure and alternative marketing systems and advanced production tools and techniques as well as a deeper understanding of quality standards. Some individuals in this group may have responded to the survey based on their existing knowledge of those techniques rather than PGS. As such, farmers were primed to share knowledge gained through projects and activities to which they had previously been exposed. They were likely considering use of their existing marketing program, and this was confirmed via open-ended survey data. For example, even though these farmers had not yet been introduced to PGS, many farmers in this group indicated they wanted to “expand their use of PGS” because “they are getting higher prices for the marketing standards.”

The Battambang, With Training, Users had high Impact stage scores. This was a surprise because these stages are usually associated with individuals who used PGS for some time and were comfortable with a technique, wanting to share knowledge with others, and to improve the system itself. This may be explained due to the similarity of statements related to the Personal and Consequence stages. As established in the CBAM framework, Personal stages statements were crafted to align with individuals contemplating “how PGS will impact me,” while Consequence stage statements model the idea “how PGS is impacting me.” Additionally, after receiving training in PGS, farmers may have felt competent enough to share what they had learned with others even though they had not yet practiced PGS themselves. This may explain the high Collaboration stage scores.

### **Concerns-based Adoption Model for Project Management**

To assess the potential of the efficacy of CBAM as a project management tool, feedback was gathered from SVVC project administrators about their experiences during the CBAM survey process. In an interview, administrators noted that the CBAM survey informed them about the concerns of project participants (LeGrand & Buntong personal communication, January 31, 2019). The method helped them identify farmers who were ready to try PGS, as well as those that either did not wish to join or might need more time to consider the guarantee system. CBAM also gave the SVVC project administrators an understanding of the stages that existing users experienced as they adopted PGS, as well as their past and present challenges

using the PGS.

## **Conclusions**

### **Adapting and Piloting the Stage of Concern Survey Tool**

The survey itself was easy to adapt from the educational to the agricultural context. Survey findings indicate the need to consider social context while acknowledging group dynamics, and compatibility as found in the theories of Lewin (1947) and Rogers (2003). In one case, the leaders of a farmers' cooperative made a decision not to use PGS, but the CBAM survey identified individual farmers wanting to learn more about PGS. This demonstrates the functionality of the SOC and how the adaptation of the SOC questionnaire to an agriculture innovation can provide tools to actualize adoption.

While adapting the tool for the PGS innovation was not complicated, some challenges arose in simplifying the wording to ease translation, while also preserving the intent of each question. This phenomenon is not unique to the Stage of Concern tool and is common in most situations when working across languages (Brislin, 1970; Hennink, 2008; Merriam, 2009). Like most surveys, the SOC tool was designed to repeat items in different ways to ensure validity and reliability. Similar questions were asked that corresponded to each stage, and these questions had very subtle differences, which proved to be difficult to translate in a field-based research setting. There are several possible reasons that this was a challenge, ranging from the differences between Khmer and English languages; the unfamiliarity of farmers with surveys and PGS; and the educational differences between farmers and enumerators.

As with most research, having multiple sources of data gives greater confidence in the findings. In the only other study that used CBAM in an agricultural context (Cashman, 1990), the researcher only used open-ended questions, which were adapted from the SOC survey to gather data, which was in contrast to the Likert-style survey approach presented in the CBAM manual (Cashman, 1990; George et al., 2006). We found using both the SOC survey and open-ended interview questions allowed for triangulation of our findings.

All technological introductions involve learning and change at the individual level. The findings of this study showed the adapted SOC tool was effective at placing people into the appropriate SOC category along the adoption process. The concerns expressed by farmers aligned with the Stage of Concern findings and support the effectiveness of the tool. These concerns also provide context and direction for project professionals to target support to program participants across each of the SOC. The SOC also has potential to be a tool to document outcomes of participatory projects and promote lasting results.

## **Recommendations**

Given the fact that enumerators in agricultural development projects are often college-aged and often have limited English skills, it was not surprising that translation was a challenge. To overcome translation and wording nuances between stages, we recommend surveys be piloted multiple times with enumerators to ensure full comprehension, and to help improve the accuracy of translation. This requires resources and time which can be a challenge in development projects; but, ultimately, investments are worth the return in terms of accurate data.

We recommend conducting further research to determine the efficacy of CBAM and the SOC in more agricultural contexts. If findings are positive and this methodology was integrated into development projects, like in this study, the CBAM SOC survey could be used as a tool to achieve greater adoption and improve learning outcomes through the use of reflection and the

development of agricultural communities of practice. The full CBAM framework, including the Innovation Configuration Map and the Levels of Use, were not tested by our study but could be analyzed for their potential to serve as a tool for agricultural development projects to elicit behavior change through a participatory framework.

Adoption researchers extensively note that change is a process that occurs over time, but donors frequently require immediate and tangible results. CBAM could be used as evidence of change as project beneficiaries move across the SOC. However, when using CBAM, development practitioners and their donors must be prepared and open to accept all possible survey results, including the possibility that an innovation might not be welcome or appropriate at a given time or to target beneficiaries. As noted by Rogers (2003), compatibility is one of the interconnected variables that determine the success of adoption. Practitioners need to have a willingness to be responsive to the community and return to the design phase if an innovation is not compatible.

### **Implications**

Agricultural development project teams are frequently tasked with reaching large numbers of people with objectives to train them in the same series of innovations constructed by donors and program administrators. This project design is contradictory to the learning and change theories which note that individuals move through the learning and adoption processes on an individual level (Baker, Robinson, & Kolb, 2012; Dewey 1938; Hall et al., 1973; Kolb, 1984). Development practitioners benefit from understanding that people go through stages as they adopt technologies or new processes, and that adopters do this at different rates and at different times, particularly in the critical Personal and Management stages within the SOC. When project implementers use CBAM SOC, they become aware of the stages project beneficiaries are in. Knowing this, project leaders can focus on activities that promote lasting adoption and strategically communicate the innovation and thereby, ensure the needs of each farmer are met at the right time (Moyo & Salawu, 2017). Restructuring a project in this way can save time and money. Resources are not wasted training farmers who will not adopt an innovation due to incompatibilities with current agricultural systems or societal frameworks. Furthermore, resources can be targeted at tailoring training for those who share similar situations, skills, and needs, thereby enhancing successful adoption.

Project monitoring and evaluation can be strengthened with the CBAM SOC tool. Practitioners are increasingly expected to demonstrate evidence-based impacts in the short lifespan of an agriculture development project (Mansuri & Roa, 2003). As change and adoption of a new innovation is an ongoing process, it can be difficult for project leaders to quickly demonstrate results. A common failure of participatory projects is that project time-frames are too short to include participatory practices (Chambers, 1994). For projects that aim to be participatory, there is a need for tools that demonstrate incremental change (Ticehurst & Cameron, 2000). If used periodically throughout a project, the CBAM SOC would document trainees' adoption over time and serve as evidence to donors that progress is taking place. CBAM can also be an ongoing monitoring tool and feedback mechanism for participatory projects, providing additional methods, while also serving a particular niche for participatory project management by focusing on learning and adoption.

### References

- Baker, M., Robinson, S. & Kolb, D. (2012). Aligning Kolb's' experiential learning theory with a comprehensive agricultural education model. *Journal of Agricultural Education*, 53(4), 1-16. doi:10.5032/jae.2012.04001
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. doi:10.1177/135910457000100301
- Cashman, K. (1990). *A grounded theory describing factors in the adoption process of the alley farming technology by Yoruba women in Nigeria*. (Unpublished doctoral dissertation). Iowa State University, Ames, IA.
- Castro, F. (2013). Overview of participatory guarantee systems in 2012. In H. Willer, J. Lernoud & L. Kilcher (Eds.), *The world of organic agriculture: Statistics and emerging trends 2013* pp. 159-163. Rheinbreitbach, Germany: Medienhaus Plump.
- CBAM: The Concerns-Based Adoption Model. (2018). *American Institutes for Research*. Retrieved from <https://www.air.org/resource/concerns-based-adoption-model-cbam>
- Chambers, R. (1994). Paradigm shifts and the practice of participatory research and development. *IDS Working Paper 2*, Brighton, UK: IDS.
- Chambers, R. (2007). Beyond "Whose reality counts?" New methods we now need? *Studies in Cultures, Organizations and Societies*, 4(2), 279-301. doi:10.1080/10245289808523516
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334. doi:10.1007/bf02310555
- Dewey, J. (1938). *Experience and education*. New York, NY: Simon and Schuster.
- George, A. A., Hall, G. E. & Stiegelbauer, S. M. (2006). *Measuring implementation in schools: The Stages of Concern questionnaire*. Austin, TX: Southeast Educational Development Laboratory.
- Gill, T., Ricciardi, V., Bates, R. & James, D. (2017). Capacity development in agricultural education and training in Cambodia: A SWOT analysis. *Journal of International Agricultural and Extension Education*, 24(1), 34-50. doi:10.5191/jiaee.2017.24105
- Hall, G. E., Wallace, R. C. & Dossett, W. F. (1973). *A developmental conceptualization of the adoption process within educational institutions*. Austin, TX: University of Texas at Austin. Retrieved from <https://eric.ed.gov/>
- Havelock, R. G. (1971). *Planning for innovation through dissemination and utilization of knowledge*. Ann Arbor, MI: University of Michigan Press
- Havelock, R. G. (1973). *The change agent's guide to innovation in education*. Englewood Cliffs, NJ: Educational Technology Publications.
- Hennink M. M. (2008). Language and communication in cross-cultural qualitative research. In: P. Liamputtong (Ed.), *Doing cross-cultural research: Social indicators research series*, (vol. 34) pp. 21-33. Dordrecht, The Netherlands: Springer.
- Participatory Guarantee Systems (n.d.). *IFOAM Organics International*. Retrieved from <https://www.ifoam.bio/our-work/how/standards-certification/participatory-guarantee-systems/pgs-toolkit>
- Kelly, M. P., & Staver, J. R. (2004). A case study of one school system's adoption and implementation of an elementary science program. *Journal of Research in Science Teaching*, 42(1), 25-52. doi:10.1002/tea.20043
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development (Vol. 1)*. Englewood Cliffs, NJ: Prentice-Hall.
- Lewin, K. (1947). Frontiers in group dynamics: Concept, method and reality in social science;

- social equilibria and social change. *Human Relations*, 1(1), 5-41.  
doi:10.1177/001872674700100103
- Mansuri, G., & Rao, V. (2003). *Evaluating community-based and community driven development: A critical review*. World Bank report. Retrieved from <https://openknowledge.worldbank.org/handle/10986/14310>
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.
- Moyo, R., & Salawu, A. (2017). An appraisal of factors influencing adoption of agricultural innovations: Insights from selected developing countries. *Journal of International Agricultural and Extension Education*, 24(1). doi:10.5191/jiaee.2016.24102
- Myers, B. E., Barrick, R. K. & Samy, M. M. (2012). Stages of concern profiles for active learning strategies of agricultural technical school teachers in Egypt. *The Journal of Agricultural Education and Extension*, 18(2), 161-174.  
doi:10.1080/1389224x.2012.655968
- Nelson, E., Tovar, L. G., Gueguen, E., Humphries, S., Landman, K., & Rindermann, R. S. (2015). Participatory guarantee systems and the re-imagining of Mexico's organic sector. *Agriculture and Human Values*, 33(2), 373-388. doi:10.1007/s10460-015-9615-x
- Participatory Guarantee Systems. (n.d.). Retrieved from <https://www.ifoam.bio/our-work/how/standards-certification/participatory-guarantee-systems>
- Rogers, E. M. (2003). *Diffusion of innovation* (5th ed.). New York, NY: The Free Press.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. doi:10.5116/ijme.4dfb.8dfd
- Ticehurst, D., & Cameron, C. (2000). *Performance and impact assessment: Emerging systems among development agencies*. Policy Series 8. Chatham, UK: Natural Resources Institute.
- Tunks, J. & Weller, K. (2009). Changing practice, changing minds, from arithmetical to algebraic thinking: An application of the Concerns-Based Adoption Model (CBAM). *Educational Studies in Mathematics*, 72(2), 161-183. doi:10.1007/s10649-009-9189-x
- Woolcock, M. (2011, May 5). The importance of time and trajectories in understanding project effectiveness [Web blog post] Retrieved from <http://blogs.worldbank.org/impactevaluations/guest-post-michael-woolcock-on-the-importance-of-time-and-trajectories-in-understanding-project-effe>