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Small Scale Goat Rearing




Littlebit more is worth the huge contribution of DMC members, however, once we start having plans an important role of food security and income of goat rearing in various districts along with the following:

- Sustainable and safe goat rearing can contribute
- Dairy income
- Milk for home use
- Disease control
- Good nutrition for women

Why raise and breed goats of goats?

- Well adapted to tough conditions in poor quality feeds
- Reproduce & breed fast
- Well adapted to local climate
- Optimally suited to most hilly areas of their forest



Advantages

- Low breeding, disease control fairly simple in practice
- Low investment, rapid pay back
- Goats can be reared on almost any type of feed
- Goats are easy to handle
- Goats are good for meat
- Goats are good for milk
- Goats are good for wool
- Goats are good for skin
- Goats are good for hair
- Goats are good for bone
- Goats are good for horn
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- Goats are good for lungs
- Goats are good for liver
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- Goats are good for bladder
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- Goats are good for perineum
- Goats are good for scrotum
- Goats are good for penis sheath
- Goats are good for prepuce
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- Goats are good for vulva
- Goats are good for vagina
- Goats are good for cervix
- Goats are good for uterus
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- Goats are good for endometrium
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Education and Training Posters for Villages

Legumes for cover cropping practice for rehabilitation of degraded land

Leguminous cover crops are cultivated in rows and planted in the soil which have multiple benefits such as:

- 1. Improve soil fertility by adding organic matter
- 2. Improve soil structure and water holding capacity
- 3. Promoting plant growth and soil health
- 4. Suppressed weed growth
- 5. Increase additional source of income
- 6. Reduce fuel cost
- 7. Reduce soil erosion

Various types of leguminous crops can be used as cover crops for the following characteristics, should be considered

- 1. Locally available species
- 2. Rapid growth and large coverage
- 3. Tolerant to drought or poor condition
- 4. Good enough tolerance to low levels of fertility
- 5. Good root resistance
- 6. Easy to control

Introducing of leguminous crops such as beans or cover crops is one way to enhance soil fertility and conserve moisture especially during the dry season.

Leguminous crops fix N available atmospheric nitrogen and put into the soil and reduce the requirements of additional chemical fertilizers on the soil.



Examples of leguminous cover crops

- Cow Pea, Beans, cow peas, lablab, Mucuna, Sesame, gram





Various types of cover crops

- 1. Intercropping in crop-planting area
- 2. Intercropping primary crop
- 3. Planting in single crop during off-season
- 4. Planting under trees or orchards
- 5. Planting in fallow crop under the tractor being used











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Correct Citation:

Myae C, Su MN, Barbon WJ, Gonsalves JG. 2020. Climate Smart Agriculture Options for Myanmar Small-holder Farmers (Education and Training Posters), International Institute of Rural Reconstruction, Myanmar

Layout and Design by: Grant Leceta

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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Boundary Planting of Green leaf manure trees for rehabilitating degraded lands

Strong wind, drought, heavy and Intense rainfall are becoming common climate change pattern in the nationwide. As a result, farms are affected by soil erosion and land degradation.

Boundary Planting is the practice of planting leguminous trees along the boundaries of agricultural lands, fields and as living fences or barrier.

Benefits:

By planting leguminous trees along the boundaries of farms, the benefits are:

1. Barrier for animals as living fence
2. Barriers against Wind break
3. Reliable sources of Green Manure
4. Barrier against rain erosion
5. Creating micro-climate which can provide cooling effects to crops
6. Firewood



What types of trees can be used?

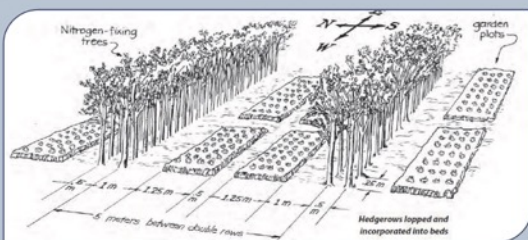
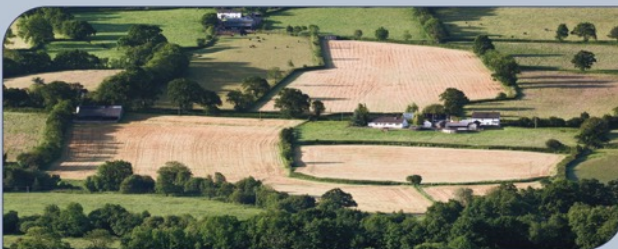
Different types of trees can be used as boundary planting for the purpose of windbreaks/ shelterbelts and living fence. However, trees especially with the character of nitrogen fixation, fast growing and big canopy types should be chosen for green manure. Some potential trees suitable for boundary planting are as follow;

1. *Ipil-IPil (Leucaena spp)*
2. *cassia siamea (maezali)*
3. *alnus nepalensis* (high elevation)
4. *gliricidia sepium* (kakawate)



Procedure:

1. Select locally adaptable and available types of trees/shrubs
2. Orient the seedlings/seeds along the boundaries with the spacing of 6 – 15 feet for regular supply of steady and reliable source of organic materials or denser spacing (about 3-6 feet) for erosion control in sloping lands
3. Select suitable growing season to ensure the plant survive
4. First pruning can be done after trees/shrubs are 9-12 months old (depend on growing trees type) and trees should be cut 3 feet above the ground level
5. Regular cut should be done whenever trees are about 9 feet in height or the stem diameter is more than one inch.
6. Cut leaves should be incorporated into the soil during land preparation and branches can be used as firewood



Integration of Perennial fruit trees: Reducing Risk of Climate Variability

Climate Change is a threat to agricultural sector in the form of prolonged drought, heavy and intense rainfall and irregular onset and withdrawal of monsoon.

The seasons are unpredictable that farmers will have challenges in producing traditional single crops in their farms.

Diversification of crops is one of the potential options to adapt to climate change and unpredictable seasons.

Tree Intercropping is a cropping practice which involves growing fruit trees with two or more crops in proximity.

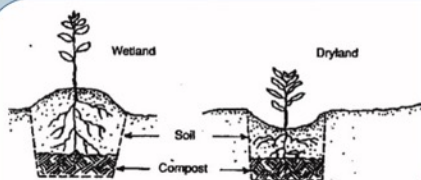
Integration of perennial fruits trees can enhance the farmer capacity to mitigate and adapt climate variability by accessing multiple benefits.

- Enhance income diversification
- Keep income under unfavorable condition of climate variability
- Environment friendly
- Creating micro climate for seasonal crops
- Ease access of nutritious foods



Procedure:

- Select locally adaptable, accessible and marketable types of perennials fruit trees e.g. Mango, guava, custard apple, lime, orange, avocado, jackfruit etc., Good quality grafts or seedlings are highly recommended
- Spacing** should be 15 x 15 feet or above for big canopy types and 3x 5 feet for small canopy which can't be interfere for seasonal crop
- Pit preparation:** should be at least 1 x 1 feet depth and width and filled with compost or organic matters or animal manure by mixing with top soil layers
- Sowing time:** should be carefully set up based on rainfall pattern of local regions (June, July, August) and also considered time of transplanting.
- Mulching:** is a very important practice to keep the soil moisture loss from direct sunlight and evaporation.
- Watering:** regular water is required based on soil moisture before plant overcomes from transplanting shock, if accessible.



Legumes and cover cropping practice for rehabilitation of degraded land

Introducing of leguminous crops such as beans as cover crop is one way to enhance soil fertility and conserve soil moisture specially during the dry season.

Leguminous crops can fix valuable atmospheric Nitrogen and put into the soil and reduce the requirements of additional chemical fertilizers into the soil.

Leguminous cover crops

are cultivated to cover and protect the soil which have multiple benefits such as:

1. Improve soil fertility by adding organic matters
2. Improve soil structure and water holding capacity
3. Preventing surface runoff and nutrient loss
4. Suppressed weed growth
5. Diverse additional source of income
6. Animal fodder
7. Protein rich foods



Various types of leguminous crops

can be used as cover crops, but the following characteristics should be considered:

1. Locally adaptable variety
2. Rapid growth and big canopy
3. Tolerance to wide range of soil condition
4. Good drought tolerance
5. Ease access of seeds
6. Pest resistance
7. Easy to control

Examples of leguminous cover crops are: rice bean, cow pea, lablab beans, horse gram



Various types of cover crops

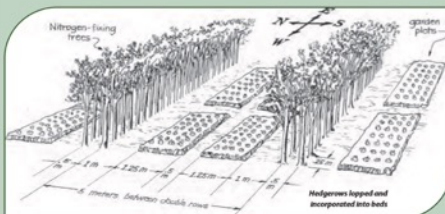
1. Intercropping or relay-planting with seasonal primary crop
2. Planting as single crop during off-season
3. Planting under trees in orchards
4. Planting as fallow crop when the land is being rested

Homestead production: Enhancing Household Food and Nutrition Security

Homestead food production refers to the production from backyard activities such as small livestock, vegetables and fruits trees gardening.

The benefits of establishing homestead production:

1. Nutritious and safe foods
2. Diverse income source
3. Enhance food security and safety
4. Jobs opportunity for female



Based on the land availability of household compound, integration of small and big canopy fruits and small vegetables plots together with small livestock such as poultry, pig, goats and fish can be set up.

For planting trees, pit preparation is crucial, minimum 1 x 1 feet width and depth hold should be prepared and well mixed cattle manure or organic matters with top soil layers are added. Fruit trees should be along the boundary of the compound so that it will not shade the other areas in the homestead.

The most common suitable practice for almost all soil type for vegetables gardening is Raised-bed garden practice.



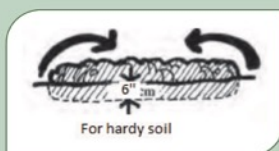
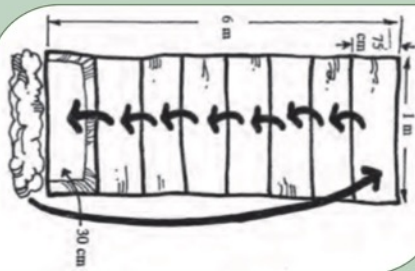
Procedure in building raised garden beds

1. Orient the growing plot in south to north direction (to ensure sunlight exposure)
2. Bed should be 3 feet width (length may vary depend on space)
3. Depth should be at least 1 foot
4. Organic materials such as dried leaves, animal manure and crops residues can apply into the bed
5. For rocky and waterlogged areas, soil can be taken from other sources and formed into a bed using artificial sidings like banana trunks, bamboo, coconut trunks, and woods planks, etc.
6. For very hard soil, initial digging of ½ foot can be prepared and raised by getting soil from the sides of the bed.
7. Appropriate spacing should be placed for different vegetables type. (e.g. ½ - 1 foot for leafy vegetables and minimum 2-3 feet spacing for fruity vegetables such as tomato, okra, eggplants)



For small scale animal production, the following considerations should be carried out;

1. Select suitable type of animals with local climate and food availability
2. Breeds (should be native because of its adaptability with local and few commercial foods supply)
3. Orientation of animal houses and pens should be located at well drained, good ventilation and good exposure to sunlight)
4. Regular vaccination and medication is important
5. Semi-intensive practice by combining local feed materials and commercial feeds can reduce the cost



Flooding area and hard soil area

Improving Seeds Quality through Better Management and Storage

Seeds are the foundation of yield and crop quality. It is important for farmers to have different varieties of seeds to match the climate and soil conditions of the farms.

Characteristics of quality seeds

1. Trueness to variety
2. Purity
3. Germination percentage
4. Vigor and appearance



Seeds extraction and cleaning

1. Wet seeds from fleshy fruits – Put the seeds in water for one to two days to remove flesh from seeds. Sunken seeds are then washed and dried.
2. Dry seed – extracted from dry fruits or pods by hand
3. Dry seeds from fleshy fruits – the ripe fruit is dried before extracting the seeds (e.g. chili, lady finger)
4. Use winnowing to remove contaminants after drying is recommended to maintain good quality.

It is very important to dry to reduce the moisture content before storing. Seeds with high moisture content are more susceptible to physical damage during processing and fungal infection.

Drying process

1. Seeds can be dried under sunlight
2. Seeds should not be in contact with soil or ground
3. Use drying materials with holes (e.g. sack, winnowing basket and mat) for good ventilation
4. Don't dry seeds rapidly not to be lower seeds germination. Rapid drying can harden seed coat.
5. Spread the seed thinly and stir and turn occasionally
6. When the seeds are dry enough, it can be stored in cleaned and air-tight containers



Ensuring longevity of seeds collected:

- Store seeds in air-tight containers
- Store seeds together with desiccants or materials that absorb moisture (e.g. charcoal, dry ash)
- Replaces desiccants and materials, each time when the container opened.
- Store seeds of cool and dark areas
- To minimize insects in the seeds use dry ash and charcoal, sand, dried and powdered leaves or seeds of different aromatic plants such as neem, loak thae (tadehaqi triquetrum), black pepper, etc

Labeling: Place labels inside and outside of the containers including the following information;

- Name of seeds.
- Date harvested
- Source
- Date stored



Backyard Native Pig farming

Livestock sector is one of the major contributors of GHG emission, however, small-scale livestock farming plays an important role of food security and income of rural community to address climate change impacts. Backyard pig production is popular among farmers and rural communities.



Backyard small-scale animal farming can contribute

- o Nutritious meat and eggs products
- o Saves cash for other essential needs of households
- o Diverse income.
- o Livelihood options for women

Why use native and indigenous breed?

- o Well-adapted to locally accessible poor-quality feeds
- o Resistant to disease and pests
- o Well-adapted to local climate
- o Optimally suited to meet farmers' needs of eggs, flesh meat



Important considerations for housing pigs:

1. Place should be under direct sunlight
2. Should be protected from extreme cold and heat
3. Should be located on higher ground with near clean water sources
4. Should be oriented in East-West direction to ensure the exposure of sunlight
5. Should be good ventilation
6. Floor can be built with hardened soil, concrete, cement bamboo, woods but it should be clean and dry all the time
7. Feedings and watering materials: can be used clean cement, wood and bamboo



Deep Litter Housing practice suitable for cold and hot weather and non-flooded area

1. Place should be under direct sunlight and should be oriented in east-west direction
2. Dig the soil about 2-3 feet depth and heap the removed soil around the pigsty to protect from surface-running water enter
3. Good ventilation
4. Fills the bedding with locally available crops residues or easily decomposable materials (rice husk, groundnut shell, saw dust, straw, beans shells)
5. After 3-6 months, the bed will be decomposed already and can be used as compost
6. Put EM liquid two weeks interval to control bad smell and for faster decomposition
7. Roofs, floors and sides can be built as regular housing

Management practices

1. Remove poor growth rate pigs and substitute with potential breeds
2. Select good potential breeds
3. Select biggest pigs and good reproductive rate for breeding
4. Poor appetite piglets, diarrhea and coughing piglets should not be selected

Feeding

1. Can be fed kitchen waste (cooked rice, curry, bones)
2. Farm by-products (rice bran, oil cake, corn, grains,
3. Green leaves (lucaena, morning glory, other green wild leaves)

Vaccine & Medication – Discuss with Veterinary when irregular things are observed

Vaccine	Age - Days	Effective duration
Diarrhea	45	1 year
Pig Plaque	65	6 months
Foot & Mouth disease	60	1 year



Backyard Native Chicken Farming

Livestock sector is one of the major contributors of GHG emission, however, small-scale livestock farming plays an important role of food security and income of rural community to address climate change impacts. Backyard small-scale animal farming such as chickens can contribute:

- Nutritious meat and eggs products
- Saving money
- Diverse income.
- Livelihood options for women

Why use native and indigenous breeds of chickens?

- Well-adapted to locally accessible poor-quality feeds
- Resistant to disease and pests
- Well-adapted to local climate
- Optimally suited to meet farmers' needs of eggs, flesh meet

Semi-Intensive Backyard chicken farming is very common livestock not only for rural areas and also in urban areas, raised primarily for home consumption. The benefits include:

- Contribute family income
- Can feed locally available foods and farm products
- Nutritious meat and eggs
- Low cost for simple housing
- Easy management



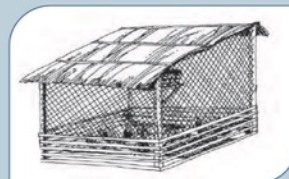
Important considerations for poultry housing

- Should be protected from extreme weather and wild animals
- Good ventilation and drainage
- Sufficient direct sunlight.
- Proper spacing
- Made of locally available materials can be used as roofs and shelters and should be built away from house. 6' x 8' housing size can accommodate 12 – 16 chickens.

Male & Female ratio should be one to two roosters is sufficient enough to control 10-15 chickens but the quality of rooster should be carefully selected.

Feeding

- Green foods (various vegetables such as tomato, morning glory, algae, water hyacinth, azolla, banana leaf, banana trunks, taro leave, taro stalks and waste products of market)
- Rice, rice bran, broken rice, maize, corn, sorghum, rice, broken rice, leguminous crops, pigeon pea, cow pea
- Small insects, earthworm, terminate, larva, snail and tiny fishes can also be used as protein sources
- By spreading organic manure in the farm, chicken can get required source of minerals and protein



Vaccination schedule for native chicken

Vaccine	Age - Days	Boosting
I2, Newcastle disease	10	Before 2 weeks
Fowl Cholera	65	Every 4 months
Fowl Pox	14	1 year
Anthelmintic	6 weeks	

General Management practices

- Chick – 0-1 week: kept together with mother 4-7 days within cage or basket, provide high protein feed and clean water
- Chick – 1-3 week: Chick should be kept under cage, mother should be kept together at night time
- Chick – 3-6 week: Free on day time, and kept together with mother at night time under cage
- Chick 6 week: Free on both day and night time, provide supplementary feeds (such as corn, sorghum, millet, pigeon pea, mung beans)



Small Scale Goat Rearing

Livestock sector is one of the major contributors of GHG emission, however, small-scale livestock farming plays an important role of food security and income of rural community to address climate change impacts. Backyard small-scale goat rearing can contribute

- e. Nutritious meat and eggs products
- f. Saving money
- g. Diverse income.
- h. Livelihood options for women

Why use native and local breeds of goats?

- e. Well-adapted to locally accessible poor-quality feeds
- f. Resistant to disease
- g. Well-adapted to local climate
- h. Optimally suited to meet farmers' needs of flesh meet

Husbandry practices

1. Free Grazing/ Extensive system freely grazed in pasture
2. Semi-intensive System – best practice, housings can be cleaned during grazing and proper feeds are available from the pasture and support to good health.
3. Intensive system – practices in too much rainfall regions and cold climate regions

Things to be considered in Goats rearing

1. Choose good local breeds, no deformities and diseases
2. Household must have access to pasture where grass, legumes and spines bush are available

Characteristics of good breeds

1. Good growth and wider chest
2. Good Growth rate
3. Strong body parts
4. Good fertility and good lactation

Site selection criteria for goat housing

1. Sufficient supply of clean water
2. Sufficient pasture land
3. Far from flooding
4. Orient along the way of sun, east to west orientation
5. Should be 6 feet – 10 feet height with Good Ventilation
6. Dry flooring and can be cleaned easily



Feeds in Supplement –For proper growth of goat, there should be feedings supplement foods.

1. Systematic supply of foods and water for rapid growth of goat
2. Regular two times per day of feeding in morning and evening (controlled grazing)
3. Concentrate feeds should also be supplied
4. Clean feeds and water

Common disease problems in Goat

1. Foot and mouth disease, 2. Black quarter, 3. Anthrax, 4. Haemorrhagic septicaemia, 5. Cold
6. Parasitic infection

Small scale Aquaculture for diversification of income and nutrition

Small scale fish farming is one of the potential ways to mitigate the impacts of climate change on agricultural production by contributing a nutritious source of micronutrient, protein and income diversification and food security. **In the uplands, there are forest ponds that are naturally formed or man-made. In the delta region, there are abandoned man-made canals** that were dug to drain water from the rice fields. These small sized ponds are potential locations for small-scale aquaculture.

Site Selection

1. Sufficient area and water level
2. Good water holding capacity
3. Clay and clay loam are the best soil type
4. easy access of transportation
5. Not flooded area
6. Continuous and sufficient water sources such as rivers and creeks

Pond Preparation

1. Depth of fish pond should be 4-6 feet
2. Pond should be in square
3. The boundary should be slope
4. For old ponds, drying the pond with sunlight should be carried out once for every 4-5 years.
5. Water should be completely taken out and show with sun to enrich oxygen level in soil, to kill the eggs of wild fish and other insects and to remove other poisonous materials
6. Regular check on the wall of ponds
7. Don't allow cattle and pigs to go through the boundaries

Water Management

1. If the water color is very dirty and pH is low, quick lime should be added. By adding 14-15 bags of lime can help to clean the water and increase pH level
2. By adding lime, it can help as follow;
 - a. To increase alkalinity of soil
 - b. To kill other wild fishes
 - c. To kill other insects and fungus and parasites
 - d. To remove the poisonous gas such as hydrogen sulphate, and salts
 - e. To balance the pH level of water

Temperature

28 to 32 Degree Celsius of water temperature is the best for fish



Water Transparency – 30 – 45 cm visibility/purity is the best situation pH level

- Under pH 4-5 fish and prawn can't survive,
- Between pH 5-6.5, fish can't be growing well and growth rate will be slow
- Between 9-11.5 is also stunting the growth rate
- The best pH range for aquaculture is between pH 7-8.5

Signs of problems in the fish pond

1. Seeing dead fishes
2. Not active in the morning
3. Water color changing (red brown, deep green and red)
4. Fishes are swimming at the top surface of the ponds
5. Bubbles on water surface

Action to be taken when there are problems in the fish pond

- a. Stop feeding the fish
- b. Cleaning the pond from trash
- c. Cleaning the pond from organic wastes (dead algae, dead plants)
- d. Drain and change water

Supplementary feed for common fish in small aquaculture ponds

Rice brans, wheat brans, wheat chaff, sesame cake and oil cake

Low Cost Feeding formulation – Fish can survive by eating natural foods derived from river, creeks & ponds

90 % of rice bran + 10 % of groundnut or sesame cake,
70 % + 10 Soy bean + 20 % coconut waste after extracting the milk,
Urea application to the pond

Suitable fish species – Grass Carp, common Carp, Roho, Tilapia, climbing perch



Promoting Gender Equality in Agriculture in the Climate Smart Villages

Social norms expect women to undertake the bulk of domestic work are often a barrier to greater female participation in the labor force including agriculture

- In the Myanmar CSVs, the general perceptions of men on the role of women is still mainly that women's primary role is to be responsible for domestic work. Men also perceive that when women involved in more economic activities, women will not be able to perform their primary role in domestic work.
- With women in the CSVs, there is a perception already that women's role is more than just domestic work but also a role in livelihoods and economic work for the households.



Agricultural extension services tend to favor men. Most extension services in agriculture such as training services are most accessible by men. For instance, when some training or learning activity is conducted outside of the village, it's the men who are going to attend. Most extension workers are mostly men as well. In the CSVs, we need to provide equal opportunities for women to attend in farmer field schools, farmer field days, roving workshops and training.

Most women support services are targeted for non-agriculture support services. In the Myanmar CSVs, most of the women receive support related to WASH, pre-natal care, birth control, as well non-agriculture livelihoods to start small businesses—all of which reinforces the idea that women's role are in the domestic area only.

Girls and women who have had more education can undertake higher-value economic activity. Increasing the educational opportunities for women allows for greater accumulation of skills and expertise within the labor force and so raises the growth potential of the economy. It is therefore important that women and girls be provided opportunities to get formal education by giving them access to schools and formal vocational training.



There is good evidence that achieving gender equality could increase agricultural profits and yields. For example, if women have access to land, farm inputs, quality seeds and training in new ways of farming will increase the productivity of farming in the community. In the Myanmar CSVs, we support women economic activities within homesteads such as vegetable production, chicken production, goats and pigs.

Improving women's incomes can lead to a higher domestic formal savings rate. Women have a high probability to save cash, which may lead to increase in domestic savings if income is created by women in the households. In the Myanmar CSVs, it is encouraged to organizing village savings group among women.

Women who are involved in agriculture will most likely suffer the effects of climate change as well as men. For example, in times of droughts, women and girls who are expected to take care of the household need to travel far distances to find and collect water. In times of flooding, women and girls also are burdened by the task of cleaning and maintaining the houses as well as in accessing clean water.

Women control over economic assets and capital can serve as important coping mechanisms for households affected by climate change. In the Myanmar CSVs, our data says when households are affected by climate risks and shocks—women seek help from friends and relatives, sell small assets, start a small business and go to the towns to do casual labor. It is important for women to have control over assets and capital to sell during emergencies or to start their own economic activities.



“Technical KNOW-how of the experts must be transformed into practical DO-how of the people.”

-- Dr. Y.C. James Yen



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