Improving the Resilience of Communities to Climate Changes Through Conservation Farming Village[1]

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Abstract

The Conservation Farming Village (CFV) is a modality for transformation of traditional upland farming systems into sustainable upland production systems that will not only address upland degradation but at the same time stimulate upland community development resilient to climate changes. It aims to help upland farmers improve their economic conditions by strengthening their capacities to manage the natural resources thereby protecting their communities against environmental degradation while sustaining their sources of livelihood.

The program adopts the community-based participatory approach to technology development, promotion and utilization; and multi-level technology promotion mechanism that will capacitate local extension/change agents. Such strategies would ensure sustainability of efforts in promoting upland farming technologies and approaches, and would strengthen the "multiplier effect" of existing technology diffusion processes at the local level.

CFV is being implemented across the Philippines in five areas: representing five different biogeophysical and social-economic-cultural environment. The program includes the empowerment of farmer volunteers enabling them to become the vanguards of sloping land resources by providing them with skills and knowledge in food, wood and fiber production and resource management; tapping the active leadership and participation of the local government units (municipal, barangay) in carrying out program activities down to the barangay level such as extension work, community organizing, and facilitating market linkages and other support services; and provision of technical expertise and guidance of a state university/college in the province or nearest the site.

During the CFV implementation from 2008 to 2010 in 5 provinces in the Philippines, a total of 16 farming villages having102 farmer volunteers and 456 adopters have participated. Establishment and/or strengthening of existing village organizations was done to facilitate marketing services and livelihood support systems. Farmers now have diverse sources of income and increased productivity owing to the adoption of agroforestry, promoted soil and water conservation, and has facilitated participation and camaraderie among community members.

Keywords: conservation farming village, sloping land management, agroforestry, natural resources management, climate change adaptation strategy

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1. Introduction

1.1. General situation of upland development in the Philippines

The Philippines is an archipelago of about 7,100 islands and a total land area of 30 million hectares or 300,780 square kilometers (Baguinon, 2007). Of the total land area, 17.6 million hectares or 59% are upland areas having slope greater than 18%.

A staggering 75% or 22.88 M ha of the Philippines total land area already suffers slight to severe erosion (BSWM, 1990). Soil erosion affects 70% of the 13 million ha of alienable and disposable land (A&D) with 13 provinces having more than half of their areas eroded. There are about 14.3 million ha of sloping lands (16-50% slope) in the country. High influx of farmers to the uplands compromises the stability and sustainability of these fragile landscapes. Farmers migrate to the uplands in search of areas to till. There are more than 24 million people living in the uplands today who are considered the poorest among the poor. In regions where upland areas constitute more than 60% of the total area, poverty incidence ranged from 27-40%. It is expected that with the rapid growth of population and the apparent lack of livelihood opportunities in the lowlands, migration into the upland communities will continue. Consequently the degradation of the uplands through erosion facilitated by unsustainable farming practices will remain unabated causing substantial losses in ecosystem services emanating from the upland with cascading negative consequences on the lowland, coastal and marine environments.

1.2. Some of the key studies in the past on upland development

The Philippine Department of Environment and Natural Resources (DENR) program on Community-Based Forest Management (CBFM) enacted in 1995, was adopted as the national strategy to achieve sustainable forestry and social justice. CBFM integrated and unified all people-oriented forestry programs of the government including the Integrated Social Forestry Program (ISFP), Upland Development Program (UDP), Forest Land Management Program (FLMP) under ADB Loan II, Community Forestry Program (CFP), Low Income Upland Communities Project (LIUCP), Regional Resources Management Program (RRMP) of the Environment and Natural Resources Sectoral Adjustment Loan (ENR-SECAL), Integrated Rainforest Management Project (IRMP), Forestry Sector Program (FSP), Coastal Environment Program (CEP), and the Ancestral Domains Management Program (ADMP). Its coverage includes all areas classified as forestlands. Local communities as represented by their respective people's organizations (POs) whose members are actually tilling portions of the area to be awarded, traditionally utilizing the resource for livelihood, and residing in or adjacent to the areas covered by the CBFM Program constitute the program's principal participants (Amaro, 2001).

The Agroforestry Support Program for Empowering Communities Towards Self–Reliance (ASPECTS) was initiated by the Institute of Agroforestry, University of the Philippines Los Baños (UPLB) and Ford Foundation in 1998. The five-year

program was implemented in three sites – one each in Luzon, Visayas and Mindanao. ASPECTS aimed at developing a grassroot-oriented extension model that simultaneously addresses the twin objectives of community empowerment and advancement of agroforestry education. At the same time, it enabled the communities to establish and maintain extension services that facilitate linkages with adjoining communities, local government units, and other sources of development assistance (Palma, 2007).

In the Philippines, the World Agroforestry Centre (ICRAF) pioneered the Landcare Approach, a movement of farmer-led organizations supported by local governments with backstopping from technical service providers—that share knowledge about sustainable and profitable agriculture on sloping lands while conserving natural resources. The approach has developed into a dynamic voluntary movement with now more than 5000 farmers involved in 250 groups from five municipalities in Northern, Central and Eastern Mindanao. Today, Landcare becomes the melting pot for farmers and others to discuss issues, share lessons, invest talents, skills and other resources geared towards better land husbandry and protection of the environment from degradation. It threads a path for constructive, long term and practical action at a community level for tackling environment and sustainability issues for the well-being of people and their communities (Catacutan, Mercado and Patindol, 2001)

1.3. Objectives of the CFV

The project's overall goal is to improve human lives through better livelihoods, agricultural productivity, and environmental security of communities living in the marginal sloping lands. It aims to help upland farmers improve their economic conditions by strengthening their capacities to manage the natural resources thereby protecting their communities against environmental degradation while sustaining their sources of livelihood.

Specifically, the program aims to:

1.3.1 Enhance farmers' adoption of SLM technologies through model S&T based farming in the sloping lands thereby enhancing their productivity and farm efficiency as well as conservation and protection of fragile upland resources;

1.3.2 Capacitate key groups and stakeholders in the community to better manage fragile upland resources on a sustained basis;

1.3.3. Conduct sustainability exercises to ensure that upland community development in general, and adoption of model farms, in particular, are on a sustainable basis and incorporated into local planning and implementation processes; and

1.3.4 Establish linkages among research-extension agencies and organizations for capacity building and provision of support systems for the conservation farming communities.

2. Methods

2.1. Principles and Guiding Philosophies

2.1.1. Community-based approach – the program believes that a lasting adoption of innovative farming technologies in the upland will require not only capacity building and education of the farmers but also transforming the community and town where the farmers belong into a huge support system to the farmers' venture into a new system of farming in the upland areas. It is the intent of the program to make the farmers commit to the CFV concept of upland development assured that their entire community and town are behind them holding the same belief that CFV is best for them and for everybody else. This is expected to translate into practical support from the community and town officials and other local stakeholders and adds perceptible dignity to what the farmers do.

2.1.2. Multi-stakeholder participation – local communities (including barangay officials, farmers, etc), LGUs (mayors, MAOs, MENROs, etc.), SUCs, national government agencies

2.1.3. Experiential learning – the CFV concept was not imposed on the farmer volunteers as a requisite to their involvement in the program. The program instead gave premium to making the farmers aware that their farms and their practices could be improved several folds over and there are several ways they can make it happen but in the end they will have to make choices to make it happen. By exposure to and trial of new farming practices and systems the farmers were expected to make informed choices based largely on first-hand information on what changes they can make in their farms.

2.1.4. Centrality of local government facilitation –upland development cannot prosper unless the local government embraces unconditionally the responsibility of being the facilitator of mobilizing resources that are needed. While farmers' ability and commitment to upland development cannot be understated, the sheer immensity of the resources required to veer the management of uplands from the path of degradation to sustainable development will be overwhelming for the farmers alone to shoulder. The local governments must believe that there is a way to better pursue upland development than leaving it to the hands of the farmers with arms that are long in aspirations but short in resources.

2.1.5. Convergence of science and local knowledge

2.2. Establishment of CFV

Under the overall concept of the CFV, sloping land farming models will be identified through participatory approaches, integrating the basic elements of on-farm research, training, capacity development and technology diffusion. Profitability and environmental management strategies would be

incorporated in farm planning processes. Experiences of practicing farmers will be documented and used in such a way as to encourage other farmers to duplicate their practices. On-site documentation of "learning by doing" mechanisms will be part of the supporting and feedback mechanisms. Farmers' trainings, cross-farm visits, and field days are among the activities to allow farmers to observe and experience.

The CFV mechanism adopts a multi-level technology promotion mechanism that will capacitate local extension / change agents. Making Farmer-Volunteers or FVs as an effective arm for technology promotion is a strategy to ensure sustainability of efforts in promoting upland farming technologies and approaches. Such farmer-to-farmer linkage would strengthen the "multiplier effect" of existing technology diffusion processes at the local level.

The program will establish sloping land model farms in conservation farming villages that will enhance the use and application of conservation land management technologies and approaches along the major goal of sustainability. In the local dialect, this will be dubbed, "Dahilig na Agrikultura sa Barangay Sagip-Saka". Hence, the expected output would be model conservation farming villages with S and T based model farms within the CFV, serving as satellite farms with several adopting farmers around the core model. The aim in view is to provide upland farmers and other clients a wide variety of choices of models to suit their farming conditions.

The CFV components that serve as an integrated vehicle to expand the promotion and adoption of conservation farming practices to other upland communities are presented in Figure 1.

Incorporated in the modality is the empowerment of the farmers enabling them to become the vanguards of sloping land resources. Tapping the active leadership and participation of the local government and other municipal and barangay stakeholders and the community-based organizations is also an important approach towards developing a CFV.

A participatory and bottom-up system of selection of the most appropriate technologies in their areas is one major deliverable of the project. These would include a combination of the technologies and approaches already proven or tested for increasing land productivity and promoting land conservation and rehabilitation.

There are three active players in the implementation of CFV – the academic institution, municipal local government unit, and the farmer. The academic institution will provide the technical knowledge about sloping land management. The municipal-level government unit will downscale implementation of sloping land management into the villages/barangays under their jurisdiction. The farmers will serve as the decision makers and implementers of sloping land management system.

Conservation Farming Villages (CFVs) were chosen based on the following criteria:

- is an upland barangay
- has reliable source of water
- has problem on soil erosion
- is within a critical watershed
- has active agricultural production
- is accessible to land transportations
- is within the covered areas of operation of respective universities
- has LGU that is supportive of the proposed technological interventions and is willing to support and assist in the implementation of CFV project.
- Few or non-existent national programs have been implemented in the area

Farmer volunteers (FVs) were selected based from consultation with either the village captain, LGU personnel assigned in the area or members of the village council. Criterion for selection of FVs is a combination of the following:1) has a relatively large farm that is generally sloping, accessible, and easy for other farmers to view; 2) has strong leadership skills; 3) is willing to have the farm developed using conservation farming technology during and after the project duration; 4) is eager to learn; 5) is committed to be trained and thereafter, train other farmers on the farm technology learned and 6) has good moral character.

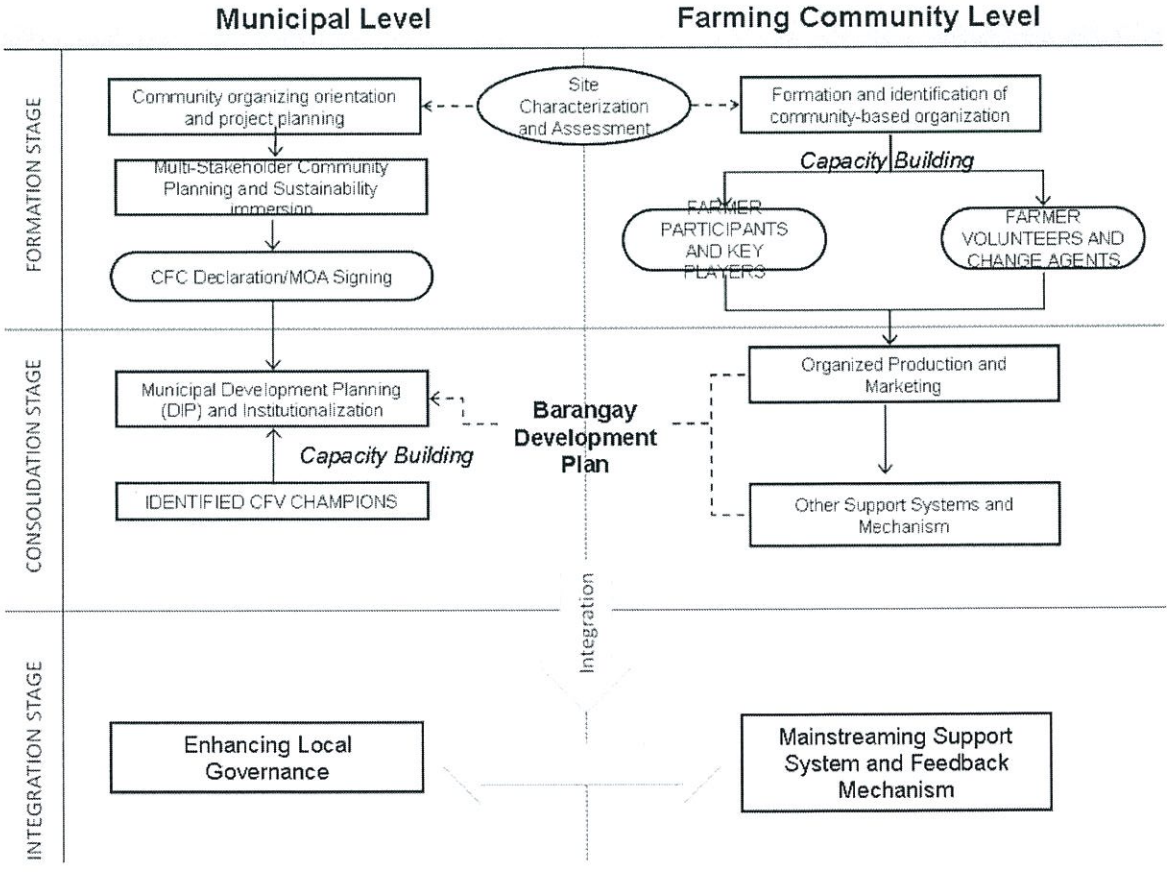

Figure 1. Conceptual Framework for the Establishment of Conservation Farming Village (CFV).

3. Results and Discussions

3.1. Key Outputs

3.1.1. CFVs Established

The accomplishments after three years of implementation yielded 16 CFVs in 5 provinces in the Philippines, each province having a unique biogeophysical characteristics.

In CFV Ligao City, Albay, the slope of the project sites ranges from 8 to 30%. The elevation of the project sites ranges from 154 – 271 meters above sea level (masl).

The CFV in General Nakar, Quezon is situated in rolling terrains where nine out of the 15 model farms have slope not exceeding 18% and the rest are within the 30-50% range. The elevation of farms ranges from 24 to 66 meters above sea level.

The municipality of Alfonso Lista, Ifugao where the CFV project is being implemented is mostly rolling to moderately steep, having a slope of 8 to 15%. Only 13% of the total land area of the municipality is more than 30% slope. All the three CFV sites are located within the 8 to 15% slope.

The CFV in La Libertad, Negros Oriental is characterized by above 18% slope which is ideal for CFV implementation, where sloping land management technologies are appropriate. The project sites are within the range of 600 to 800 m above sea level.

The CFV in Panabo City, Davao del Norte has areas with slope range of 18-50% covers about 4,109 or 16% of the total land area. Gently sloping or undulating areas with slope range of 8-18% comprise merely 2,203 hectares or 9% to total while level to gently level areas with slope of 0-8% accounts the biggest percentage of 62%.

Based on the Modified Coronas Classification, the CFV in Ligao City and La Libertad belong to Type II climate where there is no distinct wet and dry season. In General Nakar, two types of climate prevail: Type II (no pronounced dry season with a very pronounced maximum rain period from December to February) and Type IV (rainfall is more or less evenly distributed throughout the year). The western part that corresponds to the mountain valley experiences the latter. The rest of the municipality, including the three CFVs, experience the former (Table 1). CFV in Panabo City, Davao del Norte belongs to the Type IV (rainfall is more or less evenly distributed throughout the year) classification.

Table 1. Number of CFVs and the prevailing climate, slope range and elevation characteristics

PARAMETERS	IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	NEGROS ORIENTAL La Libertad	DAVAO DEL NORTE Panabo City	TOTAL
Number of CFVs	3	3	3	4	3	16
Climate	III	II and IV	II	II	IV	
Slope range, %	8-15	18-50	8-30	>18	18-50	
Elevation, meters above sea level		24-66	154-271	600-800		
Average annual rainfall (mm)	260.44	3,782			162.49	
Average annual temperature	24.9-35	26.8			33°	

3.1.2 Farmer Volunteers and Adoptors

A total of 102 farmer volunteers (FVs) were adopting the implementation of CFV in 5 provinces in the Philippines. This is 133% accomplishment from the targeted 75 FVs. The four CFVs in Alfonso Lista, General Nakar, Ligao and Panabo have met their targets, while La Libertad exceeded their target by 25 FVs.

From the FVs, 27 of them are female, representing 26% of the FVs. Adopters outnumbered the farmer volunteers in 3 years (440 adopters vs 102 FVs).

A total of 249.55 hectares of model farms, excluding those of the farmer-adopters, have been established in the 5 provinces (Table 2).

Table 2. Number of FVs and areas developed from 2008 to 2011 in 5 provinces in the Philippines

PARAMETERS	IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	NEGROS ORIENTAL La Libertad	DAVAO DEL NORTE Panabo City	TOTAL
Number of FVs	17	15	15	40	15	102
Number of female FVs	N/A*	5	4	14	4	
Number of Adopters	9	11	137	193	90	440
Number of female Adopters	N/A	1	66	82	50	199
Total area (ha) of model farms	17	50.25	49	93	40.3	249.55

3.1.3 Orientations, Trainings, Workshops, Field Visits, Field Days

Agroforestry, planting stock production, and soil and water conservation measures were the topics mostly offered in all the CFV sites. Agroforestry has been made the primary intervention in all the CFVs. A variety of topics which address specific farming issues to the site has also been offered. Examples of these are the training on anthurium production under coconut plantations for the FVs in General Nakar, rubber plantation establishment and management in Panabo City, peanut and banana production in Alfonso Lista, and coffee and cacao production and management in La Libertad.

CFV Ligao City is the only site that has offered a training on Barangay Development Planning in four barangays in the city, including the three barangay sagip saka. La Libertad, Ligao City and Panabo City have extended training opportunities too to neighboring barangays as their expansion activities.

A total of 4547 have attended the 123 training courses organized and implemented in the five CFV sites (Table 3).

Cross visits provided opportunities for the FVs to observe and learn firsthand conservation farming practices in other areas. All CFV sites undertook a number of cross visits for their respective FVs. All the FVs had a chance to spend a day at the Binahon Agroforestry Farm and Training Center in Barangay Songco, Lantapan, Bukidnon, where they were treated to extensive discussions on agroforestry, vermicomposting, integrated pest management and the prospect of transforming a well-managed agroforestry farm into an ecotourist destination.

In all the project sites where composting has been undertaken by the farmer volunteers, they acknowledged that they were encouraged to do so after seeing for themselves the practice at the Binahon Agroforestry

Farm and hearing from Mr. Binahon himself the economic and ecological advantages of going into the practice.

Table 3. Number of training courses implemented, participants to training courses and cross visits

PARAMETERS	IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	NEGROS ORIENTAL La Libertad	DAVAO DEL NORTE Panabo City	TOTAL
Number of training courses implemented	10	9	37	26	41	123
Number of training participants	758	286	778	1717	1008	4547
Number of participants to the cross visits	34	68	175	28	45	650

3.1.4 IEC Materials

Information dissemination about the project through meetings, workshops, and distribution of reading materials about appropriate farming technologies, in particular and on environmental rehabilitation in general were undertaken in all the project sites.

The different CFV sites have distributed among the farmers in their respective barangays information materials mostly in the form of hand-outs, brochures, and pamphlets (Table 16). Most of these materials are already in print and permission has been obtained from the producers to reproduce and distribute the same to the farmers in the CFV sites. The materials give information on the production of vegetables in the Philippines.

CFV Ligao has produced tarpaulins and a photo-exhibit about CFV and the different activities of the project which are prominently displayed in the project satellite offices in the three Barangays sagip saka in their area. In La Libertad meanwhile, the same kind of materials are posted in the MENRO/MAO office in the municipal hall.

With permission from Mr. Henry Binahon, his lectures and discussions during the training conducted in his agroforestry farm and attended by FV participants during the National CFV Congress held at Central Mindanao University in 2009 was packaged into a learning tool in the form of video. Copies of this material were distributed to the different CFV sites.

The project provided supplies and other materials needed in the training of farmers. Resource persons were invited whenever necessary.

Table 4. Titles of IEC materials reproduced and distributed to the FV and adoptors

IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	NEGROS ORIENTAL La Libertad	DAVAO DEL NORTE Panabo City
Sloping Agricultural Land Technology (SALT 1)	Konsepto at prinsipyo ng pagsasagawa ng agroforestry		Ang Pagbahig sa Basura	Vermicomposting
Vegetable Production Guide	Yamang pangangalaga sa mga gulay pangpinakbet		Bitter Gourd Production Guide	Diversified Farming System
Corn Production Guide			Bottle Gourd Production Guide	Pagprotektar ug Pagdumala sa Kalasangan sa Barangay
Seed Production of Okra			Broccoli and Cauliflower Production Guide	Mango Tipborer
			Carrot Production Guide	Ginger Production Guide
			Ginger Production Guide	Process Food Products from Jackfruit
			Lettuce Production Guide	Invest in Goat Farming
			Potato Production Guide	investment Opportunities in Agricultural Inputs
			Seed Production of Cucumber	papaya Production
			Seed Production of Eggplant	Seed Production of Squash
			Seed Production of Squash	Orchid Production
			Sweet Pea Production Guide	Organic Pole Sitao, Squash and Tomato Production
			Sweet Pepper Production Guide	Potato Production Guide
			Ubi Production Guide	Coco Sap Products
				E-Kawayan Technology
				Seed Production of Patola
				Seed Production of Upo
				Seed Production of Okra
				Seed Production of Eggplant
				Seed production of Cucumber
				Sweet Potato Production
				Cassava Production
				Sweet Pepper Production Guide

3.2. Key Outcomes

3.2.1. Increased Awareness on Sustainable Upland Development

The shift from collecting resources from the forest to tilling and making productive lands has eased the pressure on the forest. The forest is now valued as a shelter against extreme events and not as a resource to be depleted.

The LGUs have recognized the contribution of CFV to the conservation of natural resources, increasing farm productivity and income to the farmer-volunteer. As such, the LGUs have enacted ordinances that would make sure that CFV is institutionalized in the locality incorporating all the components of CFV.

As part of effecting change, the program is into making upland farming a local development issue which is vital in the sustainable development of upland areas.

3.2.2. Conservation Farming Skills Development

Knowledge on sloping land management specifically agroforestry and all its supportive technologies was provided to all the farmers and municipal local government unit personnel through series of training courses and cross site/farm visits. Selection of the most appropriate technology for each farm is based on a participatory and bottom-up selection system. These technologies include: alley cropping/use of hedge rows; sloping agricultural land technologies including integration of livestock; contour farming; natural vegetative strips; contour composting /vermicomposting; conservation agriculture/farming systems in the sloping lands (multi-species cropping, conservation tillage, ground cover, pole barriers and other physical barriers such as bench terraces, contour rock walls, canals and soil traps; water-saving technologies/ water management; nitrogen-fixing trees, silviculture, and improved forage planting.

The model farm is established through a simple process starting with the identification of the farmer-volunteer farm, identification and assessment of the interventions needed, the demonstration and testing of the CFV practices and the promotion of CFV practice to adjacent farms once confidence on the positive performance of the interventions has been achieved.

The CFV which is basically a sloping land management system is developed initially with farmer volunteers organizing themselves into groups that would collectively lay out contours using the A-frame in all the farms owned by group members. Hedgerows species that were initially used include rensonii (*Desmodium rensonii*), flemengia (*Flemengia congesta*), calliandra (*Calliandra calothyrsus*), madre de cacao (*Gliricidia sepium*).Eventually food crops like pineapple (*Ananas comosus*) and banana (*Musa sapientum*) were also planted as vegetative contour strips.

Before the implementation of CFV, farmers did monocropping and integration or multiple cropping was not practiced. In areas in Ifugao for example, mechanized tillage implements are used to cultivate sloping lands for corn monocropping. In other CFV sites, however, cultivation is mostly done by using manual tools and draft animals.

Sloping land management technologies adopted by FV and farmer adopters are shown in Table 5. FVs have mostly adopted the hedgerows planting and composting while farmer adopters have also adopted the hedgerows planting and multistory agroforestry system.

Table 5. Number of FVs Practicing sloping land management technologies in the five provinces.

Sloping Land Management Technologies	IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	ALBAY Ligao City	DAVAO DEL NORTE Panabo City	TOTAL
Number of Farmer Volunteers*						
Hedgerows Planting	17	15	15	40	15	102
Mulching	12	15	6	2	0	35
Rock walls	1	0	1	5	0	7
Multi story agroforestry	0	4	4	40	0	48
Composting	17	15	15	20	0	67
Crop diversification	17					17
Crop rotation	17			0	0	17
Number of Farmer Adopters*						
Hedgerows Planting	9	4		116	90	219
Mulching	0	15		0	0	15
Rock walls	0	0		8	0	8
Multi story agroforestry	0	0		193	0	193
Composting	9	0		33	0	42
Crop diversification	9	0			0	9

*Multiple answers, multiple counting

3.2.3. Organizational Skills Development

FVs were also organized into organizations able to negotiate for their well-being (e.g. marketing, prices, policy) as well as establish linkages with the local government units and the academic and research institutions. The CFV concept is recognized to become effective when farmers are organized. In recognition of this importance, the SPMT in all the sites encouraged the farmers to just do that. Table 6 lists the farmer's organizations that were formed/reorganized as a result of the CFV program.

Farmers organizations have been established in the three CFVs in Alfonso Lista in the last quarter of 2010. These are the Namnama Ecological Farmers' Organization, the Caragasan Environmental Conservation Organization, and the Catubangan Conservation Farmers' Organization in Barangay Kiling.

These organizations are yet to be registered in an appropriate government accreditation agency. In La Libertad, there is also a farmers' organization established in each barangay namely the Elecia Farmers' Association, the Pitogo Farmers' Association, Aya F.A.R.M.S. (Farmers Association for Resource Management & Sustainability) and the Nasunggan Farmers' Association. The first is a recently re-organized group and is yet to be registered. The second was also reorganized in December 2009 and is not yet registered. The third was established in April 2009 and is registered with the Department of Labor and Employment. TheNasungganFarmers' Association which was registered in 2009, is a recipient of different awards in recognition of their effort to be a cohesive group able to impart knowledge and skills to others and to produce organic vegetables from their farms. These awards include the 1) 2008 Timbayayong Awards 1st prize (Brgy. Guihob); 2) 2009 Timbayayong Awards 1st Prize; 3) 2010 Timbayayong Awards 1st Prize, and 4)1st Prize 2010 Farmers' Association Organic Farming.

The SIKAP-MANA Conservation Farming Villages in General Nakar, Quezon, Inc. is an organization of the FVs and farmer adopters in the three barangay sagip saka of the municipality. It was organized in April 2010 and incorporated with the Securities and Exchange Commission of the Philippines in November of the same year.

Table 6. Organizations formed as a result of the CFV implementation in five provinces

IFUGAO Alfonso Lista	QUEZON Gen. Nakar	ALBAY Ligao City	NEGROS ORIENTAL La Libertad	DAVAO DEL NORTE Panabo City
Namnama Ecological Farmers' Organization	SIKAP-MANA Conservation Farming Villages in General Nakar, Quezon Inc. (registered in 2010)	Oma-Oma CFV (Conservation Farming Villages) Farmers Association (registered 2011)	Elecia Farmers' Association	CFV Association (Brgy. Mabunao)
Caragasan Environmental Conservation Organization			Pitogo Farmers' Association	
Catubangan Conservation Farmers' Organization			NasungganFarmers' Association (registered in 2009)	
			Aya F.A.R.M.S. (Farmers Association for Resource Management & Sustainability)	

3.2.4. Livelihood Development

There are two dominant agroforestry systems practiced by boththe farmer volunteers and the adopters, the contour hedgerow and the multistory systems. In Ligao City, Albay and General Nakar, Quezon the contour hedgerows were established under coconut plantations and open areas. In Panabo City, Alfonso Lista and La Libertad, the same system is adopted in farms under very open conditions. Hedgerow species used included *Gliricidium sepia, Flemengia heterophylla, Desmodium rhenzonii, and Indigofera tinctoria.* All are exotic species whose performances have been tested in the Philippines under varied environmental conditions. It was noted that *D. rhenzonii* is not performing well in the farms in Alfonso Lista where poor germination has been observed in the contours where such have been sown. Seeds are sourced initially from the Mindanao Baptist Rural Life Center in Bansalan, Davao del Sur. La Libertad was also able to get seeds of these species from the DA station in Ubay, Bohol.

A novel contour hedgerow system is being carried out in General Nakar making use of the ornamental plants green and yellow corn (Dracaena sp.), rosal (*Gardenia augusta* L.) and Ti plants (*Cordyline fruticosa*), both as hedgerow species and alley crop. In La Libertad, a number of CFV adopters are observed to have resorted to the natural vegetation strip (NVS) in the establishment of their contour hedgerows. Upland rice and vegetables are the dominant crops planted in the alley ways.

Taking advantage of the abundance of indigenous materials, FVs in Barangay Nasunggan in La Libertad have established massive rockwalls as a soil conservation measure. Windrowing has also been observed in all CFV sites. This is a significant departure by the farmers from the traditional slash disposal scheme coupled with burning, an indication that they begin imbibing the principle of conservation farming. Mulching and composting are practiced by FVs in all sites. Most of the FVs admit that vermicomposting is a technology that they have acquired from the training they attended at Binahon farm and that they too recognized the value of mulching from the same training activity and visit to the Binahon Agroforestry Farm.

A change in the farming practices among all the FVs was crop diversification. In General Nakar, there was the shift from monocultures of cut foliage to cut foliage with vegetables. The establishment of contour hedgerows and underplanting of other crops in existing coconut plantations was a result of CFV. In Alfonso Lista, from pure monocultures of corn, the farms are now growing vegetables with contour plantings of perennials. The same thing is true in Bicol where there used to be pure monocultures of corn and coconut plantations. But now a myriad of crops are evident in the farms with farmers planning to grow other crops as soil fertility increases and as market opportunities likewise are rationalized to their advantage. In Panabo City, monoculture farms of sweet potato, fruit trees, or corn have likewise diversified. Planting of different vegetables like eggplant, pechay, bottle gourd, pepper, leeks, tomatoes, okra, string beans have been done as a source of additional income for the farmers.

In La Libertad, contour hedgerow plantings have initially been allowed to reach reproductive age transforming such into seed production areas. A number of the FVs are now producing seeds which are being planned to be distributed to other farmers/adopters in the municipality. The goal is to attain self-sufficiency in terms of seed supply in the province for the establishment of more contour hedgerows considering that seed supply is often a constraint in the full establishment of contour hedgerow agroforestry systems.

3.2.5. Increased Household Income

Heavy dependence on inorganic fertilizer before the project was observed with the farmers. With the implementation of the project, a shift from inorganic to organic farming is now underway. Farmers are now piling crop residues and weeds (minus the roots and seeds) in piles fenced by bamboo splits – a system of compost pile. Also, farmers sometimes dug holes where they can pile all the crop residues and cut grasses and other farm wastes and use this as fertilizer when decomposed – a system of compost pit. In one farm in General Nakar, a farmer has been doing a form of compost compartment. Two adjacent pits were constructed and the production of compost is achieved alternately in the two pits. The various capability-building sessions given to the FVs and cross visits to farms doing organic farming is an eye opener as to the reduction in costs of production and producing healthier products, and eventually making the environment healthy.

In a village in la Libertad, a farmer dug series of pits in the alley and dumps all the crop residue and weeds from his farm. He may not be able to plant the alley for a season, but he has enriched the soil and is ready for planting after 6 months.

Several farmers who planted rensonii, flemengia and indigofera hedgerows are now gaining income from the seeds of these crops.

3.2.6. Increased Resiliency to Climate Change

The ability of the FVs to adapt to climate changes is brought about by the improvement of their land management practices. The shift from monocropping to diversified and scheduled planting brings about different products at different times of the year, making the farmers self-sufficient.

The practice of alley cropping has reduced soil erosion due to the presence of obstructions piled on alleys or live plants preventing escape of top soil. The reduction in soil erosion has also minimized the use of inorganic fertilizers and at the same time taught farmers to utilize their crop residues as source of nutrients.

With the visible benefits from implementation, the local government units have incorporated CFV in their barangay development plans. The support for the wider adoption of CFV in the locality paved the way for local executives to have a better governance over their existing resources. There is

an appreciation of maintaining natural resources, especially the forest, as this is their life support system.

3.2.7 Increased Participation of LGUs in Upland Development

Starting in 2012, the City Mayor of Ligao City, Albay made CFV as the flagship program of the Department of Agriculture (DA) and will cover all the upland barangays within the city, including providing budget allocation for its implementation. The implementation of government projects has embarked on partnership with the barangay LGUs, farmers and the DA. The involvement of the barangay LGU in project implementation serves as the local extension arm of the DA and project implementation is closely monitored (Figure 2).

In La Libertad, the three-year implementation of CFV has been shared by the municipal DA, providing full time staff, financial and material resources. In fact, out of the 4 CFVs one was fully supported by the municipal LGU, and instead of 5 FVs, it was doubled to accommodate more farmers wanting to participate. CFV has been incorporated in the barangay development plan and land-use plan of the municipality. A certain percentage of the Internal Revenue Allotment (IRA) for the municipality has been allocated for the implementation of CFV in upland areas. For 2013, a portion (PHP 1,800,000) of the grant from the National Anti-Poverty Commission has been allocated by the Sanguniang Bayan of La Libertad for CFV and other livelihood activities. Further, a municipal ordinance creating the Barangay Farmer Agricultural Technicians (BFATS) has been enacted to enhance agricultural service delivery (Figure 3).

Increased production in the locality has also incited the LGUs to establish/improve on farm-to-market roads and infrastructures such as trading posts cum barangay agricultural development centers.

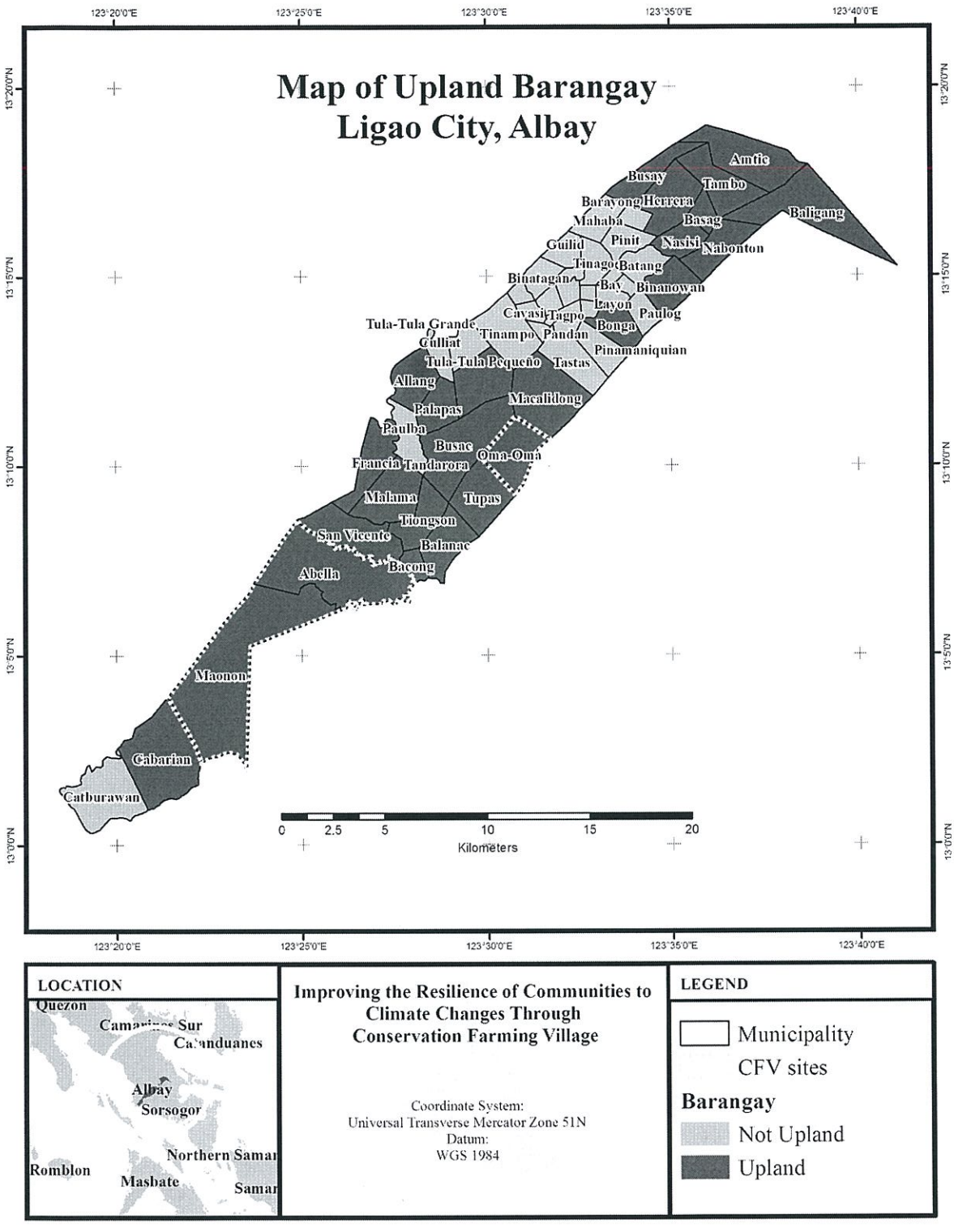

Figure 2. Map of the Ligao City showing the upland barangys where CFV is being implemented through the city government.

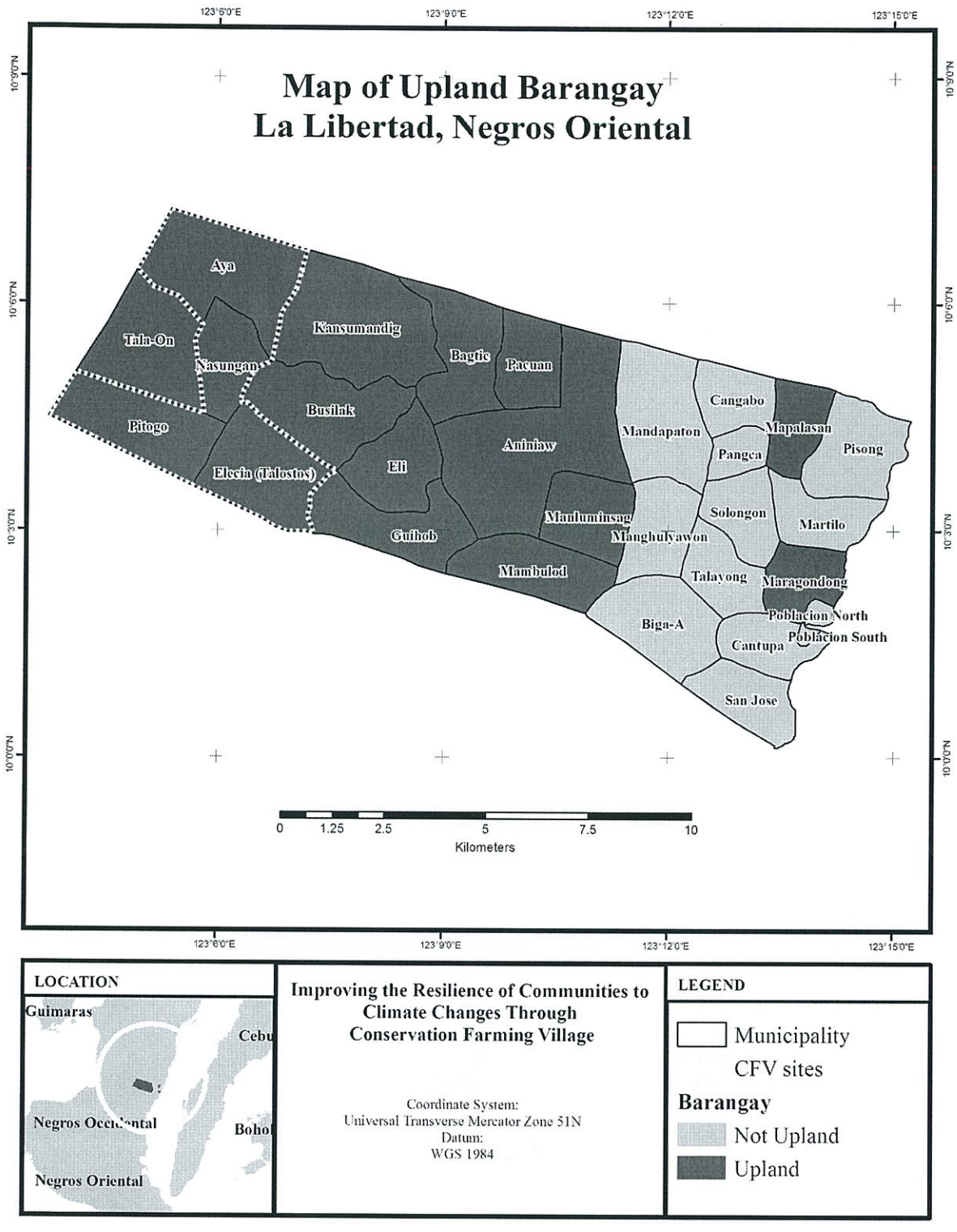

Figure 3. Map of La Libertad, Negros Oriental showing the upland barangys where CFV is being implemented through the municipal government.

3.2.8 Increased Participation of Other Stakeholders

The CFV program has also served as venue for convergence of development programs of government and non-government agencies and organizations (GOs and NGOs), as well as vehicle to link farmers/communities to local and international funding institutions. In La Libertad, the CFV management team has partnered with different agencies i.e. the Department of Environment and Natural Resources (DENR), Department of Agriculture-Regional Field Unit 7(DA-RFU 7) and Provincial Agricultural Office, Plan International, Philippine Coffee Board, Negros Island Sustainable Agriculture and Rural Development (NISARD) Foundation, and Partnership for the Development of Human Resources in Rural Areas (PhilDHRRA) for enhanced generation and complementary mobilization of resources such as farm supplies and equipment and planting materials.

The cohesiveness of the organizations in La Libertad opened other livelihood opportunities such as raising seedlings and planting 384 hectares for the reforestation program of the GIZ-Germany Resource Management Project and the KFW-West Germany Fund. Seedling production enough to reforest 500 hectares of deforested lands is underway through the Philippine National Greening Program. Currently also, policies and schemes for the Trees for Education Program of House Representative Jocelyn Limkaichong is being finalized. The program will integrate the CV approaches and technologies for its implementation.

4. Summary and Conclusions

CFV is a modality for making human lives productive and at the same time reduced the pressure on the forest and better adapt to climate changes. CFV paved the way for the implementation of sloping land management making farms diversified producing different products during different times during the year. The capacitated FVs have become extension agents spreading CFV concept to other farmers. The capacity building activities of the program in all the project sites have undoubtedly equipped the farmer volunteers and CFV adopters with the skills towards sustainable farming in the sloping lands. The adoption by other farmers was also facilitated by the FVs and development found in their farms has encouraged others to emulate their system.

Tripartite collaboration among SUC, LGU and farmer enhances the adoption of sustainable farming system and reduce pressure on the remaining forest. CFV collaborations in all levels enabled the agriculture and forestry schools to impart technical knowledge and skills to the LGU and communities to showcase SLM technologies that is appropriate to the biophysical condition and available planting materials in the locality through model farms establishment. The LGU served as the bridge that facilitated the entry of the project into the sites and the implementation of the different project activities. The LGU participation imparted the "local flavor" of the program. The model farm development addresses the need for soil and water conservation, increased farm diversity, increased farm income and promote "bayanihan" among the participants. The model farms serve as venue for experiential learning among the farmers and they implement modification based on their available resource.

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