

*Action Research Report*

# Nurturing resilience in smallholder farming systems

Emerging insights from a Climate-Smart Village in  
Southern Shan State, Myanmar



## **Correct Citation:**

Barbon WJ, Myae C, Su MN, Gonsalves J. 2020. Nurturing resilience in smallholder farming systems. Cavite, Philippines: International Institute of Rural Reconstruction.

Considerable part of this work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada. The views expressed herein do not necessarily represent those of IDRC or its Board of Governors.

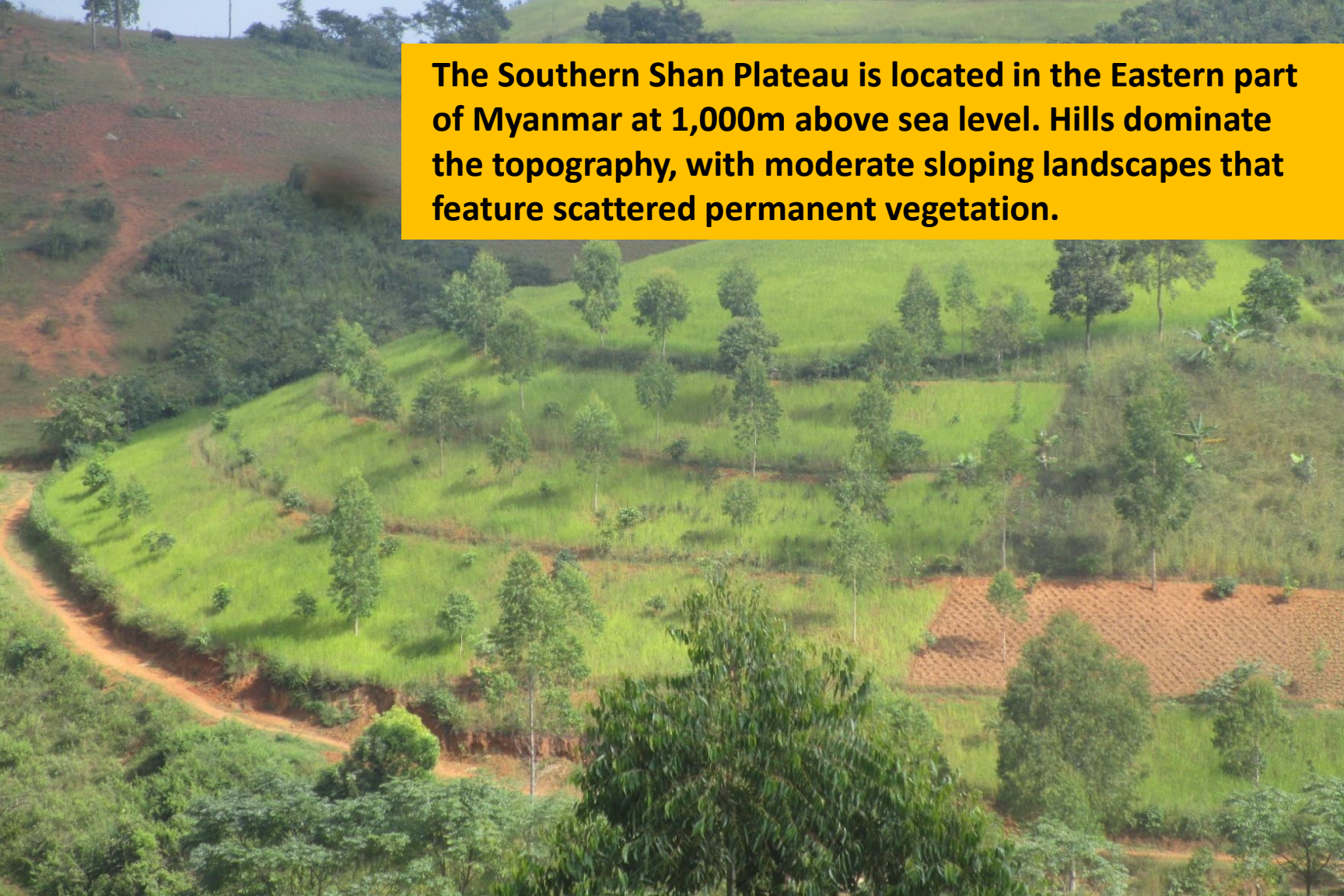
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**June 2020**



**The Southern Shan Plateau is located in the Eastern part of Myanmar at 1,000m above sea level. Hills dominate the topography, with moderate sloping landscapes that feature scattered permanent vegetation.**





**Within this mountainous agroecological zone of Shan State and under the administration of Nyaung Shwe is the village of Taungkhamauk. This is the site of a climate smart village operated by the International Institute of Rural Reconstruction and Kalayarna Mitta Foundation (KMF).**





**Subsistence as well as commercial farming on the predominately sloping lands is the major livelihood activity for households and communities. Upland rice, ginger, corn and tomatoes are the main crops.**





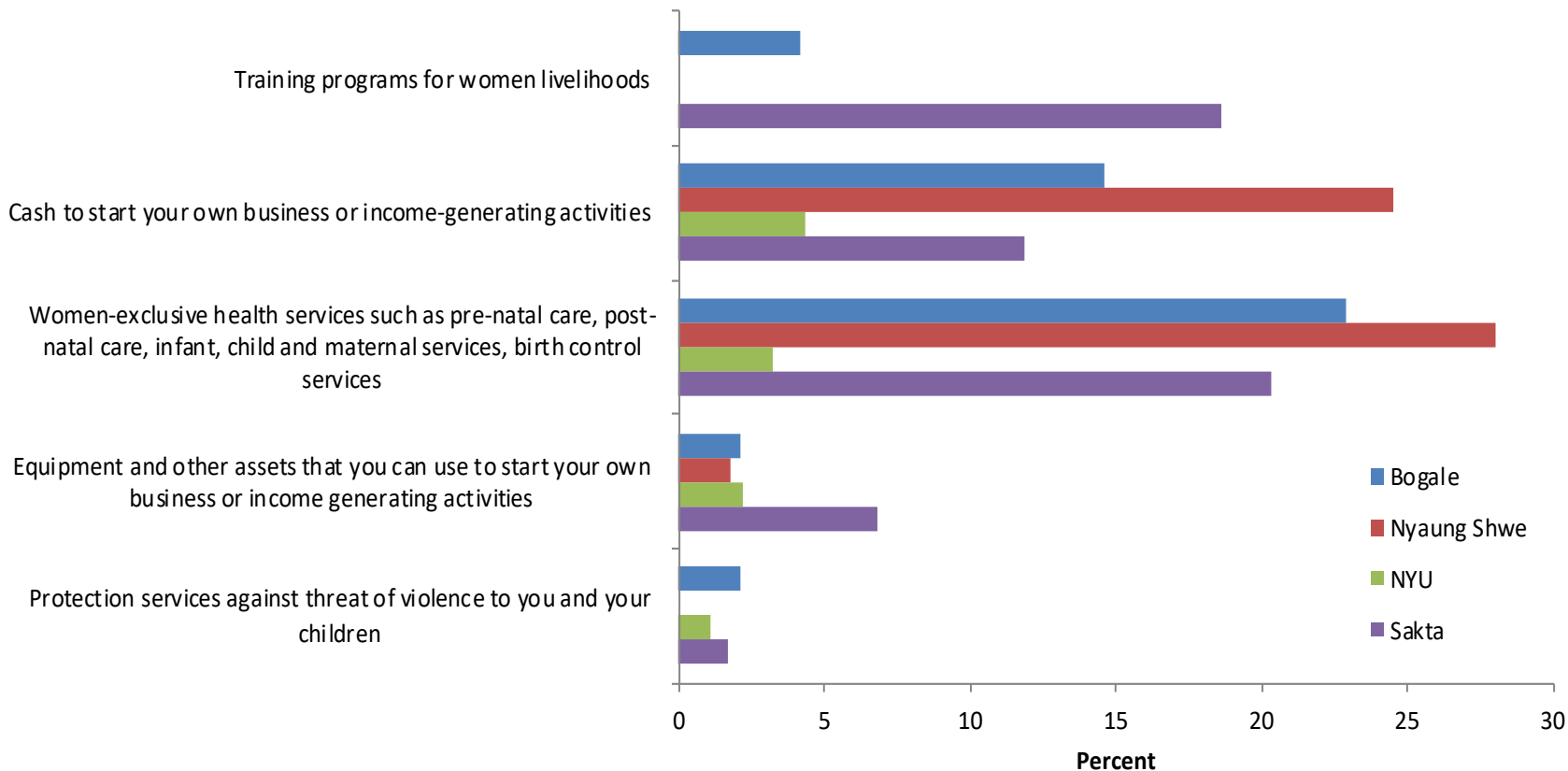


**Climate change also affects the region: irregular onset and withdrawal of monsoons compounded with erratic, and sometimes heavy rainfall result in crop failure and damage to produce quality.**



**A range of coping strategies help farmers deal with impacts of climate change (drought, crop failure, etc). Taungkamauk (Nyaung Shwe) village has a wider range of coping mechanisms than other CSVs where IIRR operates in.**

**Figure 3. Percentage of female respondents who received support services for women from any external (NGOs) and government agencies for the past 3 years (since 2015) by village**

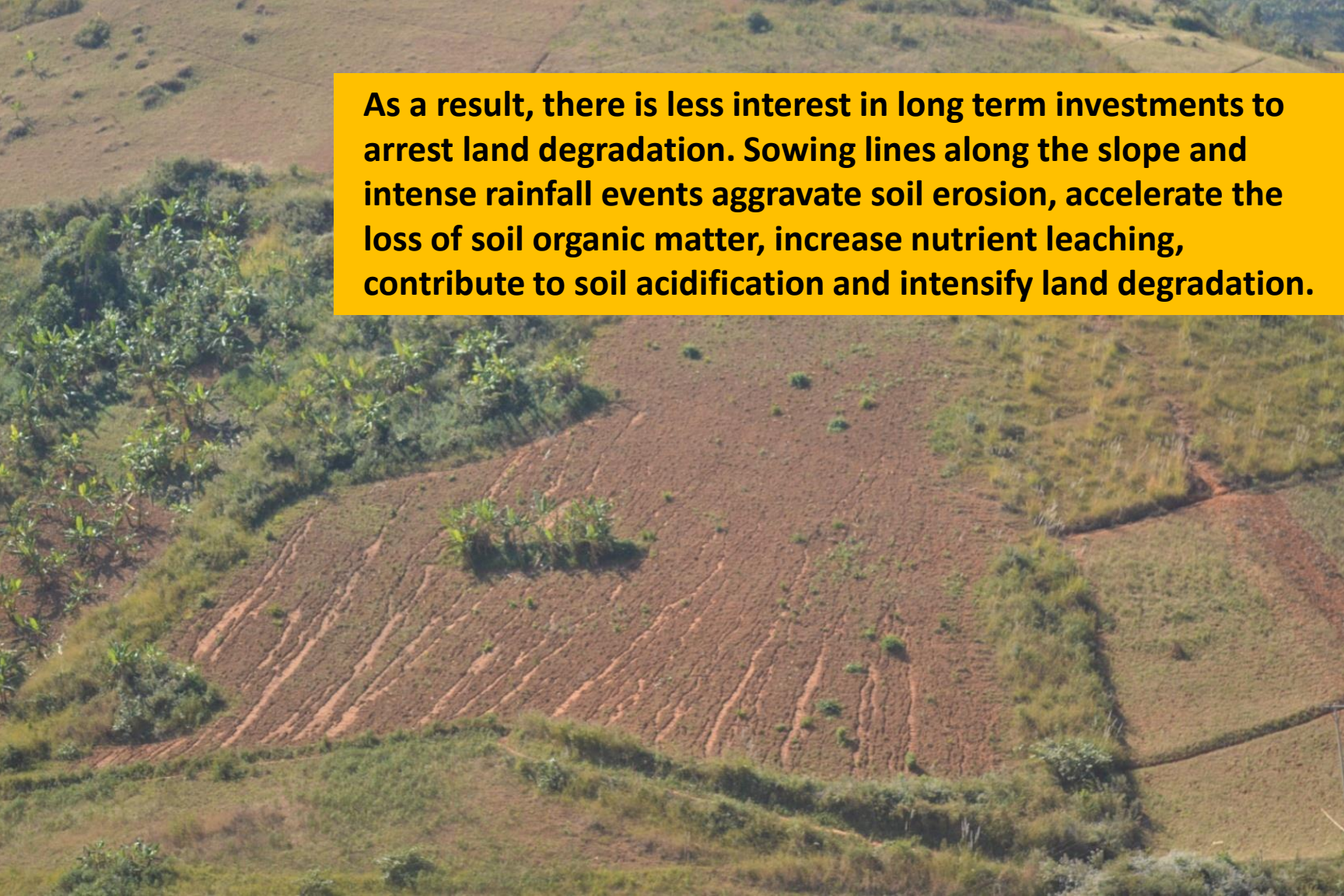




**Land tenure arrangements constitute a major challenge. Most of the cultivated lands in Nyaung Shwe township falls under the category of biosphere reservation forest. This has influenced the farming practices in the area. There is not much perennial cropping or agroforestry.**







**As a result, there is less interest in long term investments to arrest land degradation. Sowing lines along the slope and intense rainfall events aggravate soil erosion, accelerate the loss of soil organic matter, increase nutrient leaching, contribute to soil acidification and intensify land degradation.**



**Households in Taungkhamauk rely on agriculture and small scale livestock rearing for their food security. Two systems co-exist; upland rice, vegetables and legumes (lima beans) are cultivated mainly for home consumption, while corn, ginger and tomatoes are cultivated as commercial crops.**







**Livestock are very important in the village contributing to household resilience: small livestock and cattle are raised. Cattle are used for land preparation, harrowing, ploughing, threshing and as sources of manure for fertilizing crops. Small livestock such as native chicken is targeted for home consumption and other small livestock such as pigs are considered asset building for emergency or cultural needs.**



**Homestead based production of vegetables, fruits and livestock is semi-commercial in nature, providing food and supplementary income especially for women. Fruit tree such as banana, avocado and jackfruit adapt well to the area. Vegetables like tomatoes and cruciferous vegetables also perform well.**





# Food Consumption Patterns in Nyaung Shwe

The following figure presents survey derived data on the kinds of food consumed. A reasonable level dietary diversity is noted in daily food intake, though meat, milk and fish are lacking.

## Consumption vis-à-vis production

	Commonly consumed food groups	Less consumed	Agriculture produce sin the past 12 months*
<p><b>Taungkhamauk Village, Nyaung Shwe Tsp</b></p>	<ol style="list-style-type: none"> <li>1. Vit A vegetables</li> <li>2. Organ meat</li> <li>3. Eggs</li> <li>4. Cereals</li> <li>5. Dark green vegetables</li> <li>6. Oils fats</li> </ol>	<p>White roots &amp; tubers Fruits Other vegetables Sweets <b>Flesh meat</b> <b>Milk &amp; dairy</b> <b>Legumes &amp; pulses</b> fish &amp; seafood</p>	<p><b>Peanut</b> Corn Upland rice Sunflower <b>Cow</b> <b>Pig</b></p>



## Semi-Commercial Small Farm Systems Predominate

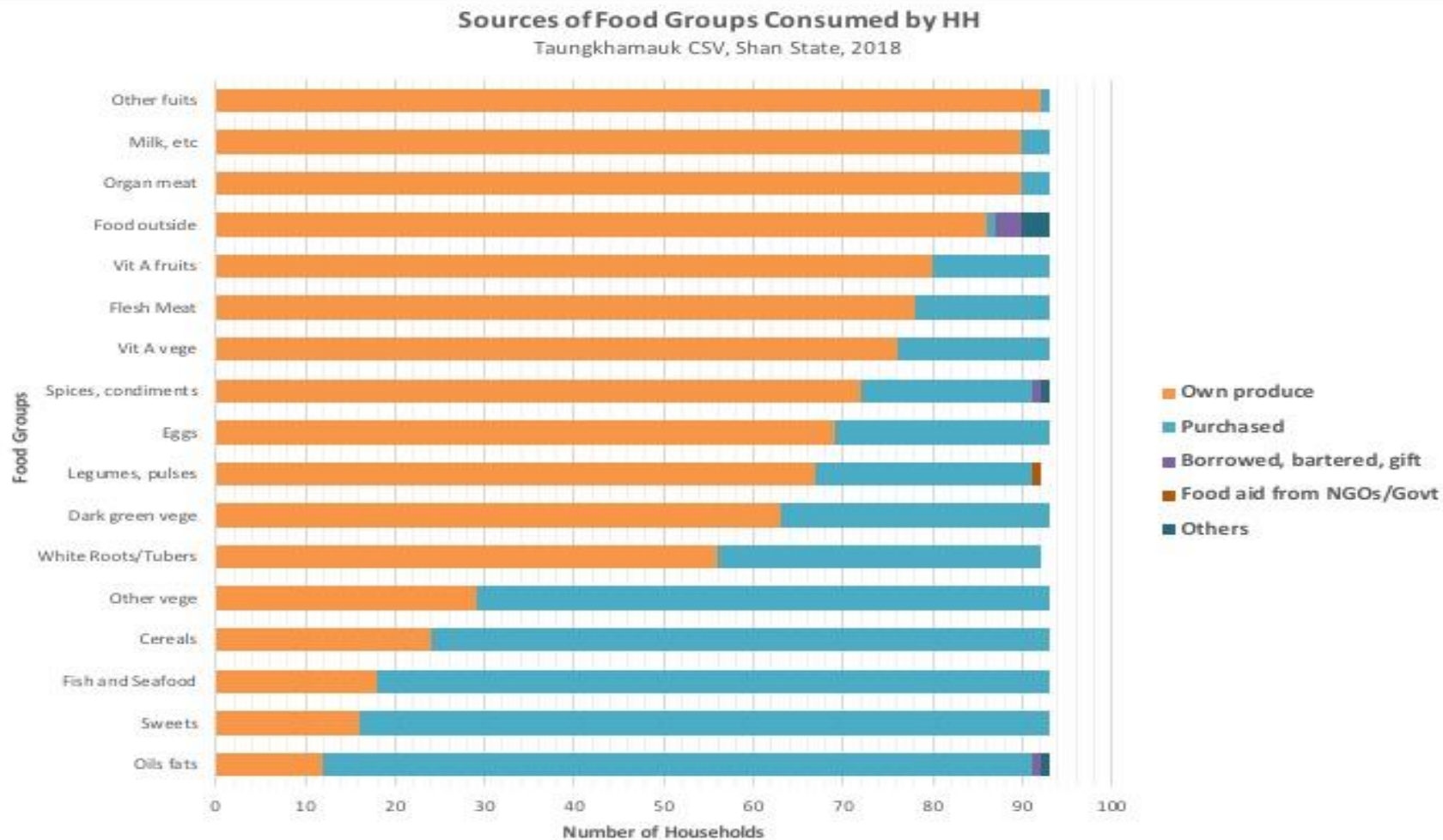
Similarly to other Climate smart villages in Myanmar, households in Nyaung Shwe consume a considerable portion of the food they grow on their farms and in their homesteads.

### % of produce consumed

Climate Smart Village	% of Households consuming their produce
Htee Pu	<b>39.41%</b>
Sakta	54.90%
Masein	<b>37.00%</b>
Nyaung Shwe	<b>35.84%</b>



The graph below demonstrates the reliance of households on both market-derived and family farm grown sources of food.





**Farmers in the area still cultivate upland rice for home consumption and there is interest in increasing productivity. The local variety, although good in eating quality, has low yields.**





**The Climate Smart Village in Taungkhamauk village supervised by KMF and IIRR has undertaken participatory research to find ways to address both climate change and livelihood needs. An initial first step involved a Participatory Vulnerability Analysis exercise with the local community. The community based participatory activities revealed the following characteristics.**

No	Major Crop	HH	No	Major Livestock	HH	Animals population
1	Corn	80 HH	1	Cow	70 HH	110 (cow)
2	Upland Rice	50 HH	2	Pig	50 HH	83 (pig)
3	Groundnut	50 HH	3	Chicken	50 HH	250 (chicken)
4	Sun Flower	50 HH	4	Buffalo	50 HH	5 (Buffalo)

No	Observed Climate Change	Climate Impacts
1	<ol style="list-style-type: none"> <li>1. Heavy and erratic rainfall</li> <li>2. Strong wind</li> <li>3. Irregular onset of monsoon</li> </ol>	<ol style="list-style-type: none"> <li>1. Damage crops</li> <li>2. Decrease agri-production</li> <li>3. Pest infection</li> <li>4. Disease infection on agriculture</li> <li>5. Animal diseases</li> </ol>



**IIRR and KMF working in close collaboration with researchers at the DAR station in Aungban undertook trials of 6 upland varieties under farmer conditions. To improve the productivity of upland rice, participatory action research with the community was carried out by doing Participatory Varietal Selection trials of both local and also improved varieties from Department of Agricultural Research (Aungban) to identify varieties that were adaptable to the area.**

<b>Participatory varietal selection</b>	<b>Numbers of participants</b>
<b>Upland rice (6 varieties)</b>	<b>57</b>

<b>Variety name</b>	<b>Source</b>
<b>Upland -2</b>	<b>Aungban (DAR)</b>
<b>Tarpegu</b>	<b>Aungban (DAR)</b>
<b>Yn 3230</b>	<b>Aungban (DAR)</b>
<b>Yanlu- 31</b>	<b>Aungban (DAR)</b>
<b>Philippines - 278</b>	<b>Philippines</b>
<b>Philippines - Red</b>	<b>Philippines</b>



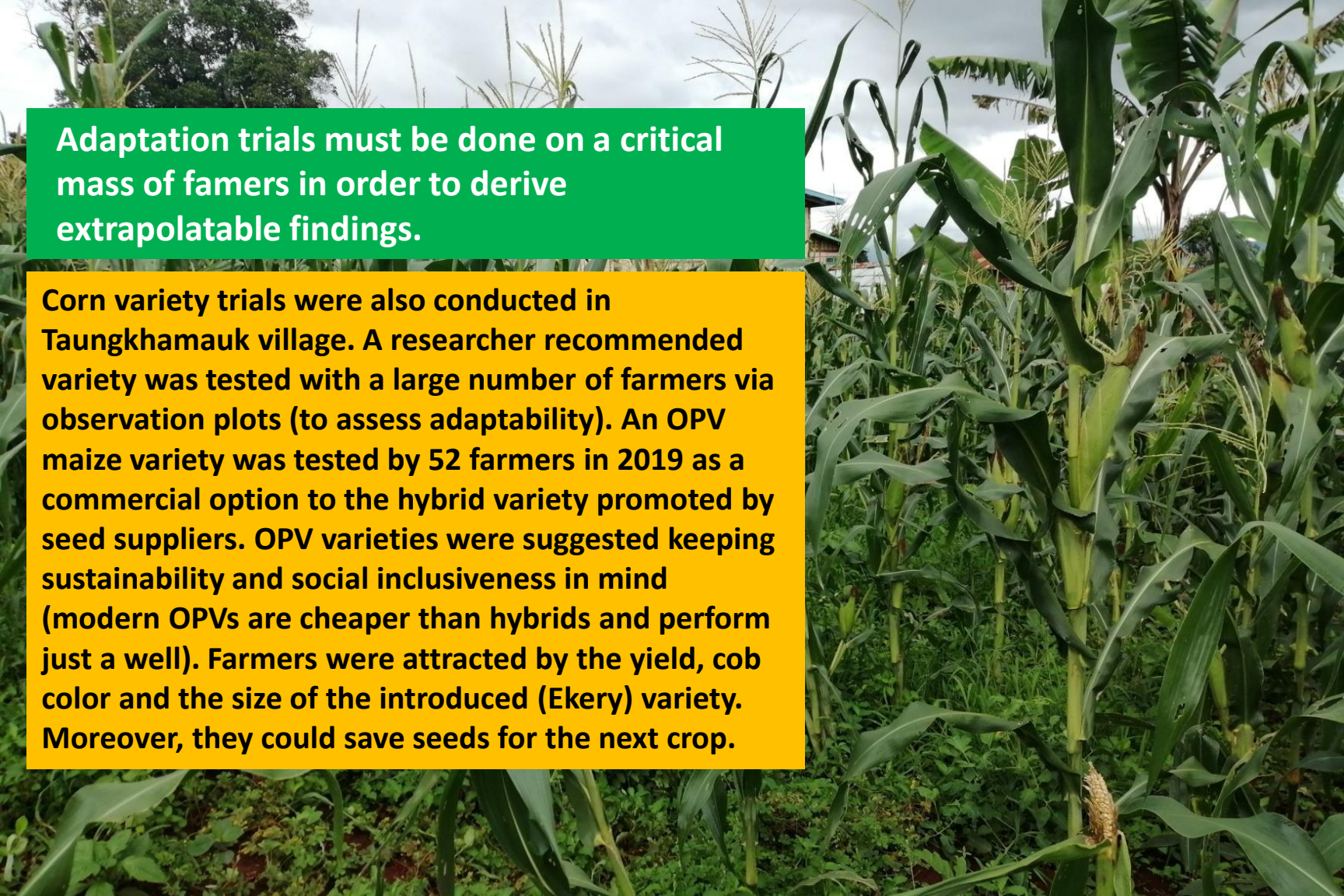


**As many as 50 farmers were involved in the testing in the first year: Yn-3230 and Tarpegu varieties from DAR – Aungban were considered the best, based on farmers observation of crop adaptability, performance and yields.**









**Adaptation trials must be done on a critical mass of farmers in order to derive extrapolatable findings.**

**Corn variety trials were also conducted in Taungkhamauk village. A researcher recommended variety was tested with a large number of farmers via observation plots (to assess adaptability). An OPV maize variety was tested by 52 farmers in 2019 as a commercial option to the hybrid variety promoted by seed suppliers. OPV varieties were suggested keeping sustainability and social inclusiveness in mind (modern OPVs are cheaper than hybrids and perform just as well). Farmers were attracted by the yield, cob color and the size of the introduced (Ekery) variety. Moreover, they could save seeds for the next crop.**

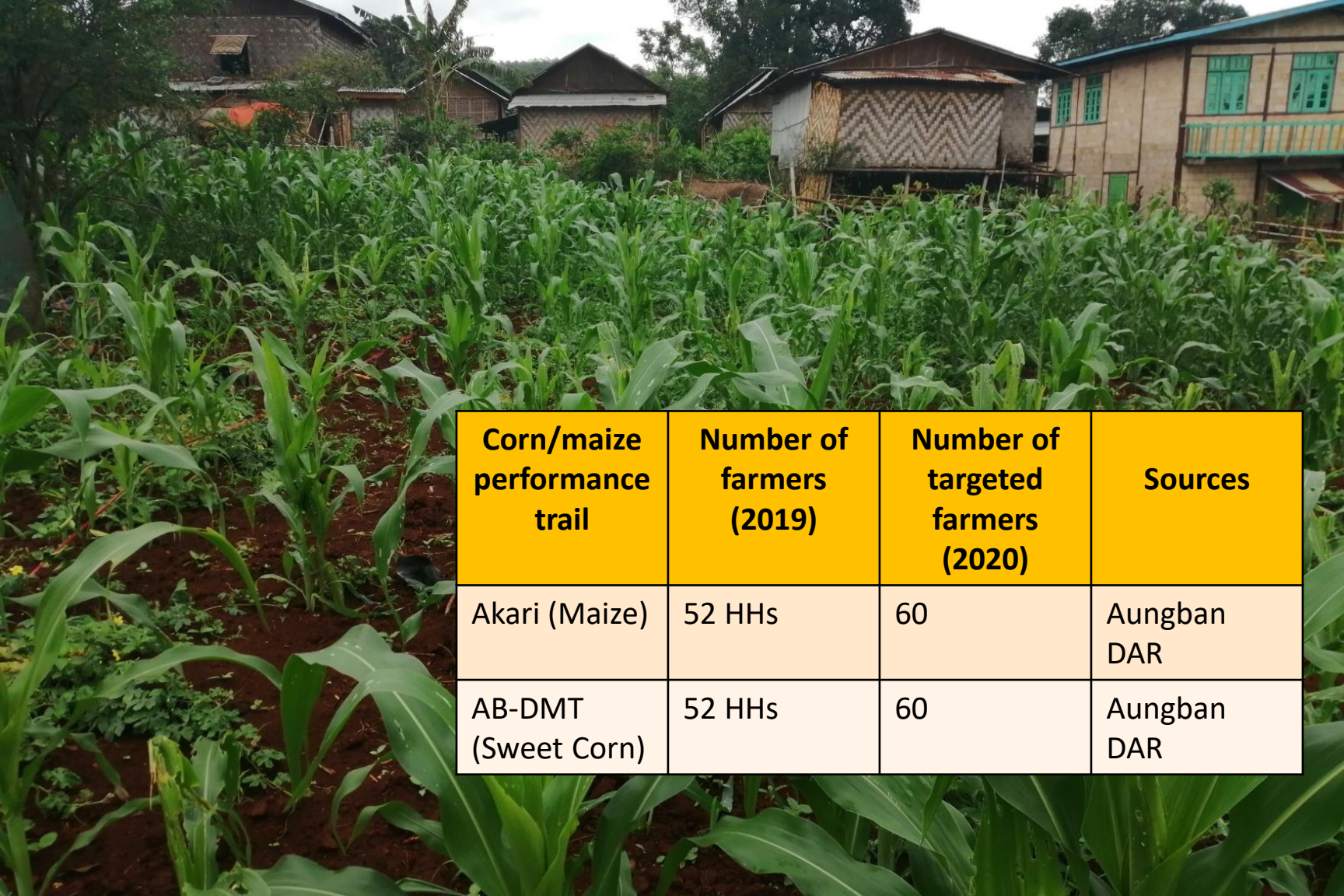


## Addressing better productivity, better nutrition, and increased income

IIRR and KMF introduced AB-DMT, a sweet corn variety. This variety was introduced and tested in crop performance observation trials. Farmers have rated it highly. In 2020 the number of farmers receiving this seed has been expanded to 60, since it has shown good performance in terms of taste, size and plant performance. Being a modern OPV the farmers are not only saving the seeds but starting to share via the farmer to farmer mode.







<b>Corn/maize performance trail</b>	<b>Number of farmers (2019)</b>	<b>Number of targeted farmers (2020)</b>	<b>Sources</b>
Akari (Maize)	52 HHs	60	Aungban DAR
AB-DMT (Sweet Corn)	52 HHs	60	Aungban DAR





**Groundnut, soya bean, safflowers and oil mustard are the minor crops of the village. Newly introduced varieties from DAR-Aungban (many were local selections) were tested on small scale to encourage farmers to experiment.**





## Start small then scale locally

Soya Bean		
Yaezin (14) Yaezin (15) Yaezin (2)	Aungban DAR	5 HHs
Groundnut		
Sinpadaythar – 11 Sinpadaythar – 6	Nyaung U DAR	10 HHs







# Agroforestry is still relevant to tenants and homesteaders

## Change occurs in small steps

In spite of the challenge of land tenure, farmers are keen to experiment with perennial fruits in homestead and farm areas, closer to their village. This form of agroforestry allows them to integrate fruit trees and green manure trees with seasonal crops such as corn, upland rice and ginger.



Fruit Tree Plantation	Numbers of participants 2019	Targeted participants 2020	Source
Avocado	30	50	Forest Department
Jackfruit	30	50	Aung Ban Big M
Orange	30	50	Ywar Ngan (Yae Oo)
Lime	30	50	Ywar Ngan (Yae Oo)
Longam	30	50	Aung Ban Big M

**These agroforestry systems are effective carbon traps, also helping farmer diversify in ways that enhance their resilience, reducing risks from both climate and income failure.**





**For demonstrating the integration of perennial trees with annual crop in untitled farm land, only three demonstration plots were developed in the first year “to test the waters”. Fruit trees such as Avocado, mango, longan and jackfruit were grown in these diverse mixed systems. In 2020, the agro forestry system will be expanded to 10 farmers.**



**The sequential introduction of trees into existing farming systems also helps diversify incomes, regulate temperature, and enhance carbon sequestration.**

**Many households in Shan State are blessed with spacious homestead areas where small canopy (occupying small spaces) species of fruit trees can be grown between annual vegetable and legume crops. Avocado, lime, orange were distributed to 30 HHs. Homesteads provide new spaces for the promotion of climate smart agriculture.**





# Homesteads as niches for agroforestry: Creating a platform for market orientation

Fruit Tree Plantation	Numbers of participants 2019	Source
Avocado	30 HHs	Forest Department
Jackfruit	30 HHs	Aung Ban Big M
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Lime	30 HHs	Ywar Ngan (Yae Oo)
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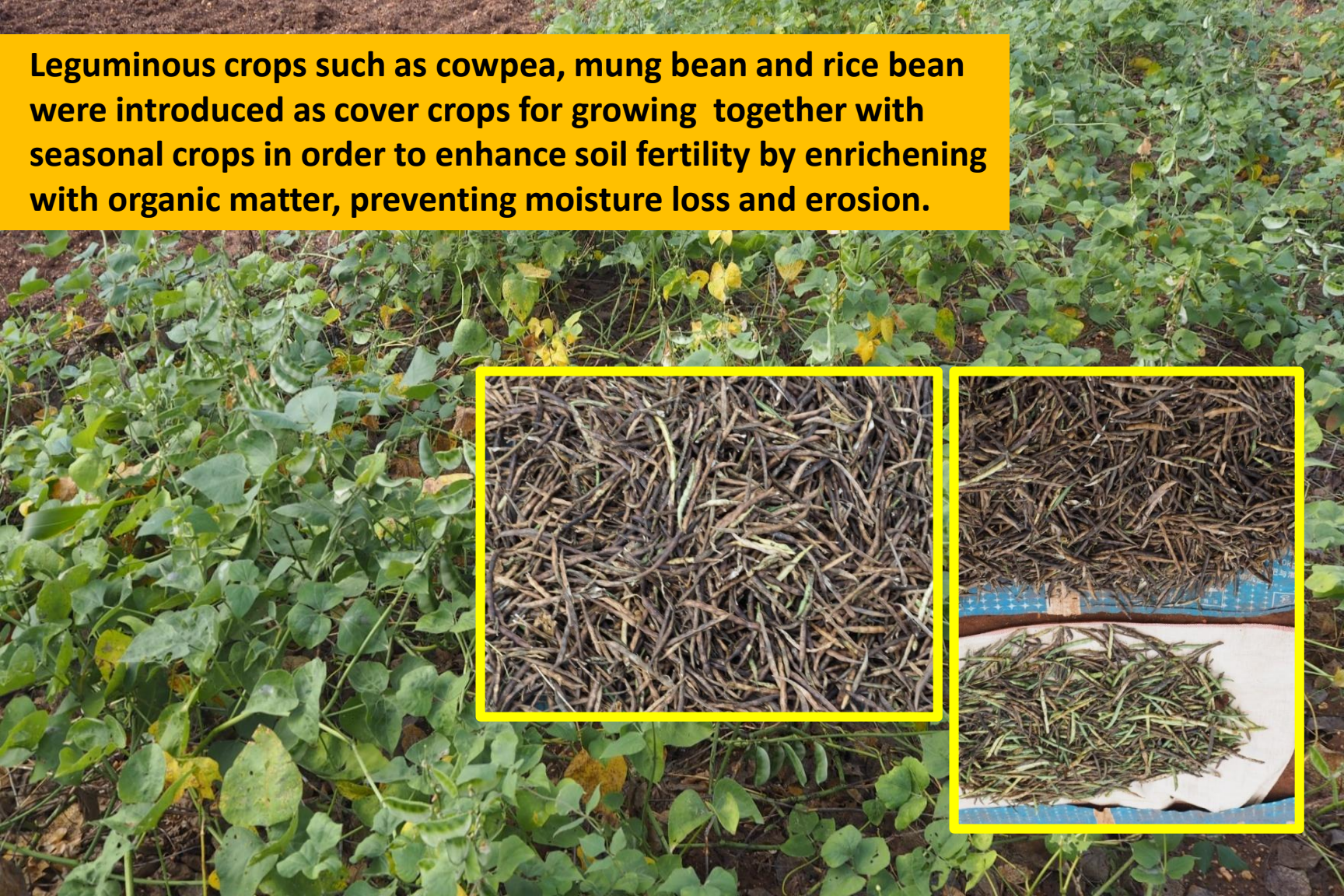




**Home gardens play a pivotal role for food and nutrition security. By supporting planting materials of root and tuber crops and other nutritionally rich vegetables such as carrot, radish, cauliflowers, beans and amaranth, household members have easy access to nutritious and safe foods. These vegetable crops are integrated with fruit trees and small livestock.**



**Leguminous crops such as cowpea, mung bean and rice bean were introduced as cover crops for growing together with seasonal crops in order to enhance soil fertility by enriching with organic matter, preventing moisture loss and erosion.**







## **Green manure trees on boundaries**

**Trees can serve as carbon sinks, sequestering and storing carbon.**

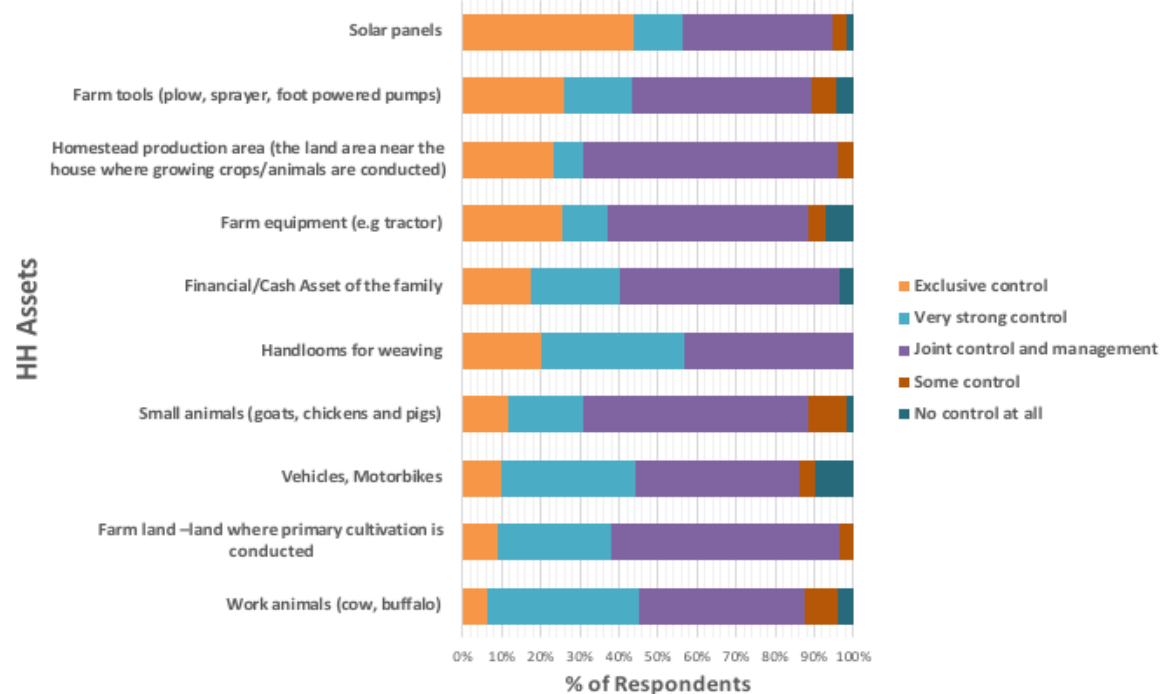


The control of assets is an important indicator of economic empowerment. In the graph below, women in Taungkhamauk CSV have significant control over solar panels, hand looms and work animals. But when it comes to land including the land in the homestead and small animals (goats, chickens and pigs)—these assets have to be “jointly controlled and managed” with men. Climate smart agriculture, if properly targeted to women (and if managed by them), can bring about the needed transformations in the roles of men and women.



### Access and Control of Women over HH Assets

Taungkhamauk CSV, Shan State, 2018



**Small scale backyard animal husbandry is important for enhancing household and local food systems. It creates space for nurturing better business skills among the poor including women.**





**Native pig raising was targeted to women including female-headed households. Deep beds (one food deep) with rice husk or groundnut shell or saw dust was one way of managing manure.**





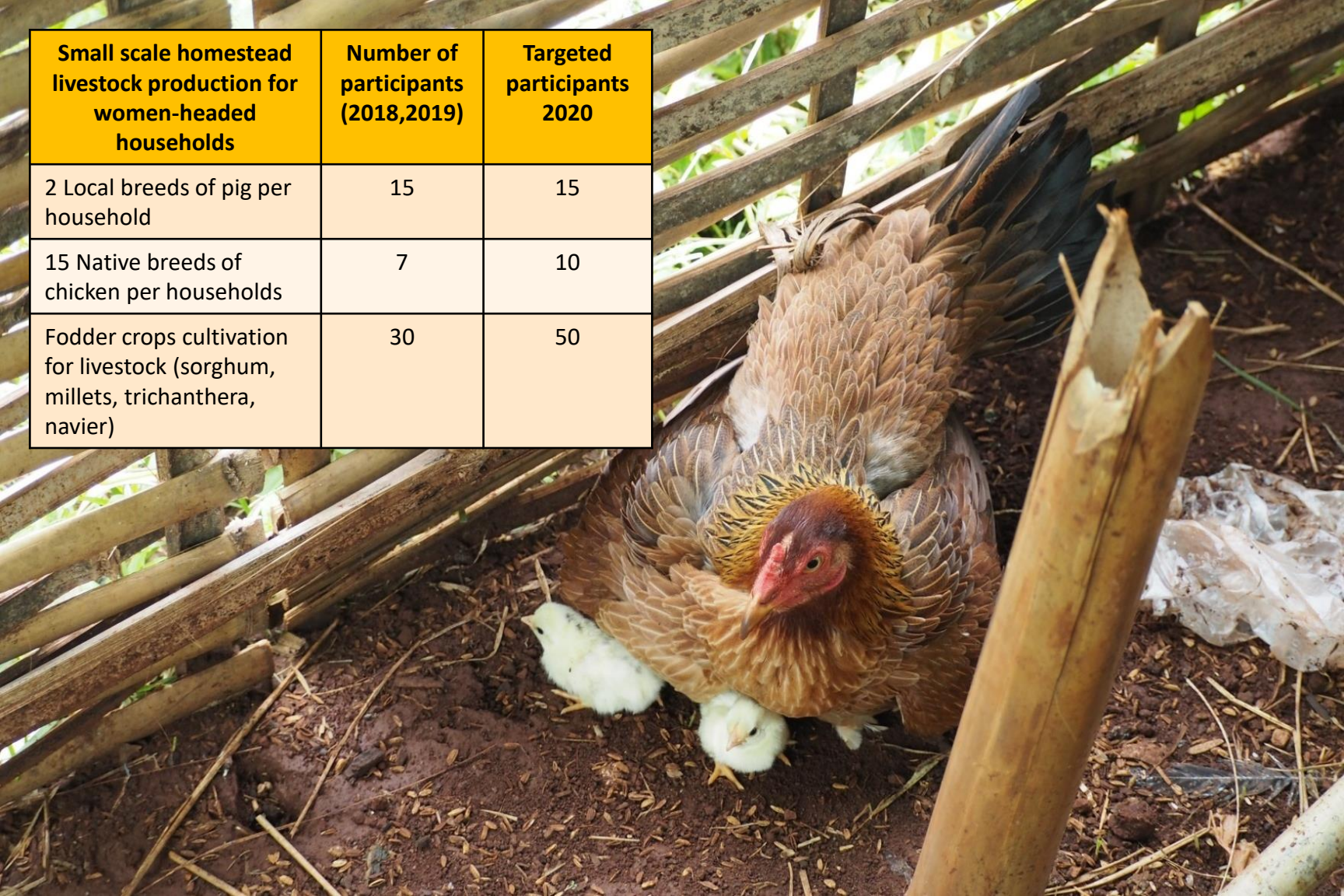


**The practice of native chicken raising can be improved with proper housing and feeding practices. Eight households started native chicken rearing with semi-intensive practices learning how better management can improve productivity. The restricted housing area helps reduce disease incidence.**





Small scale homestead livestock production for women-headed households	Number of participants (2018,2019)	Targeted participants 2020
2 Local breeds of pig per household	15	15
15 Native breeds of chicken per households	7	10
Fodder crops cultivation for livestock (sorghum, millets, trichanthera, navier)	30	50







**Livestock raising rely heavily on crop residues as feed. However with climate change, supplies are now restricted especially during the off season.**





**Farmers are now growing feed for animals (napier, tricanthera, etc.) to provide for their requirement in the dry season when feed supplies are limited.**



**Sorghum and millets are being introduced as nutritious feed for animals. Farmers are starting to grow these crops as intercrops in order to feed livestock.**





**Varieties from similar (analogous sites) agroecological zones in other parts of Myanmar are being exchanged. For example, fox tail millets from the sister CSV in Chin states were brought to Nyaung Shwe region in 2019. The conservation of agrobiodiversity should be an integral element of climate-smart agriculture.**







**Social group targeting and asset building associated with crop and varietal diversification, balancing of food, nutrition and income objectives and environmental restoration are holistic ways to approach climate smart agriculture programming.**



**The scaling of Climate-Smart Villages ( CSVs) and climate-smart agriculture (CSA) might be enhanced when program implementors and researchers are sensitive to poverty, humanitarian, social inclusiveness AND climate change considerations.**





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## Acknowledgments

Marco Rondon (IDRC)

Annie Wesley (IDRC)

Leo Sebastian (CCAFS)



*“A social laboratory: A crucible for reorientation”*

*We went back to the people, we chose a Hsien a school to re-educate us about the people, where we could learn about the long points and short points of our people. We wanted to identify the problems, not just write another book, heaven forbid. We wanted to know the problems and then tackle the problems. It's not like making a survey of all their problems and then writing a book.*

*Dr. Y.C. James Yen*



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