

THE NTOK NTEE CENTER, CAMBODIA

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1. Project Background

Small farm resource centers (SFRCs) have played a strong role in strengthening the relevance and role of their sponsoring organizations (e.g., missions organizations, development organizations) and were popular as an outreach and development tool from 1920 to 1980. In the late 1980s, the advent of participatory rapid appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability.

There is a need to document, evaluate and empower these existing SFRCs as a useful research-extension tool in South and Southeast Asia operating outside the formal government/ academic extension model. It is our perception that SFRCs have a continued role to reach neglected segments of populations, particularly communities on the margins. To justify their continued existence, however, important questions about their efficacy need to be answered, such as: what is their capability to engage a particular focus group on the basis of that group's felt needs; what is their extension strategy and its ability to catalyze documentable and felt changes related to sustained improved livelihood and food security; how adaptable to change are they in a rapidly developing Asia; and what can the SFRC do to amplify its extension impact?

The purpose of this research was to explore a suite of SFRCs in Southeast Asia to illustrate and classify the concept of the SFRC, evaluate their outreach efficacy and provide recommendations to amplify their extension services. Seven SFRCs were utilized to answer our set of research questions and determine if the concept of the SFRC is antiquated or

adaptable, and if the SFRC can remain relevant as a development tool (Table 1; Figure 1).

2. Methodology

The data was collected by a combination of questionnaires, surveys and PRAs. Initial data collection was conducted via questionnaires emailed to SFRC directors in December 2012. The questionnaire consisted of 47 questions on topics including the history and mission of the center, staffing, institutional affiliations, demographics of stakeholders and beneficiaries served, budget and financing mechanisms, monitoring and evaluation procedures, on-center and extension work, and long-term/exit strategies. This background information was intended to help identify and classify each SFRC's approach to extension and livelihoods improvement.

Once preliminary questionnaires were distributed and returned, we conducted a one-day assessment, including a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis, brief interviews, and organizational / systems modeling with the SFRC directors and staff members. This assessment took place from January to March 2013 to understand the perceived operation and services of the SFRCs. This daylong process identified how extension happens, the form extension takes, and who is involved in extension activities on and off center.

In addition, a one- or two-day assessment was conducted with stakeholders -- which we defined as anyone who had a vested interest in the success and functioning of the center and its work (Businessdictionary.com 2012) -- to understand perceived extension effectiveness and its impact on farmers / livelihoods / food security. These assessments utilized SWOT analysis, visits, brief interviews and systems modeling of perceived extension practices.

All data was entered into Excel worksheets during and upon return from the field. Where necessary, data was coded to calculate percentages and ratios. Abram Bicksler of ECHO

Asia Impact Center analyzed and interpreted the data using a combination of Excel functions and Excel macros.

3. Findings

Background of Center

Because Cambodia is a largely agrarian society with 80 percent of the population living in rural areas and 70 percent depending on agriculture for a living, the development of the agricultural sector in Cambodia remains a priority to reduce poverty and inequality. Currently, about a third of Cambodia's population of 15 million live under the poverty line (USAID 2013). Located in the remote mountainous northeast region of Cambodia, Monduliri is the country's largest province and is home to the second largest ethnic minority population, the Bunong. Having survived the wars that ravaged Southeast Asia in the 1970s, the indigenous Bunong people have struggled to reclaim their way of life. Traditionally subsistence farmers living in small village communities in the forests, the Bunong get everything they need to survive from the forest and the modest fields they plant near their villages. Bunong people remain socially isolated from the larger Cambodian society and lead a precarious existence, confronting daily the challenges of poverty and food insecurity. Improving the human and institutional capacity among the marginalized Bunong is a pressing need requiring a long-term commitment and a practical grass-roots effort to have measurable and lasting impact.

It was against this backdrop of rural poverty that the small farm resource center (SFRC) Ntok Ntee was conceived. The founders' vision for the center is to see Bunong farmers empowered to make sustainable and profitable farming decisions through the use of materials or ideas obtained from Ntok Ntee, as a result of the center's impact on their beliefs and attitudes toward farmer research and development. Ntok Ntee was founded in 2006 by Church Missionary Society of Australia (CMS) missionaries Ken and Alison Thompson. In its original form, the center utilized several small trial sites, but it moved to a single long-term site on the outskirts of Sen Monorom, Monduliri Province, Cambodia, in 2012. The mission of Ntok Ntee (Place of Learning) is to show God's love and concern for Bunong farmers through trialing and demonstrating appropriate technologies. The center demonstrates farming techniques and appropriate technologies, and offers a variety of locally adapted plant varieties and livestock for projects and for sale.

Ntok Ntee is a mission organization affiliated with the Christian and Missionary Alliance denomination and in partnership with a local church. The center currently employs five full-time staff members: two researchers who also direct day-to-day operations and founded the small farm resource center, a general laborer, an intern and a farm manager trainee. Although the work of Ntok Ntee currently reaches

mostly farmers of the upland districts of the local Monduliri Province, Ntok Ntee also has unofficial connections to several other NGOs and development organizations working in the region. The center is in partnership with the development organization International Cooperation Cambodia (<http://www.icc.org.kh/>), which plans to use the small farm resource center in its training and extension work, thus expanding the reach of Ntok Ntee to all districts of Monduliri and Ratanakiri provinces.

Ntok Ntee's approach is to widely disseminate pro-poor farming technologies and education by focusing resources on the smallholder farmer community and the marginalized Bunong ethnic group. The center is active in the communities where it works and develops programs based on stakeholder needs. Understanding that agriculture in rural Cambodia is often a feminine enterprise, Ntok Ntee consistently considers gender in the development of its programs. Now that Ntok Ntee is established at its permanent location with much of its infrastructure in place and its agriculture operation functional, Ntok Ntee founders hope to continue to expand its reach and influence through trainings, working directly with local farmers and other NGOs.

Center Efficacy

Within the Bunong community, Ntok Ntee demonstrates ideas and technologies that have been shown to be valuable elsewhere. In addition, the center actively evaluates and trials plant species thought to hold potential in Monduliri's harsh environment. The most promising ideas, technologies and plants are evaluated and adapted to become the mainstay of the center's agricultural outreach program. This adaptive research forms a crucial link between the center and local farmers. These efforts are valuable to local farmers and other NGOs because they involve little or no risk, present something that farmers and other NGOs are not already doing, have the potential to deliver substantial impact, and have a strong market link, in the case of a new plant species, or have high local acceptance if the technology is to be used by the farmers. Because traditional extension and/or advisory services are not prevalent in Monduliri Province, Ntok Ntee can have a substantial role in smallholder farmer education, particularly in reaching neglected and marginalized populations such as the Bunong.

Ntok Ntee is a relatively young SFRC -- it has been operational at the current location for less than two years. As infrastructure and capacity at the center grow, its scope and role as a training facility will likely expand. Stakeholders currently benefiting from Ntok Ntee activities include smallholder farmers, especially Bunong, of the upland districts of Monduliri; Elim Bible College students who volunteer and receive training; church groups in five local villages; and staff members from regional NGOs. Ntok Ntee is also open to the public and for consultancy, attracting several hundred visitors per year. The list of stakeholders benefiting

from Ntok Ntee activities will likely grow to include government officials, additional student groups, local/regional farmers and others.

In the view of the center's directors, aspects of the facility that have worked well include the practice of establishing fruit trees along the contours of the property. Also, certain species have performed well and hold potential to become useful tools in the region, including vetiver grass, select ground cover plants and fruit species such as passion fruit. Though the directors are pleased with the current progress and capacity of the center, they acknowledge that in the initial stages of development, there were competing work priorities. For example, it would have been beneficial to have had a more thorough rainfall runoff management plan in place immediately to protect the steep hillsides from soil erosion. Similarly, there is still progress to be made in providing water access on the higher slopes of the property, and the need to continue work on contour development and management. These water access and management issues are widespread in the uplands of Mondulkiri, and Ntok Ntee will eventually have the opportunity to demonstrate to the community how it's managed these problems.



Demonstration of appropriate technology (AT) irrigation resources.



Water access and management challenges are widespread in the upland regions of Mondulkiri.

Strengths of the Ntok Ntee small farm resource center include: the agricultural research training, background and experience of the center's directors; proximity to the nearby town, Sen Monorom (3 km); road access to the facility and a good road on the farm; a strong network of international partners and local collaborators; active support of the local church and church community ownership of the land and facilities; good microclimate for conducting plant trials including fruit trees, which are sheltered from Mondulkiri's substantial winds; adequate water resource availability, making drip irrigation possible; nursery established on site, offering certain plants for sale to the community while generating income; and the fact that the property is representative of the whole province, allowing for relevant demonstrations (Table 2).

Expressed weaknesses of the center include: property dimensions are long and narrow, which may limit potential; the farm is 3 km from the high school, making it difficult for students to access the center; the soil on the farm is degraded and too acidic, and access to agricultural lime is very limited in the region; parts of the farm are too steep; operational funding is limited; trained local labor is lacking; and tribal people are being pushed farther away from the forest and into the lowlands.

To review perceptions of the efficacy of Ntok Ntee, interviewers asked three open-ended questions. The following are the responses to the first question, "What are some of the accomplishments of which you are most proud?"

- Establishment of research trials evaluating plant and animal species adapted to the local environment and needs.
- Introduction and adoption of passion fruit (*Passiflora edulis*) in the region. It is well-adapted and is becoming more commonly grown among area farmers. More importantly, it has profit potential, and local restaurants are using the fruit.
- Establishment of the nursery, which has made it possible to distribute certain species widely and has generated a modest amount of income for the farm.
- Discovery and distribution of an upland rice variety showing some degree of resistance to the brown leafhopper, a significant local pest.
- Evaluation trials of various legumes, leading to the introduction and wide adoption of stylo (*Stylosanthes guianensis* var. *guianensis*), a useful perennial legume adapted to acidic, low-fertility soils.
- Making significant gains in chicken improvement.
- The growing role of Ntok Ntee in advising local farmers and agricultural development workers.
- Collaboration with ICC, a local NGO, for the training and deployment of veterinarians working in local villages.

The following are responses to the second question, “What do you need most for improving your agricultural development outreach work?”

- A knowledgeable agricultural worker who has the appropriate background and training to work with the poor farmers in the province.
- Stable funding to support this additional agricultural worker.
- Improved local availability of agricultural inputs.
- A workable solution for the problem of theft.

The following are responses to the third question, “How many people have benefited from your outreach work related to agriculture and development?”

- A significant effort has been made to widely distribute locally adapted fruit trees; at the time of the interview, between 1,000 and 2,000 households had received fruit trees.
- More than 300 families have benefited directly from the rice project, whereby improved upland rice was made available as a partial solution to the brown leafhopper infestation.
- A collaboration between Ntok Ntee and ICC to train and deploy village veterinarians has been highly successful and has benefited between 600 and 1,000 families in the region.



Bunong community in Monduliri Province, Cambodia.

In addition to outreach, demonstration and research projects, Ntok Ntee is actively engaged in operating agricultural enterprises on the farm, producing and marketing a range of commodities as a supplemental source of income. Currently, fruit trees, hardwood seedlings, woody ornamental species and chickens are available for sale. Though the profitability of each individual enterprise varies depending on climatic and market conditions, these income streams collectively represent an important contribution to Ntok Ntee’s operating budget. In addition, they offer a much needed real-world laboratory for training relevant to appropriate production practices, enterprise development, business management and marketing. An ever-increasing number of non-governmental organizations and other groups are involved in agricultural and community development projects in Cambodia, and many of these organizations bring with them a broad range of training needs. Ntok Ntee is working to address this need for capacity building by engaging the development community and creating a variety of training programs suited to various needs.

Extension Efficacy

Ntok Ntee has focused on developing on-farm crop, livestock and appropriate technology demonstrations and research. These programs serve as the basis for training at the center and outreach to target communities. Because of the previous and ongoing relationship with ICC as well as the recent development of Ntok Ntee, the center has a presence within local smallholder farming communities and an extended impact via interaction with regional and international development workers.

To gather feedback on the extension efficacy of Ntok Ntee’s community-based efforts, community leaders in a local Bunong village in Monduliri Province were interviewed. These interactions with community leaders in the surveyed Bunong village served by Ntok Ntee indicate that the SFRC’s outreach and training programs are having a significant positive and measurable impact (Table 3). Community leaders acknowledged improved practices based on knowledge gained from Ntok Ntee training, and they shared concrete evidence of changed practices that subsequently translated into real increased income or other, indirect benefits. Village leaders were quick to acknowledge substantial gains made in the area of livestock management. Educational programs delivered by the SFRC on pig management and culture directly or indirectly resulted in larger and healthier litters of piglets in subsequent months. The introduction of better adapted chicken species resulted in decreased losses and improved income. These improvements also had a significant positive impact on family and community nutrition, especially in protein consumption.

The interviewed community leaders and stakeholders highly valued Ntok Ntee’s effort to introduce new crops such as fruit trees and species previously unknown to the region, such as

passion fruit (*Passiflora edulis*). The farm served an important function by first testing and evaluating many of these varieties and species before promoting them. This reduced the risk borne by the farmers and improved the odds of acceptable on-farm performance once the plants were distributed. This type of fruit tree distribution project can serve as the basis for increased household income and even the catalyst for home-based businesses. Indeed, passion fruit products were on the menu at Sen Monorom restaurants as a direct result of the Ntok Ntee introduction of the crop. Improvements were also noted in the area of pest management and crop yields. The discovery, promotion and distribution by Ntok Ntee of an upland rice variety showing a degree of resistance to the brown leafhopper was important to the villages served by the SFRC because rice is the central pillar of their food security.

In support of the livestock program, the SFRC introduced and promoted locally adapted bean varieties to supplement animal feed. This introduction served the dual purpose of providing livestock fodder while improving soil fertility. Along with the bean, the center has successfully promoted the use of vetiver grass (*Chrysopogon zizanioides*) and perennial legumes such as stylo. These introductions integrate well with the livestock management system common to the region. Employing these crops in concert also ultimately results in decreased soil erosion and increased soil tilth. Steep terrain, inappropriate farming practices and extractive plantation cropping of cassava and rubber have eroded and degraded the soil in many regions of the Monduliri Province. Reversing this trend and restoring local agroecosystem health is a long-term prospect requiring education, farmer cooperation, and appropriate inputs and resources. Interactions with a variety of SFRC stakeholders indicate that Ntok Ntee has been a positive force in this restorative agriculture process and has had significant impact in a relatively short amount of time.

A theme that was repeated numerous times was the value derived from the village's having an active relationship with the SFRC. Extension efforts in the village such as training or on-site demonstrations and subsequent follow-up visits resulted in high rates of knowledge gained, innovations adopted and practices changed. It was noted that it is from within the context of this relationship that village-level problem solving can best function. It was also evident that the village had a high level of trust in Ntok Ntee because of past successes, and that this formed the basis for future cooperation.

4. Summary

Ntok Ntee has had significant local impact on the introduction and adoption of new and appropriate technologies and farming practices. Practical hands-on training coupled with demonstrations at Ntok Ntee have

allowed farmers to witness many of these new practices before trying them on their own farms, thus reducing farmers' perceived risk. This "seeing is believing" approach has been successful for the center because it has helped to change long-held perceptions of many farmers and provided them with actual data on the positive impact of the innovation. The hope is that these farmers will become allies of Ntok Ntee and its mission and engage in farmer-to-farmer demonstrations in their villages, thus spreading innovations or new technologies into the countryside. Projects that have had substantial impact and quick rates of adoption in rural villages targeted by Ntok Ntee include new crop and small livestock introductions – notably, leafhopper-resistant upland rice, fruit trees, passion fruit, annual and perennial legumes such as locally adapted beans and stylo, and chickens.

Ntok Ntee has the infrastructure, expertise and capacity to implement a useful applied research and demonstration program, particularly in species evaluation and introduction and appropriate technology. Projects of the SFRC are based on local stakeholder needs and are showing significant impact. This allows the center to extend practical, "home-grown" results locally and regionally, and should allow the center to expand its ability to host students and educators wishing to engage in applied research projects. In the span of less than two years, Ntok Ntee staff members have transformed a relatively difficult, degraded parcel of land into an active, productive research and demonstration farm.

Background of the Center

- Remote Monduliri is the largest province in Cambodia and home to the second largest ethnic minority group, the Bunong.
- The Ntok Ntee training center, situated on the outskirts of Sen Monorom, Monduliri Province, Cambodia, was established in 2012 and serves smallholder farmers, local churches, NGO and development workers, and focuses outreach efforts on Bunong smallholder farmers.
- Ntok Ntee's vision is to improve the sustainability and profitability of Bunong farmers via research and development programs of the SFRC.
- Ntok Ntee widely disseminates pro-poor farming technologies and education based on stakeholder needs.

Center Efficacy

- The center actively evaluates and trials potentially useful or profitable plant and animal species locally adapted to Monduliri's often harsh environmental conditions.
- Other appropriate technologies are field tested and adapted at the SFRC to become a key component of its agricultural outreach program.
- Development of farm facilities and infrastructure, such as the establishment of nursery facilities and irrigation, has enabled Ntok Ntee to evaluate, trial and distribute

fruit trees, hardwood seedlings and other species showing economic potential.

- Education and training programs related to livestock culture and management have been well-received and have benefited target communities.
- Evaluation and distribution of livestock forage crops and conservation species such as stylo, vetiver grass and locally adapted beans are an important component of a larger effort to restore the productivity and health of the often degraded local agro-ecosystem.
- Ntok Ntee sees the potential to expand its focus to include development of training and educational programs to groups such as agricultural NGO staff members and SFRC visitors.
- The need exists for additional staff members with agricultural training and experience to help develop the farm and work on outreach projects; lack of a local skilled workforce and enhanced long-term funding remain obstacles.
- The SFRC has established several income streams from products grown on the farm and continues to evaluate the expansion of home-grown income streams.

Extension Efficacy

- Overall, community leaders and stakeholders highly value the outreach programs offered by Ntok Ntee.
- The education and training of village veterinarians is highly regarded and has had uniformly positive results, especially in pig culture and management.
- Introduced locally adapted plant and animal species, such as passion fruit and chickens, have seen widespread adoption, and Ntok Ntee has emerged as a trusted source of innovation and positive change within the province.
- Part of the success of the SFRC program is owed to the fact that technologies and innovations are first evaluated, trialed and demonstrated on the farm, reducing risk to the farmers and allowing interested farmers and others to observe them before trying them on their own farms.
- Bunong village leaders value their relationship with the SFRC; Ntok Ntee extension efforts in the villages have resulted in high rates of knowledge gained, technologies adopted and practices improved.

5. Recommendations and Future Directions

This assessment uncovered very few areas of weakness and/or critical areas for improvement in the operation and management of Ntok Ntee. This is evidenced by the substantial measurable impacts resulting from the center and

its outreach program, all developed over a relatively short amount of time. The following are recommendations and future directions developed in collaboration with the SFRC directors:

- Continue new species evaluation, testing and distribution. This program is highly useful and popular among the Ntok Ntee clientele, and it has the potential to open markets and improve income. A focus on underutilized food crops as well as agroforestry species is recommended.
- Consider developing and marketing training programs based on Ntok Ntee's early successes and lessons learned in the region. These training services (as well as products from the farm) could be marketed to the ever-increasing number of agriculture-related NGOs and development organizations operating in Cambodia and the Mondulakiri Province in particular. In coming years, demand for agricultural training and education materials and field services will likely be increasing.
- Seek out and develop collaborative relationships with NGOs operating in Mondulakiri Province, and focus on broadening the agriculture and community development network. Actively promote agricultural training and education linkages and synergies to expand this network.
- Continue to seek grant funding for new and ongoing projects. Establish and strengthen relationships and build teams within the formal and informal agricultural education system, such as the Royal University of Agriculture in Phnom Penh. Consider ways to collaborate with grant-funded agricultural education projects such as USAID's MEAS and InnovATE projects, for example.
- Couple new species evaluation with seed banking training and dissemination to help farmers conserve crop biodiversity, improve seed germination and reduce reliance on outside sources of seeds.

6. References

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7. Tables and Figures

Table 1. The seven small farm resource centers (SFRCs) assessed as part of this MEAS case study series.

SFRC Name	Location	Director/Contact
Ntok Ntee	Mondulkiri, Cambodia	Ken Thompson
Farm Center Indochina, FCI	Indochina	Contact Authors
Sustainable Agriculture Training Center (SATC)	Hmawbi, Myanmar	Saw Hei Moo
Aloha House	Puerto Princessa, Philippines	Keith Mikkelsen
Center for the Uplift of Hilltribes (CUHT)	Chiang Mai, Thailand	Suwan Jantarayut
Thai Lahu Christian Churches (TLCC) Center	Doi Saket, Thailand	Marting Chaisuriya
Upland Holistic Development Project (UHDP)	Mae Ai, Thailand	Bunsak Thongdi



Figure 1. Locations of seven surveyed small farm resource centers (SFRCs) around Southeast Asia.

Table 2. SWOT analysis for Ntok Ntee SFRC, Mondulkiri Province, Cambodia. Answers in regular text were given by the interviewees; answers in bold are the opinions of the evaluators.

Strengths (Present)	Opportunities (Future)
<ul style="list-style-type: none"> – Community ownership of the land and facilities. – Agriculture research training of the directors. – Background and experience of the directors, esp. regarding trees and agroforestry. – Good location --only 3 km from town. – Good road to site/on farm, facilitates access. – Good network of international partners and collaborators (ECHO, UHDP). – Strong linkage with and active support of local church (meets at site each week). – Beneficial and strong relationship with International Cooperation Cambodia (ICC). – Good site for the establishment of the SFRC; some land cleared and some 10-yr-old trees. – Property representative of whole province (diverse site allows for various demonstrations). – Orchard location sheltered from the wind. – Semi-commercial nursery-plants offered for sale – Good microclimate for conducting plant trials. – Good water resources (stream) at the bottom of the site; drip irrigation-capable. – Established nursery; brought from previous site. – Strong leadership with clear vision for the future. 	<ul style="list-style-type: none"> – Increase exploitation of site microclimate. – Ability to host/train NGO personnel. – Tourist traffic near property; increase in tourism to Mondulkiri Province. – Potential to partner/integrate with local or regional SFRCs. – Relationship with ICC and potential for expanded extension efforts. – Potential for additional outside grant funding via partnership with ICC. – Future building/training center planned; large enough for multiple functions. – Stable support from CMA parent organization. – Showcase appropriate technology from around world to local communities. – Town encroachment could bring electricity. – Expand marketing of training programs to ag-related NGOs and development groups.
Weaknesses (Present)	Threats (Future)
<ul style="list-style-type: none"> – Site dimensions limit land potential. – 3 km from local high school, making it difficult for students to access property. – Degraded soil. – Funding. – Acidic soil; no local source of ag lime. – Parts of the site too steep. – Lack of full integration into local/regional markets. – Lack of control over local market demand. – Tribal people being pushed farther away. – Transient population, lack of trained labor. 	<ul style="list-style-type: none"> – Keeping qualified staff members. – Funding. – Competition among NGOs for qualified staff. – Unpredictable climate. – Theft. – Lack of water at the top of the property – Encroachment from town. – Long-term indigenous labor/management force. – Uncertain government stability and policies. – Impact of development on cost of goods and services.

Table 3. Responses of local Bunong village leaders to questions assessing the impact of Ntok Ntee training programs. (N = 9)

Question	Number of Responses by Category				
	1 much worse	2 a little worse	3 no change	4 a little better	5 much better
1: Crop production	0	0	0	4	5
2: Animal production	0	0	0	6	3
3: Household income	0	0	8	1	0
4: Household debt	0	0	9	0	0
5: Center and outreach effectiveness	0	0	0	2	7
6: Future directions	0	0	0	4	5

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