

IIRR-Myanmar

An Emerging Portfolio of Climate Smart Agriculture options in Sakta Village

**Hakha Township, Hakha District Chin State, Hilly Region
(1500 m above sea Level), Myanmar**

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Hakha is the capital city of Chin State located in the north-east of Chin State of 1,800 meters (6,000 feet) positioned on a small highland plateau. Although it is relatively small in land area, it is the largest city and capital city of the whole state serving as its capital is significantly larger than that of other towns in Chin State. Chin is one of the least developed areas of Myanmar with the highest poverty rate of all of the States and Regions of Myanmar.



The major ethnic populations of the state are Chin group which is mainly divided into sub groups. At least 45 spoken dialects have been recorded. Hakha is one of the most widely used dialects.



Sakta village is located in the Hakha Township, situated along the side of Hakha – Matupi road, 20 miles far from the city. Village community members are Chin and their dialect is not so much different with Hakha dialect. Agriculture (upland rice, corn, vegetables) is the main livelihood activity and other livelihoods include casual labor, livestock, hunting, small skill fishery and only few percent of the community are government and non government staffs. In Sakta village, almost all the households have one or more overseas workers their remittances support total HHs income.

Agriculture is a major livelihood activity for Sakta village though the production is just of subsistence level. Under unfavorable climate conditions, it is even not sufficient for home consumption. Hakha Township has experienced heavier rains, erratic rainfall patterns, increased temperatures and stronger. These are already causing a peak in occurrence of landslides, destruction of houses, failure of crops and reduced productivity.

Observed Climate Change in Sakta Village

Climate change is a reality all over the country of Myanmar. Chin state is also experiencing several climate changes such as erratic and intense rainfall, changes in temperature norms, predictability and precipitation rates. These effects are also projected in all agro-ecological zones in Myanmar without exception.

Climate Change Impact on Agriculture

In recent years, temperature variation is extremely high, especially 2015-2016: summers and minus zero temperature at night are noted during winter season. During Focus group discussion, the community explained that drier summer and irregular rainfalls affected the germination rate of the crops especially in corn and millet. Another impact of change is irregular and unpredictable rainfall during harvesting time, (November). It seriously damages the quality of products and there by reducing incomes.

On 30 July, 2015, the cyclone Komen made landfall in Bangladesh, bringing strong winds and additional heavy rain to Myanmar, which resulted in significant rise in monsoonal floodwaters in 12 regions or states. Among them, Chin state was one of the most effected in terms of displaced people. This – combination of floods and landslides – mainly affected rural areas of the country, where people rely heavily on agricultural activities for their livelihood. **Unprecedented extreme rainfalls caused serious landslides in the Chin State.**

In the aftermath of the cyclone Komen, the village communities are facing many challenges to recover including continuing landslides; lost seeds; lost of farming tools such as ploughs, hoes, water tanks and a rise in food prices (up to 35 %). The blockage of primary and secondary irrigation channels, significant damage to livestock shelter, serious impact of the floods on road infrastructure and problem in accessing to clean drinking water are the consequence impacts of cyclone Komen.

Most of the agricultural lands in Sakta village are rainfed uplands and community still practice shifting cultivation. Over decades, they developed a system to cultivate their crops in the same land limited to 3 years. The yield is lowered as result of a decline of soil fertility and increasing weed problem during second and third of growing seasons. Nowadays the community moves to another area every three years.



Lowland rain fed rice in terrace and upland rice cultivation

Climate Change Impact on Livestock

Cattles, mithun and pig constitute the majority of livestock in Sakta village. A few families own horses used during harvesting activities. Mithun is one of the more valuable animals of the Chin people: according to Chin culture, Mithun are used in special events such as weddings and other cultural ceremony. The cattle are raised for meat and in land preparation. Pigs are mainly used for short term cash needs. Sakta village possess very large grazing lands and the community practices free grazing

even for pigs(unless used for breeding purpose). They feed a small quantity of corn in the morning and evening, and at the other time they grazed in forest lands.

Climate Smart Agriculture Options for Sakta Village

1. Participatory Varieties Selection

Diversification and intensification are key elements in CSA strategy aimed at reducing vulnerabilities and risk to climate change. Implementing a PVS can help identify the crop varieties which are locally adaptable in terms of tolerance to climate change (drought, heavy rain, etc), resistance to pests and diseases low input requirements and the yield.



PVS trial plots for Upland Rice

According to International Rice Research Institute;

"PVS is a simple way for breeders and Agronomists to learn which varieties perform well on-station and on-farm and to obtain feedback from potential end users in the early phase of the breed cycle. It is a means for social scientist to identify the varieties that most men and women prefer including the reasons for their preference and constraints to adoption. "

In Sakta village, Upland rain fed rice is mainly cultivated in the shifting cultivation lands. There are also lowland rain fed rice field which are cultivated on terraces, (but only few members of community possess such lands). Rice production is mostly for home consumption. Corn is also another staple food of Chin peoples: corn is normally cultivated in home gardens and shifting cultivation. However the yield of the crops is very unsatisfactory because of lack of quality seeds adapted local climate and soil type.

IIRR has introduced the practice of PVS which carried out by the community both in rice (upland rice, rain fed lowland rice in terrace) and corn in coordination with implementing partner KMSS (Karuna Mission Social Solidarity, Hakha). The seeds of the potential varieties have been collected mainly from the Department of Aungban Agricultural Research station in Aungban Myanmar.



Participatory Varietal Selection Conducted in Sakta Village	
PVS trial for 5 Upland rice varieties from Aungban	5 HHs
PVS trial of rainfed lowland rice varieties from Philippines which can tolerant to drought	4 HHs
PVS trial of Kamorosupload Rice variety from Phillipines	3 HHs
PVS trial of Pinilisa (black) and Dinorado upland Rice variety from Phillipines	2 HHs
PVS trial of two corn varieties from Aungban research station	10 HHs

2. Introduction of new crops (testing) for diversification

The introduction of new cultivated species and improved varieties of crop is a technology aimed at enhancing plant productivity, quality, health and nutritional value and/or building crop resilience to diseases, pest organisms and environmental stresses. Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm taking into account the different returns from value-added crops with complementary marketing opportunities.

Major driving forces for crop diversification include: (a) increasing income on small farm holdings, (b) mitigating effects of increasing climate variability, (c) balancing food demand, (d) improving fodder

for livestock animals, (e) conservation of natural resources, (f) minimizing environmental pollution, (g) reducing dependence on off-farm inputs, depending on crop rotation, (h) decreasing insect pests, diseases and weed problems and (i) increasing community food security.

In Sakta village, pulse cultivation is very uncommon on rice, corn and vegetables is noted. A heavy reliance climate and geographical barrier to cultivate beans and peas as a kind of valuable protein source crops.



Corn and Cowpea intercropping

However bean varieties (Lima bean or butter bean, cow pea, Lab Lab bean) have been grown in their home compound and fields intended to promote their consumption on rich protein foods as a direct result, and to develop the market opportunity crops aside from their subsistence farming.

3. Intensification of Home stead production

Home gardens are found in both rural and urban areas in predominantly small-scale subsistence agricultural systems. These gardens have persistently endured the test of time and continue to play an important role in providing food and income for the family: it can be managed even by women, children, and elders. Home gardens have been an integral part of local food systems in developing countries around the world and now being promoted by IIRR as a climate smart agriculture option.

Home gardens are kept primarily for the food they produce, but densely planted gardens that include trees and shrubs can bring many other benefits as well. They can benefit as shade trees all across compound, sheltering the house and garden from the hot sun. Tree roots draw rainwater from deeper in the ground, boosting resilience to drought. And multi-layered gardens with trees and shrubs can provide crucial protection during storms, buffering the impact of heavy winds and rains. It can contribute to carbon capture.

a. Fruits tree plantation

Around 1980's, there were many pear trees in the village home steady (because all the community had to grow pear by the authority of socialist government of Myanmar) Chin. However, poor quality of the variety and poor markets, inadequate road infrastructure, this program failed most of the trees have been destroyed with lack of proper management.



Avocado, Grapes and Steam bean at Home garden

In recent years, infrastructure for road access is becoming better and easier access to market is noted. The community in Sakta village is now interested to cultivate some kinds of fruits with market opportunities (crops such as ZongTha (Steam Bean), Jackfruit, avocado and papaya). Several types of fruits trees (Avocado, Steam bean, Cherrimolla, plum, grape and pear) which have both market demand and compatible with local climate were recently introduced to the Sakta village's community. The community is facing some challenges such as limited land access according to cultural land tenure ownership. Another challenge which both project and community encountered is that there is no source of good quality seedlings, because there is no commercial nursery around the Hakha Township and (only availability from Kalay which is one day travel by bus from Hakha).

b. Home garden for vegetables production

Home garden is primarily intended for me continuous supply of fresh vegetables for family use. people have practiced this technology since from ancient time. Vegetable home garden has advantages including (a) Supply fresh fruits and vegetables high in nutritive value, (b) Supply fruits and vegetables free from toxic chemicals (c) Help to save expenses on the purchase of vegetables (d) vegetables harvested from home garden taste better than those purchased from market.



In Sakta village, almost all households have garden in the backyard of the house compound. Common types of vegetables cultivated are very limited, only few types of vegetables such as mustard, carrot, cabbage and potato are cultivating, because of poor access to good quality seeds for other types of vegetables. Other burrier are climate condition (serious frost problem in winter), appropriate fencing and irrigation system and water availability during summer. Since, the community in Sakta village practice free grazing for animal feeds, these animals entered to home gardens because of lack of

appropriate fence, and destroyed what they cultivated. The water availability is very easy and sufficient during rainy season; and it becomes lesser during winter and summer season. This is the challenge to grow vegetables.

Distribution of water pipe for proper irrigation, zinc thread fence and good quality of open pollinated vegetables seeds have been distributed to promote home garden practices and diversification of vegetables for the community's consumption intended to improve nutritional aspects.

Beside from paddy and corn, potato is also major crop in Chin State and most farmers from Sakta village cultivating before rainy season in deep slope lands. According to experience of the community, they explained that the size of the potato is becoming smaller year after year although they have brought the good size quality variety from other sources. To address this challenge, potato multiplication center will be set up in the next growing season with potato variety form Aungban.

4. Soil conservation activities

As a result of several factor of Climate Change such as intense rainfall, strong wind and landslide, and cultural practice which rely on mono cropping, soil erosion which leads to low fertility and soil degradation is the common problem in all agro-ecological zones of Myanmar. Among other region, Chin state was supposed to be most serious one because of its reliance on shifting cultivation (lands slopes more than 45°).

Shifted cultivation is an agricultural land use system where land is cleared of forest and cultivated until its fertility diminishes; after which it is abandoned and the farmer moves on to clear a new area. This kind of land use system promotes deforestation and forest degradation, thus contributing to carbon emission and biodiversity loss. Shifting cultivation has been practiced for a long time since ancient in Chin state.



Shifted cultivation in Deep slope Land

To be aware of the soil degradation and to address the land erosion problem in Sakta village, two demonstrations of soil conservation practice have been conducted in coordination with community and implementing partners (KMSS). The practice of growing trees to stabilize the soils involve the planting of *alnusnepalensis* tree across the slope. This was used to maintain water erosion and as a windbreak and another purpose for green manure. The leaves of the tree are supposed to be cut when the plant height reach 1m above the ground and to be used as green manure fertilizer during land preparation.



Alnusnepalensis is a plant of the warm temperate to subtropical zone, and it can also be grown at higher elevations in tropical areas with high rainfall. The trees develop an extensive lateral root system,

fix atmospheric nitrogen, and are known to be fast growing. They are planted to give stability to slopes that tend to slip and erode. Moreover, they are effectively used to reforest abandoned and deforested mountains and valleys areas because they can grow as a pioneer in degraded habitats with low fertility soils. *Alnusnepalensis* and *Gliricidia* are being introduced to stabilize soils on slopes as source of organic matter.

5. Intensification of Livestock

Rearing small livestock has been established as a promising pathway out of poverty for rural farmers in developing countries. Livestock keepers are generally better off than those who depend entirely on crop agriculture. Livestock products are an important agricultural commodity for food security because they provide valuable kilocalorie consumption and protein. The livestock sector contributes to the major livelihoods of the landless and marginal farmers of the rural community. Livestock activity is one option to reduce climate change impact and risk.



a. Pig

Pig is common and popular livestock over the country and most of the rural community including rich farmers maintain pig raising as a money saving, in Saktavillage. The Sakta village community prefers to raise pig rather than other small livestock such as goats and poultry, because pig is much cheaper and less requirements to manage according to their raising practice. In this village, pig was raised as free grazing and feeds only few quantity of corn which is also farm products, two times per day. The community has another reason why they don't prefer to rear goats and chicken, because these animals tend to destroy the vegetables and other crops which they grow in their gardens. Pig especially local pig breeds are the most adaptable livestock type for this region. As part of the CSA activities twenty(20) HHs in the village community, have been supported to raise pigs according to following their cultural practice.

b. Fish multiplication center

Small skill fishery makes an important contribution to nutrition, food security, sustainable livelihood and poverty alleviation especially in developing countries. The consumption of fish is the source of energy and high quality protein and also a key source of other nutrients such as minerals, trace

elements, fat-soluble vitamins and essential fatty acids. Small-scale fisheries and aquaculture is promising livelihood activity for landless and marginal farmers especially in relation to food security and nutrition. Interestingly there is a traditional practice of forest based fish production.



Fish Multiplication ponds

During the rainy season there are many ponds around the Sakta village and in the valleys of the mountains. Few farmers raise fish (as seasonal rearing) in their ponds. Some ponds which are connected with streams or creeks, tend to hold water throughout the year: are just seasonal ponds in (rainy season) and completely dry up or have lesser water during dry season. One of the indigenous species of fish which common in the region is Rohu, (called Golden Carp). However, in recent years, fingerlings availability is becoming difficult. To address the fingerling availability/ access and to promote the small skill fisheries in the village, two fingerling multiplication ponds (which can hold water throughout the year), were constructed by the project for custodianship of two households, Another 15 HHs were provided small quantity of fingerlings for short cycle seasonal rearing.



Small skills fish rearing at home garden

6. School Gardening

A school garden is a powerful environmental education tool. Through gardening, students have an opportunity to engage in agricultural practices on a small scale, learning about the responsibilities and impacts of land cultivation. School gardens are platform to teach students where their food comes from and how it grows. The school garden provides a dynamic environment in which to observe, discover, experiment, nurture, and learn.

School gardens are rarely found across the country. One school garden in Saktahas been organized with support of farming tools, seeds and irrigation facilities, (implemented in coordination with KMSS, community and teachers at the school compound).



Opening Activities 2018 Cropping Season	# of HHs
Participatory Varietal Selection Crop Trials	24
PVS Trial of Upland Rice (4 varieties from Aungban research station)	5
PVS Trail of Rainfed lowland (Terrace) rice varieties 278 and 280	4
PVS trial for Two corn varieties from Aungban Research station	10
PVS trail of Kamoros Variety from Philippines	3
PVS trail of Pinilisa (Black) and Malido upland rice varieties from Philippines	2
Introduction of new crop (testing) for diversification	45-50
Introduction of Lima bean	all meeting participants
Introduction of Lab Lab bean	all meeting participants
Introduction of cowpea (red)	all meeting participants
Introduction of groundnut (LUNA from Philippines)	3

Increasing homestead production	46
Fruits tree plantation (Plun, Avocado, cherrimoya, grape, pear)	30
Several varieties of potato cultivation as Potato multiplication centre	1
Home garden for vegetable production	15
Soil conservation activities	32
Nepalensis tree plantation for demonstration of soil conservation	2
Nepalensis tree plantation for Fruit tree HHs	30
Intensification of Livestock	20
1 Piglet for each HHs	10
1 goat for each HHs	10
Raising of Tilapia and Rohu as fish multiplication center	1
Setting up school Garden	1
land preparation, fencing and inputs	1



Summary and Tentative plans of CSA options for Masein village

Climate Smart Agriculture options are very locally specific and the options will vary depending on agro ecological zones culture and nature of the community. Some indigenous practices which community are using traditionally are already climate smart and just need to be refined or enriched.

Annual planning and reviewing workshop will be held every year during project implementation, in coordination with each partner organizations and with support agencies (Food security working group, Yezin Agricultural university, Department of Agriculture Research Stations) to share, discuss and develop more locally adaptive strategy and options for climate smart agriculture options for each agro-ecological zones.

Over a portfolio of climate smart agriculture options will be developed.