Food Security & Livelihoods Project Feasibility Study in Paletwa Township (Chin State, Myanmar)

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Final report

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ACRONYMS & ABBREVIATIONS

ACF	Action Contre la Faim
DANIDA	Development cooperation agency of the Ministry of Foreign Affairs of Denmark
EFY	Elephant foot yam
FFS	Farmer Field School
FAO	Food and Agriculture Organization of the United Nations
FSL	Food Security and Livelihoods
IPM	Integrated Pest Management
IRC	International Rescue Committee
KMSS	Karuna Myanmar Social Services
MAS	Myanmar Agriculture Services
MT	Metric ton
NFTS	Nitrogen fixing trees and shrubs
SALT	Sloping Agricultural Land Technology
SMART	Standardized Monitoring and Assessment of Relief and Transitions
UNDP	United Nations Development Programme
VT	Village Tract
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme of the United Nations

Measurement units

1 acre = 0.41 hectare (ha)

1 *viss* = 1.63 kilogramme (kg)

Exchange rates (as of October 2013)

1 USD (US dollar) = 970 MMK (Myanmar Kyat)

1 Euro = 1310 MMK

EXECUTIVE SUMMARY

Under a DANIDA-Cartier funded project, ACF plans to implement the following food security and livelihoods (FSL) activities in northern Paletwa Township: (i) training on sloping agriculture and vegetable production through Farmer Field Schools (FFS), (ii) the application of Sloping Agricultural Land Technology (SALT) and/or farm terracing and (iii) the creation of community banks. The project started in March 2013 and will end in December 2015 thus covering two cropping seasons. This feasibility study aims to inform FSL programming in the inception phase of the project. Field work was carried out in October 2013 and mainly consisted of landscape observation through transect walks, meetings with village leaders or elders, group discussions both with men and women, and interviews with individual farmers.

Farming system and livelihoods context

The project area is first characterized by its extreme remoteness, a very rugged landscape and the complete lack of transport infrastructures, thus posing significant access challenges. Villages are relatively small (mean of 36 households) and there are few socio-economic disparities between households. The predominant farming system is based on swidden cultivation (slash-and-burn or *taung ya* in Burmese). While the staple crop is paddy, several cash crops are produced either mixed with paddy (sesame) or in separate plots (sesame, aromatic ginger and turmeric), mainly for export markets (China and Bangladesh). As the project area is still sparsely populated, farm land is generally available and fallows usually last for 3 to 7 years. Together with the shifting cultivation pattern the prevailing land tenure system contributes to maintain a relatively equal access to farm lands for all households. There is no private ownership but short-term land use rights whereby farmers are basically free to clear and cultivate wherever they wish. In such communal and shifting land tenure system farmers have no incentive to improve soil fertility or to invest in any other kind of long-term improvement on farm lands. Besides farming the main livelihoods are the gathering of wild products from the forest, hunting, fishing as well as a few casual labour opportunities. Among the forest products, elephant foot yam (EFY) is one of the main sources of cash income in these remote villages. It is exported to China and enjoys relatively stable prices and demand. As a consequence many farmers have tried to cultivate it in the past 2 or 3 years.

The main shock households have experienced in recent years is the massive rodent infestation that followed the blooming of local species of wild bamboo in the late 2000's. Like in other parts of Chin State, rats caused destruction of paddy fields and rice stocks during three consecutive harvests, leading to widespread acute food insecurity and high debt levels. What are probably less known are the mid-term impacts of this 'bamboo crisis' on the overall agro-ecological system: in the project area soil fertility has dropped and weeds have quickly proliferated to uncontrollable levels since 2009-2010. The bamboo blooming has brought about a real crisis of the whole agrarian system in northern Paletwa Township. To cope with a fall in yields and work productivity, households have not only started to migrate out of the area or rely further on loans and wild products but also introduced new cultivation practices: in the lower parts of the secondary river valleys, where cropping intensity is higher, farmers now heavily rely on the use of herbicides – especially for sesame cultivation.

All villages in the project area are globally in deficit as regards rice production. Although most households are not self-sufficient this does not mean they are all and always food insecure: in normal years rice self-provisioning is made possible by a combination of strategies including the sale of cash crops and EFY, casual labour, rice purchase on credit, cash advances from local shopkeepers and traders, and rice or cash loans from relatives and friends. Whether to sell their products or to buy rice, the whole economy of the households in targeted communities is tied up with the shopkeepers / traders from Kalandan River bank villages who not only provide loans with usurer interest rates but are also the main outlet for local produce.

Feasibility of ACF planned activities

FFS to train farmers on sloping agriculture and vegetable production – 800 households

In the project area one of the obvious constraints to the FFS approach will be the remoteness and access to the villages: ensuring ACF staff presence in more than 25 villages on a regular basis during the monsoon will be a challenge. Moreover *taung ya* are far away from the villages and scattered on different hillsides. Mobilizing farmers when they are in their fields will be another challenge. This is all the more true that the project budget includes only 10 field staff. In addition, the field team will probably lack the facilitation skills to conduct FFS sessions. Considering these different constraints,

the type of approach and the fact that the 27 pre-selected villages together have approximately 1000 households, the target number of farmers (800) appears to be overestimated. Having said this, there is a strong demand from local farmers for technical training and the good social cohesion within villages may well facilitate the sharing of knowledge among them.

Contrary to what is stated in the proposal, soil erosion is not a major issue in the project area. The accelerated soil fertility degradation has more to do with the agronomic consequences of the bamboo crisis than shorter fallows, slope erosion, run-off and/or topsoil loss. In the same way, home gardening is not the most relevant training topic and there is no demonstrated need to foster vegetable production in the project area. During the rainy season households produce a wide range of leaves and vegetables in their *taung ya*, which they just need to pick when they need. In addition, there is no or very little demand for vegetables on local markets. There are acute needs to restore or improve soil fertility in the *taung ya* system: farmers have not yet experimented any new practice to offset the soil fertility decrease observed in the last years; they know very little about nitrogen fixing trees and crops. As manual weeding became too labour demanding after the bamboo crisis, some farmers started resorting to herbicides. Doing so, they can grow larger surface areas under cash crops such as sesame or aromatic ginger. However, few people are aware of the toxicity and long-term negative impacts of these herbicides. There is also a strong rationale for developing existing or emergent cash crops. Selling or bartering these crops is one of the main ways to repay loans that were taken out during the food gap. Although they clearly lack market information farmers have been able to adapt very quickly to price variations and market demand.

Application of Sloped Agricultural Land Technology (SALT) and/or terracing – 800 households

Both SALT and terracing are based on the assumptions that fallows get shorter and shifting cultivation is no longer sustainable due to population growth. Considering the low population density in the project area, the proximity of the forest front and the relatively good access to farm lands, there is no strong evidence to suggest that slash-and-burn is not suitable anymore and permanent cultivation is required. Under the current land tenure (short-term land use rights and common property), introducing technologies that presuppose permanent cultivation and individual ownership is very likely to be a challenge and could even be a source of tensions in the targeted communities.

While the project timeframe is relatively short, the adoption of SALT and/or terracing probably requires too many technology changes for local farmers, the first of which would be to plough the land. In the project area farm lands usually have a 15-25% slope, which is too steep for contour farming (one of the principles of SALT). The labour requirements to initiate SALT and terracing exceed households' workforce capacities and financial means. Although the proposed activities plan to fill this gap by covering labour costs, there is limited workforce available in the project area. ACF would therefore face difficulties to mobilize a sufficient number of workers over a long period and would not achieve significant results by the project end. In all instances, reaching 800 households within the project timeframe is definitely not possible. Terrace development is a very slow process that took decades or centuries in most of the agrarian societies where it occurred. Although ACF could raise funds to initiate this process for a small number of farmers in each village, it is doubtful that terraces can be replicated by others.

SALT is a low cost technology and several of its principles could easily be tested and then adopted by local farmers. There is in particular some room for improvement as regards biological nitrogen fixation, either using green manure, cover crops or nitrogen fixing trees or shrubs (NFTS). More generally, there is a need to support farmers in better integrating trees and/or perennial crops in the current farming system. One such approach is to gradually introduce the practice of improved fallows. In addition, although slash-and-burn and communal land tenure are the rules, farmers grow some perennial crops (e.g. turmeric) and a few small plots have been turned over to banana plantations or other tiny groves (e.g. orange, pineapple). This demonstrates their capacities to adapt and innovate when external conditions are met. One of the key external constraints is the very poor transport conditions on the main footpaths to Kalandan River. Providing some support to scale up existing community works and improve the footpaths would not only have positive impacts on the transport of commodities but could also be an opportunity to provide additional incomes, reduce debt levels and hence make other project activities more likely to succeed.

Creation of and support to community banks – 400 households

Community paddy banks are very likely to reduce household debt levels. The main reason why households take loans, purchase on credit or sell their cash crops beforehand is to get rice to bridge the food gap. Interest rates are usurer in most cases. Accessing rice loans with lower rates, directly

within the villages (i.e. without transport charges) would definitely relieve rice deficit households, who are in the majority in targeted villages.

There used to be community granaries in most of the project area villages in the past. They were used as emergency stocks but also to provide loans to households who faced rice shortage. They seem to have collapsed due to different external shocks such as the previous and last bamboo crises as well as recurrent extortions from the army. Village elders usually remember quite well how these 'traditional banks' used to work. Very small scale rice banks still exist in some of the targeted villages: some local churches collect small quantities of paddy from their members which they then loan to the poorest households during the lean season. Finally, both UNDP and IRC have implemented community rice banks in the recent past in Paletwa Township. There are many lessons to learn from these projects although the villages where they were implemented do not always share the same features as the ones in ACF project area. There are several other reasons for the success of this activity, including the small size of the target villages and the few socio-economic differences among households.

ACF will however need to overcome various constraints. First, the project area is a rice deficit one and there will be no way for the large majority of households to contribute with rice to set up the starting capital of the bank. This means ACF will have to provide this initial rolling fund. Supplying an initial stock of rice from the transit villages on the Kalandan River to the target villages will be expensive and logistically challenging. Second, the lack of literacy and low education level in the target communities will be a key constraint to set up paddy bank management committees and will hinder women's participation as very few of them are literate. In addition, the short implementation timeframe will make it difficult to build strong committees and to have a good follow-up of the community banks. Third, the poorest households are the ones who usually face the strongest rice shortage and are the most in need of rice loans during the lean season. In case of bad harvest they will most likely be unable to repay their loan. Finally, there is a significant risk that the target communities look on the bank as simply a source of food aid. This risk will be higher in villages where ACF implemented food distributions in 2012 and 2013. Another round of food distribution in 2014 would clearly jeopardize the chances of success of the paddy banks.

Main recommendations

Regarding the FFS approach:

→ Provide intensive training to ACF field staff on the FFS approach.
→ Reduce significantly the target number of households for FFS (down to 15-20 groups of 10 farmers each).
→ Set up only one demonstration plot in each selected village.
→ Take into account the different zones and farming dynamics when selecting the FFS sites and the training topics.

Regarding the training topics:

→ Promote the cultivation of leguminous crops to improve soil fertility.
→ Test the use of cover crops, green manure and/or improve mixed cropping systems.
→ Support the development of elephant foot yam cultivation at commercial scale.
→ Raise awareness on the intensive use of herbicides and their long-term effects on soil fertility, human health and the natural resources.

Regarding SALT / terracing application:

→ Select only some of the principles of SALT and test them with farmers through FFS, including: (i) the planting or preservation of nitrogen fixing trees or shrubs on *taung ya* in order to improve the next fallow; (ii) the pruning of these trees or shrubs and the use of cuttings and branches for mulching; (iii) the introduction of crop rotations wherever fallows became too short and farmers started to intensify their cropping system.
→ Introduce the use of manual tools such as hoes to prepare the land (before sowing) and/or to better control weeds (by removing their roots), preferably on small plots where farmers grow perennial crops.
→ Quickly submit a proposal to WFP to implement linkage footpath renovation (instead of terracing activities) during the off-farm season and other slack periods.
→ Give priority to zones that are on the other side of the mountain barrier i.e. Nga Thein and Myaun Chaung VT to implement these renovations of footpaths.

Regarding community banks:

→ Start with only 4 or 5 community banks in 2014 then spend time evaluating the results and drawing lessons before implementing a second round.
→ Scale up existing banks or resume the former ones, and involve village elders in the process.
→ Organize exchange visits with other community banks in Paletwa Township i.e. the ones set up by IRC and UNDP.
→ Pay a strong attention to the procurement of rice for the initial bank capital, and explore the possibility to work with local traders.
→ Support communities to set up their own rules and regulations without imposing standards.
→ Make sure there is a strong contribution from communities to reinforce the sense of ownership, including at least the provision of labour and local materials for the storage construction as well as all transport costs associated with this activity.

1 INTRODUCTION

1.1 Background information

ACF presence in Paletwa Township

A first multidisciplinary assessment, carried out by ACF and the local organization Karuna Myanmar Social Services (KMSS) in **northern Paletwa Township** at the end of 2011, showed high levels of vulnerability to food insecurity in this remote part of southern Chin State (cf. map in Annex 1). In order to provide access to a balanced food basket during the 2012 lean season, ACF and KMMS launched **food distributions** in partnership with WFP, reaching 3,997 households in 78 villages.

Following a post-distribution monitoring in November 2012 and a SMART survey in March 2013 in the same area, ACF decided to implement a **second round of food distributions** for all households in the same villages as in 2012 for three months, starting in May 2013. About 1,085 MT of balanced food commodities were distributed to 4,247 households and 36 MT of rice soya blend (RSB) rations were provided to 2,350 children under 5 and 865 pregnant and lactating women[1].

Following this first phase of protective intervention through food distributions, ACF now aims at linking relief, rehabilitation and development through a longer term integrated preventive programme in the sectors of food security, livelihoods, WASH and child care practices.

The current project

Funded by DANIDA and Cartier, the project activities to be implemented in Paletwa Township under the project '*Improvement and reinforcement of livelihoods, food security, health and nutrition status of marginalized and vulnerable groups in border states of Myanmar'* aim to enhance livelihood resilience and improve food security for targeted communities. This objective will be reached through two expected results: gain of two months of food security for at least 800 households and increased understanding of the local context, including resources and barriers to prevent child under-nutrition, and improved knowledge on infant and young child feeding and child care practices for 800 households. The first result consists of different types of food security and livelihoods (FSL) activities including:

- Activity 2: the provision of technical trainings on **sloping agriculture** and **vegetable production** through **Farmer Field Schools** (FFS) and referent farmers for at least 800 households;
- Activity 3: the application of **Sloping Agricultural Land Technology** (SALT)[2] and/or farm **terracing** for 800 households[3];
- Activity 4: the creation of and support to **community banks** for at least 400 households.

Three studies to inform FSL programming are planned in the inception phase of the project: this feasibility study, a study on post-harvest and storage practices and a study on farming practices.

The project started in March 2013 and will end in December 2015 (34 months) thus covering **two cropping seasons**. The programme team has not been recruited yet. The main activities that were carried out so far are a FSL assessment to select villages as well as a socio-anthropological survey. To date **27 villages** were pre-selected[4] with a total population of approximately **1000 households** (cf. list of villages and population data in Annex 2).

[1] The food ration was composed of 13.5 kg of rice, 1.8 kg of chickpea, 1 litre of oil and 0.15 kg of salt per person per month. The RSB ration was 3.8 kg per person per month.

[2] Pioneered in the Philippines in the 1970's, SALT is a package technology of soil conservation and food production on sloped farming lands, integrating various soil conservation measures. SALT basically consists in growing field and permanent crops in 3-5 m wide bands between contoured rows of nitrogen fixing trees and shrubs. The latter are thickly planted in double rows to form hedgerows. When the hedge reaches 1.5-2.0 m in height, it is cut back to 40 cm and the cuttings are placed in the alleys between the hedgerows to serve as mulch and organic fertiliser or green manure.

[3] While the other project activities are funded by DANIDA and Cartier, this activity is intended to be funded by WFP.

[4] This represents 6 Village Tracts (VT). ACF decided to select all the villages belonging to each of these VT.

1.2 Objectives and scope of the mission

The overall goal of this study is to ensure the proposed food security and livelihoods activities are **relevant** and **feasible** in the villages pre-selected for the project in Paletwa Township. More specifically, the study should provide an analysis of the local context and a first overview of the agricultural practices within the project area. It should enable to refine the above-mentioned FSL activities (2, 3 and 4), define the specific modalities and methods of project implementation, confirm the selected villages and establish targeting criteria for the households that will participate in the project.

1.3 Field work schedule

The following table provides a summary of the different activities carried out during the four weeks the consultant spent in Myanmar. The field data collection took place during the three first weeks of October 2013. A more detailed description of the work schedule is available in Annex 3.

Table 1. Overview of the main activities carried out during the mission in Myanmar

Week 1	Briefing at ACF Yangon office, clarifications of expectations with FSL Head of Department
	Desk review and methodology development
	Workshop with ACF Field Manager and former ACF/KMSS staff in Paletwa
	Locating ACF project area on Google Earth software, field work planning with ACF Field Manager
Week 2 &3	Direct observation of farm lands, settlements and markets
	Individual discussions and group meetings with farmers (male and female), community leaders, shopkeepers / traders, and former UNDP projects beneficiaries
	Meetings with key informants at Township level
Week 4	Communications with key informants at country level
	Data analysis
	Debriefing / restitution to ACF staff in Paletwa and Yangon

2 METHODOLOGY

2.1 Key questions

For each of the three FSL planned activities a series of questions and assumptions were listed on the basis of the terms of reference, the project proposal and the other documents consulted at the beginning of the consultancy. This list of questions was continuously reviewed so to become more and more specific by the end of the field mission. Please see Annex 4 for the full list of questions.

2.2 Data collection methods and limitations

To gain a better understanding of the food security and livelihoods context in the project area the consultant combined different elements of the farming systems analysis and the sustainable livelihoods approach[5]. In addition, more focused discussions took place to assess the relevancy and feasibility of each of the three proposed project activities using the above-mentioned list of questions as a guideline.

During field trips the feasibility study team was composed of the consultant, ACF Paletwa Field Manager and a Khumi[6] speaking guide (also a former field staff during previous food aid projects). The team visited **11 villages** out of 27 covering four of the six Village Tracts where the project will be implemented. Primary data collection mainly consisted of landscape observation through **transect walks**, **meetings** with village leaders or elders, **group discussions** with both men and women, and **interviews** with individual farmers (when possible directly in their field). Some of the shopkeepers and money lenders from the villages located on Kalandan River bank were also interviewed as they play a critical role in targeted communities' livelihoods (cf. chapter 3).

Secondary data collection first includes a **desk review**: ACF internal documents; maps, reports and articles dealing with the food security and livelihoods context as well as farming systems in Chin State and more specifically Paletwa Township; publications and websites related to the proposed project activities i.e. FFS, SALT, terracing, cereal banks – focusing when possible on contexts that are similar to the one in Paletwa. Direct field observations were also completed by the use of GPS device and the rapid analysis of **satellite images** on Google Earth. A **workshop** was organised with ACF current and former field staff to get their views on the planned activities as well as various information on the farming systems and livelihoods context. In Paletwa, the consultant also met some former UNDP and IRC livelihoods programme staff in order to draw the **main lessons** from their **past projects** (in particular the implementation of paddy banks); a meeting was also arranged with MAS to discuss technical issues related to SALT and terracing. A series of emails were also exchanged with GRET, UNDP and CARE for lessons learning purpose. A quick meeting was arranged in Yangon with ACF Project Manager in Kayah State. Annex 5 provides the list of the main resource persons we met.

The main constraint on data collection was by far the difficult access to the project area and the **long travelling time**: almost two thirds of the time spent in the field was dedicated to walks to reach the targeted villages. Late rains delayed the paddy harvest and farmers took advantages of the few sunny days to complete this task; as a consequence, some of the villages we visited were empty and we had to wait for people coming back from their fields in the late afternoon. In the villages, questions and answers had to be translated two times (from English to Burmese to Khumi and vice versa), sometimes three (with some Panam speaking women), which obviously made interviews more tedious. Finally, ACF is relatively new in the area and there is an overall lack of background data regarding the targeted villages. In particular, this study could have drawn more from the last FSL survey (to select villages) if the data had been further processed and analysed. Annex 6 provides other useful feedbacks and summarizes the main lessons learnt from this consultancy and the field mission.

[5] As developed by the International Fund for Agricultural Development (IFAD). Cf. http://www.ifad.org/sla/

[6] Main ethnic group in the project area.

3 RAPID APPRAISAL OF THE LIVELIHOOD CONTEXT AND FARMING SYTEMS IN THE PROJECT AREA

The general context in Chin State and Paletwa Township are widely described in the project proposal as well as previous ACF reports and assessments. As far as food security and livelihoods are concerned, the main features of northern Paletwa Township can be summed up as follows:

- **A rugged landscape** made of parallel folds and faults going from North to South. The whole area is covered with small hills (150-350 m), medium-sized mountains (750 up to 1025 m) and narrow valley bottoms, making very little room for flat areas. The main river, Kalandan, and most of its tributaries flow from North to South.
- **Three major agro-ecological levels**: (i) **Kalandan River banks**, where paddy as well as a variety of cash crops and vegetables are grown every year when the water level drops, after the peak of rains, while river banks are grazed during monsoon; (ii) the **hillsides** and thalwegs where shifting cultivation is by far the main land-use system and rainfed rice the main crop; between cultivated field patches, forest fallows and secondary forests (including bamboo groves) prevail; (iii) the **hilltops**, cliffs and steepest slopes, covered with closed evergreen forests, where people hunt and gather wild food, firewood and bamboo.
- **A tropical monsoon climate** with three distinct seasons: (i) a dry and relatively cold season from mid-November to February ('winter'); (ii) a dry-hot season in March-April ('summer'); (iii) a 6-month wet season with a peak of rains in June-August. According to the data available for Paletwa town (1968-1981)[7], the total annual precipitation would reach more than 3,500 mm with a mean temperature of 26°C (cf. the average monthly temperature and rainfall diagram in Annex 7).
- **A low population density, with different ethnic groups, tribes, languages and dialects**. The whole township had almost 79,000 inhabitants in 2011 and a population density between 10 and 15 persons per square kilometre[8]. Khumi are by far the main group but there are also significant Rakhine settlements as well as several small tribes such as Panam, Ahnu or Khaung So. Unlike other parts of Chin State, there is not much out-migration of the workforce in Paletwa.
- **An overall accessibility severely constrained by the topography and lack of roads**. The only modes of transportation for people and goods are footpaths and local canoes and boats that travel along Kaladan River. Other rivers are not or poorly navigable. During the dry season northern Paletwa can be difficult to reach by boat due to the low water level. During the rainy season access to villages by walk can be limited by frequent mudslides. A multipurpose jetty is being constructed on the eastern bank of Paletwa town by an Indian company as part of the Sittwe-Kalandan-Manipur international highway-waterway project.
- **Primarily agrarian communities, with an estimated 93% reliant on agriculture** as the main livelihoods (ACF, 2011). Upland paddy is the staple crop. It is harvested in September-October and yields currently amount to 40-50 baskets of paddy[9] per acre i.e. about 1 MT/ha (ACF, 2011). Farmers also grow several commercial crops including peanut and various beans on Kalandan River banks, and sesame and aromatic tubers on uplands. In addition to farming, other key sources of income and livelihoods include casual labour activities and the gathering and sale of non-timber forest products. Remoteness and high transportation costs however strongly constrain both the access to food and the crop marketing options. In remote villages, porter fees can increase the price of rice twofold.
- **A food security situation badly affected by massive rat infestation in the late 2000's**. Although the area is not disaster-prone and has not experienced recent armed conflicts or communal tensions, it sustained significant destructions of food crop and stocks during three or four consecutive years from 2006 till 2010. As explained in chapter 3.3, crop yields remain low nowadays.

[7] 14 years rainfall and temperature data set from Paletwa Township Profile, Myanmar Socialist Party, 1982.

[8] Source: MIMU. Population and population density map of Chin State, Myanmar, 2011. Map ID: MIMU841v03

[9] One basket of paddy approximately weighs 8.6 kg.

- **A limited number of aid agencies currently active** as regards food security and livelihoods. UNDP implemented community development programmes in Paletwa Township[10] since the late 1990's but phased out in 2012; most of their activities targeted villages that are relatively easy to access (i.e. mostly along Kalandan River). IRC had a livelihoods project in 2011-2012 which also mainly targeted villages along Kalandan River; their current activities now focus on health and family planning.

The information below focuses on ACF project area and primarily draws from the data collected during the field mission.

3.1 A very remote and sparsely populated area

The project selected areas are first characterized by their **extreme remoteness**, a very rugged landscape and the complete lack of transport infrastructures[11] but narrow and steep footpaths through secondary riverbeds and mountain barriers with passes up to 750-900 metres high[12]. Though villagers certainly walk faster than the study team, the latter had to hike an average 5-6 hours a day to reach the different villages, which gives a good idea of the huge logistical challenges to work there. Annex 8 provides an indication of the travelling time to or between some of the targeted villages.

Villages are located **near seasonal small streams or rivers** that dry up during summer (dry hot season). Most villages along tributaries to Kalandan River are at low elevation: out of 27 pre-selected villages (as of October 2013), 15 are at 40 to 90 metres above sea level. Two other villages are situated higher in one of these secondary valleys (at a height of 130 m and 155 m respectively). The other 10 villages are on the other sides of the mountain barriers, including one along Pyi Chaung River (one of the main river in Paletwa Township after the Kalandan); their elevation ranges from 115 m up to 615 m.

In the project area **villages are relatively small**, ranging from only 7 up to 123 with an average of 36 households. Out of 27 pre-selected villages, 19 have less than 50 households; and 14 have less than 30 households. With only 10-12 persons per square kilometres[13], population density is still low in three of the six Village Tracts (VT) targeted by ACF, namely Myaun Chaung, Nga Thein and Shin Ma Dein. The same applies to the highly isolated village of Pitaung (Tha Yar Kone VT), near the Bangladesh border. The northern Thar Yar Kone and Yin Khan Wa VT are twice more densely populated (about 20-25 persons/sq.km) while the three selected villages of Kun Taung VT have an estimated density of 38 persons/sq.km.

Although there are no data available to ascertain it, the trend in the project area seems to be a **fall in the population** in the last two or three decades. People left their villages for two main reasons: during the military operations in the 1980-1990's, some households decided to leave as villagers were often recruited as porters by the army and sometimes deprived of their food, livestock or assets; the last bamboo blooming and subsequent rodent infestation also caused a new wave of permanent out-migration (cf. chapter 3.3).

Overall the **socio-economic disparities between households are low** which is reflected in their similar housing conditions: most households have small, one-storey bamboo houses with thatch or sometimes tin sheet roofing; there are no big wooden houses as can be seen in the villages located on Kalandan River bank. In some of the villages we visited (e.g. Twi Sa Wat) it is frequent to see extended families sharing the same house.

There are **no markets in the immediate vicinity** of most of the selected villages. At township level, Paletwa is the main market. Traders and shopkeepers are also numerous in Hta Run Aing, which is a Rakhine village located 5-6 hours upstream of Paletwa on Kalandan River. However, there are no specific market days for farmers to sell their produce, which has a critical impact on remote

[10] Between the years 2003 and 2012 the Community Development for Remote Township (CDRT) Project covered more than 2700 households in 57 villages. This included revolving funds to support livelihoods, paddy banks and various community infrastructures.

[11] According to some villagers in Kyun Chaung Wa, the government plans to build a track for three-wheelers between Mee Zar and Ohn Thee Wa (north-eastern part of Paletwa Township).

[12] Since Kalandan River is only a few metres above the sea level this makes a difference in height of more than 750 m when climbing those mountains.

[13] Population densities were calculated for each cluster of villages on the basis of the available population figures and rough estimates of the surface area (using satellite images).

communities in terms of outlets. The population of the target villages indeed depends on local shopkeepers and traders who live in villages located on Kalandan River banks and tend to have an oligopsony position (cf. chapter 3.4). Except the ones who go to bigger villages such as Mee Zar, villagers are connected to two or three shopkeepers / traders at the most. This does not leave farmers much room for manoeuvre when negotiating the price of their produce: once they travel down to Kalandan River for hours or pay porters, there is no other way but to sell what they carried. As already mentioned, transportation by foot is very expensive – accounting for about one sixth to one third of the price of commodities. Transportation costs can even be prohibitive for some merchandise. There is not a single trader in the target villages but only a few middlemen – without much capital in their hands. Except in some bigger Rakhine villages, there are no or very few retail shops.

There are no formal community-based organisations in the target villages but the ones sometimes set up by Christian churches such as 'mother groups' – which are however rarely fully operational – and management committees for village rice mills (e.g. in Nga Thein). Under the leadership of the village chief, **different types of collective actions** are carried out on a regular basis, such as the maintenance of footpaths, the construction or maintenance of the village hall and the cleaning of grasses and bushes in the village. Footpath maintenance is usually done twice a year and involves both men and women, with an equitable contribution from all households based on their capacities. There seem to be other forms of solidarities at community level such as helping a household to cultivate its field in case of temporary labour shortage (e.g. sickness of the main breadwinner).

3.2 When subsistence farmers aim at export markets

3.2.1 Main cropping systems

The taung ya system

The predominant farming system is based on **swidden cultivation** (slash-and-burn) – called *taung ya* in Burmese[14] and *lao* in Khumi – where farmers clear a piece of land in winter, set fire to prepare the field before the first rains, grow rainfed crops during the monsoon and then shift to another plot the next year. While the staple crop is paddy, several cash crops are produced either mixed with paddy (sesame) or in separate plots (sesame, aromatic ginger[15] and turmeric) as shown in picture 1 of Annex 13. A number of vegetables and leaves (roselle, pumpkin and various other types of gourds, chilli, okra, etc.) are also grown in the *taung ya* mainly for own consumption, likewise with manioc, maize or sugar cane.

The soil fertility renewal and overall sustainability of this agrarian system rests on the **vegetation regrowth after cultivation** and before the next one. In abandoned fields, trees and shrubs gradually recover. Their rooting systems absorb mineral elements from the soil depth and these nutrients are then made available to the topsoil through falling leaves and soil litter. In addition, burning converts the biomass from the downed vegetation into nutrient-rich ash – though part of it is washed by the rain. It also temporarily eliminates most pests and weeds (Cornell, 2011).

Although fallows are relatively short (less than 7 years), the rotation usually involves **only one cropping year**. As a consequence, there are no specific crop rotations. Farmers neither use synthetic fertilizers nor organic sources such as manure. The only fertility returns come from crop residues (chiefly paddy straw). After clearing and burning the fields, farmers directly plant their crops without ploughing or any other form of land preparation. Paddy seeds are usually placed in seed holes made with a machete. Farmers mostly use their own saved seeds (the ones they keep from previous crop) although they sometimes need to purchase planting material for other crops such as aromatic ginger or turmeric. Generally speaking, farmers use only a few hand tools (machetes and sickles) and virtually no farming inputs but the recently introduced herbicides (cf. chapter 3.3). Considering that farmers mainly use their family workforce, production costs are relatively low.

Weeding, which needs to be done several times, is the **work peak and main bottleneck** of this cropping system. The workforce availability for weeding is therefore the limiting factor of the *taung ya* farming area: in other words, the cultivated acreage is determined by the household manpower and its capacity (in terms of manpower but also financial means to hire casual labour) to complete the weeding on a timely manner. The quality and timeliness of weeding has a direct impact on yields. One

[14] The word literally means hill (*taung*) cultivation (*ya*).

[15] *Kaempferia galanga*. Also commonly known as *gamon* in Myanmar.

of the strategies used by local farmers is to grow several paddy varieties in the same *taung ya* (up to 5 different varieties) in order to spread the workload during weeding.

There are no quantitative data from previous ACF surveys to estimate the yearly cultivated area per household in the project area. Moreover, most farmers do not know their acreage but refer to the quantity of seed they plant. According to our own field observations, discussions with farmers and observations of satellite images, the mean surface area of *taung ya* can be estimated **between 2 and 3 acres** (i.e. about one hectare) for a household with two main workers and a 'standard' cultivation pattern (i.e. paddy mixed with sesame, without using herbicides). Without survey data, it is tricky to estimate the acreage dedicated to cash crops. In areas where sesame is more intensively grown, households may cultivate up to 1-2 acres of sesame as a single crop. At present, surface areas under aromatic ginger seem to be smaller, probably around 0.5-1 acre per household at the most. Turmeric or elephant foot yam[16], when planted, may take less than 0.25 acre. This is however likely to change from one year to another depending on prices and market opportunities (cf. section 3.2.2).

Other cropping systems

Due to the agro-ecological conditions as well as market issues (e.g. no or very little demand, transport difficulties and costs), only a minority of farmers practice other cropping systems in addition to their *taung ya*. These crops are mainly for **own consumption**. This includes:

- small perennial crop plantations (e.g. banana, pineapple) as well as small orchards (e.g. orange, pomelo, mango, guava, djenkol bean) usually located near or within villages;
- a few counter-season gardens by the streams or directly on dry riverbeds (e.g. mustard, tobacco, cabbage, eggplant)[17];
- a few acres of lowland paddies, which are not always very productive due to sandy soils and poor water retention.

3.2.2 Post-harvest management and crop marketing

Paddy is generally stored in large, circular bamboo baskets (of 2-3 MT capacity) which are kept inside houses. It is milled according to home consumption needs, either by hand pounding with a pestle or at the village rice mill (if any). Paddy seeds for the next cropping season are saved in a separate basket. Vegetable seeds are kept in closed bamboo pipes.

While staple food security remains households' top priority, their decision making in terms of production and cash incomes are also strongly oriented towards **international markets**: sesame, aromatic ginger (*gamon*) and elephant foot yam (EFY) are primarily exported to China and turmeric to Bangladesh. There are neither collective marketing strategies nor any cooperative or other form of farmer association in the project area. Farmers **sell individually**, in general to the shopkeeper or trader who provided them with the rice loan during the lean season (cf. chapter 3.4). They transport aromatic ginger, turmeric and EFY by themselves to Kalandan River. For sesame, local middlemen as well as traders from Kyauktaw (in Rakhine State) come and buy directly in the villages (in areas where sesame is the main cash crop).

Following their harvest in December-January, *gamon* tubers are sliced up and dried under the sun, mostly to reduce their weight and ease their transportation. Although tubers could be stored for a year, there is only a one or two months window of opportunity to sell them (around March-April), which seems to be highly conditioned by the Chinese market demand. For unknown reasons, *gamon* also suffers **strong interannual price variations**. In 2012-2013, prices went sharply down so that many farmers preferred planting sesame. Nevertheless, *gamon* currently remains the principal cash crop in the most remote areas (e.g. Nga Thein and Myaun Chaung VT), probably by default.

Sesame is quickly sold after its harvest in November[18] and does not require specific post-harvest management. While it has been grown for a long time as an intercrop with paddy, **sesame** recently experienced a real **boom** in the northern, less remote, low-lying parts of the project area (e.g. Yin

[16] *Amorphophallus paeoniifolius*.

[17] Very small scale gardening by the rivers also includes sweet potato cultivation during monsoon (e.g. in Twi Sa Wat).

[18] Sesame harvest actually extend over a longer period (until January) depending on the planting date and the varieties that are grown: white sesame has a short cycle and is high yielding but sensitive to heavy rains; black sesame has a longer cycle but is more resistant to heavy rains.

Khan Wa VT) where it is now cultivated as a single crop. There is a steady demand from traders for export markets[19]. Farmers were able to quickly adapt and upscale sesame cultivation as they already knew this crop.

Due to a sharp fall in price in the past two years[20] turmeric is **less and less planted** by farmers and most existing plantations are not harvested anymore[21]. This might be explained, for the most part, by a slowdown in cross-border trade with Bangladesh following communal tensions in Rakhine. Among various other agronomic advantages, turmeric is a perennial plant that can be easily propagated from its rhizomes; farmers are therefore confident they can revert to turmeric cultivation if prices go up. Moreover, rhizomes can be stored for several years after boiling and drying; some local traders thus keep large stocks of dry turmeric waiting for price increase.

Elephant foot yam enjoys relatively stable prices and a **strong demand**. Dry tubers currently fetch 3000-3500 MMK per *viss*[22], that is 5 to 7 times more than *gamon* and turmeric. Whether raw or dry, tubers are easy to store and do not spoil. Most households thus keep their own stock of tubers in bulk near or under their house (cf. picture 2 in Annex 13). Drying (by smoking) adds much value to the final produce but is time consuming and household with urgent cash needs may have to sell raw tubers. Although the price of EFY tends to decrease in December due to higher supply, if well dried, sliced tubers can be stored and sold later during the year.

3.2.3 Land access and land tenure systems

Most of the villages in the project area were created several decades or centuries ago and there has been no village relocation due to land shortage in the recent past[23]. Overall, the settlement pattern and history attest to the **little population pressure on farm lands**. Nowadays the project area is still sparsely populated, farm land is generally available and fallows usually last for 3 to 7 years (cf. picture 3 in Annex 13). Although farmers could clear older fallows or even dense forest covers they prefer lands that are close to their village – to minimize the travelling time and reduce the risks of crop destruction by wild animals such as wild boars and elephants. They also dislike lands that are too steep and the ones with high tree canopy – which soils are said to be too rich for the paddy varieties that are grown (thus causing the laying of crop). Finally, farmers tend to avoid areas near the mountain ridges which are often exposed to strong winds.

Together with the shifting cultivation pattern the prevailing land tenure system contributes to maintain a relatively **equal access to farm lands** for all households. This is likely to be the main reason why all households are about the same wealth level. Securing land access is not yet an issue[24] and there is no fierce competition for land. Landlessness is very rare and has to do with other factors such as the lack of manpower. As mentioned in ACF assessment report (January 2012), land is relatively available but household workforce restricts the size of land they can cultivate. Nuclear families with two workers and three or four dependents are likely to cultivate 2-3 acres a year (cf. section 3.2.1) whereas larger households may farm up to 6 acres. On the hillsides, *taung ya* fields are at an elevation ranging from only 40 m up to 800 m. They are typically **30mn to 1h30 distant from home** but farmers may walk up to 2-3 hours to reach high-lying fields. It is common for several households to group and cultivate the same hillside[25] so that mutual aid is possible (if needed), especially to protect fields from wild animals. Yet most of the farm works are done individually by each household.

[19] According to FAOSTAT (faostat.fao.org), Myanmar is currently the biggest producer of sesame worldwide and China the main importer.

[20] Turmeric now fetches 600 MMK per viss as against 3000-5000 MMK before. Porter fees reach 500 MMK/viss, thus letting a thin margin of 100 MMK/viss to producers.

[21] This is not the case in villages along Kalandan River since producers there can sell at farm gate and do not have to bear transportation costs.

[22] Local measurement unit: one *viss* is approximately 1.63 kg.

[23] Rakhine villages in the project area are more recent and were populated by people coming from bigger villages along Kalandan River. For example, Kyun Chaung Wa settlement dates back to the 1960's and people mostly came from Hta Run Aing in search of more fertile lands.

[24] Under the current land management law in Myanmar, there is no legal status to protect *taung ya* farmers (San Thein, 2012). In one of the villages we visited (Sa Non Taung) peasants seem to be aware of this gap. They started a process of land registration for the whole village and are now waiting for the Land Use Office in Paletwa to send a land surveyor.

[25] In Khumi, this is called *dampa*, which literally means 'at shouting distance'. In general, 2 to 5 households gather in the same *dampa*.

Until now there is virtually no private ownership but **short-term land use rights** whereby farmers are basically free to clear and cultivate wherever they wish – provided that there is no crop anymore and the previous occupier is no more maintaining (i.e. weeding or harvesting) the land[26]. Village land boundaries are all but clear-cut and village leaders and elders do not have a say in selecting farm lands[27]. In the project area, land disputes are still rare and the land structure proved to be quite flexible in recent years: in their *taung ya* farmers not only grow annual crops such as paddy but also perennial ones (tubers and sometimes small fruit tree groves) meaning that their land use right can easily extend from one cropping season to several years of cultivation[28]. It is however worth noting that in such communal and shifting land tenure system farmers have **no incentive to improve soil fertility** or to invest in any other kind of long-term improvement on farm lands.

3.2.4 Other main livelihoods and sources of income

With only a few exceptions, almost all households farm and grow their own *taung ya* every year. The main livelihoods that households combine with farming are the gathering of wild products from the forest, hunting (wild boar, porcupine, squirrel, monitor lizard, birds, etc.), fishing as well as a few casual labour activities – mainly as porters or in other villagers' fields during weeding and harvesting[29]. There is a wide range of plants people forage either for their own consumption (leaves, bamboo shoots, yams, etc.) or for sale. For several years now **elephant foot yam** (EFY) has been **one of the main sources of cash income** in these remote villages. Most of the wild EFY collected by villagers is sold to local traders and then exported to China. EFY can also be used as a famine food. It however tends to be overexploited and wild tubers are reportedly more and more difficult to find in the nearby forests. For these different reasons many farmers have tried to cultivate it in the past two or three years.

Wild orchids also used to be a source of income, with most of the trade occurring in November for the Chinese market. They now seem to have been widely depleted. According to ACF assessment in November 2011, the sale of forest products accounts for 11% of the average cash incomes generated by households in northern Paletwa. EFY may currently account for more than this in the remote villages we visited. In addition, the cash procured by EFY comes at a **critical time** in the year: it is one of the main ways for households to repay their debts and the rice purchased on credit.

Although **livestock rearing** is not a regular source of cash incomes, backyard animals (mainly pigs and chicken, sometimes ducks) as well as goats and cows represent **essential household assets**. They are the main household savings and a capital villagers can use in case of urgent or unexpected financial needs. Livestock rearing also plays an important role in the village social life and organisation (meat eaten for ceremonial purpose, social prestige, etc.). Backyard animals are mostly fed with crop residues, rice bran, broken rice, banana stems and kitchen waste. Cows and goats graze freely and the overall integration with cropping systems looks relatively poor (e.g. no manure collection, no feeding practices). There is no regular market demand for livestock. Pigs and chicken are sometimes sold to people from better-off villages on Kalandan River, especially during celebrations. In case of cash needs, cows and goats can be sold to traders who come from Bangladesh a few times a year.

3.2.5 Livelihoods seasonal calendar

The following calendar – which would probably need to be refined during the study on farming practices – highlights the seasonal patterns as regards the main crops and livelihoods as well as cash in-and-out flows at household level.

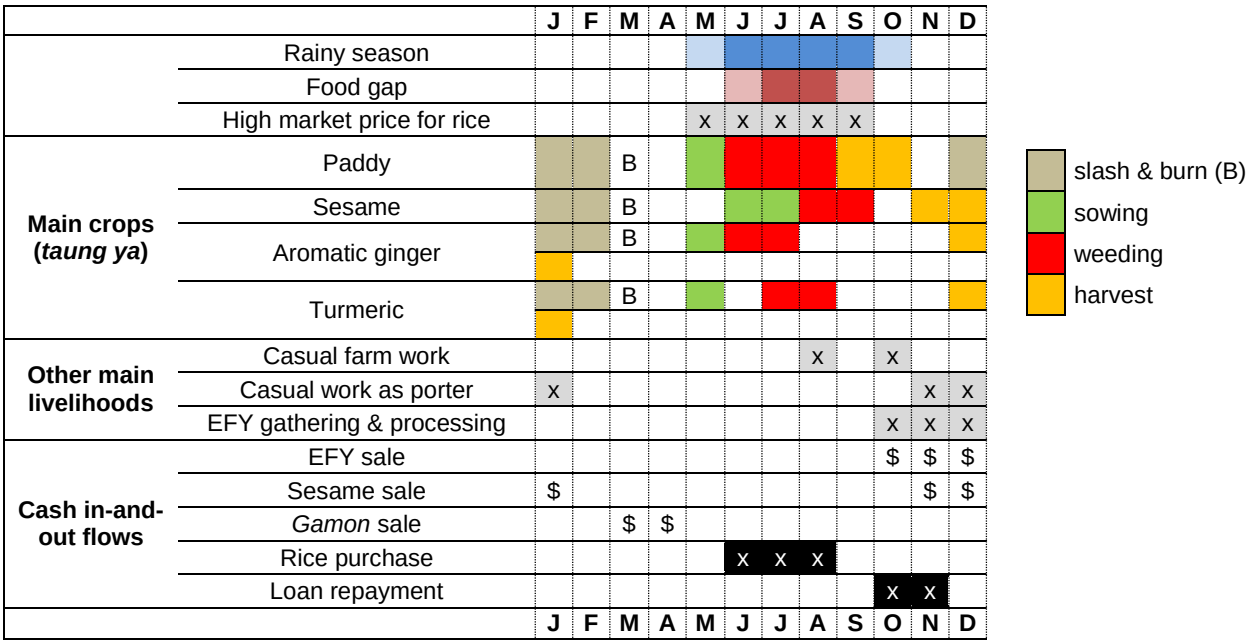
[26] In some of the Khumi villages we visited, farmers can choose and 'book' the land they will clear after the traditional ceremony called *Ta Ay Sa Paw* which takes place soon after the paddy harvest (usually in November).

[27] There is no land assignment by village authorities as described by Than Sein (2012) for farming systems in northern Chin State.

[28] A few farmers thus started to officially register lands where they planted fruit trees or other perennial crops.

[29] The average wage is 2000 MMK a day for farm works. Porter fees depend on the distance and the commodity. They range from 2500 MMK to 7500 MMK per trip. Casual work sometimes serves as in-kind repayment of debts.

Figure 1. Simplified livelihoods calendar



3.3 The bamboo blooming: a major shock that affected the whole agrarian system

The most significant shock households have experienced in recent years is with no doubt the massive rodent infestation that followed the blooming of local species of wild bamboo[30] between 2006 and 2008. Rats caused destruction of paddy fields and rice stocks during three consecutive harvests, leading to widespread acute food insecurity and putting most households in high debt levels[31]. This prompted some NGOs like ACF to launch food aid operations in southern Chin State in the following years.

What are probably less known are the **mid-term impacts of this 'bamboo crisis'** on the overall agro-ecological system: in the project area soil fertility has dropped and weeds have quickly proliferated to uncontrollable levels since 2009-2010[32]. **Upland paddy yields** are reportedly more than **50% down** on years before the bamboo crisis. As a consequence several households **moved away** from the villages located in the project area (mainly for better-off villages on Kalandan River) and some of the villages lost one quarter up to two thirds of their population.

It is probably not exaggerated to say that the bamboo blooming has brought about a **real crisis of the whole agrarian system** in northern Paletwa Township. To cope with a fall in yields and work productivity in their *taung ya*, households have not only started to migrate out of the area or rely further on loans and wild products but also introduced new cultivation practices. This is particularly obvious in the lower Ohn Thi Wa River valley (cf. figure 2 in chapter 3.5) where farming systems are changing very fast and farmers now heavily rely on the use of **herbicides** – especially for sesame cultivation. The fact that this area is more densely populated, with shorter fallow periods, probably explains why local farmers resorted to herbicides[33] since 2010. Using herbicides on sloped farm lands under a

[30] Bamboo flowers at one time then dies and regenerates from its seeds, which rats feed on, creating a sudden boom in their population. When bamboo seeds are exhausted rats leave the forest and attack both crops and grain stocks. This cyclic ecological phenomenon occurs every 48 years in Chin State as well as north-eastern Indian states. In Mizoram it has reportedly caused famine-like situations in the past (source: http://en.wikipedia.org/wiki/Mautam).

[31] In Paletwa Township one of the main coping mechanisms was to grow more aromatic ginger instead of paddy. The cash obtained from the sale of aromatic ginger was then used to purchase rice.

[32] Wide tracts of bamboo forests have suddenly disappeared. In the following years (i.e. before bamboo forest regenerate) this means that less biomass (from bamboo leaves) accumulates on forest litter and more weeds can reproduce and proliferate in the absence of the bamboo shade. According to local farmers, soil structure also declined. The extensive underground root and rhizome system of bamboos has indeed a significant capacity to bind the topsoil and conserve moisture (Zhou *et al.*, 2005)

[33] Herbicides come from Bangladesh and are smuggled through the border: villagers regularly go to Bangladesh where they sell monosodium glutamate and buy herbicides. The use of herbicides seems to have spread much faster in Rakhine villages where people are connected with Rakhine communities on the other side of the border.

monsoon regime is very likely to accelerate land degradation in the coming years – not to mention the different side effects on water sources, fish and human health.

3.4 Household food security: a fragile balance that mostly rests on usurer loans

The staple meal is made of rice served with wild or cultivated vegetables and tubers as well as small fishes, snails, crickets (depending on the season) and sometimes bigger wild animals (e.g. wild boar). Chicken and pork are usually eaten for special occasions only. People seldom if ever cook with oil. They also consume very few pulses.

All villages in the project area are globally in deficit as regards rice production. Although most households are not self-sufficient this does not mean they are all and always food insecure: in normal years **rice self-provisioning** is made possible by a combination of strategies including the sale of cash crops and EFY, casual labour, rice purchase on credit[34], 'cash advances' from local shopkeepers and traders[35], and rice or cash loans from relatives and friends. Whether to sell their products or to buy rice, the whole economy of the households in targeted communities is **tied up with the shopkeepers and traders** from Kalandan River bank villages who not only provide loans with usurer interest rates (usually 50% to 100% over 6 months or less) but are also the main outlet for local produce (cf. chapter 3.1). In a way such economic links contribute to secure the food access of the households living in remote areas; they also keep them in chronic poverty traps. Each household is tied to a specific commitment with the shopkeeper / trader who provided the loan (amount, type of repayment, due date, etc.) which probably explains why households operate individually when selling cash crops and wild products.

Within the same village, relatives and friends can sometimes provide loans without interest but this is only for short duration (one or two weeks) and small quantities of rice. The only credit services available within or near the project area are some revolving funds managed by self-help groups which were set up by UNDP: they sometimes provide cash loans with 5% interest per month (instead of 2% for their members).

In the villages we visited, an estimated **60% to 80% of households** need to purchase rice on credit and/or have recourse to loans (rice or cash) during the lean season. The quantity of rice they borrow depends on the household size (number of mouths), their own rice production (therefore the acreage and workforce) and their capacity to generate cash incomes from commercial crops or other sources. For the majority of households, it usually ranges between 10 and 25 baskets of rice a year (120-300 kg). This is equivalent to **1.5 to 3.5 months of food consumption** for an average-size household[36].

3.5 Current trends: towards different zones with different dynamics

According to ACF assessment report (January 2012), during 2011 cropping season, 75% of the farmers in northern Paletwa produced *gamon* while 50% grow sesame in small quantities and mixed with paddy. While this pattern is probably still true for Nga Thein and Myaun Chaung VT, sesame clearly supplanted *gamon* in the northern parts of the project area.

The **lower parts of the secondary river valleys**, and more specifically Yin Khan Wa VT and Kun Taung VT[37] share the following features and dynamics:

- They are less remote and relatively easier to access from the Kalandan River (e.g. possible travel by boat during the rainy season).

[34] Shopkeepers usually sell rice on credit with 100% interest rate. This rate may vary according to the location, the repayment modalities (in cash or in kind i.e. with commercial crops), the loan duration and the month it is taken and repaid. Annexe 9 provides examples of different loan modalities and their corresponding interest rate.

[35] Contrary to what is stated in ACF assessment report (January 2012) there is no cash advance as such on commercial crops but a loan system whereby households can get rice on credit from a shopkeeper or trader under the condition that they sell or barter their cash crop or wild EFY to this shopkeeper / trader at a price that is imposed beforehand (i.e. by the time the rice loan is obtained). The fixed price of the standing crop is usually much lower than what farmers could get at harvest time.

[36] 5.5 persons per household according to ACF proposal. The current dataset available for the 27 pre-selected villages however gives an average of 5 persons.

[37] The team could not visit Shin Ma Dein VT for lack of time. Nevertheless, we can assume that villages which are less remote and/or more densely populated (e.g. Pwatsar Chaung, Shin Ma Dein) follow the same dynamics as the ones described in this chapter: shortening fallows, introduction of herbicides and sesame monocropping.

- They are closer to big villages and local markets (e.g. Mee Zar, Hta Run Aing).
- Their population density is higher.
- The agrarian landscape is more open (cf. picture 4 in Annex 13), with degraded forests and shorter fallows (3-4 years).
- Cropping systems are becoming more intensive and start to specialise (e.g. sesame monocropping, use of herbicides, and ongoing conversion of the few flat lowlands into wet paddies).

In this **zone of higher cropping intensity**, maintaining adequate fallows is becoming increasingly difficult, thus adding to the reduction of soil fertility and proliferation of weeds caused by the last bamboo crisis. This is likely to result in a vicious cycle of soil degradation, crop yield declines, and further pressure on available land.

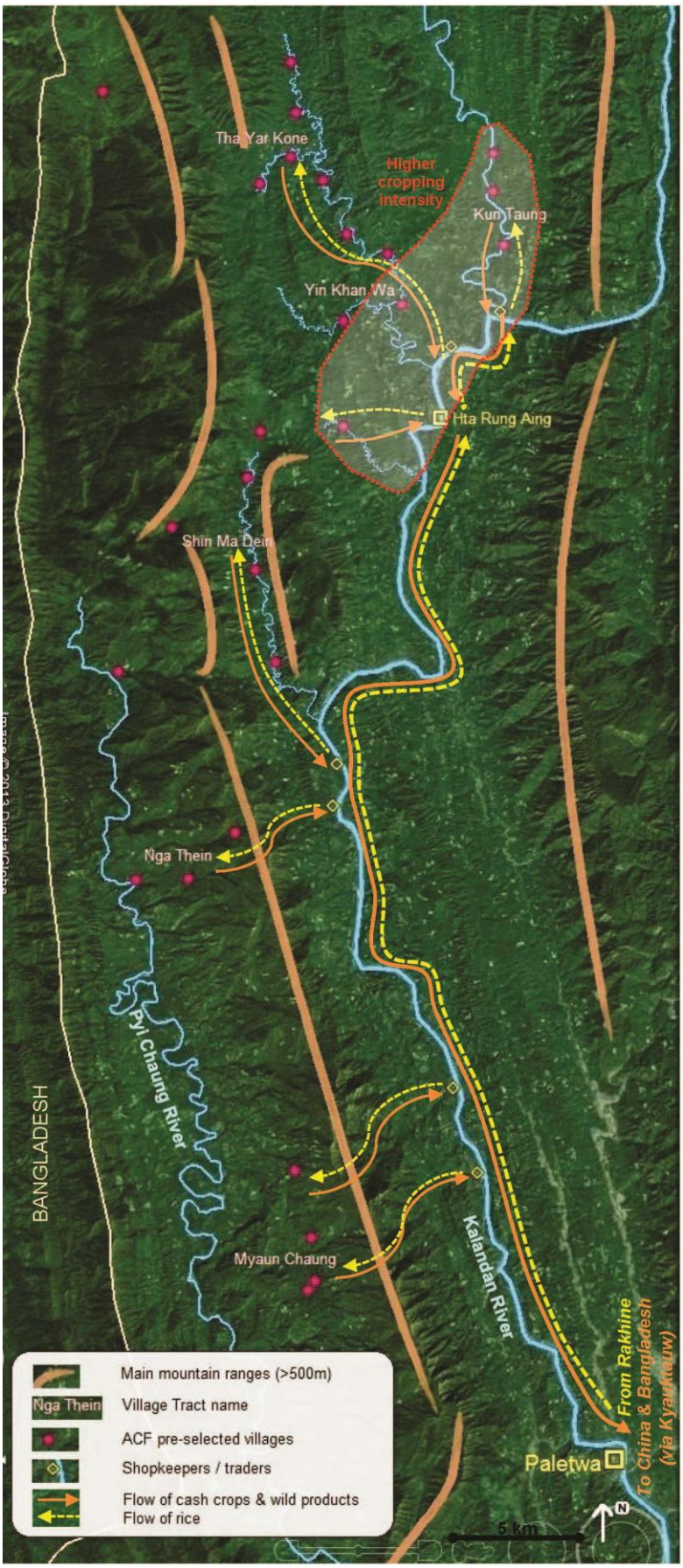


Figure 2. Map of ACF project area in Paletwa Township

Source: adapted from Google Earth satellite image

4 RELEVANCY AND FEASIBILITY OF ACF PLANNED ACTIVITIES

4.1 Overall project relevancy

Following the bamboo crisis and two consecutive bad harvests in 2011 and 2012, food distributions during the hunger season were fully justified and consistent with ACF mandate. Communities in northern Paletwa have recovered but now more heavily rely on loans to bridge the food gap, which they then repay for a large part through the sale of cash crops and forest products. In the project area, poverty, indebtedness and food insecurity are deeply embedded in **structural issues** such as a particularly rugged landscape, the lack of transport infrastructure, poor agricultural yields and the subordination of farmers to shopkeepers and traders who provide usurer loans. As regards food security and livelihoods, the project aims to tackle these structural problems and its objectives of **increased food production** and **reduced dependency to debts** are therefore **highly relevant**. As we will see in section 4.2.2, the objective of diversification of food production through vegetable cultivation may not be that relevant. Wisely, ACF has however planned to carry out different studies which will hopefully provide a better understanding of farming practices and food consumption patterns.

The project duration is probably **too short** to properly address the different structural issues. More specifically, agricultural development and changes in farming systems are long and difficult to achieve, especially when dealing with shifting cultivation systems, which are not only depending on technical and economic factors but often encompass complex socio-cultural dimensions. Having said this, most of the farmers in the targeted villages have never received any technical training or advice; they will surely see ACF presence as a great opportunity.

The village selection was mainly based on a FSL survey in a sample of 28 villages belonging to 18 distinct Village Tracts (VTs) in northern Paletwa. Although the selection process is not documented and seems quite complicated, it can be summarized as follows: using a matrix with different vulnerability criteria, sample villages were assigned a score and 'the most vulnerable' VTs were pre-selected on this basis. Other factors such as their accessibility and the WASH needs were then combined with this vulnerability score to select 7 VTs. Later on, one VT was removed as it was rightly judged far too remote. All the villages belonging to the 6 remaining VTs were eventually selected. In a way, ACF has decided to select some villages based on the VT administrative boundaries. Considering the type of activities to be implemented, it would probably have been more relevant to work in relatively homogenous **agro-ecological zones** (so that the issues to address – and therefore the training topics – are the same). Finally, it is worth noting that out of 27 villages pre-selected for this project, 20 villages were distributed food by ACF in 2012-2013, thus ensuring some continuity in the intervention. As regards the total number of villages, 27 is already a lot considering the project timeframe (and the remaining time), the number of field staff, the local context (remoteness, big distance between villages, etc.) and the fact that this is a relatively new area for ACF. It is not recommended to add more villages.

Due to human resource gaps at different levels and because ACF was waiting for the results of this study to really launch project activities, there are some delays in the implementation timeframe. A **revised activity schedule** is proposed in Annex 10 taking into account ACF achievements as of October 2013 as well as the different conclusions and recommendations in the following chapters.

4.2 Farmer Field Schools to train 800 farmers on sloping agriculture and vegetable production

4.2.1 The Farmer Field School approach

A challenging training approach for ACF in such a remote context

The **Farmer Field School (FFS) approach** basically consists in learning by doing and building farmers' capacities to analyse their problems and develop locally adapted practices to solve them (concept of participatory technology development or PTD). A FFS typically gathers 20-25 farmers during one or several full cropping season(s). In the project area one of the obvious constraints to this approach will be the **remoteness** and **access** to the villages: while a significant amount of time will be spent in travelling some of the villages may not be accessible at all during heavy rains. Ensuring ACF staff presence in more than 25 villages on a regular basis during the monsoon will therefore be a huge challenge.

Moreover ***taung ya*** are **far away** from the villages – typically from 30mn to 2h walk – and they are **scattered** on different hillsides. Mobilizing farmers when they are in their fields (and sometimes stay there overnight during work peaks) will be another challenge. This is all the more true that the project budget includes **only 10 field staff** and one agronomist. Considering the target of 800 households and assuming that all staff work on FFS, this means that each staff would have to train 80 farmers i.e. carry out 3 or 4 FFS – which seems too optimistic. The approach requires at least two meetings or follow-up visits a month with each FFS group, meaning that ACF would be able to support about **20 groups per cropping season at the most**. To achieve tangible results (i.e. some changes in farmers' practices) and for ACF to be able to monitor this activity and draw lessons, starting another batch of FFS groups during the second year of implementation is not recommended, unless funding is already secured for a follow-up project and these groups can be supported during the next cropping season (2016).

Regarding the selection of FFS sites or demonstration plots, the same constraints as above will apply: due to long distances and travelling time, ACF staff will not be able to set up and monitor too many FFS sites in the same location. It sounds reasonable to implement only **one demo plot per village**, selecting if possible a plot of land that is not too steep and is located near the village or the main footpath, so that it is easy to watch and to protect from cows and wild animals, and everybody – including women and children – can visit it. While the proposal suggested visiting other training sites established by other organizations in Paletwa, there seems to be no such training site, and it would be very difficult and time consuming to arrange trips to other parts of Chin State. Farmer exchange visits should be conducted between the different FFS groups, with at least one visit a year.

Although the field team has not been recruited there is a pool of former ACF or KMSS[38] staff who participated in previous assessments and food distributions. They speak Khumi, know pretty well the area and most of them have a farming background, thus understanding the main issues at stake in the targeted villages. However none of them has ever been exposed to the FFS approach and they probably **lack the facilitation skills** to conduct training sessions based on PTD. There is a significant risk that they consider the training as a way to show 'backward farmers' the 'modern techniques'. It is therefore obvious that the field team will need appropriate training on FFS before starting to use this approach with farmers.

An overestimated target number of farmers

The 27 pre-selected villages (as of October 2013) together have approximately 1000 households. Some of these villages may not be included in the FFS activity as they are far too remote (e.g. Pitaung, which is 2 days walk plus 7 hours boat from Paletwa). Directly targeting 800 households means that at least 80% of the households should take part in the training sessions. Considering what has been said above regarding the maximum number of FFS groups, how scattered are the cultivated fields – and therefore the traveling time for each participant to attend the training – this is not realistic. The FFS approach also implies that a **small group of farmers** are trained (and then share and spread their knowledge within their communities) i.e. this training approach is not really designed for big audiences. The point is of course not to exclude anyone willing to participate. In order to avoid frustrations or tensions within communities, the idea is probably to let everybody take part during the first FFS meetings. For each FFS group, ACF staff will gradually have to focus on approximately **10 farmers** (male or female) who are the most committed, motivated and innovative – some of which could later on become 'referent farmers' in the next programmes.

Several assets that can make this activity successful

Local farmers never received any kind of technical training and most of them seem to be really **eager to learn** and take part in training sessions. In all the villages we visited, people show a high level of motivation to set up demonstration plots in order to test new or improved techniques.

As said before, targeted villages are relatively small and there seems to be a **good social cohesion** within villages although people do not always belong to the same ethnic or religious group. This may well facilitate the sharing of knowledge among farmers. Although there is a need to further assess gender roles and the reparation of farm works between men and women, couples seem to carry out most of the work together in their *taung ya*. Achieving a good level of participation of women in the FFS should then be possible.

[38] This local NGO was ACF's partner during the previous food aid projects in Paletwa.

To identify the FFS participants, several lessons can be learnt from **ACF experience in Kayah**: in addition to their level of motivation and capacity to share what they learnt with other farmers, another requirement could be their age, in order to avoid households sending some children because the breadwinners are too busy to attend the training sessions.

Finally, the budget available for this activity is approximately 98,000 USD (122 USD per beneficiary household), which can easily cover some agriculture inputs but also exchange visits outside Paletwa Township and external ad-hoc expertise (for example to conduct soil analysis).

4.2.2 Training topics

Some mistaken conclusions in the proposal

Contrary to what is stated in the proposal, **soil erosion is not a major issue** in the project area. There are no landslides reported on farm lands. The accelerated soil fertility degradation has more to do with the agronomic consequences of the bamboo crisis (cf. chapter 3.3) than shorter fallows, slope erosion, run-off and/or topsoil loss. All the farmers we met are thus much more concerned by weed control and declining paddy yields than soil erosion.

Home gardening is not the most relevant training topic and there is **no demonstrated need to foster vegetable production** in the project area. During the rainy season households produce a wide range of leaves and vegetables in their *taung ya*, which they just need to pick when they need. In addition a variety of wild vegetables are gathered from the forest at different times of the year. Producing off-season vegetables could probably improve the diet diversity during summer. However this requires a good access to irrigation water and most of the villages have just enough water from springs and creeks for drinking purpose. Another major constraint to home gardening is that livestock and especially cows roam freely for food and cause damages to crops that are near or within the villages. Moreover, if the expected result of vegetable production is to generate cash incomes this is definitely not the best option: there is no or very little demand for vegetables on local markets[39]; most vegetables are highly perishable products and are difficult to store and transport, which obviously does not fit with the remoteness and transport conditions in the target area. Any attempt to develop cash crops in the project area should take into account transportation costs and priority should be given to merchandise of **high value added per unit of weight and volume**.

The main cropping issues

According to ACF assessment report (January 2012), the main issues reported by farmers for the 2011 cropping season were in descending order: (i) crop pests, (ii) irregular rainfall, (iii) crop destruction by wild animals (other than rats), and (iv) the lack of cash to hire labour. During the food post-distribution monitoring carried out by ACF in November 2012, respondents were asked to mention the three main reasons for crop failure experienced in 2012. The majority said that pests and diseases were the main challenges faced during monsoon cultivation (69%), followed by heavy rains (10.2%) and irregular rainfall (9%). According to our discussions with farmers and field observations, upland paddy is subjected to damages from rice bugs (*Leptocorisa oratorius*) that suck the rice grain at milking stage, resulting to production of smaller or empty grains. For a few years now, an unidentified disease also affects *gamon* tubers, which go rotten in the fields. There is definitely a need to better assess the main **pests and diseases**, and then promote integrated pest management (IPM) as suggested in the proposal.

As explained before there are acute needs to restore or improve **soil fertility** in the *taung ya* system. Although soil fertility has significantly decreased in the past few years, local farmers have not yet tried out any new practice to reverse this trend. Some of them believe that chemical fertilizers could be the solution but such inputs are not available locally and would drastically increase farming costs, which is not economically viable for resource-poor farmers. In addition, on steep slopes, most of the mineral fertilizers would be washed away by the monsoon rains. As regards other soil fertility management methods, farmers know very little about **nitrogen fixing trees and crops**[40]. They usually keep only a few big trees (the ones they cannot cut) on their *taung ya*. The way trees are cut does not encourage

[39] The only notable exceptions seem to be some varieties of large gourds and pumpkins which are grown in the *taung ya* and can be sold to traders on Kalandan River who then transport them down the river to Kyauktaw market (Rakhine State).

[40] These plants – which include the legume family – can theoretically enrich soil through symbiotic nitrogen fixation by the Rhizobia bacteria which live in nodules in the plant roots. The Rhizobia chemically convert the nitrogen from the air to make it available for the plant. One of the conditions for nitrogen fixation is that the proper Rhizobium strain be present in the soil. This is usually the case for most native nitrogen fixing plants.

their spontaneous regrowth during the following fallow period. Soil fertility management and improvement of fallows should be two core topics of the FFS training curriculum.

In some parts of the project area local farmers started to resort to herbicides as manual weeding became too labour demanding after the last bamboo crisis. They seem to mainly use broad spectrum non-selective herbicides such as paraquat[41]. The immediate tangible effect of these unsustainable **weed control methods** is that farmers can grow larger surface areas under cash crops such as sesame or aromatic ginger. Several households already invested in knapsack sprayers, especially in the 'sesame boom' area (cf. chapter 3.5)[42]. Farmers are still adjusting to this new technology, but not without difficulties (e.g. late sowing of sesame, overestimation of the cultivable area). Herbicide labels are in Bengali and farmers have little knowledge of the different types of chemicals and the way they should be applied. In addition, very few people are aware of the toxicity of these herbicides and farmers do not wear any protective clothing when spraying. If no alternatives are proposed to farmers, this trend is likely to expand to the more remote areas of northern Paletwa. To hold their own against herbicides, these alternatives should aim at high work productivity. Different labour saving techniques such as cover crops or intercropping could be promoted to limit the development of weeds.

A strong rationale for developing cash crops

For several years or decades now, local farmers have combined subsistence farming (upland paddy) with **cash cropping**. Selling or bartering these crops is one of the main ways to repay loans that were taken out during the food gap. Although they clearly lack market information farmers have been able to adapt very quickly to price variations and market demand. For instance turmeric fields have been temporarily disregarded due to low market price for two or three consecutive years; in some areas sesame is currently booming as the demand is high and traders directly come and purchase this crop in the villages.

Since farmers have started growing it, **elephant foot yam** deserves some specific attention. Currently there are virtually no cultivation operations after planting. In terms of planting material, farmers who pioneered EFY cultivation in the project area use either seeds or small tubers from wild plants, without much knowledge about the most effective method. The plant growing cycle also needs to be better understood as EFY is a perennial crop which can be harvested after 8-10 months from planting. EFY **processing** is also of primary importance: dry EFY tubers fetch 7 to 10 times higher price than raw ones. According to our estimation[43], processing can bring 70% value added to the final produce. There is probably a need to better assess the processing techniques and yields to see whether this income generation activity can be improved or scaled up.

As explained in previous chapters, farmers do not sell any cash crop collectively and they are often offered low prices for the cash crops they sell to local traders. It would be worth including a training module on **collective sale and negotiation skills**. FFS groups could even be seen as a first step towards the creation of small farmer associations in next programmes.

4.3 Application of Sloped Agricultural Land Technology (SALT) and/or terracing for 800 households

Permanent cultivation: neither immediately required nor feasible

Both SALT and terracing are based on the assumptions that fallows get shorter and shifting cultivation is no longer sustainable due to population growth. Considering the **low population density** in most villages of the project area, the proximity of the forest front and the relatively good access to farm lands, there is no strong evidence to suggest that slash-and-burn is not suitable anymore and permanent cultivation is required in the short or medium term.

Under the current land tenure mode whereby farmers have **short-term land use rights** and land is a **common property**, introducing technologies that presuppose permanent cultivation and individual

[41] Paraquat dichloride is distributed by Syngenta under the brand name 'Gramoxone'. Since 2011 this agro-chemical is recommended for listing as 'Severely Hazardous Pesticide Formulation' by the Rotterdam Convention (please see www.pic.int for more information).

[42] For example, one quarter of the households in Kyun Chaung Wa village now have their own sprayer.

[43] This estimation does not take into account the depreciation of the shelter and small equipment and tools such as tin sheet. It is based on an interview with a local farmer who runs a small processing unit in Kyway Thaung (near Kalandan River). He processes about 500 viss a year i.e. 815 kg of raw EFY tubers. These are obtained from own gathering and cultivation as well as purchase from other villagers. He sells to traders or directly by himself in Kyauktaw (depending on the market price).

ownership is very likely to be a challenge and could even be a source of tensions in the targeted communities. There are **legal aspects** related to turning swidden farming patches over to more permanent fields, which include long and complicated land registration procedures that seem to go beyond ACF expertise and mandate. More generally speaking, attributing land rights to shifting cultivators is in Myanmar a highly political issue for which there is not a clear policy yet.

Too many constraints to SALT adoption and terracing

While the **project timeframe** is relatively **short** (less than 3 years and covering only two farming seasons) the adoption of SALT and/or terracing probably requires **too many technology changes** for local farmers, the first of which would be to plough the land: as demonstrated before, there is no acute need to cultivate the same *taung ya* for several years; local farmers do not have the required production means (oxen, plough or even hoes) and know-how. Planting nitrogen fixing trees or shrubs on hedgerows would also be challenging as their effects on soil fertility will come only after some years and farmers may not be easy to convince if they do not see any quick and tangible results. Testing and validating different crop rotations with farmers will also take more time than two cropping seasons.

One of the principles of SALT is **contour farming** which consists in carrying out farm works along contour lines drawn beforehand rather than following the direction of the slope. Contour farming becomes challenging if not impossible when the slope is higher than 10%. In the project area farm lands usually have a 15-25% slope, which looks **too steep** for contour farming.

The **labour requirements** to initiate both technologies are **high** (SALT) to **very high** (terracing). They obviously exceed households' workforce capacities and financial means. Although the proposed activities plan to fill this gap by covering labour costs, there is **limited workforce available** in the project area for several reasons: (i) most villages are not much populated; (ii) almost all households are engaged in farming and there is virtually no landless household (hence no manpower 'reservoir'); (iii) even during slack periods farmers are busy with other livelihoods that make it possible to bridge the food gap (e.g. gathering wild EFY, working as porters). ACF would therefore face difficulties to mobilize a sufficient number of workers over a long period of time and would not achieve significant results by the end of the project. In all instances reaching 800 households within the project timeframe is definitely not possible.

Terrace development is a **very slow process** that took decades or centuries in most of the agrarian societies where it occurred. Previous attempts at developing terraces in Paletwa Township – by the State in the 1980's then UNDP in the late 1990's – all failed[44]. Without massive and long-term external support an individual subsistence farmer would need a whole life to convert a few acres of sloped agricultural lands into terraces. Although ACF could raise funds to initiate this process for a small number of farmers in each village, it is doubtful that terraces can be replicated by others. GRET experience in northern Chin State also shows that building terraces has a limited impact on soil erosion prevention if this is not implemented at the whole watershed level[45].

Although they would need to be further explored, there are probably **other technical constraints to terrace farming**. Several areas are characterized by rock outcrops and a very thin topsoil (e.g. Sa Non Taung village), which make terracing impossible. Several farmers also mentioned the poor water retention capacity of the soil: in permeable soils it would be difficult to maintain a perched water table for paddies or off-season crops.

Towards a better integration of trees and perennial crops in the current farming system

SALT is a **low-cost technology** and several of its principles could easily be tested and later on adopted by local farmers. Although farmers are unlikely to stop shifting cultivation and venture on more permanent and intensive cropping systems in the near future, they may consider testing new practices that can save time for weeding and improve paddy yields while not requiring too many financial means. There is in particular some room for improvement as regards **biological nitrogen fixation**, either using green manure, cover crops or nitrogen fixing trees or shrubs (NFTS). As

[44] There is very little if no institutional memory of these terrace development projects. The government made the construction of one model terrace field compulsory in each village along Kalandan River in the 1980's; elders remember this as a very top-down project which did not take any account of farmers' practices and needs. The later UNDP attempt to develop terrace cultivation seems to have failed for different reasons including poor methodological choices (e.g. common plots, lack of follow-up) as well as technical issues: in comparison with the work requirements, the terrace productivity was reportedly poor due to the lack of irrigation water to crop during the dry season and the absence of fertilization; in addition, the monsoon rains strongly eroded the newly built terraces.

[45] Personal communication from Murielle Morisson, GRET Programme Manager in Chin State.

mentioned before, there is very little if no knowledge of NFTS, whether it is their identification, planting method, regeneration or maintenance.

More generally, there is a need to support farmers in better integrating trees and/or perennial crops in the current farming system. One such approach is to gradually introduce the practice of **improved fallows**[46]. To do so, ACF should build on existing practices: for example, some farmers already preserve timbers such as gmelina[47] in their *taung ya*. While the current project could focus on **fast growing species** that can bring **useful products** such as timber, the next programming should include tree and shrub species which have positive effects on soil fertility, some kind of tolerance to fire and seeds easily available from the forest. One such species could be the locally called *zai* tree. As a first step, there is rationale for farmers to cut the trees in their *taung ya* which needs to be better understood and ascertained: problem of shade, damage after sowing due to raindrop impact, etc.

Although slash-and-burn and communal land tenure are the rules, farmers grow some **perennial crops** such as turmeric and a few small plots have been turned over to banana plantations or other tiny groves (e.g. orange, pineapple)[48]. Some farmers also tried and registered these lands as permanent ones. This demonstrates their capacity to adapt and innovate when external conditions are met. Perennial crop cultivation also indicates that local farmers are able to anticipate and plan beyond their immediate food needs.

The transport conditions: a major issue for farmers

One of the key constraints for farmer households to diversify their crops and improve their livelihoods is the **very poor transport conditions** on the footpaths that link remote villages with the ones located on Kalandan River bank. Villagers usually arrange community voluntary works twice a year – in June after sowing and October after the paddy harvest – to clear the grasses on these footpaths. Providing some support to scale up this type of community work and improve the main footpaths would not only have positive impacts on the transport of commodities (i.e. rice up the villages and cash crops down the main river) but could also be an opportunity to provide additional incomes, reduce debt levels and hence make other project activities more likely to succeed: for example, farmers' participation during FFS and training sessions may be higher if they have less immediate cash needs; households who borrowed rice from the community banks may be more capable of repaying their loan.

4.4 Creation of and support to community banks for 400 households

The right approach to relieve rice deficit households

Most of the community cereal banks implemented in other countries are primarily involved in acquiring, pricing and supplying grain for their members: they usually buy locally-produced grain soon after the harvest (when price is low), store it and sell it to their members at reasonable price during the hungry season; they rarely sell on credit. The community banks ACF plans to support will operate in a different way as their main focus is to provide **food loans** to their members during the food gap, **with a fair interest rate**. Knowing that local farmers almost never sell the rice they produce and the one they purchase to bridge the gap mostly comes from far away (e.g. Rakhine) ACF approach seems to be the right one.

Community paddy banks are **very likely to reduce household debt levels**. Indeed, the main reason why households take loans, purchase on credit or sell their cash crops beforehand is to get rice to bridge the food gap. Interest rates are usurer in most cases. Accessing rice loans with lower rates, directly within the villages (i.e. without transportation charges) would definitely relieve rice deficit households, who are in the majority in the targeted villages. During the cropping season these households often look for immediate sources of cash such as casual labour to repay their debts, at the expense of their own fields. As ACF projects in Kayah have shown, rice loans from the community bank would enable this type of households to work more intensively on their farms. Reducing their

[46] *'An improved tree fallow is a rotational system that uses preferred tree species as the fallow species (as opposed to colonization by natural vegetation), in rotation with cultivated crops as in traditional shifting cultivation. The reason for using such trees is production of an economic product, or improvement of the rate of soil amelioration, or both'* (Nair, 1993).

[47] *Gmelina arborea*.

[48] Although we did not directly observe teak plantations in the visited areas, there seems to be an upward trend among local farmers to plant this timber as it is fast growing, not much labour demanding and has a good market. Teak farming however remains a touchy issue in Myanmar due to the monopoly the military used to have in teak production and trade.

dependency on usurer rice loans would also help them better negotiate the price they get for their cash crops.

A loan system that is already known locally

There used to be **community granaries** – called *bong tso*[49] in Khumi – in most of the project area villages **in the past**. People used them as collective emergency stocks but also to provide loans with interest[50] to households who faced strong rice shortage (due to crop failure for example). In addition, the granary was often used as a safety net mechanism through rice donation to help households cope with specific shocks such as the death of the household head[51]. These granaries all seem to have collapsed due to different external shocks such as the previous and last bamboo crises as well as recurrent extortions from the army. Village elders usually remember quite well how these 'traditional banks' used to work. For example, Sat Ta Laing Wa villagers managed to accumulate a total of 700 baskets of paddy in their granary (i.e. about 4 MT of milled rice) which amounted to 1.5 month consumption needs for the 30 households or so who used to live in this village. Thanks to higher paddy yields than nowadays, villagers were able to contribute to the initial capital of this bank. The whole savings were lost during the last bamboo crisis.

Very small scale rice banks still exist in some of the targeted villages. Some local churches collect small quantities of paddy from their members which they then loan or sell at very low price to the poorest households during the lean season[52]. The capital is also often spent for community development works.

Both **UNDP** and **IRC** have implemented community rice banks in the recent past in Paletwa Township (cf. picture 5 in Annex 13). There are many **lessons to learn** from these projects although the villages where they were implemented do not always share the same features as the ones in ACF project area (less remote, smaller rice deficit, presence of better-off households and rich traders, etc.). The table in Annex 11 compares the two approaches and highlights the main lessons learnt.

Several other reasons for success

Target villages are usually **small** and **socio-economic differences** are **few** among households. As the socio-anthropological study has shown, the clan system is a guarantee of a great cohesiveness among the villagers. People know each other and there is little risk that one or two better-off households use the community bank for their own profit (for instance by borrowing a large quantity of rice from the bank then relending it to other households with a higher interest rate). For the same reasons, and also because villages are far too remote, there is no major risk of theft, thus limiting the need to have a permanent watchman.

ACF plans to support 400 households i.e. about 40% of the population in the pre-selected villages. This looks like a good compromise between the actual needs on the one hand, and the project timeframe and the organisation's capacities and experience in the area on the other hand. In terms of budget, there is approximately 55 USD per beneficiary household which should be sufficient to cover 2 months of rice for an average 5.5 persons per household. Several **risks and assumptions** however need to be anticipated by the project management team:

- There is no major increase of price e.g. no disaster in Rakhine from where rice is likely to be sourced.
- Transport costs from Kalandan River to the villages will be borne by the communities.
- Storage construction materials will be provided by the communities.
- The activity starts early enough in 2014 to buy rice at low price.

As demonstrated in this study, **local shopkeepers and traders** are relatively wealthy and have significant financial means. Besides their retail and cash crop trading activities, they are also the **main suppliers of rice during the lean season**. We therefore assume they could play an important role in

[49] Which literally means 'community rice'.

[50] For example, until the rat infestation onset in 2006-2007, the traditional community granary in Kha Maung Wa used to provide loans at 50% interest to households facing rice shortage.

[51] In Sat Ta Laing Wa, this form of solidarity also reportedly applied to new households settling in the village, who received a gift amounting to 6 months rice consumption.

[52] For example, in Tha Yar Kone, two churches have respectively 100 and 150 baskets of paddy.

this project. For example, villagers in Sa Non Taung and Laing To Taung (Myaun Chaung VT) have dealings with three shopkeepers from Kyee Lay (on the Kalandan River). Each one has a volume of trade of 700-800 bags of rice a year i.e. more than 105 MT for the three of them. If compared to the total requirements to cover 2 months of rice for all 17 households in Sa Non Taung (2.8 MT), these shopkeepers are very likely to be able to supply the initial capital to start a paddy bank there. Further assessment would shed light on the supply capacities of other local traders and their willingness to take part in such project. Possible negative impacts on the local rice market should also be further explored.

The main challenges to overcome

The project area is a **rice deficit** one. A few years ago households overcame a major shock which made them more vulnerable to food insecurity and led to unusual debt levels. Rainfed paddy yields remain lower than they used to be before the bamboo crisis. There will be no way for the large majority of households to contribute with rice to set up the **starting capital** of the bank. This means ACF will have to provide this initial rolling fund. Starting with money i.e. providing a cash grant to the bank management committee may not be the most efficient option as these newly formed committees will certainly lack the experience and knowledge of the rice market to procure large quantities of rice on time.

Supplying an initial stock of rice from the 'transit villages' on the Kalandan River to the target villages will be **expensive** and **logistically challenging** as all the transport will be done by foot with head-carrying baskets – usually 25 kg per porter per trip[53]. Starting with **rice rather than paddy** will of course make the transport by foot more cost efficient as rice has a higher value per unit of weight and volume. After the harvest households will however repay their loans in paddy because it can be stored longer and hulled gradually according to household consumption needs. The conversion of initial rice loans into paddy repayment should therefore be discussed with communities from the project onset.

The **lack of literacy** and low education level in the target communities will be a key constraint to set up paddy bank management committees. This is very likely to hinder **women's participation** as few of them are literate in the target villages. In addition, the **short implementation timeframe** will make it difficult to build strong committees and to have a good follow-up of the community banks.

The **poorest households** are the ones who usually face the strongest rice shortage and are the most in need of rice loans during the lean season. In case of bad harvest or sharp deterioration of the terms of trade between rice and cash crops, they will most likely be **unable to repay their loan**. This must be discussed beforehand and communities should receive some guidance on how to deal with non-repayment so that management committees can set up their own rules.

There is a significant risk that the target communities look on the bank as simply a source of food aid. This risk will be higher in villages where ACF implemented food distributions in 2012 and 2013. **Another round of food distribution in 2014 in the same communities would clearly jeopardize the chances of success of the paddy banks**. Giving the paddy bank management committees the task of procuring the initial stock of rice could be a good way to make a clear difference with food aid. As said above these committees may not be mature and strong enough to do so in an efficient manner. In order to make the initial capital procurement distinct from food distribution, ACF could also explore the opportunity to work with local shopkeepers through a voucher system.

The total budget for this activity (22,000 USD) was designed based on the implementation of 10 banks with 40 beneficiary households each. The average village size is only 36 households, so it might be difficult to reach 400 households unless more banks are created. This raises the following question: is it possible to create, support and monitor more than 10 banks in two years considering the remoteness and access to the target villages? Our opinion is that ACF should start with a smaller number of banks during the first year then draw lessons and scale up (or not) during the second year.

Lessons from ACF experience in Kayah

ACF can draw from its recent experience of supporting paddy banks in Kayah State. According to available reports and the feedback we got from the current manager, some interesting lessons are listed in the table 2. Knowing that the target areas and populations have **different features**, ACF should be aware that there will be limitations in the replication of this activity. For instance, one of the

[53] For example, a porter will take 2,500 MMK to transport a load of rice from Shin Dauk (located on Kalandan River) to Nga Thein which is equivalent to 100 MMK per kg. The average price of rice at Shin Dauk was 300 MMK per kg in 2013, meaning that transportation by foot to the project area adds 33% to the market price.

factors that probably made the paddy banks implemented by ACF successful in Kayah State is the strong leadership role played by pastors or other religious leaders at community level. This may not be the case in Paletwa Township where different churches and sometimes religions are represented in the same village. Moreover, ACF staff will have to deal with communities who have a limited experience of collective action and formal community based organisations.

Table 2. Some lessons learnt from Kayah

Topics	Main lessons and issues	Possible solutions
Management committee	High turnover from members (too much responsibility, lack of time, risks of tensions) and poor understanding of their responsibilities by the new ones	Organise regular refresher training and annual meeting with different committees, raise the question of incentives for committee members
Interest rate	Lower rate than the private sector: 16% on average	-
Main results	Cheap loans, easier access to food, less time spent to look for casual labour or other sources of cash income, more time dedicated to their own cultivated fields	-
Targeting	The poorest are reluctant to borrow because they are not sure to be able to repay; risk of paddy remaining in the stock	Make sure specific rules are set up in case of non-repayment but they do not put the poorest in difficult situations
Storage construction	About 40% of the storage facilities were not properly designed by the communities + lack of protection against rodents	Provide stronger technical advice (in Paletwa: focus on moisture and wind resistance, use a ceiling to prevent rats)
Storage management	Paddy is sometimes stored in individual bags (i.e. people want to get back their own rice)	If this happens, check with committees whether it is likely to affect the bank functioning

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Adapting the FFS approach and project target to local realities

- In spite of their excellent knowledge of the area and understanding of the issues at stake, the people that are likely to be part of ACF field team do not have experience of the FFS approach.

→ R1: **Provide intensive training to ACF field staff on the FFS approach**. This must be done prior to the start of the farming season i.e. in the few coming months.

- ACF will operate in a mountainous area with isolated upland populations. The organisation is relatively new to the area and will face a number of challenges when implementing the FFS, including logistic ones.

→ R2: **Reduce significantly the target number of households for FFS**. To ensure good quality training and regular follow-up ACF should focus on about **15-20 groups of 10 farmers** each, meaning that this activity will concentrate in 20 villages at the most and target a total of 150 to 200 households or so. These groups should be supported and monitored during the two consecutive cropping seasons of the project.

→ R3: **Set up only one demonstration plot in each selected village**. It is preferable to have an individual household managing the plot in order to ensure a strong commitment. However ACF may encourage the work contribution from other FFS participants on this plot. It should be located closed to the village or the main footpath. Meetings and training sessions (at the plot) should be held once or twice a month, with one or two days per session since participants will probably have to travel back and forth from their *taung ya*.

- Different zones with different dynamics as regards farming patterns were identified during this study. The study on farming practices may come with a more accurate agro-ecological zoning.

→ R4: **Take into account the different zones and farming dynamics** when selecting the FFS sites and the training topics.

5.2 Improving the existing farming systems instead of introducing new ones

- Following the bamboo crisis, there has been a fall in land productivity (lower yields) as well as work productivity (increased labour requirement for weed control), leading to unsustainable farming practices. While soil erosion is not a major issue in the project area, accelerated soil fertility degradation and weed proliferation surely are.
- There is little interest from local farmers and no demonstrated need to develop vegetable production. The local demand is weak. On the contrary, several cash crops have a very good potential (export markets). Rice self-provisioning is for a large part ensured by the sale of these cash crops.
- There are several trends in the farming systems that deserve some attention such as the single cropping of sesame, EFY cultivation and (to a lesser extent) perennial crop plantation.

→ R5: **Promote the cultivation of leguminous crops to improve soil fertility**. This should be combined with awareness sessions on the nutritional aspects of legumes / pulses and the ways to cook them. It is recommended to use species that farmers already know, readily set seeds (for better reproducibility) and can be intercropped with paddy without increasing too much the workload. Possible suitable species for the project area are pigeon pea (*Cajanus cajan*), different subspecies of cowpeas (*Vigna unguiculata*) and lablab bean (*Lablab purpureus*) – cf. Annex 12 for more information on these crops.

→ R6: **Test the use of cover crops, green manure and/or improve mixed cropping systems** (e.g. better spacing in sesame-paddy mixed cropping, intercropping of paddy and legumes). Cover crops would not only improve soil fertility before planting paddy but also help control weeds. For green manure, it is important to check first with farmers if there is a sufficient time gap with a few rains before sowing paddy.

→ R7: **Support the development of elephant foot yam cultivation at commercial scale**. The main constraint is likely to be the availability and price of planting material (seeds or small tubers). The

project should therefore look at ways to multiply seeds and/or introduce improved planting material, and perhaps provide small grants to farmers willing to scale up EFY cultivation. ACF should also draw lessons from CARE work in southern Chin State (which notably includes the design of a training booklet). The project could also look at ways to support EFY processing and improve the quality of produce to better meet the market demand.

→ R8: **Raise awareness on the intensive use of herbicides and their long-term effects** on soil fertility, human health and the natural resources. This should be done in collaboration with Myanmar Agriculture Services (MAS). Since this is likely to become a major public health issue, the awareness campaign may be coordinated with other government services (e.g. Department of Health).

- With the exception of the lower parts of the secondary river valleys, where fallows are shortening, the population density is still low in the project area and there is not much land pressure. Permanent cultivation is not seen by farmers as a suitable option in the current context.
- In addition to the land structure (i.e. short-term land use rights), several technical constraints and technological change requirements would make the adoption of SALT difficult and the implementation of terraces nearly impossible.

→ R9: **Select only some of the principles of SALT** and test them with farmers through FFS. This may include: (i) the planting or preservation of **nitrogen fixing trees or shrubs** on *taung ya* in order to improve the next fallow; (ii) the **pruning** of these trees or shrubs and the use of cuttings and branches for **mulching**; (iii) the introduction of **crop rotations** wherever fallows became too short and farmers started to intensify their cropping system (e.g. single cropping of sesame with the use of herbicides).

→ R10: **Introduce the use of manual tools such as hoes** to prepare the land (before sowing) and/or to better control weeds (by removing their roots). Minimum tillage with hoe is one of the techniques promoted by conservation agriculture, notably to reduce weed proliferation. In such context, this is certainly more sustainable than using herbicides from both an economic and environment point of view. Hoeing would also have a better effect on the weed ability to re-sprout. Considering the high labour requirements for manual ploughing and hoeing, this should be preferably tested **on small plots** where farmers grow perennial crops.

5.3 Rethinking the strategy for short and longer term activities to complement each other

- Local farmers have proved their capacity to quickly adapt their practices to new market opportunities. Besides the lack of fair credit systems, poor transport conditions and high transport costs are the main constraints they face to venture on cash cropping and improve their livelihoods.

→ R11: **Quickly submit a proposal to WFP to implement linkage footpath renovation** during the off-farm season and other slack periods. This should build on existing collective action mechanisms at village level and avoid disrupting them. Appropriate tools such as hoes or spades should be provided if required by the communities. From October to March, labour should be paid in cash as most households still have rice and/or can purchase it at relatively fair price. The main works are: clearing the bush, redraw the footpath course to zigzag along the slope, repair and increase the number of bamboo handrails and tree trunk ladders (cf. picture 6, Annex 13), dig and make steps where the footpath is very steep and slippery, and if possible build small retaining walls where there are landslips.

→ R12: **Give priority to zones that are on the other side of the mountain barrier** i.e. Nga Thein and Myaun Chaung VT (7 villages and about 155 households in total). Most other villages are less difficult to access thanks to their location along Kalandan River's tributaries (so villagers mostly use the riverbeds to reach the bigger villages and market places). Furthermore, these 7 villages did not receive food aid from WFP-ACF in 2012-2013 contrary to the other 20 pre-selected villages.

5.4 Learning from local experiences to resume community granaries

- Households are highly dependent on local shopkeepers and traders who provide usurer loans. After the bamboo crisis, households became even more vulnerable to food insecurity and indebtedness.

- Community paddy banks appear as the right approach to relieve rice deficit households in this context. This is a system that some villagers (particularly elders) already know. Many lessons can be learnt from previous experiences in Paletwa as well as ACF project in Kayah State.

→ R13: **Start with only 4 or 5 community banks in 2014** then spend time evaluating the results and drawing lessons before implementing a second round.

→ R14: **Scale up existing banks or resume the former ones**. Village **elders** should play a key role in explaining the bank objectives and raising awareness on the possible benefits for individual households and the whole community.

→ R15: **Organize exchange visits with other community banks in Paletwa Township** i.e. the ones set up by **IRC** and **UNDP**. Choose banks that are successful and others that failed. Visits should be conducted prior to the start of this activity (with village representatives, both men and women) and then during implementation (with newly formed committees). Exchange visits in Kayah State are less relevant and would not be cost efficient.

→ R16: **Pay a strong attention to the procurement of rice for the initial bank capital**. Several options are possible and their advantages and disadvantages should be discussed with communities: direct procurement by ACF (from Rakhine); procurement by bank committees (after receiving a cash grant); procurement through local traders (e.g. using vouchers).

→ R17: **Support communities to set up their bank rules and regulations** (loan amount and timing, interest rate, etc.) without imposing standards.

→ R18: **Make sure there is a strong contribution from communities** to reinforce the sense of ownership. This should at least include the provision of labour and local materials for the **storage** construction as well as all **transport** costs associated with this activity.

5.5 Crosscutting recommendations

5.5.1 Adapting projects and activities to remote conditions

Remoteness and the absence of transport infrastructures of any kind but sometimes dangerous pathways and rare and seasonal waterways are two key features of the project area that shape the whole livelihoods systems. Although remoteness dramatically affects the transport conditions for goods as well as people, it should not automatically be seen as a vulnerability factor: some of the most remote villages could for example be the ones with the best access to swidden land and forest (i.e. closer to the pioneer agriculture front) and the best suited for trade with Bangladesh – be it illegal. Having said this, remoteness is for sure a strong constraint to external support, whether it is a question of emergency assistance in times of crisis or longer term development. Although ACF has purposely limited the number of target villages and opted for Village Tracts that are relatively closer to Paletwa, there are several implications to this extreme remoteness for ACF current and future projects:

- Adapt the **projects' targets** to a tremendously difficult access as reaching some of the villages is not a matter of hours but days, making the implementation of some activities inefficient and their regular monitoring impossible;
- Give priority to projects and activities with **minimum input delivery** and logistic requirements i.e. strong focus on training and capacity building (e.g. paddy bank storage almost entirely built with local materials);
- Look for solutions that **minimize the transport burden** for both ACF and the people that are supported;
- Invest massively in the **improvement of transport facilities** i.e. improve or rehabilitate pathways, which in this context has to be done through the mobilization of the local workforce during the slack periods where this type of work is feasible (preferably towards the beginning of the dry season) and households are not engaged in clearing the land or farming.
- In terms of crop diversification, focus on commodities with **high value for low weight**, easy to transport and non-perishable.

5.5.2 Using Google Earth and GPS device for more reliable mapping

The main map that ACF currently uses as a reference is the Paletwa Township map[54] from Myanmar Information Management Unit (MIMU). This map shows the elevation as well as the main streams, which is very convenient. However, many villages where ACF plans to work do not appear on this map and there are many wrong locations and names.

During this mission, we took GPS points for all the villages we visited as well as important other points such as the mountain passes and footpaths leading to these villages. Using Google Earth images – which are recent and which resolution is quite good – we managed to identify all the villages targeted by ACF project. In some cases, we could also roughly crosscheck the available population figures (by counting the number of houses)[55]. From a programming point of view, satellite images are a very useful tool, for example to identify where cultivated fields are located, their size, elevation and the average slope. This also provides an overall picture of the cropping intensity and the different agro-ecological zones – which of course need to be confirmed by direct field observations.

Finally, using Google Earth would definitely help the Logistics Department better assess the distances, travelling time and associated risks or difficulties.

For the different above reasons, we recommend ACF to: (i) include **Google Earth** in the list of software the core management staff in Paletwa is allowed to download, (ii) provide the necessary **training on its use** (as well as the use of GPS device), and (iii) use Google Earth images as a **mapping tool** for both programme and logistics purposes. More specifically, the Logistics Department should edit a poster-size map that records the travelling time to the different target villages so that this type of information is shared with programme managers or visitors in an efficient way.

5.5.3 Food security monitoring

The project activity 6 under Expected Result 1 (food security and basic nutrition surveillance and context analysis) intends to collect key food security indicators by surveying six sentinel sites (villages) in Paletwa Township. In order to better inform the current and future FSL activities in northern Paletwa, a specific **post-harvest assessment** should also be conducted in the project area. In particular, yields and total output per household should be estimated for paddy and the other main crops. This would enable to calculate the current **self-sufficiency levels** in a more accurate and reliable way than what has been done until now (i.e. asking, during focus group discussions at village level, the average number of months of food consumption covered by own production). If possible, data should be **disaggregated by household type** since the village average is not always meaningful.

When assessing **yields**, whether it is for the post-harvest assessment or to monitor the demonstration plot, ACF should use the ratio of the **quantity of grain harvested to the quantity of seeds** as most farmers do not know their acreage.

5.5.4 Research gaps

As shown in the following table, a number of questions were not addressed during this study for lack of time and because the focus was on the planned activities:

Table 3. Main research gaps

Topic	Questions	Assumptions
Population changes	-How have population figures evolved in the target villages in the past decades? -What are the likely future trends?	The natural growth was offset by out-migration
Household typology	-What are the main criteria to establish a household typology? -What are the different household types? -What is the proportion of households of each type?	Two main factors: (i) household workforce, (ii) level of dependency on rice loans

[54] The map ID is MIMU679v02. It was created in July 2011.

[55] For instance, ACF village database indicated a population of 1090 in Laing To Taung (based on government source). Satellite image observation shows that there are about 15 houses at the most in this village. This was latter on confirmed that Laing To Taung has only 12 households (so probably not more than 80 persons).

Gender	-What is the gender repartition of farm works? -Are there many women headed-households and do they farm their own *taung ya*?	The division of labour is generally balanced between men and women
Markets	-What are the supply and demand levels for the main cash crops? -What are the main outlets for livestock?	
Cropping systems	-What are the different soil types and their properties?	Cambisols (according to Harmonized World Soil Database of FAO)
	-What is the productivity (yields and work productivity) of *taung ya*, including all crops grown (not only rice)?	
	-Are there other cash crops suitable for the project area?	Black cardamom seed (*Amonum xanthoïdes*), other edible species of Amorphophallus such as konjac (export to Japan)
	-What are the main pests and the possible control methods? Which disease affects *gamon* tubers?	
	-Are there opportunities to develop lowland paddy fields in flat areas e.g. near Twi Sa Wat?	Soil are sandy and too permeable
Livestock rearing	-What are the main animal diseases? -Would pig fattening be technically and economically viable with local species? What is the demand in Paletwa or Kyauktaw?	Possible to fatten weaners into 6-8 months pigs fed with fodder maize
Credit	-What are the different types of credit systems? -What are the main reasons behind the different interest rates?	The loan duration and type of repayment have an impact on the interest rate

5.5.5 Coordination with other departments and possible partnerships

ACF plans to implement WASH projects in Paletwa Township, probably in the same areas where FSL activities are carried out. This may include the construction of gravity flow systems which requires a strong participation from communities through **unpaid labour**. This approach aims to increase the sense of ownership and later on maintenance of these water supply systems. There is therefore a possible contradiction between this approach and the one proposed for footpath renovation. If both activities are implemented in the same villages or areas, then a good coordination between the FSL and WASH departments will be needed as well as clear communication with villagers to avoid creating some confusion in the communities.

Considering the limited number of aid agencies in Paletwa, there are not many opportunities to build partnerships. However, ACF should probably **liaise with MAS** regarding technical issues and specifically the design of training curriculum for FFS groups. MAS could also provide some expertise on an ad-hoc basis, for example as regards EFY cultivation which they planned to support.

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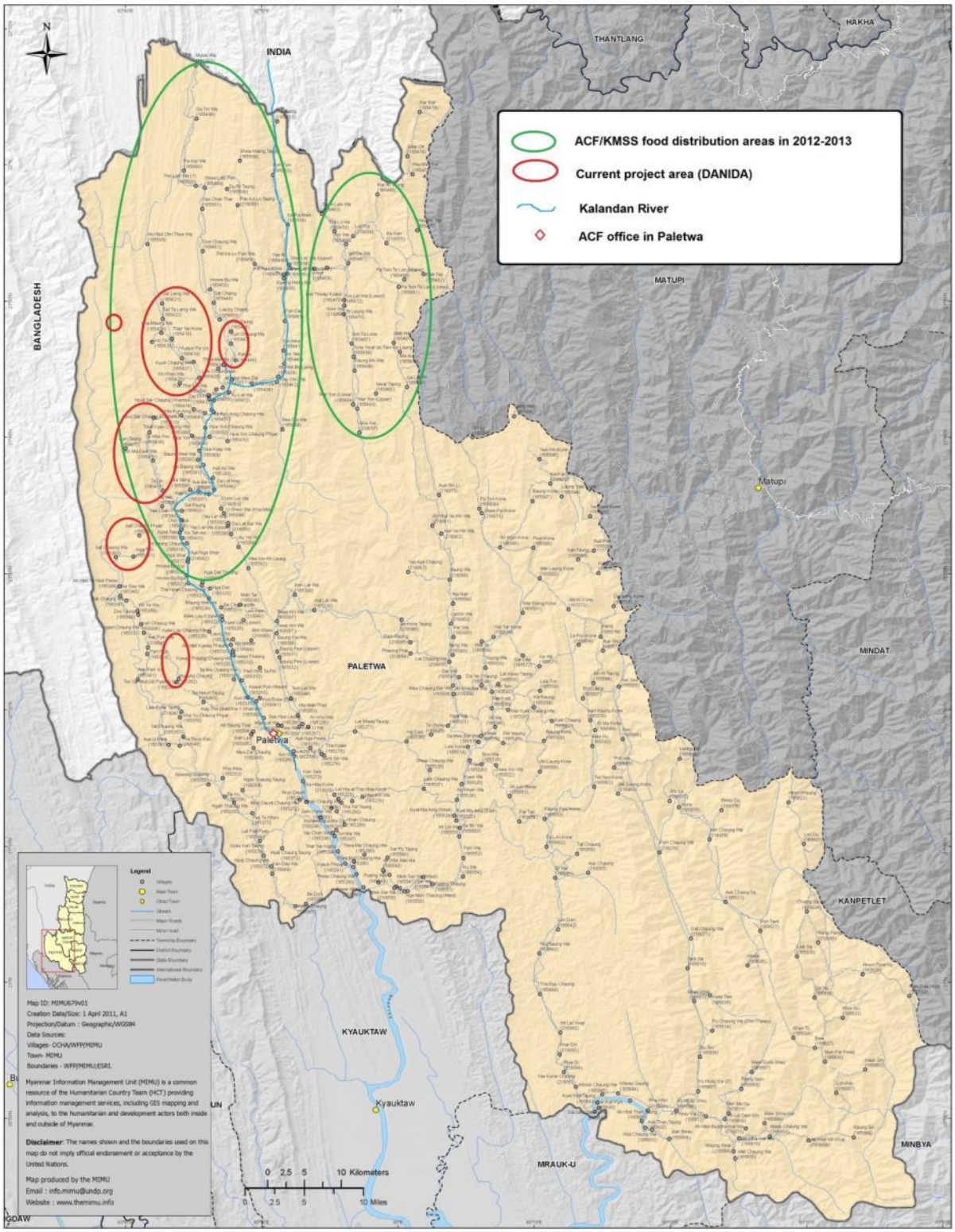
ANNEXES

Annex 1. Map of Paletwa Township



Source: adapted from MIMU (Map ID: MIMU940v01).

Annex 2. Villages pre-selected for the project and population data as of October 2013

#	Village Tract	Village	No. of households	No. of people	Food aid[56]
1	Shin Ma Dein	Ket Ta Lin	32	179	✓
2	Shin Ma Dein	Shin Ma Dein	77	398	✓
3	Shin Ma Dein	Kan Taung	21	96	✓
4	Shin Ma Dein	Toe Pwi	31	159	✓
5	Shin Ma Dein	Landom	23	131	✓
6	Shin Ma Dein	Ku Chaung Phyar	21	118	✓
7	Shin Ma Dein	Pwat Sar Chaung	19	94	✓
8	Tha Yar Kone	Sat Ta Laing Wa	21	100	✓
9	Tha Yar Kone	Kyauk Pa Lin	32	157	✓
10	Tha Yar Kone	Kha Maung Wa	62	298	✓
11	Tha Yar Kone	Tha Yar Kone	52	300	✓
12	Tha Yar Kone	Kin Ta Lin	26	136	✓
13	Tha Yar Kone	Sat Laing Wa	58	254	✓
14	Tha Yar Kone	Pitaung[57]	54	260	✓
15	Yin Khan Wa	Leik Chaung Wa	7	31	✓
16	Yin Khan Wa	Kyun Chaung Wa	58	276	✓
17	Yin Khan Wa	Yin Khan Wa	28	153	✓
18	Kun Taung	Kun Chaung Wa	57	299	✓
19	Kun Taung	Ra Kay	19	93	✓
20	Kun Taung	Kun Taung	123	527	✓
21	Myaun Chaung	Sa Non Taung	17	88	
22	Myaun Chaung	Twi Sa Wat	18	85	
23	Myaun Chaung	Myaun	18	n/a	
24	Myaun Chaung	Laing To Taung	12	54	
25	Nga Thein	Nga Thein	32	170	
26	Nga Thein	Sat Chaung Phyar	17	n/a	
27	Nga Thein	Sat Chaung Wa[58]	40	n/a	
	Total		**975**		

Source: data compiled by ACF Paletwa

[56] Villages which received ACF-WFP food distributions in 2012 and 2013.

[57] The number of households seems to be overestimated if compared with observations of satellite images.

[58] Population data estimated on the basis of satellite images on Google Earth.

Annex 3. Detailed mission schedule

Date	Location	Activities
26-27 Sept.	Paris → Yangon	Transport + briefing
28-29 Sept.	Yangon	Methodology development
30 Sept.	Yangon → Sittwe	Transport + methodology development
01 Oct.	Sittwe → Paletwa	Transport + briefing
02 Oct.	Paletwa	Workshop with ACF team
03 Oct.	Paletwa	Meeting with Socio-Anthropologist + field trip planning
04 Oct.	Paletwa → Sat Chaung Phyar	Transport + Walk + FGD (men) + meeting with village leaders
05 Oct.	Sat Chaung Phyar → Nga Thein → Sat Chaung Phyar	Walk + FGD (mixed) in Nga Thein + FGD (women) in Sat Chaung Phyar
06 Oct.	Sat Chaung Phyar → Shin Dauk → Paletwa	Walk + meeting with Shin Dauk paddy bank committee member + transport
07 Oct.	Paletwa	Satellite image observations + work on ACF survey database + data analysis
08 Oct.	Paletwa → Kyway Thaung → Twi Sa Wat	Transport + visit of EFY processing unit near Kyway Thaung + walk + meeting with village leaders in Twi Sa Wat
09 Oct.	Twi Sa Wat / Myaun → Laing To Taung → Sa Non Taung	FGD (women) in Twi Sa Wat + transect walk to Myaun village Walk + farmer interview & FGD (men) in Sa Non Taung
10 Oct.	Sa Non Taung → Kyee Lay → Paletwa	FGD (women) & meeting with village leaders in Sa Non Taung + walk + shopkeeper interviews in Kyee Lay + transport
11 Oct.	Paletwa	Interviews with former UNDP staff, MAS Manager, IRC field staff + data analysis
12 Oct.	Paletwa → Mee Zar → Leik Chaung Wa → Kyun Chaung Wa	Transport + walk + meeting with village leaders in Kyun Chaung Wa
13 Oct.	Kyun Chaung Wa → Sa Ta Laing Wa	Transect walk to *taung ya* & FGD (mixed) in Kyun Chaung Wa + walk + FGD (men) in Sa Ta Laing Wa
14 Oct.	Sa Ta Laing Wa → Tha Yar Kone → Kyauk Pa Lin	Transect walk to *taung ya*, farmer interview & FGD (women) in Sa Ta Laing Wa + walk + meeting with elders in Tha Yar Kone + walk + FGD (men) in Kyauk Pa Lin
15 Oct.	Kyauk Pa Lin → Mee Zar → Paletwa	Transect walk to *taung ya* & FGD (women) in Kyauk Pa Lin + walk + transport
16 Oct.	Paletwa	Data analysis + preparation of presentation
17 Oct.	Paletwa → Sittwe	Presentation to ACF Paletwa + transport
18 Oct.	Sittwe → Yangon	Meeting with DRR Consultant + transport
19-21 Oct.	Yangon	Data analysis
22 Oct.	Yangon → Paris	Presentation to ACF coordination + meeting with ACF Programme Manager in Kayah + transport

Annex 4. List of key questions

Technical training on sloping agriculture and vegetable production through Farmer Field Schools (FFS) – 800 households

Main questions	Sub-questions	Assumptions / Risks
Does the project staff have the necessary skills to use the FFS approach?	-What are ACF staff facilitation skills (non-formal education methods, group dynamics, participatory technology development, etc.)? -What are their specific technical skills regarding sloping agriculture and vegetable production?	Some intensive training of the project staff will be required before starting FFS
Will it be possible to gather 20-25 farmers during a full cropping season?	-What should be the size of the FFS groups? -What is the best implementation level for FFS: clusters, villages or groups of households who farm the same area? -How to select the field school sites or demonstration plots? When do farmers decide which place they are going to farm? Are cultivated lands allocated at village level? If yes, when during the year? -What should be the frequency of meetings?	Upland fields are scattered and far away from villages Households have other economic activities during monsoon which require movements (e.g. forest products foraging)
How many farmers can the project directly reach?	-How many FFS groups can ACF form and train? -Is it possible to reach directly 800 farmers using the FFS approach?	Population density is low
How and when can Field Days be organized?	What are the other possible modalities for FFS participants to share their knowledge with other farmers?	Gathering villagers during the cropping season will be a challenge
Can exchange visits be organized outside the project area	Are there other agriculture training sites established by other organizations in Chin State? If yes, are the training topics similar to the ones planned under this project?	Heavy logistics
What are the criteria to select FFS participants and FFS group leaders?	-Are there other criteria besides farmers' motivation and willingness to share their knowledge? -How to ensure gender balance within FFS groups? How can women that are not household heads be actively involved? -How to avoid people sending their children to the FFS?	Adults may not come to the training due to lack of time
Are there existing groups at community level that could be strengthened through FFS?	-Which are the farm works that are done collectively? -Do people have experience of community plots?	There are few formal groups or associations in the project target area

Main questions	Sub-questions	Assumptions / Risks
What are local farmers' priority problems and the possible solutions?	-Should the training focus on SALT? -What are the other topics FFS should cover: IPM, soil fertility management, water management, seed saving / storage, home gardening, cash crop cultivation (e.g. elephant foot yam, *gamone*)? -Are there marketing issues that could be alleviated through training (e.g. negotiation skills)? -What are the main pests? Are there any existing control methods?	Soil erosion and decreasing fertility are two major issues Other important farming constraints are pests and wild animals Home gardening is constrained by people mobility during monsoon
Is vegetable production suitable for the area?	-Are vegetable already cultivated in home gardens? If yes, is the production confined to river banks? -What are the main constraints to vegetable cultivation? -What would be the main objectives: income generation? Improved diet diversity? -What are the marketing conditions?	Vegetable production requires flat or gentle slopes, land available near the village and good access to water
What type of inputs should be provided to FFS participants?	-Are quality seeds needed? If yes, which crops? -Can we expect the beneficiaries to provide seeds to 2-3 households after the harvest? -What are the other inputs most likely required?	Farmers have no access to quality seeds

Application of SALT and/or terracing – 800 households

Main questions	Sub-questions	Assumptions / Risks
Is soil erosion the main issue of upland farmers?	-Are farmers aware of soil erosion, its causes and consequences? -Does soil erosion affect all areas or villages? Do some villages have access to more lands so that fallows are still long enough?	In the slash and burn system, fallows get shorter and yields decrease
Is permanent cultivation feasible in the project area?	-What are the different land tenure systems? Do farmers have a secured access to farming land? What are the legal aspects to permanent cultivation? -Do people move seasonally for other reasons than farming e.g. water, forest products, diseases? -Do some HH have access to draught animals for land preparation?	There are several constraints to permanent cultivation: land tenure systems, distance to fields, labour availability, HH investment capacity
Would SALT be easily adopted by farmers?	-Are there nitrogen fixing trees or other useful trees? If yes, how do farmers plant or regenerate or maintain them? How fast do they grow? What are the different uses people make of these trees? Do they provide incomes? Where are they located? -Do farmers have access to enough land? -What is the level of knowledge and practice of contour cultivation, crop rotations, intercropping and hedgerow cultivation? -What are the techniques farmers already use to reduce run-off? Do some farmers plough their land? How to they sow: broadcasting or seed hole sowing?	For some HH or villages, farm size may be too small to cultivate alternate strips Slopes may be too steep (>10%) to implement contour farming

Main questions	Sub-questions	Assumptions / Risks
What are the possible constraints for terracing?	-Are there local materials such as stones to maintain the terraces during the first months / years? -Will terracing have an impact on soil erosion if the whole watershed is not protected? -Are there other investments HH will have to cover besides the initial labour requirement?	
How should labour-intensive activities be implemented in connection with SALT / terracing?	-What is the most suitable period of the year in terms of labour availability and climate? -What would be the targeting criteria to select workers? What about landless HH? -What would be the best approach: FFW, CFW, vouchers? -What would be the payment modalities? Based on acreage and/or number of working days? -What would be the work arrangements? Should beneficiary farmers group and work alternatively on others' plots?	WFP funding can be secured

Creation and support of community banks – 400 households

Main questions	Sub-questions	Assumptions / Risks
Is there a need for community banks?	-What would be the main objectives: to decrease HH debt level? To improve food access during food gap? To limit staple price variations throughout the year? -Are paddy banks the best way to reduce HH debts? Are there other options such as corn banks, cash banks, etc? -How do poor HH get grain during the hunger gap? Do they borrow grain or money? What are the interest rates?	Establishing paddy banks would help reduce the dependency on traders / money lenders The main commodity people need during the hunger gap is rice
Are there sufficient cohesion and skills amongst communities in the project area?	-Are there already groups at village level? -Are people cooperating to purchase / transport / sell crops or staple food? -Do credit services exist besides the ones proposed by traders / usurers? What about self-help groups? -What is the level of literacy within targeted villages? -Do some people already have basic skills for bookkeeping, accountancy, stock management, marketing?	Few existing groups Little experience of community credit systems and collective marketing
How should bank management committees be set-up?	-How many committee members? What should be their different roles and responsibilities? -What should be their profile? -What would be the selection process? -Should committee members receive some incentives? -What types of training should they get? Is it possible to carry out exchange visits with committees from Kayah State? When?	

Main questions	Sub-questions	Assumptions / Risks
Who should be member or beneficiary of the community banks?	-Should vulnerability criteria apply? If yes, which ones? -Should there be membership fees? -Should people have to pay for the storage service?	
How will the bank be operated?	-Where will the bank purchase grain? How will the transport be organized? What are the possible costs? How much grain should be purchased? -To whom and when the bank will sell grain? At which price? -How to avoid individuals buying large quantities to resell at a profit? Should quotas be fixed beforehand? -Should the bank be associated with a social fund to assist the poorest in the community? If yes, how?	The poorest may not benefit if buying and selling are not regulated
Should the community bank provide loans?	-Can we expect beneficiaries to repay their loan? -What sanctions could be taken for HH who don't repay? -If loans are provided, what would be the modalities e.g. quantities and timeframe? How many loans a year? Is there a maximum amount that can be borrowed?	Many risks associated with credit services at community level e.g. poor recovery rates
Should ACF provide the initial capital?	-Should the initial capital be a donation or a loan? -What would be the most suitable way of starting: money, grain or both? -What should be the quantity or amount provided? Is the equivalent of 2 months consumption for 5.5 persons relevant? -Can we really expect beneficiaries to 'transfer' the first year benefits of the bank to another village?	Considering the project area is a grain deficit one, an initial rolling fund will probably be needed Risk that the community look on the bank as simply a source of food aid
What type of storage should be built?	-What should be the storage capacity? Does it depend on the quantity of grain that is likely to be purchased or borrowed during the year? -What types of materials should be used? What are the locally available materials? -What should be the design? Are there any specific features required e.g. to prevent pests, rodents, moisture? -What would be the community contribution for the storage construction?	
Where should the storage be located?	Who will watch the storage during the cropping season?	Few people stay in the villages during the cropping season

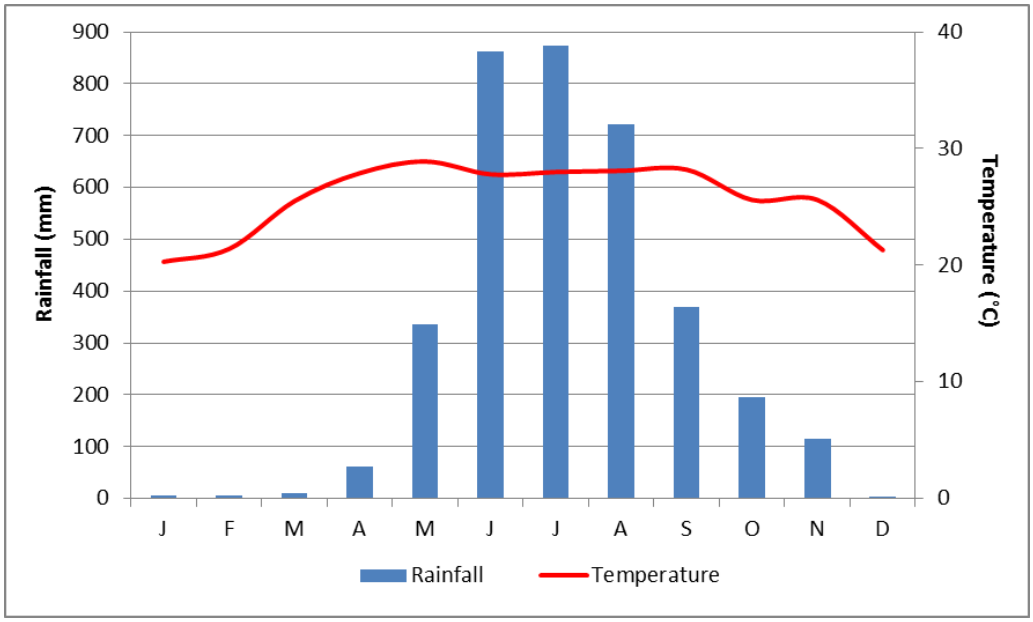
Annex 5. List of persons met

Organization	Position / responsibilities	Name	Contact
Myanmar Agriculture Services (MAS)	Township Agriculture Manager	Mon Kee	MAS office - Paletwa
IRC	Community Development Officer	Thwin Zar Laing	IRC office - Paletwa
IRC	Health Service Quality Officer (former FSL staff)	Khin Ei Ei Phyu	IRC office - Paletwa
IRC	Health Educator (former FSL staff)	Hein Rar	IRC office - Paletwa
-	Former Community Facilitator for UNDP in Paletwa	Aik Tin	0949660914
ACF	Programme Manager in Kayah State	Laurence	
Solidarités International	Programme Coordinator	Vincent Panzani	09425007166
-	Disaster Risk Reduction Consultant	Jan Willem van Rooij	09250248988
-	Anthropologist / Independent consultant	Maxime Boutry	0949578662

Annex 6. Feedbacks and lessons learnt from this consultancy and field mission

Strengths	Weaknesses
• Very knowledgeable guide during field trips, who provided much information on local farming practices (being himself a farmer). • Very high commitment from ACF Paletwa Field Manager during the field visits and very good level of translation during meetings and interviews. • Targeted communities eager to answer questions and very welcoming to the consultancy team. • The main findings and recommendations were shared and discussed at both Paletwa and coordination levels including other technical departments and organisations.	• Data from the last FSL survey to select project areas and villages poorly processed and barely analysed by ACF. • No accurate map of the project area available. • Poor anticipation of the travelling constraints and overall field work conditions by ACF coordination (e.g. what would have happened if the consultant was not able to walk 5h a day in a tropical mountainous context?) • No or very poor institutional memory on UNDP and IRC sides to draw accurate lessons from their past livelihoods projects in Paletwa. • HR gap preventing from directly sharing the main findings and recommendations with the first persons concerned: the Project Manager and team.

Annex 7. Average monthly temperature and rainfall for Paletwa from 1968-1981



Source: adapted from Paletwa Township Profile, Myanmar Socialist Party, 1982 (in Burmese).

Annex 8. Indicative travelling time to some of the project villages

Boat trip distances to the nearest villages on Kalandan River (hours):

		TO:				
		Paletwa	Kyway Taung	Kyee Lay	Shin Dauk	Mee Zar
FROM:	Paletwa		1.5	2	3	7
	Kyway Taung	<1				
	Kyee Lay	1				
	Shin Dauk	2				
	Mee Zar	5				

Downstream trips in column (↓)

Upstream trips in rows (→)

Walking distances from the nearest villages on Kalandan River to the target villages, and between targeted villages (hours):

- Shin Dauk ←→ Sat Chaung Phyar: 4-5h ←→ Nga Thein: 2h
- Kyway Taung → Twi Sa Wat: 6h30***** ←→ Laing To Taung: 1h ←→ Sa Non Taung: 2h
- Sa Non Taung → Kyee Lay: 6h30*****
- Mee Zar ←→ Leik Chaung Wa: 1h ←→ Kyun Chaung Wa: 1h ←→ Kyauk Pa Lin: 1h
- Kyauk Pa Lin ←→ Tha Yar Kone: 3h ←→ Sa Ta Laing Wa: 2h
- Mee Zar ←→ Sa Ta Laing Wa: 8h ←→ Sa Laing Wa: 1-2h

Mee Zar — Villages on Kalandan River

Nga Thein — Target villages

***** include dangerous sections where the path rises steeply.

Annex 9. Examples of different loan systems in the project area

Village	Type of loan	Lender	Repayment modalities	Interest rate and loan duration
Nga Thein	rice purchase on credit	Shin Dauk shopkeeper	cash or cash crops	50% / 6 months
Sat Chaung Phyar	rice loan	Shin Dauk paddy bank	rice	150% / 6 months
Sat Chaung Phyar	cash loan	Shin Dauk shopkeeper	cash	60% / season
Twi Sa Wat	rice loan	other villagers	rice	50% / season 100% / 2 seasons
Sa Non Taung	rice purchase on credit	Kyee Lay shopkeeper	cash or EFY[59]	100-130% / season
Sa Non Taung	rice loan	other villagers	rice	50% / season
Kyun Chaung Wa	cash loan	Hta Run Aing shopkeeper	sesame	120% / year
Sat Ta Laing Wa	rice purchase on credit	Mee Zar shopkeeper	cash	100% / season
Tha Yar Kone	rice purchase on credit	Mee Zar shopkeeper	cash	100% / season

[59] 10 viss of dry EFY for each bag of rice.

Annex 10. Revised activity schedule

	2013										2014												2015											
	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Activities related to Result 1: Gain of two months of food security per year for at least 800 households																																		
Activity 2: Provision of technical trainings on sloping agriculture including farmer-to-farmer exchanges (FFS) and referent farmers for at least 800 farmers																																		
Identification of FFS groups and referent farmers at village level										X	X																							
Specific training for ACF field team on FFS										X	X																							
Theoretical training sessions													X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X		
Practical training sessions													X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X		
Organization of exchange visits																			X									X			X			
Activity 3: ~~Application of SALT techniques and/or terracing~~ Renovation of footpaths																																		
Identification of ~~plots~~ footpaths and agreements at village level									X	X	X	X																						
~~Terracing~~ Renovation activities											X	X				X				X	X	X	X											
Activity 4: Creation and support of community paddy banks for at least 400 households																																		
Support to communities for the formation of committees and rules/regulations definition									X	X	X	X	X	X	X							X	X	X	X	X								
Procurement of community banks supplies											X	X	X										X	X	X									
~~Delivery of materials for storage construction~~																																		
Storage construction											X	X	X	X									X	X	X	X								
Provision of the initial capital to the banks														X	X											X	X							
Lessons learning exercise																					X	X											X	X
Regular follow-up of bank management															X	X	X	X	X	X							X	X	X	X	X	X		

as planned by ACF in the revised activity schedule of June 2013

X as proposed in this feasibility study & according to actual achievements as of October 2013

Annex 11. Comparison of UNDP and IRC paddy bank activities in Paletwa Township

	UNDP	IRC
Coverage	57 villages mostly along Kalandan River and its main tributaries	13 villages along Kalandan River
Village selection process	Villages where CDRT project is implemented + written proposal from communities (with UNDP staff support)	Villages where food shortage is ranked as top priority by villagers + written proposal from communities (with IRC staff support)
Initial capital	Cash grant or paddy donation from UNDP + contribution from each member (smaller than UNDP donation)	-Cash grant from IRC (no contribution from members) -Same capital for all banks whatever the village size and number of members (equivalent to about 440 baskets of paddy i.e. 3.8 MT)
Procurement of initial capital	Rice or paddy procured by management committee	Paddy procured by management committee
Transport costs	Covered by UNDP	-Shipment cost included in the cash grant -Transport by foot ensured by villagers (free of charge)
Committee	-7-9 persons -No specific criteria but literacy and calculation skills -Proposed by village elders then validation by members with vote by a show of hands -Received a basic accounting training	Received a training on invoicing procedures
Membership	-Decided by the committee -Based on wealth ranking: only the poorest and middle groups are entitled	Decided by the committee on the basis of a household food security ranking
Storage type	-Standard UNDP design which can be adapted by each committee -Ex.: capacity of 400 bags of paddy (>14 MT) in Kyee Lay	Large wooden building with tin sheet roofing (4.5 million MMK worth)
Storage construction	Materials and labour provided by the members	-Materials procured by the committee with IRC cash grant -Labour provided by the members
Loan period	May-November, decided by the committee	Decided by the committee
Loan amount	According to repayment capacity, decided by the committee	The first loan amount depends on the initial capital and the number of members (equal sharing out)
Interest rate	Decided by the committee, usually 50%	Decided by the committee
Specific rules related to non-repayment	-Repayment is postponed to the next year -If a household faces a major shock (e.g. death of the breadwinner), the loan is not repaid and is recorded as a loss by the committee	In case of poor harvest, loans can be repaid in cash instead of paddy
Strengths	-Much lower interest rates than shopkeepers and traders -Rice directly available at village level -No major pest issues and loss in the storage -Bank benefits used for various investments in community development	-Bank still running one year later -Much lower interest rates than shopkeepers and traders -Rice directly available at village level
Weaknesses	-Negative impact of the wealth ranking and member selection on community cohesion -Difficult to impose sanctions on members who do not repay -In better-off villages, bank used as a savings scheme i.e. capital pooling for community development purpose instead of serving a food security purpose. Ex.: in Shin Dauk, borrowing is compulsory; all the rice is loaned out by the end of February. As a consequence, during the food gap, people borrow money from micro-credit groups to buy rice! -The poorest are not creditworthy and not always accepted as members -Some bank members do not face rice shortage but borrow rice which they then relend to others (with or without a benefit) -Lack of follow-up e.g. after UNDP phased out, one of the committees – for fear of tensions between members – decided to sell the bank stock in order to build a community school	-Very short implementation timeframe (1 year), little follow-up from IRC -Procurement issues due to a lack of literacy -Implementation delays due to the travelling constraints and the fact that project activities compete with farm works -Transportation charges were under-estimated -Depending on the procurement timing, the market price of rice and their village remoteness, different committees procured different quantities of rice with the initial cash grant. -Depending on the above factors and the village size, households could borrow variable amounts of rice.

Annex 12. Examples of legumes that could be introduced or scaled up

Pigeon pea (*Cajanus cajan*):

- Already grown by local farmers in their *taung ya* but at very small scale (for own consumption).
- Perennial plant which can grow into a small shrub or tree.
- Originally from eastern India, so the specific Rhizobium is very likely to be found in soils in Paletwa.
- Can be used both as a food crop (dried peas or green vegetable peas) and cover crop or fodder; contains high levels of proteins.
- Open canopy which does not overshadow the crops underneath.
- Can be frequently pruned for mulch.
- Very deep tap root that is able to break through hard pans and improve the soil structure; also brings nutrients from the subsoil to the surface.
- Could play a key role in improved fallows:
  "Cajanus cajan, with its deep roots, survives most dry seasons and has an abundance of litter and leaves to contribute as green manure at the start of the rains. A planted fallow of shrub legumes such as *Cajanus cajan*, already widely used by traditional farmers, was sometimes found to be more efficient than natural regrowth in regenerating fertility and increasing crop yields." (Nair, 1993)

Different subspecies of cowpeas (*Vigna unguiculata*):

- Usually eaten as green vegetable in Myanmar; potential market in Paletwa town, Kyauktaw and Sittwe.
- Shade tolerant, so is compatible as an intercrop.
- Drought tolerant and grows well in poor soils.
- Could be sown as a catch crop with rainfed paddy.
- Seems to have been already tested in the southern part of Paletwa (to be crosschecked).

Lablab bean (*Lablab purpureus*):

- Climbing or erect perennial herbaceous crop often grown as an annual.
- Climbing variety grown as cash crop on Kalandan River banks during the dry season.
- Roasted lablab beans are traditionally eaten as snack with tea in Myanmar.
- Short growing cycle (60 days).
- Recognized as an excellent cover crop to suppress weeds and provide soil erosion control; very good nitrogen-fixer and green manure to increase soil organic matter and improve soil structure and quality; tolerates acidic, low fertility soils and drought (Valenzuela and Smith, 2002).

Annex 13. Pictures from the project area (October 2013)

Picture 1. Sesame monocropping & paddy-sesame mixed cropping near Sa Ta Laing Wa

Picture 2. Stock of wild elephant foot yam near a house in Sat Chaung Phyar

Picture 3. Old forest fallow (on the back) & former taung ya near Sa Non Taung

Picture 4. Open landscape & higher cropping intensity near Kyun Chaung Wa

Picture 5. Paddy bank storage implemented by UNDP in Kyee Lay

Picture 6. Bamboo handrail on a steep section of the footpath from Sa Non Taung down to Kalandan River