



Japanese International Cooperation Agency (JICA)
Sustainable Natural Resource Management (SNRM) Project

ACTIVITY ASSESSMENT REPORT
SUSTAINABLE NATURAL RESOURCE MANAGEMENT (SNRM)
PROJECT
PILOT REDD+ ACTIVITIES IN LAI CHAU PROVINCE



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Abbreviations

JICA	Japan International Cooperation Agency
SNRM	Sustainable Natural Resource Management
PCO	Project Consultancy Office
CPMU	Central Project Management Unit
PPMU	Provincial Project Management Unit
MARD	Ministry of Agriculture and Rural Development
DARD	Department of Agriculture and Rural Development
CPC	Commune People's Committee
DPC	District People's Committee
HH	Household
VFPT	Village Forest Patrolling Team
VF	Village Fund
VMBFMLD	Village Management Board for Forest Management and Livelihood Development
PFES	Payment for Forest Environmental Services

GENERAL INTRODUCTION

The SNRM Project, funded by JICA, started implementing in Lai Chau Province in August 2016. Phuc Khoa commune, Tan Uyen District was selected to be pilot area for REDD+ activities. The commune is located in the North East of Tan Uyen District. It borders with Bo village in Tam Duong District in the North, Ta Van commune, Sa Pa district, Lao Cai Province in the East, Tan Uyen town in the West, and Muong Khoa commune, Tan Uyen District in the South. Total natural area of the commune is 8,446.51 ha, of which 2,069.04 ha is agricultural land, 5,042.35 ha of forest land, the rest is other lands. The commune has a total of nine (09) villages with a population of 4,357 people with 1,005 households.

Pilot activities of the Project focus on two main areas: livelihood development, and forest management and development. The SNRM project started in August 2016. After nearly two years of implementation, Lai Chau Project Office prepared a report on the implementation of the activities, results to be shared, achievements and lessons learned. The content of this report includes a list of major participatory partnerships to the implementation of the project. Implementation results of the forest management and livelihood development activities.

I. PROJECT COUNTERPARTS

1. CENTRAL PROJECT MANAGEMENT UNIT (CPMU)

The CPMU was established in March 27, 2017 as in accordance with the Decision No. 1002/QĐ-BNN-TCCB of MARD. The CPMU represents MBFPs in management and implementation of the project activities at the national level. CPMU is also responsible for ensuring that the project stays on track, meets quality and objective requirements. CPMU regularly exchanges information with Lai Chau PPMU on implementation arrangement and lessons-learned.

The CPMU has paid number of visits to work in Lai Chau province to direct, attend, monitor and evaluate the implementation of project activities in relation to development of PRAP and REDD+ pilot activity plan, procurement of van and motorbikes. At the same time, CPMU also requested Lai Chau PPMU to submit regular reports on project progress in the province (i.e., monthly/quarterly/9-month/annual reports)

In general, coordination of CPMU and PPMU is good. However, Operational Regulation of CPMU was issued late that caused delay implementation of tasks stipulated in the Regulation.

2. LAI CHAU PPMU

On August 9, 2017, Lai Chau PPC issued a decision to establish Lai Chau PPMU, which will work under management of DARD. There are 7 members who work on a concurrent principle.

Director of PPMU is Deputy Director¹ of DARD in charge of forest protection and development; one (01) Deputy Director of PPMU who is Director of Sub-FPD; one (01) planning member of PPMU is officer of DARD; one technical member of PPMU is officer of Sub-FPD; one (01) accountant and one (01) document controllers are from Sub-FPD; and one (01) driver from DARD.

Roles of Lai Chau PPMU are to provide advices and being responsible to the Provincial People's Committee, the Department of Agriculture and Rural Development (DARD), the Forest Management Board and the CPMU for the management and implementation arrangement of the project in Lai Chau Province as stipulated in the SNRM Project Document. The PPMU is guided, supervised, and evaluated by the CPMU for each component of the project as in accordance with the agreement signed with the donor and the approved Project Document.

The PPMU coordinates with the Provincial Project Consultancy Office to organize, monitor, evaluate and synthesize periodical and ad-hoc reports on the implementation of the project in the province to concerned agencies and units, and to JICA as agreed.

Although Lai Chau PPMU was established late (a year after the Project kick off workshop organized in Lai Chau on 8th August 2016), the members of PPMU have been working effectively with Project Consultancy Office (PCO) to carry out the project work. Director and Deputy Director of the PPMU have attended the kick off workshops at provincial, district and communal level. They have also engaged in establishment of facilitator group to support the Project. The PCO regularly exchanges and updates project information with the PPMU.

Not only provided advices on the 5-year and annual plans applicable for pilot commune, Director of PPMU has also paid a visit to pilot area to understand and provide helpful advices to project implementation.



Image 01: Kick off workshop organised in August 2016



Image 02: Director of PPMU is visiting Pa Khoang in December 2017

¹ Since June 2018, the PPMU director, Mr. Nguyen Huu Ai, has retired; the new PPMU director has not been officially placed.

Although the PPMU has made great contribution to the Project, there are pending issues as follows:

- As the members of the PPMU work for the Project on a concurrent principle, so the time spending to the project work was less than requirement, especially to the field work.
- PPMU establishment and issuance of its operational regulation were late, so responsibilities of its members have only been fully taken after having the official decision on establishment.
- PPMU did not organize meeting regularly in the early stage of the project. There was only one meeting organized until March 2018. Afterwards, the meeting is organized more regularly.
- Members of PPMU are only from provincial units/agencies but not from district or communal level. Therefore, roles and responsibilities of district and communal departments/agencies to this Project have not been clearly identified.

3. TAN UYEN DPC

Tan Uyen DPC did not involve in Project management work, but they attended many important meetings of the Project, for example, the kick off workshops, or the meeting on selection of pilot commune. Vice Chairman of the DPC have attended the kick of workshop in Phuc Khoa commune. During the workshop, he contributed his ideas and requested concerned stakeholders at district and communal levels to work closely with the Project staff to ensure that the Project implementation will achieve the highest results. Moreover, he also agreed to establish group of facilitators to assist the Project team.

Unlike Dien Bien Province, Lai Chau PPMU's structure has no presence of representatives from district or communal level, thus, roles and responsibilities of these levels to the project (i.e., work performance, reports, and meetings...) are not clear. Although their roles are unclear, they should be invited to attend important meetings (quarterly/review meetings) to express their ideas/comments and share lesson-learned.

4. PHUC KHOA CPC

Phuc Khoa CPC has been selected as a target area, leaders of the commune have been actively participated in the project and contributed greatly to project implementation in the locality.

Phuc Khoa CPC, together with PCO has organized workshop to introduce about the Project and its objectives to the local people. During the workshop, CPC Chairman delivered opening remarks and instructions to the engaged staff and villages to actively participate in the Project. Phuc Khoa CPC has engaged in:

- Provision of comments to and approval for the 5-year village plan (2016-2020) and annual village plan, organisation of a workshop to consult with CPC units about the plans before officially approve it.
- Assignment of staff to support the Project. Particularly, CPC assigned 2 facilitators to support the Project in carrying out project work in the villages.
- Issuance of instructions to villagers to actively involved in the Project. Review and approval of the village FPT regulations and commitments with each engaged HH.
- Assignment of CPC staff to participate in the Project and provide required information when needed.
- Provision of support to the Project to organize communal/village meetings and visits of concern stakeholders to the commune.
- Receiving project information provided by Project staff and provided helpful advices in a timely manner to the Project in the commune.

There is no CPC participation in Lai Chau PPMU so their roles and responsibilities to the Project are not clearly identified. However, CPC representatives always invited to participate in Project work and meetings to contribute ideas/comments.



Image 03: Commune kick off workshop in September 2016

5. FACILITATORS OF THE PROJECT

In order to implement pilot activities on forest management and livelihood development in Phuc Khoa commune, Tan Uyen District, the Project has requested DARD to select nine (09) facilitators from local level to support implementation of the pilot activities in nine (09) villages. Number of facilitator is equal number of target villages to ensure implementation progress and volume of work. For forest management and protection, facilitators requested to have experience

and knowledge in this area. For livelihood development, having experience and knowledge in agriculture, or agroforestry, or related area is criteria to be appointed as a facilitator.

DARD, having considered request of the PCO, sent request to DPC to select facilitators for the Project. The group of facilitators has been formed with 9 members from district and communal units (Table 01).

Table 01: Group of facilitators

No.	No. of facilitators	Organization	Position
1	1	Tan Uyen District DARD	Technical officer
2	2	Protection Forest Management Board of Tan Uyen District	Technical officer
3	2	Extension Center of Tan Uyen district	Extension staff in charge of cultivation technology transfer in Phuc Khoa commune
4	2	Tan Uyen District FPD	
5	2	Phuc Khoa CPC and Tan Uyen DPC	Commune extension staff; member of H'Mong program

The Project has organized 2-day training for facilitators upon establishment of the group in September 2016. During the training, facilitators learned about participatory approach, presentation skills, planned activities of the Project, REDD+, and climate change. The facilitators are required to work closely with PCO staff to organize village meetings on development of village plans and carry out project work.



Image 04 & 05: Technical training for facilitators

The facilitators have actively participated in pilot activities of the Project in Phuc Khoa commune. They are local people so they understand quite well about locations and conditions of the commune. They are considered as source of indigenous information for reference before making decisions. They are requested to involve in the work that their expertise can contribute,

for example, extension staff involves in livelihood development (water melon and fruit tree cultivation), or facilitator from district FPD involves in forest management.

However, the mobilization of facilitators faced obstacles. First, their time spending to the Project is less than expectation since they work for the Project on a concurrent basis. They need to arrange time for office and Project work. Thus, sometimes, the PCO found difficult to call for their participation in the Project activities. Second, allowances for the facilitators are low (compared to allowances paid by other organisations). Third, staff rotation (facilitators change their positions), for example, local forest rangers moved to new location, and their successors need time to learn about the Project.

6. DISTRICT DEPARTMENTS/ AGENCIES

During implementation of Project work, the PCO have received strong support of the following departments/units:

6.1 Tan Uyen Protection Forest Management Board: This unit provided the PCO with data/statistics related to forests and forest development. In addition, the unit worked also with PCO to develop design documents for af/reforestation, regeneration, and tree planting along boundaries of forests and agriculture lands.

6.2 Tan Uyen Extension Station provided advises for the Project on livelihood development (cultivation techniques such as fruit tree cultivation, watermelon cultivation).

6.3 Tan Uyen District DARD commented on design documents for forest regeneration and planting trees along borders of forest land and agriculture land.

7. VILLAGE MANAGEMENT BOARDS

In order to create linkages between PCO and villages in commencing project work, the Project has supported the target villages to establish one Village Management Board for Forest Management and Livelihood Development (VMBFMLD) in each village. Mission of the VMBFMLD is to sustainably manage forests and forestry land that were allocated to village communities and households (HHs) through promotion of forest management and livelihood development. Details of the VMBFMLDs' mission are as follows:

- Promote for planning for implementation and monitoring forest management and livelihood development in the village.
- Develop regulation on forest use in the village.
- Promote for awareness raising of the local people on forest management.
- Ensure that the local people follow and implement the village regulation on forest management.
- Establish VFPTs and monitor their work.

- Develop interest groups for livelihood development by activities (i.e., fruit tree and vegetable cultivation).
- Ensure that livelihood development activities implemented as in accordance with schedule, regulation, and technical requirements.
- Establish, manage and operate Village Fund (VF).
- Work with VPFTs and CPC to handle violations to the village regulations on forest management and livelihood development.
- Work with forest rangers and CPC to coordinate the work of forest management and livelihood development in the village.

In Phuc Khoa commune, 9 VMBFMLDs of 9 villages have been established and each VMBFMLD has 4 members (a Head, a Deputy Head, a Secretary cum Accountant, and a member). Selection of the 4 members was done through village meeting and the Village Heads were voted to be Heads of the VMBFMLDs. According to the collected information from villagers, selection of Village Heads hold position of Heads of the VMBFMLDs was right decision as it is convenient for them to manage and call for village meeting, if needed. The VMBFMLDs follow CPC-approved operational regulation. The operational regulation of the VMBFMLD was developed and agreed during the village meetings.

After nearly 02 years of implementation, it showed that the VMBFMLDs performed their work seriously and effectively in commencement of project activities in the villages, for example, mobilization of villagers to participate in village meetings, organization of training courses, study-tours, call for contribution of the local people for labor, available materials, and cash for village funds, etc.

However, there are shortcomings:

- Sustainability of the VMBFMLD: This is community-based organization and its members are leaders of the village. Another existing community-based organisation has similar functions as the Project-established VMBFMLD. Establishment of the VMBFMLD is considered unnecessary as the Project can work with the existing one to carry out the Project work.
- Village meetings are not organized regularly due to the Project seasonally and differently supports villagers in each village, so the facilitators and Project staff only call for meetings when the work carried out in the villages.
- Some VMBFMLDs do not have much funding, so allowances for the members are limited, therefore, participation of members to the Project work is not good.
- Some villages newly elected Village Heads and that change affected the work performed by the VMBFMLDs.
- There were changes to members of the VMBFMLDs so not every of them can fully commit to the Project work.
- Capacity of the VMBFMLD members is below expectation.

II. FOREST PROTECTION AND DEVELOPMENT ACTIVITIES

1. FOREST PATROLLING

1.1. INTRODUCTION

In Phuc Khoa commune, there are 9 villages contracted to protect forest with a total area of 4,230.51 ha under 3 forest categories as of special-use forest, protection forest and production forest. Up to now, villages in the commune have established task forces for forest protection, forest fire prevention and fighting, and PFES with CPC-approved operational regulation.

Working objectives of the village task forces is to detect and handle violations to forest protection regulation in a timely manner as well as to prevent and fight forest fires. In addition, they are responsible for forest resource monitoring, protection of forests that the village are contracted, where the government policies on forest investment (i.e., PFES) is applicable in order to increase income and living standards.

1.2. LEGAL BASIS

1.2.1 Legal basis

Law on forest protection and development dated December 3, 2004;

Pursuant to the Decree No. 99/2010/ND-CP dated September 24, 2010 of the Government on the policy on payment for forest environment services;

Pursuant to the Decision No. 799/QĐ-TTg of Prime Minister dated June 27, 2012 approving the national action program on reduction of green-house gas emissions through efforts to reduce deforestation and forest degradation, sustainable management of forest resources, and conservation and enhancement of forest carbon stocks" for 2011 – 2020 period;

Pursuant to the Decree No. 147/2016/NĐ-CP dated November 2, 2016 amending and supplementing a number of articles of the government's decree no. 99/2010/ND-CP of the Government dated September 24, 2010 on the policy on payment of forest environment service.

Pursuant to the Decision No. 36/2014/QĐ-UBND dated November 27, 2014 of the Lai Chau PPC on the promulgation of the Regulation on management and implementation of the policy on PFES from hydropower plants that use water from the basin of Lai Chau province;

Based on the Forest Management and Livelihood Development Plan for Phuc Khoa Commune, Tan Uyen District, Lai Chau Province in 2016.

1.2.2. Lesson-learned from other places

Many localities have been promoting the forest management and protection and implementing a number of forest protection programs and projects that have achieved practical and useful results. In Dien Bien Province, Sustainable Forest Management in the Northwest Watershed Area (SUSFORM-NOW Project) has achieved positive results from forest management activities, for

example, establishment of FPTs in villages where have natural forest areas and development working regulations for the FPTs to actively promote forest protection.

1.2.3. Reasons for activity selection

Forest patrolling is not only for enhancement capacity of the village FPT members on forest protection and monitoring but also encouragement of their contribution to the village forest patrolling and protection.

1.3. CARRIED OUT WORK

1.3.1. Technical training

The Project organized training courses for nine village FPTs on forest patrolling at the end of the rainy season (April – May), so after the village FPT members could start their work at the beginning of dry season. Trainers of the technical training were officer of Sub-FPD who assisted by a forest ranger. The trainer and his assistant have many years of working experience in this area, especially in guiding and supervising the FPTs' work.

Each training class lasted for one (01) day and divided into two parts: theory and practice. In the morning, the participated members were equipped with basic knowledge and skills on forest patrolling. The theory part helped the FPT members to understand about roles of forests, roles and responsibilities of the FPT members, patrolling and monitoring methods, and skills required for forest patrolling. In the afternoon, all members went to the field to develop patrolling plans (i.e., use of maps and guidelines for reporting), practice forest patrolling and recording.



Image 06: In class training for members for the FPTs



Image 07: Training for FPT members on the field

The training was welcomed and participated by members of the FPTs.

Table 02: Total of participants to the technical training on forest patrolling.

No.	Village	Total participants	Male	Female
1	Phuc Khoa	42	36	6
2	Pac Khoa	46	45	1
3	Ho Bon	42	42	0
4	Na Lai	40	34	6
5	Nam Bon 1	41	37	4
6	Na Khoang	40	40	0
7	Ngoc Lai	43	31	12
8	Ho Ta	60	60	0
9	Nam Bon 2	40	36	4
Total		394	361	33

1.3.2. Provision of forest patrolling tools

Besides, the Project also provided the members of the 9 village FPTs with forest patrolling tools like uniform, raincoats, shoes, flashes, matchets, maps, and recording forms. Equipment/tools provided in 2017 and 2018 is shown in Table 3 below.

Table 03: Provision of tool for forest patrolling to the FPT members in villages

No.	Village	Protective clothes (set)	Raincoats (set)	Protective shoes (pair)	Matchets (pcs.)	Flashes (pcs.)
1	Ho Bon	29	20	29	29	29
2	Nam Bon 1	20	20	20	20	20
3	Nam Bon 2	21	20	21	21	21
4	Pac Khoa	23	20	23	23	23
5	Phuc Khoa	22	21	22	22	22
6	Ngoc Lai	28	21	28	28	28
7	Na Lai	21	20	21	21	21
8	Na Khoang	21	20	21	21	21
9	Ho Ta	32	30	32	32	32
Total		217	192	217	217	217

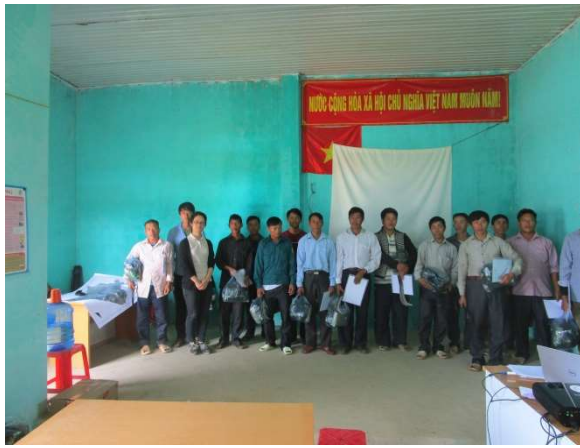


Image 08: Provision of forest patrolling tool to FPT members



Image 09: Provision of uniform to FPT members

1.4. MONITORING

The monitoring process which was applicable to the trained and tool-equipped FPT members shown clear positive results:

Table 04: Synthesis of monitoring indicators applicable for forest protection

No.	Monitoring indicators	Quantity
1	Forest area protected by the FPTs	4,230.51 ha
2	Forest patrolling routes	12 routes
3	Forest patrolling plans	9 villages
4	Frequency of forest patrolling	1 time/month
5	Allowances for FPT members	
6	Number of violations	

1.5. ENCOUNTERED PROBLEMS

- The complicated hilly and mountainous terrain was a disadvantage for conducting forest patrolling in villages.
- Some of village FPTs were not active in development and implementation of the monthly forest patrolling plans.

1.6. SOLUTIONS

- Identify illegal forest encroachment and fire hotspots and focus patrolling those identified areas.
- Concerned authorities/departments/agencies should urge the forest patrolling in villages.

1.7. LESSON-LEARNED

- The attention and coordination of all authority at all have brought positive changes in awareness and sense of responsibility in forest protection of the villagers.
- The local government, agencies, especially, the forest rangers regularly push and urge the FPTs to seriously perform forest patrolling work.
- The FPTs should develop sound forest patrolling plans, identify key routes, and focus on patrolling to deforestation hotspots.

2. SCATTERED TREE PLANTING

2.1. INTRODUCTION

At present, there is very little land available for afforestation in pilot commune. One of the measures to increase green coverage is scattered tree planting. Scattered plantation is very practical and meaningful for protection of the environment and ecological landscape. Scattered tree planting can be applied to a very small land area where large forest tree planting is impossible. Trees can be planted on tea hills, gardens, pond dams, and roadsides in Phuc Khoa commune.

Scattered tree planting is good for not only environment protection but also bring benefits to the people, for example, wood, fruit, seeds, etc. that indirectly reduce impacts on the forests.

2.2. LEGAL BASIS

2.2.1. *Legal basis*

Law on forest protection and development dated December 3, 2004;

Pursuant to the Decision No. 799/QD-TTg of Prime Minister dated June 27, 2012 approving the national action program on reduction of green-house gas emissions through efforts to reduce deforestation and forest degradation, sustainable management of forest resources, and conservation and enhancement of forest carbon stocks" for 2011 – 2020 period;

Pursuant to the Decision No. 17/2012 / QD-UBND of Lai Chau PPC dated 20 August 2012 on approval of forest protection and development plan in Lai Chau province;

Based on the Forest Management and Livelihood Development Plan for Phuc Khoa Commune, Tan Uyen District, Lai Chau Province in 2016.

2.2.2. *Lesson-learned from other areas*

Scattered tree planting has been widely implemented throughout the country with a number of shared experiences from localities. In Phu Tho Province, the local people understand roles and contribution of scattered tree planting to forestry development and environmental protection, so they planted trees around the house, in their garden, along the roadsides, river/canals banks, and

other land available places. Multi-purpose tree species have been selected to plant as it brings both economic and landscape values. In Thai Nguyen province, forestry development from scattered tree planting projects that are suitable with the capacity, production conditions and needs of local people have been actively supported and participated by social organizations.

2.2.3. Reason for activity selection

Scattered tree planting has been implemented with the aim of increasing forest cover, improving the landscape, protecting the environment and bringing benefits to the local people, and meeting requirement of the planning in the province.

2.3. CARRIED OUT WORK

2.3.1 Registration and review

The local people actively participated in the scattered tree planting. In 2017 and 2018, 419 households in the commune registered to be in with 25,172 registered seedlings. Based on the households' registration list, project staff and facilitators came to each household to check available land that they have to conduct the tree planting. Based on the number of registered trees and the size the lands, the project staff advised the registered households on the number of trees that they can plant. Many households registered quantity of seedlings that exceeded the available area or the tree species that they registered are not suitable with the soil. After reviewing, in two years 278 households were eligible to participate in this activity, and their demand for seedlings was 12,254 trees.

2.3.2. Technical training

After the review, the project has organized training courses for households on techniques for planting, tending and prevention of some common diseases to trees.

Trainer and training assistant: Trainer was from Tan Uyen Protection Forest Management Board and one assistant from Tan Uyen district FPD, who have many years of working experience in forest sector.



Image 10: In-class theory training on scattered planting



Image 11: Hole digging practice

The trainees divided into two parts:

+ Theory: introduction of planting technique. Discussion, Q&A.

+ Practice: The participants divided into small groups and practiced hole digging, filling and planting trees by following instruction of the trainer.

The training was welcomed and participated actively by the participated households in the village.

Table 05: Information on training on scattered tree planting:

No.	Village	No. of participants	Male	Female
1	Phuc Khoa	31	22	9
2	Na Khoang	30	29	1
3	Ngoc Lai	46	33	13
4	Phyc Khoa	35	17	18
5	Nam Bon 2	36	16	20
6	Nam Bon 1	29	24	5
7	Pac Khoa	23	22	1
8	Na Lai	39	35	4
9	Ho Bon	20	13	7
Total		289	211	78

2.3.3. Provision of seedlings

After the training on planting and tending techniques, the project provided the participated HHs with seedlings that meet standard of "*normal growth, straight stem, no twists, no pests, with tops, planted in good pots without breaking*". Details are as follows:

Table 06: Quantity of provided seedlings

No.	Village	No. of HHs	Quantity of seedlings				Total
			Michelia	Chukrasia tabularis	Canarium	Re	
1	Ho Bon	24	1,192				1,192
2	Nam Bon 1	24	269	27	26		322
3	Nam Bon 2	29	537	80	170	100	887
4	Pac Khoa	24	362	316			678
5	Phuc Khoa	31	790	267	251	40	1,348
6	Ngoc Lai	63	2,180	780	215	185	3,360
7	Na Lai	28	995	373	521	60	1,949
8	Na Khoang	24	335	515	50	50	950
9	Ho Ta	31	1,473		95		1,568
Total		278	8,133	2,358	1,328	435	12,254

2.4. MONITORING

Monitoring indicators applicable for scattered tree planting shown in the below table:

Table 07: Monitoring indicators applicable for scattered tree planting

No.	Monitoring indicator	Unit	Quantity
1	Quantity of trees	trees	9,034
2	No. of villages	village	9
3	Participated HHs	HH	238
4	Acceptance of the participated HHs to the seedlings	%	100
5	Survival rate	%	≥ 80
6	Planting locations: Tree species planted on the tea hills, in gardens, pond banks, and roadsides.		

2.5. ENCOUNTER PROBLEMS

- Growth of planted trees affected by cattle happened in some villages.
- Local people (children) destroyed trees due to their low awareness.
- Some HHs planted near streams; therefore trees are affected by flash flood

2.6. SOLUTIONS

Regularly conduct communication and dissemination to raise awareness of the local people, especially to HHs whose children, cattle destroyed trees. In addition, implementation of village regulation on forest protection and development is important.

2.7. LESSON-LEARNED

- Local authorities/agencies perform communication/dissemination work to raise awareness of the people.
- The supported HHs should be more active in protecting planted trees.
- Affection from natural disaster should be avoided before implementing activity to have better result

3. AF/REFORESTATION

3.1. INTRODUCTION

Unlike scattered tree planting, af/reforestation is carried out on bare-land (Ia status) with an area of 0.5 ha or more that planned as protection forest land. Polyculture is applied to facilitate tree growing and reduce pest.

3.2. LEGAL BASIS

3.2.1. Legal basis

Law on forest protection and development dated December 3, 2004;

Pursuant to the Decision No. 799/QĐ-TTg of Prime Minister dated June 27, 2012 approving the national action program on reduction of green-house gas emissions through efforts to reduce deforestation and forest degradation, sustainable management of forest resources, and conservation and enhancement of forest carbon stocks" for 2011 – 2020 period;

Pursuant to the Decision No. 17/2012 / QĐ-UBND of Lai Chau PPC dated 20 August 2012 on approval of forest protection and development plan in Lai Chau province;

Based on the Forest Management and Livelihood Development Plan for Phuc Khoa Commune, Tan Uyen District, Lai Chau Province in 2016.

Based on the af/reforestation design document applicable for protection forests in Phuc Khoa commune, Tan Uyen district in 2017.

3.2.2. Lesson-learned from other places

Many af/reforestation programs and projects have been implemented in many provinces, including the Forest Tree Planting Project funded by KFW. The lesson-learned shared as follow:

Planting and tending techniques: Applying the current processes and norms of the government and referring to technical guidance of localities. Technical solutions can be applied including using high quality seedlings, planting with moderate density, apply plenty of fertilizer, planting in the right time/season with high intensity of tending/maintenance, and creation of fire breaks in the large forest plantations.

Monitoring and evaluation: Af/reforestation has been checked and accepted on a regular basis including processing of vegetation, digging holes, fertilizing, planting and tending planted trees. Staff of project management units at all levels regularly present at the villages and communes to directly address questions and suggestions of the local people, direct and check the work to ensure that af/reforestation work achieves the best results.

Technical training and awareness raising: organize technical training courses which provide participants with new approaches for the whole afforestation process including land use planning, land allocation, nursery, land preparation, fertilization, tree planting, and tending, etc. All the

participants have opportunities to be trained, attended study-tour to learn about different techniques.

3.2.3. Reason of activity selection

Af/reforestation contributes to increasing forest area and coverage, improving landscapes, and protecting the environment. This is in line with the provincial development plan.

3.3. CARRIED OUT WORK

3.3.1 Registration, inspection and development of design document

In 2017, the Project received registration of 37 HHs who wished to plant trees on 11.7 ha. After conducting area checking, the area included in the designed document for af/reforestation was 3.3 ha.

3.3.2 Training and provision of seedlings

The Project has organized a technical training on af/reforestation and maintenance techniques for participated HHs. Most of them have participated in the training and understood trained techniques. 10 out of 11 participated HHs (over 90%) attended the training.

3.3.3 Forest tree planting

After land preparation done by the local farmers, holes were dug properly, density and size meet with requirements, the Project provided seedlings species for planting as designed with total of 5,152 trees (2,576 Michelia and 2,576 Schima trees). Quantity of seedlings provided for main planting were 3,920 (1,960 Michelia, and 1,960 Schima trees), and for supplemental planting were 2,576 (1,288 Michelia, and 1,288 Schima trees). All HHs actively participated in af/reforestation by following design and type of provided trees. Total planted area was 2.45 ha (accounted for over 70% of designed area).



Image 12: Technical training in tree tending



Image 13: Local farmers planting trees

3.4. MONITORING

Monitoring indicators shown in the below table:

Table 08: Af/reforestation monitoring indicators

No.	Monitoring indicators	Unit	Quantity
1	Planting area	ha	2.45
2	Quantity of trees (main and supplemented planting)	tree	5,152
3	Village	village	1
4	Participated HHs	HH	9
5	Acceptance of the local HHs to the provided trees	%	100
6	Survival rate	%	95
7	Planting locations: Designed forest plots, and hills that belong to protection land area.		

3.5. ENCOUNTERED PROBLEMS

- Af/reforestation was done at the same time with agriculture crop harvesting (rice and tea, etc.) and that affected greatly to the progress of af/reforestation.
- Planted area was smaller than designed one because the local farmers did not complete planting as planned. Some small area was under conflict during implementation process.
- Trees died due to bad weather.
- Cattle destroyed planted trees.

3.6. SOLUTIONS

- Coordinate with local authorities to regularly supervise households in conducting af/reforestation.
- Check the results of land preparation by the households and provide support as equal to what they have done.
- Choose the right time to provide the seedlings for the households
- Local authorities and other concerned stakeholders should raise awareness for the people, especially the ones who raise cattle.

3.7. LESSON-LEARNED

- Regularly mobilize and urge HHs to participate in and arrange their time to carry out af/reforestation work as committed with the Project.
- Project work should not be carried out on conflicted areas.
- Afforestation should be done when the weather is favorable and within planting season

- Coordinate with the authorities to raise awareness and sense of responsibility in protection not only for planted forest trees but also for other crops of the local farmers.

4. FOREST REGENERATION

4.1. INTRODUCTION

Forest regeneration is implemented with a goal of taking full advantages of regeneration and natural changes in the areas of forest land with timber trees to ensure the state of Ic with the reasonable intervention by the people to promote forest restoration for a certain period of time.

4.2. LEGAL BASIS

4.2.1. *Legal basis*

Law on forest protection and development dated December 3, 2004;

Pursuant to the Decision No. 799/QD-TTg of Prime Minister dated June 27, 2012 approving the national action program on reduction of green-house gas emissions through efforts to reduce deforestation and forest degradation, sustainable management of forest resources, and conservation and enhancement of forest carbon stocks" for 2011 – 2020 period;

Pursuant to the Decision No. 17/2012 / QD-UBND of Lai Chau PPC dated 20 August 2012 on approval of forest protection and development plan in Lai Chau province;

Based on the Forest Management and Livelihood Development Plan for Phuc Khoa Commune, Tan Uyen District, Lai Chau Province in 2016.

Based on the design document for natural forest regeneration in Phuc Khoa commune, Tan Uyen district in 2018.

4.2.2 *Lesson-learned from other areas*

A number of provinces have applied silvicultural measures to regenerate natural forests. In Yen Bai province, silvicultural measures have been applied such as awareness raising for local people to prevent regenerated areas from being destroyed by human's activities, cattle, and poultry by means of building guard towers, signboards, fire-breaks, fences, etc., in order to facilitate tree growing and forest canopy closing and transfer to nursing stage. In Quang Binh Province, the effective forest regeneration has contributed significantly to increasing the forest coverage of the whole province to 67.5% in 2016.

4.2.3 *Reason for activity selection*

Forest regeneration is a quick and effective solution for forest restoration which is in line with the general planning of Lai Chau province. The area planned for forest regeneration will be enjoying incentives policies and mechanism on investment in forests, including payments for forest environment services that generates practical benefits to people living near by the forests.

For example, income increasing and livelihood improvement for the people as well as contributing to increase forest cover, improve landscape and environment.

4.3. CARRIED OUT WORK

4.3.1 Registration and development of design document

The pilot commune, 4 villages have registered to carry out forest regeneration. After field investigation and design document development, the total area for forest regeneration was 70.37 ha.

Table 09: Registration and field investigation to registered areas for forest regeneration

No.	Village	Registered area	Investigated area (ha)
1	Ho Bon	24.60	7.10
2	Nam Bon 2	5.11	3.10
3	Na Lai	16.70	15.20
4	Na Khoang	48.30	39.16
Total		94.71	70.37

4.3.2 Technical training for forest regeneration

Once the design document for forest regeneration agreed and approved by Tan Uyen District DARD, the Project has organized training classes on forest regeneration (8 classes for 4 villages).

Schedule: November 2017.

Trainer of the trainings was officer of Tan Uyen Protection Forest Management Board who have many years of working experience in forestry sector in general and in forest protection and development in particular.

Contents of the training:

- Forest regeneration techniques and basic knowledge on forest regeneration.
- Case study: encountered common issues of forest regeneration
- Discussion, Q&A.

The trainings were welcomed and participated actively by the participated households in the village.

Table 10: Information of training on forest regeneration.

No.	Village	Training class	Participants		
			Total	Female	Male
1	Nam Bon 2	02	57	13	44
2	Ho Bon	03	119	9	110
3	Na Lai	01	45	7	38
4	Na Khoang	02	76	10	66
Total			297	39	218

4.3.3 Installation of signboards

According to the contents of the design document for forest regeneration, the project has designed the signboards and the FPT members installed it in the area of forest regeneration by follow instruction and design: 20 signboards for 4 villages.



Image 14: Technical training on forest regeneration



Image 15: Installation of signboards

4.4. MONITORING

Installation of signboards in the area of natural forest regeneration: 16 signboards for 3 villages (achieved 80% of the design). Signboards have not been installed in Nam Bon 2 due to land use conflict occurred between households and village communities.

Status of forest regeneration: Ic status (bare-land with scattered trees (density of 1000 trees/ha)

4.5. ENCOUNTERED PROBLEMS

Land use conflict occurred between households and village communities.

Free grazing issue in the area of forest regeneration of the villages has not been controlled seriously.

4.6. SOLUTIONS

Report to local government to identify suitable solutions.

Local authority should carry out more awareness raising activities to the local people on forest regeneration for common interest; handle violations by following village regulations/charters.

4.7. LESSON-LEARNED

Local government should have solutions to settle land-use conflicts to avoid negative impacts to the Project work.

Awareness raising for the local people should be paid with more attention. Any violations to regulation on forest protection and development should be handled by law sanctions.

5. BOUNDARY PLANTING

5.1. INTRODUCTION

Currently, the need of expanding production land of the people in Phuc Khoa commune is increasing that leads to illegal encroachment to forests and forestry land. Planting trees to create boundaries between the agriculture production lands and the forest/forestry land aims to limit illegal encroachment into the forests and forestry land.

5.2. LEGAL BASIS

5.2.1. Legal basis

Plan of forest management and livelihood development of Phuc Khoa commune, Tan Uyen district, Lai Chau Province in 2016.

Design Document of boundary planting between protection forest and agricultural land in Phuc Khoa Commune in 2018.

5.2.2. Reason for activity selection

Planting trees to create boundaries between the agriculture production lands and the forest/forestry lands aims to limit illegal encroachment into the forests and forestry land.

5.3. CARRIED OUT WORK

5.3.1 Inspection, design document

In Phuc Khoa commune, there are 6 villages having agricultural land near protection forest. More specifically, HHs from villages of Ho Bon, Nam Bon 1, Nam Bon 2, Na Lai, Na Khoang, Ho Ta have this border land.

The Design Document indicates the boundary planting line of 7.290m, number of seedlings needed 1.241 trees. Michelia is the species that most local farmers prefer and choose and this species is also agreed by local agencies.

5.3.2 Technical training and tending

After designing document and working with those HHs who have the boundary line running through, in April 2018, SNRM Project organized training classes to provide techniques of planting and tending and diseases prevention. Trainer is from Tan Uyen Protection Forest Management Board with many years of experience in forestry sector.



Photo 16: Technical training on boundary planting



Photo 17: Practice planting

Training classes were organized with the highly participated farmers; totally there were 5 classes with 60 participants as in the following.

Table 11: Summary of training information for boundary planting

No	Village	No. of training class	Participant		
			Total	Male	Female
1	Hô Ta	1	13	7	6
2	Nà Khoang	1	10	8	2
3	Nậm Bon 1	1	3	2	1
4	Nậm Bon 2	1	9	8	1
5	Nà Lại	1	10	6	4
6	Hô Bon	1	15	13	2
Total		5	60	44	16

5.3.3 Implementation of boundary planting

HHs prepared land (holes) as trained and followed the plan. Project supported HHs by providing seedlings and fertilizers.

Table 12: Summary of seedlings and fertilizer provided in villages for boundary planting

No	Village	No. of HH	No. of seedlings (tree)	Fertilizer NPK (kg)
1	Hồ Bon	15	300	60.0
2	Nậm Bon 1	4	77	15.4
3	Nậm Bon 2	15	241	48.2
4	Nà Lại	10	106	21.2
5	Nà Khoang	10	200	40.0
6	Hồ Ta	13	218	43.6
Total		67	1,142	228.4

5.4. MONITORING

Indicators for boundary planting are shown in the table below

Table 13: Monitoring indicator for boundary planting

No.	Monitor indicator	Unit	No.
1	No. of planted trees	Tree	1,142
2	No. of villages	Village	6
3	No. of HHs	HH	67
4	Level of acceptance of local farmers	%	100
5	Survival rate	%	≥ 90
6	Planting location: Planted on boundary land between protection forest and agricultural land		

5.5. ENCOUNTERED PROBLEMS

- Tree's growth is affected by animal damage in some villages.
- Newly planted trees were stolen in some villages.

5.6. SOLUTIONS

Often propagate awareness of farmers to protect trees (children) and HHs having animals and apply village regulations into this policy.

5.7. LESSON-LEARNED

- Local agencies increase farmers' awareness of tree protection.
- Households highly need to protect the trees.

III. LIVELIHOOD DEVELOPMENT ACTIVITIES

1. INTRODUCTION

Based on the final report on Socio-Economic Survey in Phuc Khoa Commune (October 2016) and results of the SUSFORM-NOW Project, from September to November 2016, three meetings were held in each of nine villages in Phuc Khoa Commune for the purpose of:

- i. introduction of the Project to the local people;
- ii. analysis of the status of forest management and livelihood development activities; introduction of potential activities supported by the project and identifying the needs of the people.
- iii. guideline for development of the 5-year (2016-2020) and annual (2016, 2017) FM&LD implementation plans.
- iv. improve the support mechanism of the project for each livelihood development activity.

In December 2016, the five-year FM&LD implementation plan with a total of 10 different livelihood development activities was officially approved, subject to natural conditions, farming practices and the needs of the people in each village (Table 14)

Table 14. List of livelihood development activities and registration of villages

Registered villages Activities	Ho Bon	Nam Bon 1	Nam Bon 2	Pac Khoa	Phuc Khoa	Ngoc Lai	Na Lai	Na Khoang	Ho Ta	No. activity /village
1. Provision of improved stoves	x			x	x	x	x	x	x	7 villages
2. Fruit tree cultivation	x	x	x		x	x	x	x	x	8 villages
3. Fodder grass cultivation	x	x			x		x	x	x	6 villages
4. Vegetable cultivation	x	x	x	x		x	x		x	7 villages
5. Water melon cultivation (including agriculture film application model)		x	x	x						3 villages
6. Fish raising									x	1 village
7. Biogas			x	x		x	x	x	x	6 villages
8. Technical training for pig raising	x	x	x	x	x	x	x	x		8 villages
9. Technical training for tea farming	x	x	x		x	x	x	x	x	8 villages
10. Establishment of tea picking service team				x						1 village

(Source: 5-year plan – FM&LD in Phuc Khoa commune, SNRM Project)

Based on the 5-year and annual FM&LD plans, in 2017, the Project implemented all of livelihood development activities in the 9 villages that achieved initial results. Due to the short time of implementation of the project activities, this report only contains the initial achievements

and preliminary assessment, while highlighting the shortcomings and recommendations/solutions for the next stage.

2. RESULTS OF FOREST MANAGEMENT AND LIVELIHOOD DEVELOPMENT ACTIVITIES

Livelihood development activities can be divided into 3 groups of objectives: (1) reduce pressure on forests (i.e. reduction of fire wood by using biogas), (2) increase income through support for agriculture production (3) provide the knowledge for the farmers through training classes. In report, results of the carried-out work presented by groups of common objective activities.

One in the objective of the SNRM Project is to reduce deforestation and forest degradation caused by demands of economic development and daily living needs (collection of firewood for domestic cooking or for selling by the local people). Provision of improved stoves and support for biogas installation were implemented by the Project to achieve above-mention objectives.

2.1. PROVISION OF IMPROVED STOVES

2.1.1. Background

The socio-economic survey report (October 2016) indicated that the use of NTFPs is no longer significant for people in all 9 villages in Phuc Khoa commune as they have been using gas for cooking instead of firewood. In fact, the farmers still use firewood for cooking food for animals, or alcohol, or boiling water, etc. During the village meetings, the Project introduced to the local HHs about a model of improved stove called Laos stove that was provided to the people in Dien Bien Province. After the introduction, people gave feedbacks that they need a larger, more stable stove models for cooking with large pots. Studying about samples of firewood stoves that have been selling on the market and learning from results of the provision of improved stoves shared by SNRM Project in Son La province as well as conducting a study-tour to Son La to learn about stove making technique, the project in Lai Chau have decided to support the registered people in 9 villages in Phuc Khoa commune with stove model learned from Son La.

2.1.2. Carried out work

a. Technical assistance

The training used materials prepared by SNRM project staff/consultant in Son La province (with modifications on material norms and unit price applicable for Phuc Khoa commune), requested Son La SNRM project office to assist in purchase a stove mold as training tool. The project has organized 9 training classes to equip stove making technique to the participated HHs and make stove samples for villagers in 9 villages. After the training, 100% of participants, with technical

instructions of the Project, are capable of removing/fitting of the stove mold and producing improved cooks.



Image 18. Technical training on stove making in Nam Bon 1 village



Image 19. A completed stove made in Ngoc Lai village

During the technical training on stove making, the project staff also mentioned about cost of stove, support mechanisms and methods of the project, and co-contributions of the participated HHs to the Village Fund. The VMBFMLDS, upon receiving registration of households, have submitted the registration list to the project for preparation of tools and materials.

b. Provision of stove molds, input materials and results of implementation.

Stove molds: Based on the number of registered households (only 71 households), the distance between villages is close, so the project has provided them with 4 stove molds for 7 villages where the local HHs registered to be supported. The project also organized meetings with 7 VMBFMLDs and registered households to schedule for stove making in order to guide and supervise their work as well as control rotation of molds among the HHs.

Material for stove making (iron and cement): Based on support agreement for improved stove support signed between the VMBFMLDs and the HHs, the Project provided iron and cement to the VMBFMLDs. The VMBFMLDs distribute these materials to the local HHs based on their contribution to the VF.

Each household is supported with one set of iron plates, iron pads and 35 kg of cement PCB30 (costs VND 226,000), the households provide themselves sand, and labor for making stoves. At the time of receiving materials from the VMBFMLD, each household must pay 50% of the cost of materials supported by the Project to the VF (equivalent to VND 113,000 /HH). The results of supporting for improved stoves are presented in Table 15 below.

Table 15. Technical training on and provision of materials for improved stove production

No.	Village	Participated in training HHs	Registered HHs	Provision of materials	No. of HHs	Contributed to VF (VND)
1	Ho Bon	36	8	18	14	1,610,000
2	Nam Bon 1	30	20	-	-	-
3	Nam Bon 2	39	8	8	4	460,000

4	Pac Khoa	33	0	-	-	-
5	Phuc Khoa	28	2	-	-	-
6	Ngoc Lai	22	12	16	12	1,380,000
7	Na Lai	28	0	-	-	-
8	Na Khoang	18	7	7	7	805,000
9	Ho Ta	66	14	14	10	1,035,000
	Total	234	71	63	47	5,290,000

71 HHs in seven out of nine villages registered to participate in this activity. The Project has prepared enough materials for them. However, by the time of provision of materials, only 61 HHs expressed that they want to continue. 20 HHs in Nam Bon 1 village and 2 HHs in Phuc Khoa village later decided not to receive materials for improved stove making. It is explained that the HHs in Nam Bon 1 village did not want to continue because they could not contribute to the VF as committed (confirmed by the VMBFMLD), while the other 2 HHs in Phuc Khoa decided not to continue because they left their home for working in a far place.

In Ho Bon and Ngoc Lai village, number of HHs who participated in stove making were higher than the registered number because all HHs in Ho Bon village are H'Mong and they still use stoves for cooking, while HHs in Ngoc Lai have high demand in using fire stoves for cooking.

Up to 30 June 2018, there 47 HHs received materials from VMBs and made the cook stoves; 14 HHs cancelled as they are no longer raising pigs. Materials provided for those HHs who did not make the stoves will be returned back to the Project.

Contribution to the Village Fund: Although the Project Office requested to collect money to the VF before delivering materials to the HHs, the VMBFMLDs explained that it would be difficult to call for HHs participation, therefore, they proposed to provide materials for stove making to the participating HHs and they will be responsible for VF collection. According to checking result, until June 2018, 46 out of 47 HHs contributed to the VF with a total of VND 5,290,000. Only 1HH left to contribute into VF, accounting for 2.13% HHs receiving materials from project.

2.1.3. Monitoring and evaluation

Monitoring and evaluation to the improved stove making: Based on the schedules of the participating households, the project staff coordinated with the VMBFMLDs to regularly check and urge the households to follow the schedule and rotate the mold to meet the time requirement. In 2 villages where number of HHs is higher than the initial registration number, the project staff have actively taken materials prepared for HHs who did not want to continue in other villages and given to the ones who need it. For materials distributed in villages and were not used, the Project will take them back (including iron and mold/frame).

Evaluation to effectiveness and impact of the activity: As the activity was implemented at the end of 2017, so it is not yet to evaluate impacts of the activity; however, in the next months, this activity will be surveyed.

2.1.4. Encountered problems and solutions

As the economic conditions of Phuc Khoa Commune are relatively developed, most households use gas for cooking. The firewood stoves are mostly used for cooking food for animals or alcohol, thus, their demand for the improved stove model was not high. Some HHs have expressed their demand for bigger size stoves, so it is necessary to conduct survey to understand their demands before implementation of the activity to ensure it meets their needs.

Regarding the collection of counter-funding from the participating HHs, the VMBFMLDs should collect the money in advance as a basis for the Project to prepare materials for them to avoid it being waste due to the local HHs changed their mind.

2.2. SUPPORT FOR BIOGAS CONSTRUCTION AND INSTALLATION

In order to reduce pressure on forests by reducing human dependence on forest resources (collection of firewood for cooking), the Project supported the local HHs to build not only improved stoves but also biogas plants to utilize livestock waste sources to create gas, while reduce environmental pollution.

2.2.1. Background

According to statistics as of August 2016, the whole Phuc Khoa commune has 1,022 buffaloes and cows; 1,836 pigs and 14,155 poultry. Cattle farming has not developed due to the lack of grazing areas and farmers have been using machines for land digging instead of cows/buffalos. Ho Bon and Ho Ta villages have the biggest number of buffaloes and cows thanks to the field that cultivated for 1-crop only and the rest of the time it can be grazing pasture. In addition, Hmong, Dao and Kho Mu people are living in high places of these villages, near by the forests where they can raise cattle. However, due to the traditional practice of grazing, most buffaloes and cows are grazed freely in the forests without being raised the cages like the ones raised by Kinh people. Pig production have been developed in Ngoc Lai and Phuc Khoa village as mainly Kinh people are living in these villages. Any households who raise more than 10 pigs are in Ngoc Lai and Phuc Khoa village.

Based on the list of registered HHs, the project coordinated with the VMBFMLDs to organize meetings to find out more about demand of the local HHs on different types of biogas plants. The project contacted and requested tank supplier to supply composite tanks as well as informed the participating HHs about support of the Project, responsibility of supplier, and co-contribution of the HHs. The Project also carried out investigation to each household on number of raised

animals, locations for tank installation. Based on the investigation results, the Project signed support agreements with the HHs and carried out the work. In June 2018, 22 composite biogas tanks have been installed for 22 HHs in 5 villages. Details are shown in the below Table 13.

Table 16. Number of registered HHs for biogas plant building till June 2018

No.	Village	Registered HHs	Participated HHs	Supported value
1	Nam Bon 2	4	0	0
2	Pac Khoa	2	1	5,000,000
3	Ngoc Lai	13	14	70,000,000
4	Na Lai	5	3	15,000,000
5	Na Khoang	2	1	5,000,000
6	Ho Ta	4	3	15,000,000
Total		30	22	110,000,000

2.2.2. Monitoring and evaluation

Upon completion of the biogas plants, all of 22 plants have been working well to serve demand of the people. The Project has conducted survey to evaluate impact of the biogas plants.



Image 20. Supervision of Biogas plant installation by Mr. Nguyễn Lương Phu household (Ngoc Lai village)



Image 21. Japanese expert visiting and interviewing Mr. Nguyễn Quang Tien (Ngoc Lai village) on the impact of the biogas plant

Cost of installation: 1 composite biogas plant costs from VND 12 million to 15.5 million, depending on the size of the tank and terrain, the cost includes: (i) cost for tank and installation (paid to supplier with an amount of VND 11.5 million for a tank with diameter of 2.4 m and VND 9.5 million of a tank with diameter of 2.25m) and (ii) cost for hole digging labor and sand (VND 2.5million - VND 5million).

Regarding to efficiency, fuel consumption index: there are three main types of fuel used by the local households (firewood, rice husk and industrial gas), each of which is used for different purposes. Firewood and rice husk are often used by people for cooking food for animals, alcohol, and boil water, while industrial gas is used only for daily cooking. The fuels are provided from 3 sources:

- ✓ Firewood collected from forests or purchased from market (price: VND 1,000/kg)
- ✓ Rice husk bought from the rice milling facilities (price: VND 5,000/pack)

✓ Gas (price: VND 250,000/tank)

Fuel consumption of households who installed biogas plants is shown in Table 17

Table 17. Survey results of fuel consumption index

No.	Type of fuels	Unit	No. Of HHs	Fuel consumption index		
				Lowest	Highest	Average
1	Firewood	Kg/year	10	2,000	7,000	3,636.4
2	Rice husk	pack/year	7	10	200	34.5
3	Industrial gas	tank/ year	11	4	20	7.6

(Interviewed results)

Having interviewed 11 households on fuel consumption, we drew that the local HHs consume an average of 3,636.4 kg firewood/year/household, 34.5 rice husk packs/year/household. Especially, there are 2 households in Ngoc Lai village (Mai Thi Cuc and Nguyen Luong Lien households), consumed highest amount of firewood and rice husk for cooking food for pig raising at large number, particularly, Mai Thi Cuc household consumes 7,000 kg firewood per year and Nguyen Luong Kien household uses 200 rice husk packs per year.

Index of industrial gas consumption: average of 7.6 tanks/HH/ year.

For biogas, volume of gas depends on volume of manure supplied to the tanks. According to interview to biogas users, the biogas plants generate enough gas for 4-5hours cooking per day and they don't have to use industrial gas for cooking. Therefore, using the biogas plant can help saving VND 1.5million (6 tanks of gas) per year. However, since this activity was newly implemented so the assessment based on just initial information. In the next phase of the Project, more assessment should be made.

2.2.3. Encountered problems and solutions

Cost for construction and installation of biogas plant is big compared to incomes of the HHs and only HHs who have large scale of livestock are suitable to use biogas plant. Since October 2016, pig price reduced significantly, thus, so many HHs either reduced scale of or stopped pig raising. In order expand the scale of using biogas to many local HHs, it is necessary to encourage and support the HHs to cultivate fodder grass and building cages for cattle to utilize manure for biogas, reduce free grazing and loss due to diseases.

In the second phase, this activity will be extended.

2.3. SUPPORT FOR VEGETABLE CULTIVATION

2.3.1. Background

Phuc Khoa is a purely agricultural production commune, located adjacent to Highway 32, 11 km from Tan Uyen district center. There are 9 villages and many ethnic minority groups. Income sources of the local people include agricultural crops (tea, rice, maize, and watermelon), livestock and services. The total cultivated land area of the commune is 790 ha, of which 319 ha for rice, 259 ha for tea, 126 ha for maize, 114 ha for peanuts, vegetables, and beans, etc.

Table 18. Area of cultivated land for some major crops in Phuc Khoa Commune

Village	Area of cultivated land for some major crops (ha)				
	Rice	Tea	Maize	Water melon	Other annual crops (vegetable, peanuts, beans, etc.)
Phuc Khoa	15.4	90	5	NA	7
Ngoc Lai	32	22	25	NA	9
Nam Bon 1	30	26	20	7	9
Nam Bon 2	42.9	22	25	5	4
Na Lai	38.5	26	NA	NA	13
Na Khoang	35	19	12	NA	2
Ho Ta	67	48	15	NA	4
Pac Khoa	19.4	0	2	5	0.5
Ho Bon	38.8	6	22	NA	65.5 (including cardamom)
Total	319	259	126	17	114

(Source: Socio-economic survey report of Phuc Khoa Commune, October 2016)

For vegetable cultivation, the survey results showed that people in Phuc Khoa commune do not pay attention to vegetable cultivation. Scale of vegetable cultivation is just for self-serving. Only one or two HHs in Phuc Khoa and Ngoc Lai village cultivate vegetable for selling. In some villages where lived by many ethnic minority people, area for one crop rice is large (i.e., Ho Bon village) or in some other villages where land for agriculture production is limited (i.e., Pac Khoa), land use index in these villages is low, from September (after crop harvesting) agriculture production land is uncultivated, while a number of HHs still go to forests to collect vegetable or bamboo shoot. Based on this, the Project decided to support the local HHs to cultivate vegetable which aims to help increasing their living standard and changing cultivation practices. For King people villages like Phuc Khoa and Ngoc Lai, the Project support aims to build larger vegetable cultivation scale for selling. Through village meetings, many HHs expressed their interest in this activity, especially for winter vegetable crop, therefore, the Project decided to support for vegetable cultivation in Phuc Khoa commune.

2.3.2. Carried out work

a. Technical assistance

The Project has organized 8 training classes on cultivation technique applicable for 6 winter vegetable varieties and for chayote with participation of 278 people from 8 villages (1day/training class/village). Trainer of the training was officer of district extension center.

The training contents divided into two parts of theory and practice training on field. The participants were trained on cultivation technique applicable for some common vegetable varieties in winter crop, how to properly use pesticide, land preparation, fertilizer and sowing seeds.



Image 22. Technical training on vegetable cultivation in winter season (Nam Bon 2 village)



Image 23. Guideline on land preparation and seed sowing (Na Lai village)

b. Provision of seeds/seedlings

Results of provision of vegetable seeds/seedlings are shown in the Table 16. There were 275 HHs who participated in winter crop vegetable cultivation. Six vegetable varieties and chayote were provided to the HHs, of which 55,000 seedlings of kohlrabi, cabbage, and broccoli (F1 variety imported from Thailand and Japan) and 48,200 grams of seeds of mustard green, Chinese broccoli, and field cabbage.

Table 19. Number of beneficiaries, varieties, quantity of seeds/seedlings

No.	Village	No. of HHs	Variety/quantity						
			Cabbage (seedling)	Kohlrabi (seedling)	Broccoli (seedling)	Mustard green (gram)	chinese broccoli (gram)	field cabbage (gram)	Chayote (fruit)
1	Ho Bon	20	1,950	605	535	300	2,000	1,200	3
2	Nam Bon 1	44	2,820	1,850	1,280	250	3,100	4,250	6
3	Nam Bon 2	25	1,930	1,220	990	450	2,200	1,950	33
4	Pac Khoa	44	5,370	2,350	440	2,600	900	5,300	9
5	Phuc Khoa	40	3,400	2,970	2,310	150	2,600	4,250	54
6	Ngoc	61	7,880	5,700	5,620	1,050	3,250	3,600	66

Lai									
7	Na Lai	30	1,930	1,110	950	1,450	2,450	2,000	27
8	Ho Ta	11	710	630	450	500	1,200	1,200	6
Total		275	25,990	16,435	12,575	6,750	17,700	23,750	204

c. Monitoring and evaluation

Monitoring: After the technical training, the Project staff have worked with the facilitators from extension center to conduct field visit to review land scale and preparation by the local people before cultivating cabbage, kohlrabi, and broccoli. Only HHs who completed land preparation are eligible for being supplied with seedlings, thus, all registered HHs have finished land preparation before seedlings/seeds provision.

The facilitators (technical officer from extension center) conducted visits to the supported HHs after vegetable being cultivated to provide technical support to the local HHs, when needed.

Evaluation: In March 2018, the Project conducted Knowledge - Attitude - Practice (KAP) evaluation to evaluate technical application to vegetable cultivation in winter crop by the HHs.

Interview with 58 HHs showed that:

- ✓ Knowledge: 94.83% of the HHs know and understand vegetable cultivation technique (i.e., selection of seeds/seedlings, land preparation, density, fertilizer, tending, and pesticide prevention)
- ✓ Application: 84.48% of the interviewed HHs partly applied techniques of using fertilizer, tending and 89.66% partly applied technique of preventing diseases.

There are 2 reasons why they only partly applied the trained technique.

- ✓ The HHs could not afford fertilizer;
- ✓ Traditional practice of using only animal manure.

Impacts: 34.48% interviewed HHs said that vegetable yield is higher than before (over 20%); 63.79% said that the vegetable yield increases but not very much.

98.55% of the interviewed HHs expressed that they will continue participating in winter vegetable crop in 2018 and applying trained techniques/guidelines, 94.83% of them will cultivate in a larger scale.

Market: 24.14% of the interviewed HHs (14 HHs) sold vegetable and total income from the selling was about VND10,250,000.

100% of the interviewed HHs wished to receive support from the Project in building bridge with input/materials (seeds, fertilizers) suppliers and accessing to markets for selling outputs.

d. Encountered problems and solutions

Most of the HHs cultivate vegetable for domestic use and only sell if the outputs exceed their demand within the commune/village but not yet formed a vegetable supply area. During the next phase of the Project, interest groups should be established to promote large scale vegetable cultivation for selling.

2.4. SUPPORT FOR FRUIT TREE CULTIVATION

Rice and tea are two major crops of the commune. In recent years, the local HHs have been investing much for tea development as this crop generates large income, while land for fruit tree cultivation is limited. The HHs planted fruit trees such as pomelo, lime in their garden for domestic use only, very few HHs plant fruit trees in large scales. During planning process, the HHs registered to be supported with small quantity of diversified fruit trees to plant in their gardens. Having consulted with officer from District Extension Center, there were 6 fruit tree species considered suitable, but it takes at least 3 years to stably fruit. However, within the Project timeframe, every pilot activity in the first phase carried out for 1.5 years so it is too early to evaluate its impacts. The project support for fruit tree cultivation includes two parts: (i) technical training, and (ii) provision of fruit trees.

2.4.1. Technical training

Most people plant fruit trees based on their traditional practice and experience, so the results are not as high as expectation. In order to ensure that the people will apply the proper technique, the Project has organized technical training on planting 6 fruit tree species for registered HHs in 8 villages. The training aimed equipping the participants' knowledge and skills on planting, tending and preventing common diseases to 6 fruit tree species: pomelo, longan, guava, lime, persimmon, and plum. The training was facilitated by experienced trainer from Lai Chau Provincial Extension Center.

Training contents:

- ✓ Land preparation (design planting area, density, hole digging)
- ✓ Planting technique (standards of seedlings, time for planting, and planting technique)
- ✓ Tending technique (watering, fertilizing, pruning, and canopy creation)
- ✓ Preventing common diseases to 6 fruit tree species.

After theory training, the participating HHs practiced digging holes and planting trees. The trainer also trained the participants on techniques of pruning and canopy creating to the existing fruit trees in the gardens of the HHs.

The Project has organized 8 training classes in 8 villages with 390 participants. There was no participant from resettled Pac Khoa village due to limited land area and no one registered to participate in this activity.



Image 24. Technical training on fruit tree planting (Nam Bon 1 village)



Image 25. Technical training on pruning and canopy creating on the (Phuc Khoa village)

2.4.2. Provision of fruit tree seedlings

In order to diversify fruit tree species that are suitable with soil conditions in the locality, market potential, and demand of the local people, the fruit tree species were suggested and selected through village meetings organized at the end of 2016. The selected fruit tree species are Taiwan guava, lime (lime with rosy pulp and bearss lime varieties), crispy persimmon (no seeds), late ripe longan PH-M99.1, plum, and Dien pomelo.

The Project has met and agreed with the local farmers on support mechanism of the Project: (1) the Project provides free of charge 10 fruit trees for each participating HH, (2) the receiving HHs contribute 50% value of the 11th fruit tree onwards to the VF, (3) the Project only provide seedlings to the HHs who have prepared land and dug holes (number of seedlings is equal to number of dug holes). Results of provision of fruit tree seedlings and collection of money to the VF are shown in the below Table 20.

Table 20. Provision of fruit tree seedlings and collection of money to the VF

No	Village	HHs	Species / Quantity						Provided trees	Collected amount
			Guava	Lime	Plum	Persimmon	Longan	Pomelo		
1	Ho Bon	51	83	119	197	12	82	117	610	1,602,500
2	Nam Bon 1	28	11	66	74	190	22	47	410	2,702,000
3	Nam Bon 2	55	104	163	135	119	55	130	706	2,621,500
4	Phuc Khoa	51	68	78	97	107	77	135	562	1,678,500
5	Ngoc Lai	107	197	193	139	108	154	221	1,012	693,000
6	Na Lai	58	103	242	192	12	25	141	715	2,065,000
7	Na Khoang	53	101	210	99	51	12	82	555	863,000
8	Ho Ta	68	128	215	213	59	100	117	832	2,495,500

Total	471	795	1,286	1,146	658	527	990	5,402	14,721,000
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The Project has provided 5,402 seedlings to 471 HHs. Total collected money to the VF is VND 14,721,000.

2.4.3. Monitoring and evaluation

After the training, the facilitator (officer of the district extension center) worked with the VMBFMLDs of the villages to visit the participating HHs to check hole digging and number of dug holes as ground for seedlings provision. Some of HHs who did not attend the training but dug holes properly are eligible to be provided with seedlings. The number of receiving HHs is higher than the number of training attended HHs (471/390 HHs)

The Project visited the HHs who planted fruit trees to check dead rate after 15 days from the date of provision. The checking results showed that death rate was 4.65%, the highest dead rate fall under plum (10.73% - see appendix 6). For the death trees, the Project requested the supplier to supplement as requested by the Project.

2.4.4. Encountered problems and solutions

Demands of the local people for fruit tree species vary. In order to ensure concentration and development of fruit trees towards fruit production, the Project agreed to provide 6 fruit tree species to avoid planting too many species that is difficult to develop fruit production area.

Moreover, development of tea in the commune is a reason that limits expansion of the fruit production. In order to solve this issue, Tan Uyen DPC has been implementing a program to provide macadamia tree the people to intercrop with tea to increase income and reduce protection forest encroachment.

2.5. FISH RAISING

Phuc Khoa Commune is like a small valley, it surrounded by mountains on the north, east and west; the terrain is high in the north and west, lower in the east and south. There are two streams (Nam Bon and Nam Be Stream) flowing through this commune, which provide water for agricultural production. The terrain allows people in the low areas like Phuc Khoa, Ngoc Lai and Ho Ta village to dig ponds and small lakes for fish raising with size varies from 200 - 10,000 m², total pond area is about 12 hectares.

In order to make initial assessment on fish raising experience of the local people, hydraulic, hydrological conditions of ponds, the Project has supported 5 HHs in Ho Ta villages to do polyculture fish raising that achieved certain results. The Project staff took three main steps: 1) worked with VMBFMLD to investigate the field and select HHs; 2) organized 2 training courses

on techniques for pond preparation, fish releasing, maintenance and disease prevention; 3) check fish raising by the local people and provide technical advices on the regular basis.

2.5.1. Technical assistance

The Project has organized two theoretical training for 5 HHs (trainer was project officer). After the first training on pond preparation technique for 7 HHs, the Project and the VMBFMLD have selected 5 HHs who have prepared ponds well to participate in the polyculture fish raising model. Total pond area is 5,070 m², pond scale varies from 450 m² - 1.439 m². The Project also provided 507 kg of lime for the 5 HHs.

Based on technical process, the project has informed the participating HHs about quantity and fish species as well as amount of money (50%) they have to contribute to the Village Fund. Having searched information about fingerling suppliers in Lai Chau Province, the Project signed a supply contract with Tam Duong fish supply farm (belongs to provincial extension center). The Project has organized a study tour for the participating HHs to the fingerling raising farm in Tam Duong district to check the fish before delivery.

The Project staff visit the HHs monthly to check their fish raising and provide technical advices, when needed.



Image 26. The project staff were visiting fish fingerlings supply farm and signing supply contract



Image 27. Study tour for farmers

2.5.2. Provision of fingerlings, lime and implementation results

a. Lime powder:

The Project has provided 507kg of lime powder to the 5 HHs for pond refreshment before releasing fish. Each HH applied 10kg lime powder for 100m². Details of lime powder provision to the HHs are shown in the below Table 21.

Table 21. Results of provision of lime powder to the HHs

No.	Full name	Pond size (m2)	Quantity of lime powder (kg)
1	Lò Văn Chiến	450	45
2	Hoàng Văn Đồn	1,207	121
3	Lò Văn Xanh	672	67
4	Doãn Thị Nhung	1,439	144
5	Lò Văn Luân	1,302	130
Total		5,070	507

Having provided with lime powder, the HHs have applied it for pond refreshment as required.

b. Fish fingerlings:

In order to utilize the available food source for fish in ponds combined with additional food supplied by the people, based on market demand for fish in the locality, the Project provided technical guidance to the local people on polyculture fish raising model, in which grass carps account for 50%, tilapia account for 20%, Indian *Cirrhina molitorela* account for 15%, bighead carps account for 10% and hybrid common carps account for 5%, density is 2 fish/m².

As the Project requested for 5 different fish species with different sizes, so the supplier delivered fingerlings by 2 times due to not having enough fingerlings to provide at once. For the first time, they delivered grass carp and hybrid common carp, and the rest of fingerlings delivered after that. Results of fish fingerlings provision are shown on the table 22 and 23.

Table 22. Result of the 1st fingerling provision

No.	Full name	Total quantity of fingerlings	Quantity of fingerlings provided for the first time and death rate after 24 hours of releasing					
			Grass carp			Hybrid common carp		
			Quantity (fish)	Death fish (fish)	Death rate (%)	Quantity (fish)	Quantity of dead fish (fish)	Death rate (%)
1	Lò Văn Chiến	900	450	100	22	45	-	-
2	Hoàng Văn Đồn	2,414	1,207	200	17	121	-	-
3	Lò Văn Xanh	1,344	672	612	91	67	24	36
4	Doãn Thị Nhung	2,878	1,439	200	14	144	-	-
5	Lò Văn Luân	2,604	1,302	1,107	85	130	-	-
Total		10,140	5,070	2,219	43.77	507	24	4.73

Table 23. Provision of fingerlings for second time and supplemental fish to replace dead fish of the first time

No	Full name	Provision of fingerlings for 2 time and death rate after 24 hours										
		Supplemental fish to replace dead fish after the first supply										
		Grass carp	Hybrid common carp	tilapia	Indian Cirrhina molitorela			Bighead carp				
		Quantity	Quantity	Quantity	Dead fish	Death rate (%)	Quantity	Dead fish	Death rate (%)	Quantity	Dead fish	Death rate (%)
1	Lò Văn Chiến	200	-	180	-	-	135	61	45.19	90	36	40.00
2	Hoàng Văn Đòn	200		483	-	-	362		-	241	10	4.14
3	Lò Văn Xanh	527	24	269	-	-	202	20	9.92	134	8	5.95
4	Doãn Thị Nhung	200		576	-	-	432	10	2.32	288	10	3.47
5	Lò Văn Luân	1,107		521	-	-	391	11	2.82	260	40	15.36
Total		2,234	24	2,028	-	-	1,521	102	6.71	1,014	104	10.26

For the first time (Table 19), Tam Duong fish supply worked with the Project to deliver grass carp and hybrid common carp species. 24 hours after delivery, death rate of grass carp is high (43.77%), particularly, 2 HHs recorded death rate at over 85%. There are 4 reasons led to high death rate of grass carp as following:

- ✓ Fish releasing was not safe: Tam Duong fish supply farm transported fish in the oxygen packs and delivered to each HH. The fish after that released to a tank for counting before truly being released to the ponds that caused shocking two times with water environment and temperature. The movement/transportation, and counting fish were strong that cause to shocking.
- ✓ Fish were released in the morning, it rained heavily in the afternoon same day, and fish were so weak that they could not stand with change of water environment.
- ✓ Getting water to the ponds before releasing fish: time for getting water to the ponds of these two HHs (HHs of Mr. Hoàng Văn Đòn and Mr. Lò Văn Luân) did not meet requirement (less than 3 days), water in the ponds was still muddy before fish releasing. It is attributed that the fish died because of the mud stuck to its gills and prevented fish from breathing then died.
- ✓ Pond management during fish raising: Grass carp fish raised by Mr. Lo Van Xanh died as many because his pond located in the crowded area, after heavy rains, water with waste

from surrounding area flowed into the pond and contaminate pond water that caused fish death.

The Project has discussed with the fish supplier on supplemental supplying fish to the HHs to compensate to the dead fish of the first and second time of delivery.

Learning from the first delivery, the Project has requested the HHs to come to Tam Duong supply farm to check fish before it being packed in oxygen packs and transported to famers' ponds. This time, the death rate after 24 hours of fish releasing of the supplemental supplying recorded low (below 10.26%, see the Table 20). Moreover, the Project has agreed with the supplier to supply 10-15% more than the registered amount to ensure the designed density of 2 fish/m². The activity has been implemented for 18 months so it is too early to make comprehensive evaluation but based on the current result; however, in July 2018, grass carp fish gained 1.5kg for big fish and 0.2 – 0.3 kg for small fish. In June and July 2018, as affected by flood, 1 HH – Doan Thi Nhung had some losses (unfortunately, the loss cannot be estimated).

c. Contribution to the Village Fund

It was difficult to collect money to the VF. Total of 5 HHs have to contribute VND 17,922,450, but until July 2018, only 3 HHs contributed with an amount of VND 8,231,000 (45.93%). The Project has met with the VMBFMLD and the remaining two HHs to discuss and agree that the contribution to the VF should be completed within April 2018. However, until July 2018 they have not contributed. VMB will go and work with each HH and apply method to collect this money into VF.

Table 24. Fingerling expense and contribution to the Village Fund

No.	Full name	Pond size (ha)	Quantity of fingerlings	Expense	Contribution to the VF	Contributed amount	Receivable
1	Lò Văn Chiến	450	900	3,181,500	1.590.000	1,590,000	90,750
2	Hoàng Văn Đòn	1,207	2,414	8,533,490	4.266.000	4,266,000	4,266,745
3	Lò Văn Xanh	672	1,344	4,751,040	2.375.000	2,375,000	875,520
4	Doãn Thị Nhung	1,439	2,878	10,173,730	5.086.000		5,086,865
5	Lò Văn Luân	1,302	2,604	9,205,140	4.602.000		4,602,570
Total		5,070	10,140	35,844,900	17.919.000	8.231.000	9.688.000

2.5.3. Encountered problems and solutions

a. Duration

Through interviews, the local people shared that they often raise grass carp fish because it is market potential with good price. They often buy bigger size fish (0.5kg) to raise because after two years the fish weight can reach 3kg per one (market size).

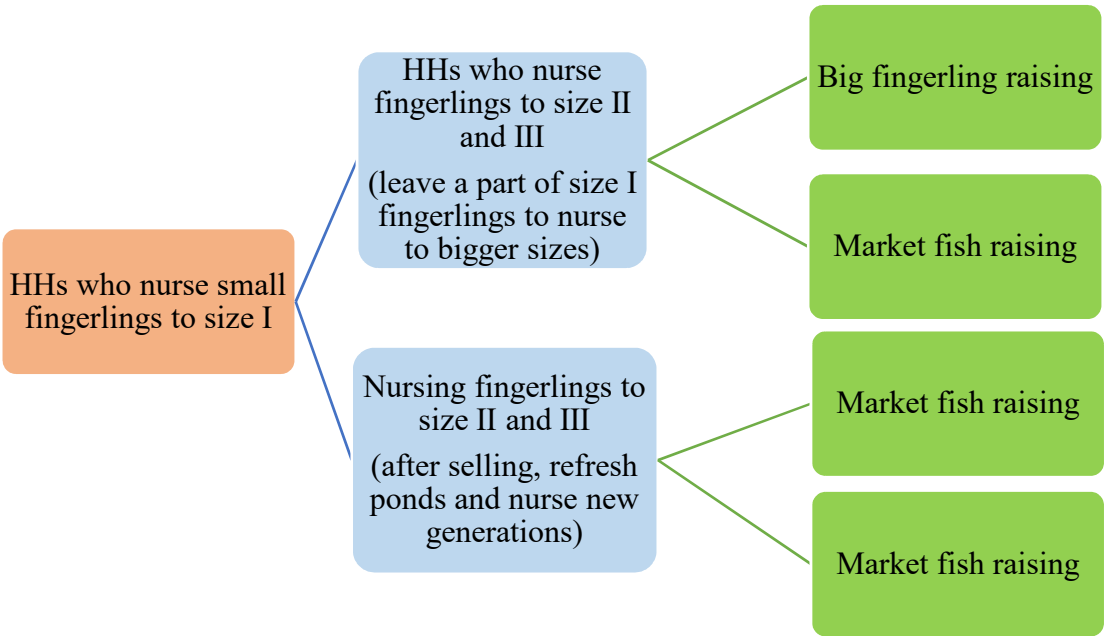
Fingerlings size III (10 – 12 cm) have been selected for the fish raising model supported by the Project, after 18 months, the fish weight is about 1.5 – 2kg/fish, smaller than the market size. It is necessary to discuss with the HHs to prolong the duration to 2.5 years (30 months) and continue monitor the process to have more comprehensive assessment.

b. Supply source and demand

In Lai Chau Province, there is no artificial fish breeding facilities, the fingerling raising farms by alevin (2-3 cm) or fingerlings (4 – 6 cm) from other provinces like Phu Tho, Bac Ninh, Hai Duong to raise to bigger sizes before selling to the local people. Some fingerling sellers have brought size I and II from lower lands and then temporary raised in the pond before selling, so the fingerling quality does not meet requirement. For market fish raising HHs, they often buy big size fingerlings (0.5kg/fish) from early harvested ponds.

In order to promote fingerling supply chain in the locality, it is necessary to establish farmer groups (2-5 HHs) to raise fingerlings with different size and species (at least 3-5 specialized ponds for fingerling raising). In addition, it is important to provide guidance to the farmer groups on fingerling production and annual production planning as well as expected incomes to the HHs who raise fingerlings as illustrated in the below chart 1.

Chart 1: Illustration of “fingerling raising model of farmer groups”



c. Pond environment quality control

Most of the HHs raise fish in the water flowing ponds, which conditions are not stable, especially during rainy season (May – September). Rainfall flow into ponds with waste from the upper land, thus, the farmers should not release fingerlings during heavy rains. In addition, during May and June, when the local people prepare land for rice cultivation, muddy water can flow into ponds that can negatively affect the fish.



(Image 28 & 29: Water source for ponds of Mr. Luân and Mr. Đòn)

In order to mitigate negative impacts of contaminated water source, it is necessary to apply measures to ensure quality of the water source by placing lime powder pack at water incoming points of the ponds, preventing water flowing into the ponds during heavy rains, and checking water source if the water color is not normal.

As the ponds/lakes located nearby living and farming areas of the people, so it is necessary to check surrounding areas to prevent water waste (animal manure) flow to the ponds to avoid diseases.

d. Food and recording

The results of the monthly technical inspection report showed that most of the households provided only 50% of the required green feed to the fish (e.g. it requires 25 - 30 kg of green feed daily for every 100 kg of grass carp, but the local HHs provided only 15 - 20 kg of green feed for every 2 - 3 days). Moreover, starchy food for fish was not provided enough. This particularly happened to large ponds, for example, ponds of Mr. Don and Mr. Luan, during the dry season (from October to March) when the green food source is not available. In order to address this issue, people should cultivate fodder grass, banana trees around the pond banks or gardens to create feed source for fish.

The Project has provided a record notebooks and guideline for each household to record information on feed and diseases to fish, but they did not record fully. They explained that they have no recording habit, so the Project staff have to come and guide them to record information weekly. In July 2018, the Project mobilizes facilitator to join Project staff for checking 2 times/month and ask farmers filling in the forms for final model evaluation.

2.6. SUPPORT FOR FODDER GRASS CULTIVATION

In order to support for livelihood development (raising buffaloes, cows, and fish) and reduce negative impacts of free grazing in forests, especially to newly planted forests, the Project supported the local people to cultivate fodder grass.

2.6.1. Background

According to the socio-economic survey report of Phuc Khoa Commune in March 2018, there were 815 buffaloes, 27 cows, 11 horses and 455 goats in the whole commune. Comparing the current number of buffaloes and cows with the number collected at the time of Socio-economic Survey (October 2016), the buffalo and cow herd has decreased by 180. The reduction is due to the fact that grazing pasture areas have been narrowed as a part of grazing area has been converted to tea plantations. In addition, people now use machines to facilitate agriculture production instead of taking advantage of buffalo/cow traction as before, this makes the number of cows and buffaloes declined.

According to the socio-economic survey report (October 2016), the number of cattle and buffaloes raised with large quantity in villages of ethnic minorities such as Ho Bon, Ho Ta, Nam Bon 1 thanks to the available grazing pasture. From September to May, after harvesting, paddy field is free to be used as a grazing pasture. In addition, people in these villages do not raise cattle in cages but freely graze in forests, they only go to forests to check their cows and buffaloes every two or three days in combination with vegetable or firewood collection. This is considered as one of forest degradation drivers.

Having considered the above-mentioned issues, the Project decided to support the local people in Phuc Khoa with fodder grass cultivation.

2.6.2. Carried out work

The Project has provided two varieties of grass named VA06 and Mulato-II to the people to plant. These varieties are resistant to cold weather. It has high productivity, nutrition content, and soft leaves that are good for cows, buffaloes and goats.

The Project has organized training classes on fodder grass cultivation to the local people to ensure that they will plant and maintain grass properly. The training facilitated by a trainer who is technical officer of Tan Uyen district Extension Center.

2.6.3. Monitoring and evaluation

The Project has recruited a technical officer of Tan Uyen district Extension Center to be trainer of the training on fodder grass cultivation. The trainer prepared training materials and provided technical guidance to the participating HHs. After the training, the Project staff checked the registration list and land scales of the registered HHs before providing grass cuttings and seeds to

them based on technical norms and project support mechanism. Details are shown in the Table 25.

Table 25. Number of participants to training, registered land area, and quantity of grass cuttings and seeds.

No.	Village	No. of HHs	Registered land area		Quantity of VA06 cuttings		Quantity of Mulato 2 seed (gram)	
			VA06	Mulato 2	Requested cuttings	Provided cuttings	Requested seeds	Provided seeds
1	Ho Bon	15	30,100		135,450	6,000	-	-
2	Nam Bon 1	12	2,800		12,600	4,800	-	-
3	Phuc Khoa	1		500	-	-	750	500
4	Ngoc Lai	15	5,000	7,000	12,000	3,200	10,500	3,500
5	Na Lai	1	500		2,250	400	-	-
6	Na Khoang	5	1,700	1,700	4,500	400	2,550	2,000
7	Ho Ta	14		21,000	-	-	31,500	7,000
Total		63	40,100	30,200	166,800	14,800	45,300	13,000

Training results: 63 participants /5 classes /7 villages. Each training class lasted for ½ day. To save time and resources, for villages where number of registered HHs was not large, the Project organized one join training class.

Result of provision of grass cuttings and seeds: Total grass planting area is 70.300 m², each HHs was provided with 400 cuttings of VA-06 or 500 grams of Mulato-II grass seeds. Total of provision was 14,800 cuttings of VA06 and 13 kg seeds of Mulato-II for 63 HHs who participated in the training.

It is too early to assess effectiveness of the activity as it was started in February 2018.



Image 30. Technical training on fodder grass cultivation in Ho Ta village



Image 31. Check and receive VA06 cuttings

2.6.4. Encountered problems and solutions

In order to mitigate impacts of free grazing to the forest resource, the Project has supported the local people to cultivate fodder grass. In addition, the Project should consider to support the ethnic minority people to build cages for cows and buffaloes to reduce pressure on forest resource.

2.7. SUPPORT FOR WATER MELON CULTIVATION

2.7.1. Background

According to the socio-economic survey report conducted in October 2016, main livelihood of Nam Bon 1 and Nam Bon 2 village is cultivation of rice, maize, tea and water melon (table 26).

Table 26: Ethnic and livelihood

Ethnic	Villages	Main livelihood
Kinh	Phuc Khoa, Ngoc Lai	Tea production at large scale, rice (2 crops), large scale livestock, and services (machines, electricity, carpenter services, etc.)
Kho Mu	Na Lai, Ho Ta	Rice and tea at small scale, small scale livestock and services.
H'mong	Ho Bon	Large scale cardamom, 1 crop of rice and maize, small scale tea, livestock, and harvesting forest resources.
Lao	Na Khoang	1 crop of rice, small scale tea production, livestock and services.
Giay	Nam Bon 1, Nam Bon 2	1 crop of rice, maize, medium-scale tea production, livestock, water melon, and services
Thai	Na Khoang	2 crops of rice, maize, medium scale tea production, livestock, and services
Dao	Ho Ta	1 crop of rice, small scale tea production, livestock, and services

(Source: socio-economic survey report of Phuc Khoa commune conducted in October 2016)

According to statistics, area of water melon cultivation is about 15 ha, average productivity is 13 tons per ha. The Project has supported the people in Nam Bon 1, Nam Bon 2, and Pac Khoa village to cultivate water melon toward intensive cultivation. Pac Khoa is a resettle village with limited land for cultivation, but the HHs in the village said that they can borrow 1 crop land of others, therefore, the Project decided to support them. Main steps: 1) organization of technical training on water melon cultivation, 2) provision seeds, 3) development of water melon cultivation using agriculture film, 4) organization of study tour outside the province. The activity is under implementation process so no assessment report conducted. It will be completed in May 2018 as planned.

2.7.2. Carried-out work

a. Technical training

Technical training classes were organized in 3 villages (1 day/class/village) with total of 136 participants (table 24), of which, women accounted for 22.06%. Trainer of the training was a technical officer of Tan Uyen District Extension Center.

The training includes two parts: theory and field practice. For the water melon cultivation using agriculture film, the Project requested the trainer to train the participating HHs on their own field.

b. Provision of water melon seeds

Implementing method: During the training, the Project staff informed the participating HHs on support norm and mechanism and requested the HHs to register land area for seeds preparation. Moreover, the Project the Project staff worked with the VMBFMLDs to urge the HHs to prepare land and only HHs who completed this work were provided with seeds. The Project staff conducted field visit to check the land and provided seeds to the HHs based on the checked results. Technical training and provision of seeds results are shown in the Table 27.

Table 27. Number of participants to the training and quantity of provided seeds

No.	Village	No. of HHs participated training	No. of HHs who met requirements	Check land area (m^2)	Seed demand (gram)	Provided seed quantity (gram)
1	Nam Bon 1	36	33	44,461	3,557	2,840
2	Nam Bon 2	51	51	64,035	5,123	4,380 (*)
3	Pac Khoa	49	35	20,089	1,527	1,940
Total		136	119	128,580	10,207	9,160

(*) Included 7 HHs who conduct water melon cultivation using agriculture film

The Project provided 9,160 gram water melon seeds to 119 HHs who had prepared land as required by the Project. The quantity of seeds is enough for cultivation on 114,500 m^2 .

c. Model of water melon cultivation using agriculture film

According to the survey, all of the HHs in the 3 villages cultivate water melon using their own experience with limited application of technology. Particularly, they do not do create beds, but just dig holes and place 3-4 seeds per hole that is very resource consuming and costly. Manure application is limited and no agriculture film is used to reduce pests/diseases, therefore, productivity is not high. From this fact, the Project design a model of water melon cultivation using agriculture film and seedlings planted in pots a method to encourage people to apply technology to agriculture production in order increase productivity and reduce costs.

Achieved results: After field checking, the project selected 7 HHs to implement the model of water melon cultivation using agriculture film. The Project provided 100% agriculture film, fertilizer and pesticides. The supported HHs contribute 50% of value of supplies, equivalent to

VND 631,000 to the VF. Each model is 500m². All HHs completed planting before May 3, 2018 and now is time for supervision and technical assistance.



Image 32. Guiding for bedding and applying agriculture film



Image 33. Checking and guiding people to plant seedlings in pots

2.7.3. Supervision, encountered problems and solutions

The Project supervised and provided technical support to the HHs who cultivates watermelon during production cycle, especially to the ones who are in the model. A district technical extension staff, also the Project facilitator, recruited to provide constant support and supervision to the 7 HHs. In May 2018, the Project organized a so-called Field Workshop to assess the model. Below are some results.

Table 28. Average Productivity and Income from Watermelon Cultivation

Indicator	Unit	Traditional cultivation	Model using mulching system (min - max)
Productivity (estimated)	Ton / ha	10	21.94 - 28.72
Net income (excluded production cost) (selling price estimated 8,000 đ/kg)	Million VND / ha	10 - 30	78.06 - 145.90

Productivity: the huge difference regarding productivity between HHs received seeds and followed traditional cultivation with 7 HHs followed the model. The productivity from HHs in the model is 2.2 -2.9 times higher than those HHs are not in the model.

Income: After deducting production cost, income from none-model HHs estimated 10 – 30 million VND/ha while HHs in the model reached 78 – 145.9 million VND/ha.

Challenges and solutions: The local people have a habit of planting water melon before Tet holiday, when the weather is very cold and not good for water melon growth. In addition, they apply sowing seed method, which is very costly (seed and labor consuming). In order to change this traditional practice, based on results from the model, the Project should continue to extend

the model in 3 villages of Nam Bon 1, Nam Bon 2 and Pac Khoa in the next production season 2018 – 2019 and organize study tour for new HHs.

Contribution into VF: up to July 2018, there 6/7 HHs in the model in Nam Bon 2 village contributed into VF with 3,786,000 VND, 1 HH has not yet contributed. To avoid this problem in the next production season, the Project and VMBs should apply new method; that is registration and contribution before implementing the activity; or only support HHs who contributed into VF.

2.8. TECHNICAL TRAINING ON PIG RAISING

The SNRM Project has been implementing livelihood development activities not only through provision of seeds/seedlings to the local people for cultivation and support their agriculture production, but also organization of technical training classes. Based on the needs of the local farmers, two technical training courses were considered: 1) technical training on pig raising, preventing and treating diseases to pigs; and 2) technical training on tea maintenance. So far, only “technical training on pig raising, preventing and treating diseases to pigs” was organized.

Results: 118 participants / 7 villages (52.54% of women) / 5 training classes. Each class lasted for 1 day. Trainer of the training was technical officer from Lai Chau Provincial Department of Livestock & Veterinary and technical staff of Tan Uyen District Veterinary Center.

Monitoring and evaluation: There is no assessment conducted to this activity.

APPENDIXES

Appendix 1: MONITORING INDICATORS FOR FOREST MANAGEMENT

Activity	Forest Patrolling Teams (FPT)	FPT members	Protected area (ha)
Forest protection	09	192	4,520.31

Appendix 2: MONITORING INDICATORS FOR SCATTERED TREE PLANTING

Activity	Technical training/provision of training material	No. people/HHs	Quantity of trees (tree)
Scattered tree planting	09 training classes and handout	242 people/242HHs	9,034 trees

Appendix 3: MONITORING INDICATORS FOR AF/REFORESTATION

Activity	Technical training/provision of training material	No. participating people/HHs	Planting area	Forested rate
Af/reforestation	01 training class and handout	11 people/11HHs	2.45 ha	Forested rate will be collected after 4 years since planting time

Appendix 4: MONITORING INDICATORS FOR FOREST REGENERATION

Activity	Technical training/provision of training material	No. of beneficiaries	Area	Interventions	Status of target areas
Forest regeneration	08 technical training and handout	297 people/297HHs	70.37 ha	<ul style="list-style-type: none"> - Reduce free grazing - Design methods of forest fire prevention and fighting - Stop cutting regenerated trees - Install signboards around area of forest regeneration 	1c bare-land with scattered timber trees

Appendix 5: MONITORING INDICATORS APPLICABLE FOR LIVELIHOOD DEVELOPMENT

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
1	Provision of improved stoves	<ul style="list-style-type: none"> • Technical training on improved stove making • Provision of stove molds • 3) Provision of materials for stove making 	<ul style="list-style-type: none"> • 234 participants (52.54% women) • 4 stove molds /7 villages • 61 HHs (47 HHs implemented) 	Designed by SMRM Project in Son La province, made by the local HHs	Improved stoves help saving more firewood than traditional ones	<ul style="list-style-type: none"> • Reduce firewood cost • Save time for firewood collection 		
2	Support for Biogas plant construction and	Technical guidelines for building biogas plant using composite	22 HHs	<ul style="list-style-type: none"> • Biogas plant using composite 	<ul style="list-style-type: none"> • Reduce firewood • Reduce 	<ul style="list-style-type: none"> • Reduce firewood cost 		

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
	installation	tanks		tanks <ul style="list-style-type: none"> • Using livestock waste (manure) for gas generation 	cost for industrial gas	<ul style="list-style-type: none"> • Save time for firewood collection • Contribute to environment protection 		
3	Support for vegetable cultivation	Technical training on vegetable cultivation applicable for 6 vegetable species for winter crop (included handout)	278 people	Common vegetable cultivation techniques				
		Provide 48,200 gram of three species:	275 HHs		Increase of cultivating	Increase income from selling		

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
		mustard green, cChinese broccoli, field cabbage and 55,000 seedlings: cabbage, kohlrabi, and broccoli.			area, vegetable for domestic use; reduce pressure to forests	outputs Save time for collecting vegetable from nature		
4	Support for fruit tree cultivation	Technical training on fruit tree cultivation applicable for guava, pomelo, lime, plum, longan, and persimmon (included handout)	390 people	Normal cultivation techniques		Not assessed yet		
		Provision of 5,402 seedlings of the 6	471 HHs					

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
		fruit tree species.						
5	Support for fish raising	<ul style="list-style-type: none"> Techniques of polyculture fish raising, preventing and treating diseases to fish (included handout) 	7 HHs	<ul style="list-style-type: none"> Polyculture fish raising for 5 freshwater fish species Semi-polyculture fish raising. Density: 2 fish /m² 		Not assessed yet		
		<ul style="list-style-type: none"> Provision of 507 kg lime powder; Provision of 10,140 fingerlings 	5 HHs			Not assessed yet		

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
		of all types						
6	Support for fodder grass cultivation	Technical training on cultivation of VA06 and Mulato-II grass varieties (included handout)	63 participants	Intensive cultivation technique		Not assessed yet		
		Provision of 13,000 grams of Mulato-II seeds and 14,800 cuttings of VA06	63 HHs			Not assessed yet		
7	Support for water melon cultivation	Technical training on water melon cultivation (included	136 participants	Intensive cultivation technique, using		Not assessed yet		

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
		handout)		agriculture film				
		Provision of 9,160 grams of water melon seeds	119 HHs	Normal technique		Benefit from 10 – 30 million VND/ha		
		Provision of agriculture film, fertilizer, and pesticides	7 HHs who are implementing the model (out of 119 participating HHs)	Intensive cultivation technique, using agriculture film		Benefit from 78 – 145.9 million VND/ha		
8	Technical training on pig raising,	Technical training (included handout)	118 participants	Provision of basic technical knowledge on pig		No assessment		

No.	Activities	Training/ provision of training materials	Number of beneficiaries	Applied technique	Impacts (increase production/ saved fuel)	Economic impacts (income generation/save labor cost)	Community-based organisations (farmer groups)	Impacts generated by community-based organisations (marketing, group purchasing, access to financial sources)
	preventing and treating common diseases to pigs			raising				

Appendix 6. TOTAL OF DEAD FRUIT TREE 15 DAYS AFTER PLANTING

No.	Village	Date of checking	Species / Quantity / No. of dead trees (Unit: tree)												Provided trees	Dead trees
			Guava		Lime		Plum		Persimmon		Longan		Pomelo			
			Provided trees	Dead trees	Provided trees	Dead trees	Provided trees	Dead trees	Provided trees	Dead trees	Provided trees	Dead trees	Provided trees	Dead trees		
1	Ho Bon	25, 26/6	83	-	119	2	197	12	12	2	82	-	117	5	610	21
2	Nam Bon 1	25/6	11	-	66	-	74	3	190	1	22	-	47	1	410	5
3	Nam Bon 2	26, 27/6	104	1	163	-	135	3	119	3	55	-	130	1	706	8
4	Phuc Khoa	25, 26/6	68	1	78	2	97	12	107	-	77	-	135	4	562	19
5	Ngoc Lai	30/6 - 2/7	197	2	193	4	139	21	108	4	154	2	221	8	1.012	41
6	Na Lai	27, 28/6	103	2	242	8	192	22	12	-	25	2	141	2	715	36
7	Na Khoang	28, 29/6	101	3	210	17	99	6	51	4	12	-	82	-	555	30
8	Ho Ta	29, 30/6	128	10	215	5	213	44	59	11	100	7	117	14	832	91
Total			795	19	1,286	38	1,146	123	658	25	527	11	990	35	5,402	251
Death rate/provided trees (%)				2.39		2.95		10.73		3.80		2.09		3.54		4.65

REFERENCES

1. Socio-economic survey report of Phuc Khoa commune conducted in October 2016; consultant team.
2. Socio-economic report of Phuc Khoa commune conducted in March 2018; Phuc Khoa CPC.