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**A Phenomenological Study of Individual Strategies for Rebuilding Food Production Ability in Resource Poor Post-Conflict Farming Communities in Myanmar**

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**Abstract**

*The impact of armed conflict on small-holder agricultural production recently became a closely studied topic (Verwimp, 2011). In post-conflict, or perpetual low intensity conflict, situations policy makers have identified agricultural rehabilitation of small-holder food production as vital for preventing economic collapse, encouraging internally displaced persons (IDPs) to return to their rural communities, and to reintegrate former insurgents into viable rural livelihoods (Christoplos, Longley, & Slaymaker, 2004). This issue has been studied at the regional and country level, but few studies have looked at this issue from resource poor small-holder farmers' perspective (Shinn, 2010; Verwimp, Justino, & Bruck, 2007). This qualitative study documented the experience of resource-poor farmers who experienced armed conflict in northern Shan State, Myanmar. Thirty-four resource-poor farmers and six agricultural advisors were interviewed using semi-structured interview methods. The study was conducted over a three-month period in 2013. The study revealed eight themes, which described the reality of the post-conflict environment and small-holder strategies to cope and recover food production capacity. The themes were, armed conflict is always with the farmers; loss of animals and seed stock; loss of local markets; forest as refuge; fear of government and militias was mitigated by family networks; large agribusiness control land and employment; prolonged conflict causes movement to safe areas and neighboring countries; rebuilding food production. These findings reveal the need for policy makers and agricultural advisory services to modify their assistance strategies and services to better match upland resource-poor farmers realities and adaptation strategies.*

**Keywords:** post-conflict, resource-poor, farmers, extension

### **Introduction**

Development agencies, realize the vital role agricultural development plays in assisting rural communities stabilize and rebuild food production systems during post-conflict recovery (Kock, Harder, & Saisi, 2010; Bhatia, Goodhand, Atmar, Pain, & Suleman, 2003). Organizations like the United States Department of Agriculture (USDA) and the United States Institute of Peace (USIP) have affirmed the role of agricultural extension in peace building (USIP, 2009).

Agricultural development has been in place since the first agricultural extension system was developed in the U.S. (Swanson & Rajalahti, 2010). Attempts to assist lesser-developed countries in growing their agriculture has been a component of development assistance efforts since the 1950s (Christoplos, 2010). It was believed development of industrialized nations followed a linear progression from an agrarian society to an industrial production economy (Peet & Hartwick, 1999). An effective agricultural extension system maintained and funded by the government was understood as an integral part of this development (Christoplos, 2010).

Additionally, agricultural extension has been a necessary component of agricultural development with Western aid for lessor-developed countries since the 1950s, but the extension systems have faced several issues (Swanson, 2010; Christoplos, 2010). Christoplos and Farrington (2004) described some of these challenges as: decreasing funds for maintenance and expansion; difficulty engaging marginalized producers; and effectively providing assistance to agrarian societies devastated by armed conflict.

### **Theoretical Framework**

Rogers (2003) diffusion theory has traditionally been the theoretical base undergirding agricultural extension practice. The theory is particularly useful in describing the role opinion leaders have in the diffusion and adapting of new innovations. It is the starting point for this issue, but as experiences emerge other theories will be explored to help explain the phenomenon.

A second theoretical insight is a “key player” from Borgatti (2006). The key player is a vital connecting node within a social network (Borgatti, 2006). The term key farmer could also encompass the term “innovation brokers” or “catalytic agents,” which describes the building of agricultural innovation networks for developing agriculture (World Bank, 2012, p. 46). The definition of the key farmer used in this study are farmers who have developed influential recovery strategies to rebuild post-conflict community and food production systems.

A third theory is Dual Concern Theory (Blake & Mouston, 1964). The theory says in dealing with interpersonal conflict people have two primary motivations (Mohammed, 2007). The “desire to obtain one’s own goals (concern for production) versus the desire to retain interpersonal relationship (concern for people)” (2007, p. 3884).

Several additional theories come from the disaster literature (Dronberger, 2013). Couch and Kroll-Smith (1994) described the Consensus Crisis Reactions, where crisis brings about consensus within a community and galvanizes the community towards positive action to alleviate a crisis (Dronberger, 2013). Non-economic shocks can lead to community social capital enhancement where quality of life improves or returns to the status quo (Coach & Kroll-Smith, 1994; Drabek, 1986). Closely connected in the opposite direction is the Corrosive Community Reactions theory (Freudenberg & Jones, 1991; Besser, Recker, & Agnitsch, 2008). In this case, shocks to the community create corrosive community reactions where there is a decrease in community quality of life and a decrease in social capital after shock (Besser, Recker, & Agnitsch, 2008). Also, in the disaster literature is Mayunga’s (2007) discussion of resilience and

vulnerability. These theories related to consensus crisis, corrosive community, resilience, and vulnerability apply to communities facing the hazard of conflict or persistent low-level conflict.

A final theory of importance is Conflict Management Theory (Hamad, 2005). Conflict management theory makes the assertion conflict, whether at the individual or community level, is always present and can only be managed. It is opposed by interpersonal conflict resolution theories assuming conflict can be resolved and, essentially, nonexistent (Mohammed, 2007).

### **Problem & Purpose**

Literature shows armed conflict is a disruptive force to agricultural communities (Verwimp, 2007; Jorgensen, 2006; Green, 2012). Examples from sub-saharan Africa show impacts have lasting effects on marginalized farmers (Marijke, 2009; Bozzoli & Bruck, 2009). Agricultural extension and private advisory services have an essential role in assisting communities recovering from armed conflict. The research helps further food security and conflict management initiatives of several organizations concerned with improving post-conflict recovery. The organizations include the Howard Buffet foundation, which specifically focuses on meeting the needs of agricultural resource development for underserved smallholder farmers (Howard Buffet Foundation, 2013). The United States Institute of Peace is another organization emphasizing the importance of assisting rural populations recover from conflict (USIP, 2009). Understanding how to more efficiently work with and facilitate food production recovery after conflict is crucial for communities after the devastation of armed conflict (Goodhand, 2006).

The purpose of this phenomenological study was to understand the experiences of resource-poor individuals adapting recovery strategies to rebuild their food production systems after disruption by armed conflict. A secondary purpose was to add additional information about a poorly understood area of human experience. A third purpose was to make the voice of marginalized farmers heard (Smith, 2012). This research was conducted to faithfully represent the concerns of the marginalized farmer (Chilisa, 2012).

### **Research Questions**

The following research questions were formulated to guide this research:

1. What are the experiences of farmers when adapting food production systems after conflict in northern Shan State?
2. What influences the experiences of farmers when adapting food production systems after conflict in northern Shan State?

### **Methods**

This research follows a qualitative research design and the principles of emergent design (Creswell, 2007). Creswell (2007) described emergent design as a research framework where the format and structure of inquiry and data collection are flexible to capture data emerging from the research. This flexibility in the design structure is what enables a qualitative researcher to better describe poorly understood phenomenon. The use of phenomenology in studying issues related to conflict situations was used by other researchers (Minami, 2011; Murphy, 2011).

The study does not attempt to be prescriptive of what occurs with farmer adaptation. This means the consumers of this research cannot assume to take the themes from this phenomenology and state all other farmers have these same experiences when they experience recovery from armed conflict. The readers of the research findings will be encouraged to make application to their own experience and context (Patton, 2002).

The subject farmers who were identified by government officials, businessmen, and development workers as a key farmer. Trust was developed through ongoing relationships with the partnering non-government organizations and agribusiness. Because the researcher was also providing agricultural extension expertise to the organizations the research was seen as part of the work of the NGO and agribusiness. The key farmers were found within communities in one administrative area in Shan State, Myanmar.

Thirty-four farmers were interviewed for this study. Five women and twenty-nine men were interviewed. Of the men, most were older, approximately 50 – 90 years old, who had years of experience farming and often were former members of a conflict force. A second group ranged from 35 – 48 years of age, and they were key farmers who also held leadership positions in different civil society organizations or were part of non-government aid and development organization development programs. A third group were younger people who had not migrated to other countries like China or Thailand for work. They relied on farming as their livelihood. In addition to the 34 farmers, six individuals who worked closely with farmers were interviewed to deepen the understanding of the farmers' experiences. These individuals included a village schoolteacher in a farming community, agricultural advisors working for NGOs, a college student, forestry officer, and a local agribusiness person.

Phase 1: Project surveys, reports, and evaluations were gathered by the researcher to provide background information through a web-based search. This data was synthesized into a report before arriving in-country. This informed the researcher to modify the interview protocol. Once the researcher arrived in country and received all necessary initial approvals, one research assistant was selected and trained by the researcher and expatriate agribusiness advisor using methodology from Patton (2002), Creswell (2007), and Chilisa (2012).

Phase 2: Through discussions with the agribusiness and NGOs a list of key farmers spread throughout the administrative region was made. Using the relationship built by the development organization the 15 key farmers were interviewed in depth using a semi-structured interview guide. Using the snowball method additional influential farmers were identified. This method yielded 34 individual farmer interviews for the study, which covered ten villages.

Phase 3: In order to provide background data on the community history of armed conflict and post-conflict recovery, village oral histories were developed where possible through interviews with the key farmer. This provided information, in combination with the background data, in order to better understand the context, the phenomenon was experienced.

### **Data Analysis Procedures**

The phenomenological method relies on rich description describing the essence of lived experience for select individuals (Moustakos, 1994). The main source of data was generated from 34 interviews with farmers affected by armed conflict and considered innovative by locals. The interviews were taped, transcribed, and coded according to modification of the Stevick-Colaizzi-Keen method of analysis of phenomenological data (Moustakos, 1994, p. 121-122).

Supporting data consisted of interviews with ten individuals who provided triangulation and confirmation of data from the farmers' interviews. These data were also analyzed through the same method and utilized to develop themes. Additional supporting data were gathered through analyzing recurrent themes in newspaper articles.

These transcriptions were analyzed using NVIVO10® and coded for significant themes. These codes were compared across interviews in order to find the recurrent themes of the experience. The constant comparative method by Strauss and Corbin was used (Creswell, 2007).

## **Results**

### **Theme 1: Armed Conflict is Always with Us**

It quickly became apparent participants experienced conflict throughout their life. Major events moving families were remembered. Conversely, the daily intermittent conflict, or adjustments made daily to avoid potential conflict, were seen as everyday occurrences. It was also evident the participants could identify the armed conflict events, actors and threats around them. However, because they had always known this existence, it was not seen as unusual. It was as if they were talking about the weather. One participant said, "I think it's just normal and very simple for us to recognize the battle since, we, the villagers here have so many experiences of the battle." This comment shows the coping and adapting ability of the farmers to this environment.

### **Theme 2: Forest is Our Refuge**

An essential part of experiencing and recovering from conflict for the farmers in this study was finding an immediate refuge to flee. Sometimes the farmers received a warning ahead of the conflict. This warning came from family members in insurgent militia groups, local traders, government officials, or military members and the farmers had to judge when to leave. One participant stated, "It's depended on the battles," when they would run from the farms.

Other times farmers had no warning and had to flee immediately. The overall theme for the small-holder farmers in northern Shan State was they would flee. They would take whatever they could grab and go to the nearby forest to escape. The effort was on escaping as quickly as possible. There was a danger if they did not leave soon enough, as evidenced by the comment, "Some people escaped and run to the safe place. Some were arrested and forced to be a porter to carry things." Hence, there was urgency for the farmers and their families to flee as soon as the perceived threat was critical.

### **Theme 3: Fear of the Government and Militias Mitigated by Familial Networks**

Discussion of fears brought on by insurgent militia actions and government military actions was a sensitive subject. As study participants discussed their experience of recovering and adapting their farms after armed conflict it became evident networks were the main mode farmers used to manage risk inherent in intermittent conflict zones. The connections were not limited to family and included friends and other relationships.

One participant said, "Villagers or farmers are always afraid of not only the ethnic troops but also the military government." Another said, "We are more afraid of (insurgent militia) than the military government. As if the government found them guilty, we would go to jail but the (insurgent militia) killed those who they don't want or who they think is guilty." Farmers in remote villages were usually in buffer areas, where the government military was willing to go and where the insurgent militias had their areas of control.

In managing their situation, the farmers talked about connection to family members or relatives they had in the military. One farmer said, "Yeah, some villagers have their relatives in the military. So then, they hear and know when they can come back to their village." Another farmer described using personal connections to insurgent militia members to protect villagers.

### **Theme 4: Loss of Animals and Seed Stock**

A strong theme was difficulty recovering from armed conflict because of the loss of animals and seeds. This theme speaks to the destruction of the physical resource base farmers

relied on. In addition, the inability to attend to timely tending, preparation, and harvesting of field crops added to the resource issue. One farmer said, “So they don’t have time to get their rice. They don’t have time to get their buffalo. They just had to run.” When the farmers returned to the village after it was deemed safe there was the overwhelming realization, “...they could not see their raising animals. Just their farm fields were left. All the animals were shot and made food by the soldiers – yeah, government soldiers and rebellion soldiers.”

Another farmer described this experience, “The farmers have to abandon their fields when the battle takes place. They leave all their prosperity and try to find another safe place. But when they came back, some of their fields and food stores were destroyed. If the battle took place in the growing season, there would be nothing to do for the farmers.”

Not only was there loss of animals, rice stores, and seeds, there was a loss of communal resources like important hard woods and the prized hardwood species of teak. A forestry officer with familial connections on both the government military side and insurgent militia side said, “There was side effect on the forest when the battles took place. Because they could not look after the forest and then some groups are already in the forest that cut down and steal some wood and teak illegally, you know. And they sell to the China or Thailand.”

### **Theme 5: The Market is Gone**

Market opportunities disappeared as a result of conflict. Resource poor farmers living in villages struggle to engage in markets. Armed conflict can cause farmers to lose their cash crops or excess grain they planned to market. One farmer said, “We, the villagers, got big trouble as the military government organized and controlled all the products and goods. The only reason was they were afraid of the villagers supporting the --- (insurgent militia). Moreover, we had to be afraid of --- (insurgent militia) because if we didn’t supply the rice or other foods such as meat and vegetables something like that, we could be killed. So, we didn’t show all the rice and food to the military and we hid the food in the ground in order to supply --- (insurgent militia). The villagers could not even eat freely.” This experience illustrates how the villagers are stuck between two armed sides and had to give away all their marketable produce.

Farmers deal with prices dropping as traders who come to the village realize farmers must sell their produce quickly or risk losing it. The traders take advantage of the situation. The fear of conflict also means buyers/traders will not risk traveling rural roads to purchase produce.

### **Theme 6: Big Agribus/Govt. Military/Insurgent Militia Control Land and Employment**

Participants cited issues associated with large agribusinesses and the government military control of the best agricultural land. The local and regional Myanmar government encouraged this practice. The common theme discussed by farmers was they did not have access to land. Many farmers also were constrained because they lived in areas where the government military appropriated land for security reasons and concentrated the farming populations into villages near the main roads. These farmers then rent land from the military. Study participants explained the armed conflict was the precursor for their displacement from their traditional farming lands.

A farmer shared, “The upland land is also borrowed from the military. But in the past, all that land was owned by the villagers. The military seized all the land.” This situation was similar to another area where a farmer said, “There’s no farming for the local people in this area since the Chinese businessmen came and bought almost all the land.” This farmer explained now the farmers in the area work on the Chinese business farms.

**Theme 7: Prolonged Conflict Causes Movement to Safe Areas and Neighboring Countries**

This theme focused on the difficulty of maintaining productive farms with reoccurring conflict. Some farmers found it difficult to move to safe areas. A farmer said, "It's difficult to find a new land. As my experience, we asked other villages to share their land. But they are not supposed to get the land and to stay there. Finally, some people just went back to their old place. But some people went to a refugee camp." This trend of movement is evidenced when a study participant said, "Mostly in (neighboring administrative region), the villagers were traumatized about not going back to their village. So that, they go and find other places and built the new village." Another farmer shared, "We migrated one place to another in search of food and tested crops like rice and corn. But nothing was implemented as the villagers were afraid of war."

There is also difficulty finding an outlet for productive employment for the young people. The trend is for young men and women to leave northern Shan State and move into neighboring countries like Thailand and the border region with China to seek employment. They then send earnings back to the families remaining in the country.

Finally, some farmers became involved in political processes, which meant they could no longer remain in the rural area between the government military and the insurgent armed forces.

**Theme 8: Rebuilding Food Production**

This theme emerged as farmers described their practices and efforts to rebuild food production during times of post-conflict and intermittent conflict. The general components of this theme were animals, crops grown, new methods, preserving the resource base, beneficial social structures, and market interaction.

Farmers faced the struggle of rebuilding food production by borrowing money to buy animals. A second important component of recovering food production is having seeds and planting material to begin crop production. Few farmers still had their original heirloom seeds. One participant said, "For example, if this village was destroyed by conflict, the other villages would help and look after the villagers from this village by supplying seeds and some foods to eat." The farmer added, "They just grow whether the seed is good or not. They don't know and they don't care." As the situation stabilized farmers became more concerned about seed quality.

Farmers often began growing new crops after armed conflict uprooted them. A study participant who worked closely with the farmers emphasized those facing intermittent conflict are reluctant to plant anything long term. "They (farmers) are not so sure about their land. For example, when shall they have to flee? So, they don't dare plant fruit trees or long-term plants. But we, the facilitator, have to be good at persuading or presenting for them why they should grow long term fruits," the non-farmer participant said.

In this example, farmers are expressing the need for preservation of the little resource base they have left. Even as farmers are aware of pressing environmental and food security issues, the years of conflict have eroded the traditional social structures, which helped provide communal preservation of forest resources or management of water resources.

**Conclusions, Implications, and Recommendations**

This phenomenological study recorded the lived experiences of resource poor farmers in northern Shan State who experienced armed conflict. The research questions asked about experiences of farmers when adapting food production systems after conflict; and what factors influenced the experiences of farmers when adapting food production systems after conflict.

The reality armed conflict is always with the farmers in northern Shan State is reflected in the almost calm response to ongoing persistent low-level conflict. It is similar to the outlook of individuals in places of the world who experience regular occurrences of severe weather (Freudenberg & Jones, 1991). Many farmers learned to cope with persistent conflict from their parents. Many experienced conflicts, but it occurred mainly in the forest and the farms. Opportunities for agricultural rebuilding are made more difficult as the farmers are reluctant to risk new opportunities because of increasing vulnerability. However, through the persistent threat of intermittent conflict farmers have shown a resilience to survive.

Development workers and extension personnel should seek to understand the vulnerability felt by farmers through participatory methods and begin working toward agricultural activities respecting the persistent resilience. Research should be conducted to quantify the vulnerability farmers face, as this study revealed many themes but not a prioritization of the greatest vulnerabilities' farmers face.

Farmers see the forest as their refuge. Anderson (1993) described the forest as a provider of many food items, building supplies, medicinal plants, and refuge during times of armed troubles. At the same time the forest was the place where insurgent militias found their refuge (Scott, 1990; Scott, 2009). The forest has been, and is still, an important part of the marginalized farmers' resource base. This position marginalized, resource poor farmers as viable partners in preserving forest resources. Although the farmers have a growing awareness of the forests as being a finite resource, armed conflict means all actors, including marginalized farmers, have unsustainably harvested from the forests as a way to keep each of their causes/livelihoods alive.

Careful implementation of community forestry management is a way to engage these farmers in preserving their resource base, which would be a way of preserving both the cultural traditions of the marginalized ethnic people and also the forests. Additionally, an important area to further understand is marginalized farmers understanding of the forest as a resource base and what actual forest resources are still available for such preservation.

The people of northern Shan State are guarded and careful about their comments concerning the government military and the insurgent militia groups. With conflict ever-present in their lives, there is always a concern/fear of negative impacts from any of the warring parties. The fear of both government military and armed insurgent militias means farmers have a high amount of distrust toward outsiders attempting to develop new projects through the government. Farmers who are opinion leaders are vital to involve farmer participation in projects and developing equitable business ventures involving marginalized farmers (Rogers, 2003).

Agricultural development experts and government agricultural planners should consider what trust building activities might encourage engagement with marginalized farming communities. Key farmers should be identified and engaged in the early stages of agricultural program development in order to develop local enthusiasm and support for program activities.

The loss of animals and seed stock was a particularly devastating theme emerging from interviews. The resiliency of marginalized farmers regarding their animal stocks is not very high. This is true because of the difficulty of moving livestock quickly during the quick onset of armed conflict. Carrying sufficient seeds to replant for the season can also be problematic. Without their traditional seeds and livestock, marginalized farmers have lost an important resource they preserved for hundreds of years. Post-conflict development practitioners have recognized farmers recovering from armed conflict often need seed for replanting. This point was noted by Christoplos, Longley, and Slaymaker (2006). Assistance needs to be carefully considered because the wrong seed can be provided at the wrong time.

Further research should be conducted to look at the viability of using traditional seeds and heirloom varieties as seed assistance after armed conflict. Several non-government organizations are encouraging the development of seed saving groups among marginalized farmers. Further research should focus on the proper time to provide seed resources to farmers recovering from armed conflict. Research is also needed to quantify the extent of livestock loss and the local breeds essential for marginalized farmers cultural and farming system activities.

The markets in northern Shan State are not stable because of the ebb and flow of conflict. Marginalized farmers like those in this study have limited knowledge of the prices for the commodities they have for sale (Christoplos, Longley, & Slaymaker, 2004; Mohammed, 2007). Marginalized farmers in northern Shan State need better information about the markets. Farmers expressed they are limited by not having consistent market access because the market disappears during spikes of armed conflict. The movement of family members to the regional towns to find opportunity and avoid armed conflict is one-way marginalized farmers are gaining access and knowledge of more equitable pricing. Even with better knowledge the farmers are still limited by sufficient transport means to market their goods.

Further research should be conducted to understand market changes. Just like armed conflict, there appear to be zones of differing impact depending on how close they are to the armed conflict zones. In addition, the constraints on traders and the risk they incur in operating near conflict areas should be studied. Further consideration should be given for how marginalized farmers can gain better access to the markets.

Many farmers expressed the opportunity for off-farm seasonal labor as an important source of cash income for marginalized farmers. This confirms the same trend noted in post-conflict Mozambique (Bozzoli & Bruck, 2009; Cramer, Oya, & Sender, 2008). Marginalized farmers in northern Shan State are being pushed away from agricultural land they believe belongs to them. There was a sense of frustration by farmers and agricultural development workers concerning land use. This issue will likely grow in importance as the Myanmar government encourages foreign agricultural investment. Research should seek to clarify the displacement of marginalized farming communities. When marginalized farmers displaced by armed conflict make their way to urban and peri-urban areas, will they overwhelm the urban local government and services to handle them?

The movement of farmers into peri-urban safe areas and young people to neighboring countries is a strategy marginalized farmers use to avoid armed conflict. It is risky for young people because most will be undocumented workers. In addition, women can be caught in prostitution enslavement. The farm family also loses the potential labor of the young people in the community. The result is many marginalized farm villages in northern Shan State have few young people from 16 – 30 years of age. This loss of a proportion of the community and the risk involved in moving is similar to the corrosive community reaction theory of Freudenberg and Jones (1991) where social capital is lost after shock to the community.

The movement of marginalized farmers to safe areas means farmers are available for off-farm work in small scale local business, local industry, and, as farm labor. When moving to safe areas the farmers often are not able to find enough land to support themselves through their own agricultural production. Often, these farmers can only produce backyard livestock, a home garden, and a few fruit trees to offset the need to purchase food from local markets.

The strategy of off-farm movement into safe areas by farmers should be further studied to understand the impact the practice has on their livelihoods. Quantifying this movement and the advantages and disadvantages to the farm family would help agricultural development

practitioners know how to assist farm families when they make this difficult choice. It would also help aid agencies work in IDP camps and develop policies toward reintegrating displaced marginalized farmers into their farming livelihoods after conflict. The impact on agricultural production resulting from young people leaving to work in neighboring countries is not yet understood. This information is important for the individual farm households and the overall agricultural production capacity.

The last theme revealed farmers found ways to rebuild their food production after conflict. Although not an easy process, many innovative farmers were able to find ways to borrow money or use familial networks to purchase animals and find new seed to plant. The seed purchased was often hybrid corn seed or vegetable crops like watermelons. Often, NGOs provided seeds.

Agricultural development of the relatively conflict-free zones is progressing due to the demand for agricultural products from the growing Chinese market and the regional market in Myanmar. The transition to growing hybrid corn by marginalized farmers provides the quickest route for cash income but is also having negative effects that must be considered. One effect is the need for increased agrochemical purchase and application for optimized growth. Another impact is the loss of traditional varieties of corn, upland rice, and traditional legumes. These crops are being replaced by seed purchased from seed companies.

The approaches to encourage an effective decentralized diffusion system valuing the indigenous knowledge systems of the farmers should be considered. This tactic includes training agricultural advisors who are able to work together with marginalized farmers to encourage deliberative livelihood improvement strategies. It is important to quantify the effect of agrochemicals on farmers' livelihoods and farming systems. Using farmer field schools and working with farmer self-help groups should be considered to improve the opportunities for equitable agricultural development.

The issue of marginalized farmers recovering from armed conflict merits more research to further understand the dynamics of this phenomenon. Future research should include mixed methods approaches (Thaler, 2012; Barron, Diprose, & Woolcock, 2011).

### **Practical Application**

Implications for practice fall into three categories: post-conflict agricultural development; agricultural extension and training; and agricultural innovation systems. In all of these practices, the belief it is "possible to establish a virtuous cycle wherein more or better (conflict-sensitive) development will reduce violent unrest, which in turn will bolster growth, reduce poverty, and enhance prosperity" (Barron, Diprose, & Woolcock, 2011, p. 41).

**Post-conflict agricultural development.** Post-conflict agricultural development requires more research. The most effective ways to design appropriate responses to assist agricultural recovery after conflict that does not cause the marginalized, resource poor farmer to become more vulnerable and impoverished. It is important to remember armed conflict will continue (Barron, Diprose & Woolcock, 2006).

The second issue to consider is shifting from acute emergencies, during and immediately after conflict, to solving chronic agricultural development issues. This was discussed by Kabeer (2002) and Barrett (2002) with the illustration of the *safety nets* to assist in temporary crises and longer-term *opportunity ladders* marginalized farmers can use to increase resilience of their farming systems and livelihoods (Christoplos, Longley, & Slaymaker, 2004).

**Agricultural extension and training (AET).** After considering the experience of marginalized farmers recovering from armed conflict, I support the observation of Swanson and Rajalathi (2011) that the worldwide trend toward a more pluralistic agricultural extension service is a positive development for marginalized farmers. Myanmar has made hard choices to use a portion of its limited government budget for agricultural extension and development.

**Agricultural innovation systems.** In order to meet the needs of a more mobile population when they are recovering from armed conflict, it is clear international non-government organizations, international government aid organizations, and government entities should consider the advantages of encouraging agricultural innovation systems. These systems are more flexible to meet the needs of industrial agriculture and agribusiness needs along with providing appropriate networks for marginalized resource poor farmers.

Rogers (2003) helped us understand some of the key core strengths of the U.S. Cooperative Extension model. The core strengths should be used in design and strengthen a more effective agricultural innovation system for northern Shan State. Key additions needed with marginalized, resource poor farmers are for a more decentralized system where farmers have a voice in the development agenda and the support to experiment with what works best for them.

Part of the decentralized system is a need for persons who are able to assist farmers in adapting innovations to fit their local context and integrate these innovations into production systems (Lionberger, 1972). This role could be filled in a lower cost way by equipping key farmers or key players with skills allowing them to function as a semi-official extension agent.

More research is needed to further understand the strategies of marginalized farmers in order to rebuild food production systems. What is clear is innovative systems matching the reality of post conflict and complex political emergencies are needed. “The need is enormous, not only for recovery, but also transformation. If there is anywhere that organized support to technological change is needed, it is in places where former livelihood strategies are no longer viable” (Christoplos, Longley & Slaymaker, 2004, p. 24).

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