CENTRE DE COOPÉRATION INTERNATIONALE DE RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

NORTHERN UPLANDS DEVELOPMENT PROGRAMME

DEPARTMENT OF AGRICULTURAL LAND MANAGEMENT, MINISTRY OF AGRICULTURE AND FORESTRY

THE EUROPEAN UNION
LAO PDR GLOBAL CLIMATE CHANGE ALLIANCE PROGRAMME

LANDSCAPE MANAGEMENT AND CONSERVATION AGRICULTURE DEVELOPMENT FOR ECO-FRIENDLY INTENSIFICATION AND CLIMATE RESILIENT AGRICULTURAL SYSTEMS

COMMUNITY-BASED AGRICULTURAL DEVELOPMENT PLANS (CADPS) 2015

PHONGSALY PROVINCE

EFICAS project

May 2015

FOREWORD

Community-based Agricultural Development Plans (CADPs) were conducted in the two target districts (Mai and Samphan) and the four target villages (Sanamha, Phia, Phialouang, and Houayvangkao) from January to February 2015.

CADPs are the results of a 4-day full-time participatory process (presented below) involving the whole village community and including the collection of various data (e.g; men and women problem census, village population trends, diversity and profitability of agricultural and non-agricultural activities etc.).

The content of the present document only refers to the CADP-related activities planned for 2015 and to the related budgets. It also includes a short description of village and village landscape units main characteristics to facilitate the understanding of the activities presented.

Activities planned in Hattham Technical Service Center are also presented as complementary activities to those planned in target villages.

Community-based Agricultural Development Plan 4-day steps

Day 1. Opening village meeting

- Introduction of the project team
- Presentation of the members of the Village Land Management Committee (VLMC)
- Objectives of the meeting and activities that will take place in the village

Day 1-2. Data collection

- Socio-economic data collection (rapid survey of all village households)
- 4 Focus group discussions
  - Problem census (men / women)
  - Wood, wildlife and NTFP
  - Village population trends
  - Land use systems (crop – livestock): input-output parameters
- Land management and regulations (3D model, maps)

Day 3-4. Activity planning

- Discussion on innovative practices
- Land management rules, indicators
- Field visits, site selection, volunteer households

Day 4. Closing village meeting

Remark: Tentative budget and budget disbursement modalities were finalized and validated later on with the Village Land Development Committee

CONTENT

EFICAS Project
Community-based Agricultural Development Plan (CADP) 2015
Ban Phialouang , Samphan district, Phongsaly Province

Content

1. VILLAGE MAIN CHARACTERISTICS

- GPS coordinates: 21°12,765'N – 102°10,7782'E (Fig. 1 and 2)
- Location: 920 m asl, on the hedge of a hill
- Accessibility: not easily accessible, 15 km far from the main road
- Size (2014): 34 households, 168 inhabitants, 891 ha
- Ethnic group: Khmu
- External supports:
- Past supports from GoL projects (PRF, EU, FAO, Nayubai bank) for infrastructure improvement (school, water supply), credit and animal access, rice bank
- 2 different PLUPs implemented in 2012 with the support from NUDP-GiZ and MONrE
- Several on-going partnerships with the private sector for lemon grass (Changxeunta Cie, China), coffee (Changxeunta), job's tear (Saota, China), benzoin and NTFPs (Agroforex, France)

Fig 1. Phialouang location in Samphan district (MoNRE, 2011)

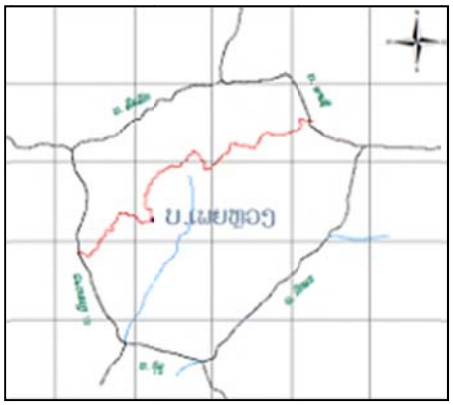

Fig 2. Phialouang village bounderies (PLUP, 2012)

2. LANDSCAPE UNITS / LANDSCAPE USE

5 main landscape units identified (Fig. 3):

- **Permanent cropping area** (50 ha, all HH)
  - **Coffee** area (15 ha, 29 HH): coffee (10 ha), job's tear (8-10 ha, intercropped with coffee), galangar (3 ha), cardamom Paksong (2 ha)
  - **Cardamom Quangtum** area (35 ha, 33 HH)
- **Rotational cropping area** (upland rice, 40 ha, all HH; rotating on 8-10 years)
- **Lowland paddy rice area** (5 ha, 4 HH)
- **Bamboo and Benzoin forests**
- **(Planned) livestock area**

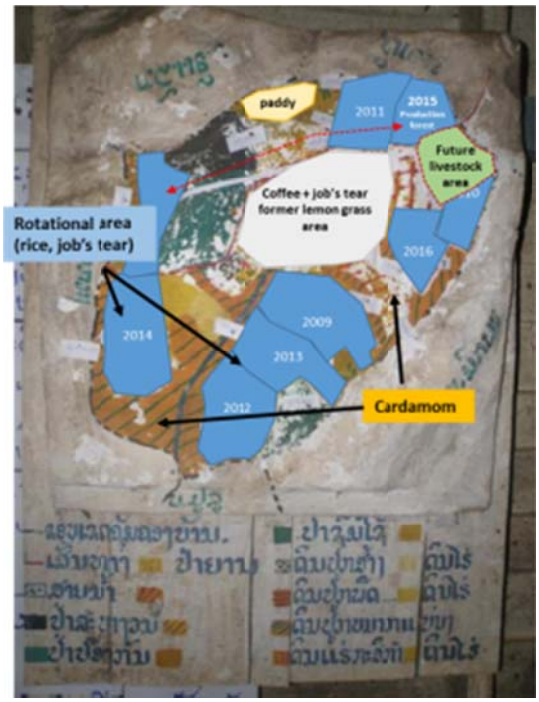

Fig 3. Phialouang main landscape units location

3. ACTIVITY PLANNING 2015

Activities planned for 2015 are related to 3 main topics: cardamom, coffee, and livestock production improvement.

1. Cardamom

Context:

- Main current cash crop in the village (surface and income)
- Important driver of past recent village development (price in 2014 for Cardamom Quangtum was of 400,000 LAK/kg dry)
- Problem with cardamom fructification (flower degeneration); ranking priority N°1 for men and N°4 for women in problem census
- Limited information on market demand (China), production trends (Province/ target districts; productive vs not yet productive area), and price evolution in the future

3 proposed activities: Problem census, market study, and on-field experiment

1.1 Problem census
A study will be conducted by the project to assess if similar problems have been experienced elsewhere (e.g. other villages and districts in Phongsaly Province, other production areas in Laos and China).
Different stakeholders involved in Cardamom production promotion (e.g. Phongsaly PAFO/DAFOs, NUDP lot C, CCL, CARE, World Renew, TABI, NAFRI) will be contacted to make a problem census, as well as an inventory and analysis of the solutions that were tested.

Activity implementation:
- Study: April-May
- Reporting: June

1.2 Market study
As for many other commodity chains in Laos, cardamom production is opportunistic; Cardamom production area has been increasing very fast during the past years since the prices are high (e.g. 400,000 LAK/kg for Quantum). But this increase in the production area may also lead rapidly to a drop in selling prices.
An analysis of Cardamom value chain in NUDP target area is currently under process with support from NUDP lot C (2 months consultancy started in March 2015).
An additional study will be conducted if needed in Sept-October according to consultancy outputs.

1.3 On-field experiment
Cardamom flower degeneration might be related to flower immediate environment (soil and air humidity), the best production being observed where Cardamom stolon is out of the soil. On-field experiments are proposed in 3 different fields experiencing Cardamom production problems and presenting different sun orientation. After discussion with the Village Development committee, 3 fields were selected:
- M. Pheng (west orientation)
- M. Peng (north orientation)
- M. Bounhi (eastern orientation)
In each field, 3 plot replicates (if possible with different distance to the river: close, mid-distance, far)
In each replicate, 3 cropping itinerary will be tested on elementary plot of 2x10m each (total of 60 m2, 6x10m for each replicate):
- Treatment 1: no leaf clearing in April
- Treatment 2: leaf clearing (business as usual, conventional system)
- Treatment 3: leaf clearing + stolon slight removal from soil

Monitoring of treatment impact on:
- Flowering: 0: no flowers, 1. Little flowers (less than usual), 2. Normal rate, 3. Many flowers (more than usual)
- Production: weight measurement (fresh weight in kg / 20 m2)
Implementation steps:
- Plot replicates selection and delimitation (before Pimai)
- Notation on flowering: May- June
- Production measurement: August

2. Coffee area

Context:
About 10 ha cultivated in the village

- Important investments over the past 2 years (labor, inputs)
- Possible important driver of village development in the near future (30-year contract with Chinese Cie)
- Problem with weeding requirements (3-4 times/year, about 200 md/ha)
- Plant death due to insect and fungal attacks on plant collar (that might be favored by excessive soil covering plant collar)
- Limited plant shading
- High reliance on chemical inputs (mineral fertilizers, insecticide)

3 proposed activities: test of agricultural equipment for labor reduction (weeding, sowing of cereals intercropped with coffee), diversification of shading material, and composting for coffee fertilization

2.1 Small equipment for labor reduction

- Context of limited slope in coffee plantation (smooth hills)
- Introduction and test of power-operated slashing machine (vs. manual hoeing) impact on labor requirements for weeding, and on coffee growth and health
- Introduction and test of locally-made hand-jab seeder impact on labor requirements for sowing; 3 sowing treatment:
    - manual sowing after hoeing (conventional system)
    - sowing with hand jab seeder after hoeing
    - sowing with hand jab seeder after slashing and residue retention

Monitoring of labor requirements (weeding, sowing), sowing quality (sowing density, germination rate, insect pressure) and of treatment impact on coffee growth and health (plant height measurement, notation of the color of coffee leaves).
Implementation steps:
- 3 slashing machine (1 per village unit) to be purchased by the project for Pimai
- 9 hand jab seeders from Sayabouri Province (3 per village unit: rice, maize, job's tear) to be ordered in Sayabouri by the project as soon as possible
- Labor monitoring for first weeding (May- June) and sowing (July)
- Monitoring the impact of treatments on sowing quality (July) and coffee growth (Oct.-Nov.)

2.2 Diversification of shading material

Proposal to diversify perennial crops in coffee plantations using:
- Temperate fruit trees (e.g. peach, plum; see catalog from Vietnam Center in Dien Bien Phu): 5 trees of each specie x 3 species x 6 HH = 90 trees.
- Leguminous (forage) trees (e.g. Leuceana, Gliricidia, Calliandra): tree seedlings to be planted in Hattham TSC

Monitoring:
- Survival and growth rate of the different tree species
Implementation steps:
- Households to be identified within each group

- Holes to be dug and organic material to be put in holes (pig manure, plant material): April-May
- Trees ordered by the project (Vietnam or Thailand) and delivered before June
- Monitoring of tree survival and growth rate: October-Nov

2.3 Composting for fertilization of coffee plantations

Mineral fertilizers were provided by the Company to farmers but without notification of fertilizer price. Meanwhile, the village is raising an important number of pigs whose manure is not used (washed away with run-off).
It is proposed to work in 2015 on increased pig manure collection and transformation for coffee plants fertilization.
Training and support for experimenting compost production and application on coffee (2-3 household/group x 3 groups); comparison of coffee growth and health with or without manure.

Monitoring:
- labor (compost production, transportation, and application)
- coffee growth and health (plant height measurement, notation of the color of coffee leaves)

Implementation steps:
- Training on how to make compost from pig manure (yet not used) to be used on coffee (and fruit trees) (all families): after pimai
- Selection of families and plots: May
- Compost application: June
- monitoring coffee growth and health: October-Nov

3. Livestock raising

Discussions and activities were planned related to improved feeding systems (for cattle and goat livestock systems), improved access to animal drugs, and improved genetics (cattle).

3.1 Improved feeding systems

Complementary introduction (*Supports from NUDP lot C for 2015 of 12 kg of stylo, 6 kg of ruzi grass, and 6 kg of Guinea grass*) of improved forages to be used as a supplement to native grasses (e.g. for cows with calves before weaning) or in times of great feed shortage.
- For cattle: introduction of other *Brachiaria sp (brizantha, mullato), Paspalum atratum*, + elephant grass (nepia) close to bull stall in new grazing area.
- For goat: introduction of forage trees (e.g. *Calliandra calothyrsus, Gliricidia sepium, Leucaena* etc

Support on barber wire for permanent fencing of livestock area.

Monitoring:
- labor for sowing, cutting (if not grazed), and processing (e.g. hay, silage) if any
- Forage plot management (grazing/cutting periods)

Implementation steps:
- Request to be made to district (area supposed to be a land reserve): head of village + MALaM technicians: Jan-Feb
- Fencing: collective (not only 13 HH from livestock group); data distance checked by project; all villagers involved; to be implemented before Pimai
- Sowing: Project responsible for seeds and training, villagers for slashing + sowing: April to June

3.2 Improved animal health

Animals are vaccinated on a frequent basis since 2013 with the support of different initiatives (ADB livestock project, PAFO priority plan) but farmers still depend on animal drugs and DAFO staff availability. Financial support from project on training, input (e.g. fridge for drugs and vaccines), and revolving fund for drugs and vaccines.
Monitoring of animal vaccination frequency and coverage and impact on animal health

3.3 Improved genetics

Request from the village for financial support to purchase an improved bull to improve village cattle genetics. Request postponed to 2016; financial support from project to be based on village capacity to manage improved forage plots (2nd year).

4. TENTATIVE BUDGET

Project support of about 21,5 millions LAK (2,700 USD) for 2015, not including training support (details next page).

Activity	Project support (LAK)	Description	Farmers contribution
1. Cardamom			
1.1 Problem census	pm		
1.2 Market study	pm		
1.3 On-field experiment			
Small equipment	600 000	Bags, rope, ear marker etc.	Labor for experiment implementation and
Balances	pm	Precision balances (DAFO staffs)	activity assessment (weight)
2. Coffee area			
2.1 Small equipment for labor reduction			
Brush cutter	6 800 000	3 Honda slashing machine	Gasoline, maintenance, assessment
Hand-jab seeders	1 800 000	9 hand jab seeders from Saya	Maintenance, assessment
2.2 Diversification of shading material			
Tree seedlings	1 800 000	90 fruit and shading trees	Hole digging and fertilizing, tree maintenance
2.3 Organic fertiliza. of coffee plantations			
Training on composting	pm		Labor for compost production, transport and
Lime (CaCO3)	200 000	60 Kg lime for 1000 kg compost prod.	impact assessment on coffee
3. Livestock raising			
3.1 Improved feeding systems			
Training on forage management	pm		
Forage seeds cattle	3 000 000	2,5 ha	Fencing and sowing
Forage seeds goat	800 000	0,3 ha	
Support for fencing livestock area	1 200 000	10 rolls barber wire	Wood pot, nails, labor for fencing
Support for bull stall	3 300 000	Roof material, water storage	Wood pot, nails, labor for bull stall
3.2. Animal health improvement			
Training on animal health management	pm	Village veterinarians	
Fridge / boxes for vaccines & drugs	1 000 000		
Revolving fund for vaccines & drugs	1 000 000		
TOTAL (LAK)	**21 100 000**		

EFICAS Project
Community-based Agricultural Development Plan (CADP) 2015
Ban Sanamha, Samphan district, Phongsaly Province

Content

1. VILLAGE MAIN CHARACTERISTICS

- GPS coordinates: 21°14'13.21"N – 102°17'47.40"E
- Location: 1,000 m asl, on the hedge of a hill
- Accessibility: not easily accessible, 25 km far from the main road (Fig. 1 and 2)
- Size (2014): 35 households, 227 inhabitants, 2400 ha
- Ethnic group: Khmu
- External supports:
- Past supports from GoL projects (PRF, EU, FAO, Nayubai bank) for infrastructure improvement (school, water supply), credit and animal access, rice bank
- PLUP implemented in 2012 with the support from NUDP-GiZ
- Several on-going partnerships with the private sector for lemon grass (Changxeunta Cie, China), coffee (Changxeunta), job's tear (Saota, China), benzoin and NTFPs (Agroforex, France)

Fig 1. Sanamha location in Samphan district (MoNRE, 2011)

Fig 2. Sanamha village bounderies (PLUP, 2012)

2. LANDSCAPE UNITS / LANDSCAPE USE

5 main landscape units identified (Fig. 3):

- **Upland permanent agricultural area:**
  - **Coffee plantation area** (about 25 ha, all HH)
  - **Cardamom area** (about 45 ha, all HH)
- **Rotational upland rice** (about 35 ha, all HH, rotation on 6-7 years)
- **Job's tear cultivation area** (about 40 ha, all HH, rotational and permanent CS)
- Lowland paddy rice area (1-2 ha, but not used due to lack of water)
- **Bamboo and Benzoin forests**
- **(Future) livestock area**

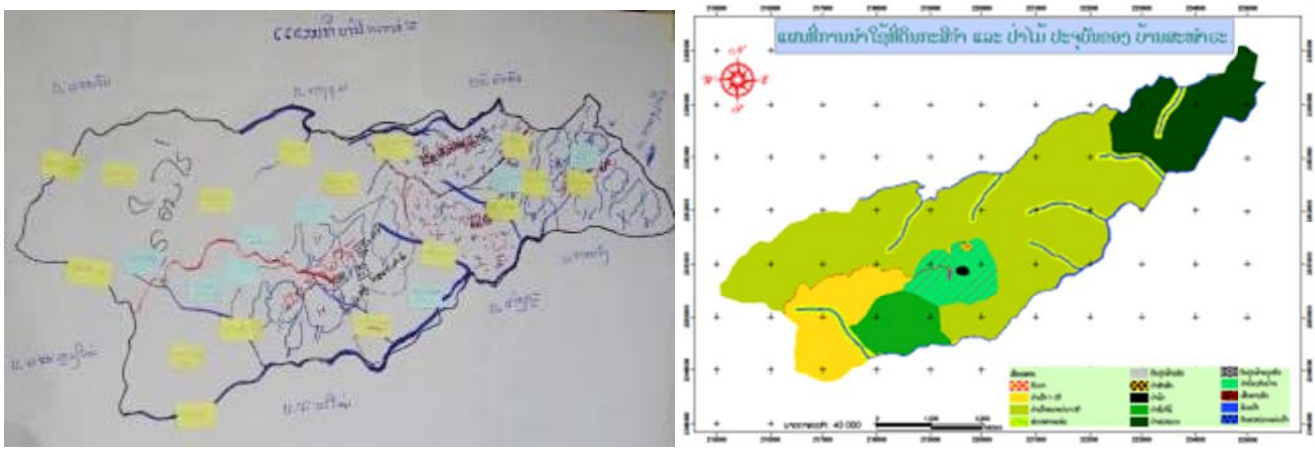

Fig 3. Sanamha main landscape units location

3. ACTIVITY PLANNING 2015

Activities planned for 2015 are related to 3 main topics: cardamom, coffee, and livestock production improvement.

1. Cardamom

Context:

- Main current cash crop in the village (surface and income)
- Important driver of past recent village development (price in 2014 for Cardamom Quangtum was of 400,000 LAK/kg dry)
- Problem with cardamom fructification (flower degeneration); ranking priority N°1 for men and N°4 for women in problem census
- Limited information on market demand (China), production trends (Province/ target districts; productive vs not yet productive area), and price evolution in the future

3 proposed activities: Problem census, market study, and on-field experiment

1.1 Problem census

A study will be conducted by the project to assess if similar problems have been experienced elsewhere (e.g. other villages and districts in Phongsaly Province, other production areas in Laos and China).

Different stakeholders involved in Cardamom production promotion (e.g. Phongsaly PAFO/DAFOs, NUDP lot C, CCL, CARE, World Renew, TABI, NAFRI) will be contacted to make a problem census, as well as an inventory and analysis of the solutions that were tested.

Activity implementation:
- Study: April-May
- Reporting: June

1.2 Market study

As for many other commodity chains in Laos, cardamom production is opportunistic; Cardamom production area has been increasing very fast during the past years since the prices are high (e.g. 400,000 LAK/kg for Quantum). But this increase in the production area may also lead rapidly to a drop in selling prices.
An analysis of Cardamom value chain in NUDP target area is currently under process with support from NUDP lot C (2 months consultancy started in March 2015).
An additional study will be conducted if needed in Sept-October according to consultancy outputs.

1.3 On-field experiment

Cardamom flower degeneration might be related to flower immediate environment (soil and air humidity), the best production being observed where Cardamom stolon is out of the soil.
On-field experiments are proposed in 3 different fields experiencing Cardamom production problems and presenting different sun orientation.
In each field, 3 plot replicates (if possible with different distance to the river: close, mid-distance, far)
In each replicate, 3 cropping itinerary will be tested on elementary plot of 2x10m each (total of 60 m2, 6x10m for each replicate):
- Treatment 1: no leaf clearing in April
- Treatment 2: leaf clearing (business as usual, conventional system)
- Treatment 3: leaf clearing + stolon slight removal from soil

Monitoring of treatment impact on:
- Flowering: 0: no flowers, 1. Little flowers (less than usual), 2. Normal rate, 3. Many flowers (more than usual)
- Production: weight measurement (fresh weight in kg / 20 m2)

Implementation steps:
- Plot replicates selection and delimitation (before Pimai)
- Notation on flowering: May- June
- Production measurement: August

2. Coffee area

Context:
About 25 ha cultivated in the village

- Important investments over the past 2 years (labor, inputs)
- Possible important driver of village development in the near future (30-year contract with Chinese Cie)
- Problem with weeding requirements (3-4 times/year, about 200 md/ha)
- Plant death due to insect and fungal attacks on plant collar (that might be favored by excessive soil covering plant collar)
- Limited plant shading
- High reliance on chemical inputs (mineral fertilizers, insecticide)

3 proposed activities: test of agricultural equipment for labor reduction (weeding, sowing of cereals intercropped with coffee), diversification of shading material, and composting for coffee fertilization

2.1 Small equipment for labor reduction

- Context of limited slope in coffee plantation (smooth hills)
- Introduction and test of power-operated slashing machine (vs. manual hoeing) impact on labor requirements for weeding, and on coffee growth and health
- Introduction and test of locally-made hand-jab seeder impact on labor requirements for sowing; 3 sowing treatment:
    - manual sowing after hoeing (conventional system)
    - sowing with hand jab seeder after hoeing
    - sowing with hand jab seeder after slashing and residue retention

Monitoring of labor requirements (weeding, sowing), sowing quality (sowing density, germination rate, insect pressure) and of treatment impact on coffee growth and health (plant height measurement, notation of the color of coffee leaves).
Implementation steps:
- 3 slashing machine (1 per village unit) to be purchased by the project for Pimai
- 9 hand jab seeders from Sayabouri Province (3 per village unit: rice, maize, job's tear) to be ordered in Sayabouri by the project as soon as possible
- Labor monitoring for first weeding (May- June) and sowing (July)
- Monitoring the impact of treatments on sowing quality (July) and coffee growth (Oct.-Nov.)

2.2 Diversification of shading material

Proposal to diversify perennial crops in coffee plantations using:
- Temperate fruit trees (e.g. peach, plum; see catalog from Vietnam Center in Dien Bien Phu): 5 trees of each specie x 3 species x 6 HH = 90 trees.
- Leguminous (forage) trees (e.g. Leuceana, Gliricidia, Calliandra): tree seedlings to be planted in Hattham TSC

Monitoring:
- Survival and growth rate of the different tree species
Implementation steps:
- Households to be identified within each group
- Holes to be dug and organic material to be put in holes (pig manure, plant material): April- May
- Trees ordered by the project (Vietnam or Thailand) and delivered before June
- Monitoring of tree survival and growth rate: October-Nov

2.3 Composting for fertilization of coffee plantations

Mineral fertilizers were provided by the Company to farmers but without notification of fertilizer price. Meanwhile, the village is raising an important number of pigs whose manure is not used (washed away with run-off).
It is proposed to work in 2015 on increased pig manure collection and transformation for coffee plants fertilization.
Training and support for experimenting compost production and application on coffee (2-3 household/group x 3 groups); comparison of coffee growth and health with or without manure.

Monitoring:
- labor (compost production, transportation, and application)
- coffee growth and health (plant height measurement, notation of the color of coffee leaves)
Implementation steps:
- Training on how to make compost from pig manure (yet not used) to be used on coffee (and fruit trees) (all families): after pimai
- Selection of families and plots: May
- Compost application: June
- monitoring coffee growth and health: October-Nov

3. Livestock raising
Discussions and activities were planned related to improved feeding systems for cattle, and improved animal health.

3.1 Improved feeding systems for cattle
Introduction of improved forage species (*Brachiaria sp -ruzi, brizantha, mullato-, Guinea grass, Paspalum atratum*, stylo+ elephant grass close to bull stall in new grazing area) to be used as a supplement to native grasses (e.g. for cows with calves before weaning) or in times of great feed shortage.

Monitoring:
- labor for sowing, cutting (if not grazed), and processing (e.g. hay, silage) if any
- Forage plot management (grazing/cutting periods)
Implementation steps:
- Request to be made to district (area supposed to be a land reserve): head of village + MALaM technicians: Jan-Feb
- Fencing: collective (not only 13 HH from livestock group); data distance checked by project; all villagers involved; to be implemented before Pimai
- Sowing: Project responsible for seeds and training, villagers for slashing + sowing: April to June

3.2 Improved animal health
Animals are vaccinated on a frequent basis since 2013 with the support of different initiatives (ADB livestock project, PAFO priority plan) but farmers still depend on animal drugs and DAFO staff availability. Financial support from project on training, input (e.g. fridge for drugs and vaccines), and revolving fund for drugs and vaccines.
Monitoring of animal vaccination frequency and coverage and impact on animal health

4. TENTATIVE BUDGET

Project support of about 22 millions LAK (2,800 USD) for 2015 excluding training costs (details next page).

Activity	Project support (LAK)	Description	Farmers contribution
1. Cardamom			
1.1 Problem census	pm		
1.2 Market study	pm		
1.3 On-field experiment			
Small equipment	300 000	Bags, rope, ear markers etc.	Labor for experiment implementation and
Balances	pm	Precision balances (DAFO staffs)	activity assessment (weight)
2. Coffee area			
2.1 Small equipment for labor reduction			
Brush cutter	6 800 000	3 Honda slashing machine	Gasoline, maintenance, assessment
Hand-jab seeders	1 800 000	9 hand jab seeders from Saya	Maintenance, assessment
2.2 Diversification of shading material			
Tree seedlings	1 800 000	90 fruit and shading trees	Hole digging and fertilizing, tree maintenance
2.3 Organic fertilization of coffee plantations			
Training on composting	pm		Labor for compost production, transport and
Lime (CaCO3)	300 000	60 Kg lime for 1000 kg compost prod.	impact assessment on coffee
3. Livestock raising			
3.1 Improved feeding systems			
Training on forage management	pm		
Forage seeds cattle	3 600 000	1,5 ha	Fencing and sowing
Support for fencing livestock area	2 400 000	20 rolls barber wire	Wood pot, nails, labor for fencing
Support for bull stall	3 300 000	Roof material, water storage	Wood pot, nails, labor for bull stall
3.2. Animal health improvement			
Training on animal health management	pm	Village veterinarians	
Fridge / boxes for vaccines & drugs	1 000 000		
Revolving fund for vaccines & drugs	1 000 000		
TOTAL (LAK)	**22 300 000**		

EFICAS Project
Community-based Agricultural Development Plan (CADP) 2015
Ban Phia , Mai district, Phongsaly Province

Content

1. VILLAGE MAIN CHARACTERISTICS

- GPS coordinates: 21°04,975'N – 102°34,643'E
- Location: 400 m asl, along the main road (Fig 1 and 2)
- Accessibility: easy, 30 km far from Mai district and 10 km from Khua district
- Size (2014): 44 households, 232 inhabitants, 1575 ha
- Ethnic group: Khmu
- External supports:
    - Past supports from past supports from FAO, CARE, MCC, GAA on village infrastructure improvement, food security, and education
    - PLUP implemented in 2009 with the support from GAA
    - Contract farming on rubber (Chongtianluey Cie)

Fig 1. Phia location in Mai district (MoNRE, 2011)

Fig 2. Phia village bounderies (PLUP, 2015)

2. LANDSCAPE UNITS / LANDSCAPE USE

6 main landscape units identified (Fig. 3):

- **Rotational upland rice** (about 35 ha, 31 HH, rotation on 7-8 years)
- **Lowland paddy rice area** (13 ha, 23 HH, maize production during dry season)
- **Rubber area** (60 ha, 41 HH)
- **Cardamom area** (about 20 ha, 43 HH)
- **NTFP conservation area** (broom grass, wild galangar, bamboo)
- (Former) **livestock area**

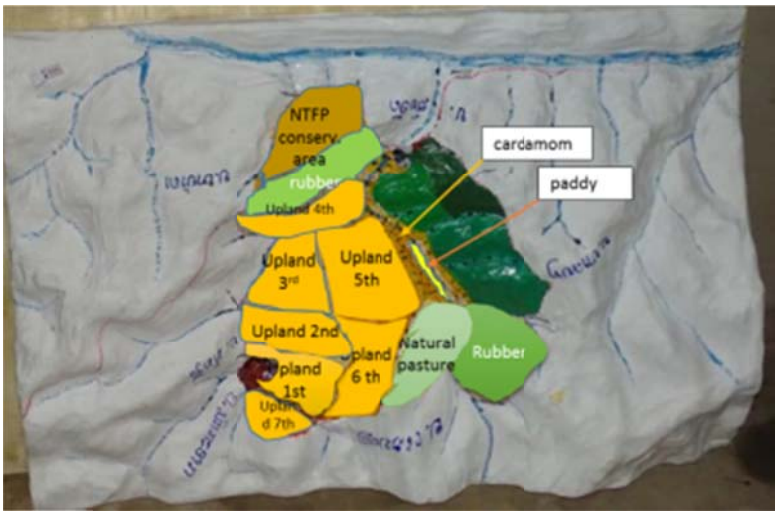

Fig 3. Phia main landscape units location

3. ACTIVITY PLANNING 2015

Activities planned for 2015 are related to 7 topics: cardamom, rice variety, mice control, alternative to herbicides in rubber plantations, pig livestock system, orchards, and labor productivity improvement.

1. Cardamom

Context:

- Main current cash crop in the village (surface and income)
- Problem with cardamom mortality at early stage (after planting) and on production (flower degeneration)
- Limited information on market demand (China), production trends (Province/ target districts; productive vs not yet productive area), and price evolution in the future

3 proposed activities: Problem census, market study, and on-field experiment

1.1 Problem census

A study will be conducted by the project to assess if similar problems have been experienced elsewhere (e.g. other villages and districts in Phongsaly Province, other production areas in Laos and China).
Different stakeholders involved in Cardamom production promotion (e.g. Phongsaly PAFO/DAFOs, NUDP lot C, CCL, CARE, World Renew, TABI, NAFRI) will be contacted to make a problem census, as well as an inventory and analysis of the solutions that were tested.

Activity implementation:
- Study: April-May
- Reporting: June

1.2 Market study

As for many other commodity chains in Laos, cardamom production is opportunistic; Cardamom production area has been increasing very fast during the past years since the prices are high (e.g. 400,000 LAK/kg for Quantum). But this increase in the production area may also lead rapidly to a drop in selling prices.
An analysis of Cardamom value chain in NUDP target area is currently under process with support from NUDP lot C (2 months consultancy started in March 2015).
An additional study will be conducted if needed in Sept-October according to consultancy outputs.

1.3 On-field experiment

Cardamom flower degeneration might be related to flower immediate environment (soil and air humidity), the best production being observed where Cardamom stolon is out of the soil.
On-field experiments are proposed in 3 different fields experiencing Cardamom production problems and presenting different sun orientation.
In each field, 3 plot replicates (if possible with different distance to the river: close, mid-distance, far)
In each replicate, 3 cropping itinerary will be tested on elementary plot of 2x10m each (total of 60 m2, 6x10m for each replicate):
- Treatment 1: no leaf clearing in April
- Treatment 2: leaf clearing (business as usual, conventional system)
- Treatment 3: leaf clearing + stolon slight removal from soil

Monitoring of treatment impact on:
- Flowering: 0: no flowers, 1. Little flowers (less than usual), 2. Normal rate, 3. Many flowers (more than usual)
- Production: weight measurement (fresh weight in kg / 20 m2)

Implementation steps:
- Plot replicates selection and delimitation (before Pimai)
- Notation on flowering: May- June
- Production measurement: August

2. Rice variety diversification

Context:
- No 1 ranking priority for both men and women in problem census
- Limited number and long-time used cultivated variety notably in lowland paddy area (glutinous one, *khao ou bon*)
- Farmers perception that the it explains increased pest pressure (e.g. disease) on rice crop

Activity:
Test and evaluation of a collection of glutinous rice (from Lao-IRRI inventory) in both lowland and upland areas.

Monitoring:
Rice variety characteristics (cycle length, shape, grain color etc.), performance (productivity, sensitivity to pest), and taste (ranking score on blind test).

3. Mice control
Context: High ranking priority for both men and women in problem census
Activities:
- Training (using GiZ past training support)
- Financial support for the purchase of additional traditional mouse trap and the introduction of (multiple catch) metal mouse trap

Monitoring of rat pressure (number of animals caught) and impact (% losses on maize production).

4. Alternative to herbicide use in rubber plantation
Context: heavy use of herbicide in rubber plantations (60 ha)
Activities: introduction and test of grass cutting machine as alternative to herbicide
Monitoring of labor and cost-benefit analysis as compared to manual or chemical weeding

5. Improvement of pig livestock systems
Context:
- Strong demand from Vietnam for pigs (local and improved variety)
- Support needed for improved raising system (feeding, housing, health management)

3 proposed activities: training on pig management, financial support for improved animal health (fridge, revolving fund for vaccines and drugs) and genetics (improved race from Vietnam).

Monitoring: animal and revolving fund management, changes in animal health practices, profitability of pig raising activity.

6. Composting for fertilization of orchard plantations
Context:
- New trend of crop diversification into orchard (11 HH, 3 ha)
- Support needed for improved cropping system (notably on tree fertility management)

2 proposed activities: training on fruit tree management and composting, financial support for experiment on composting

Monitoring: labor requirements for composting (production, transport), impact on tree crop growth and health.

7. Labor profitability improvement
Introduction and test of hand-jab seeders to reduce labor requirements for sowing (upland rice, job's tear).
Monitoring: labor (hand-jab vs manual), sowing quality.

4. TENTATIVE BUDGET

Project support of about 21,5 millions LAK (2,700 USD) for 2015, not including training cost (details next page).

Activity	Project support (LAK)	Description	Farmers contribution
1. Cardamom			
Problem census	pm		
Market study	pm		
On-field experiment			
Small equipment	200 000	Bags, rope etc.	Labor for experiment implementation and
Balances	pm	Precision balances (DAFO staffs)	activity assessment (weight)
2. Rice variety diversification			
Collection lowland rice variety	300 000	0.4 ha (0.1 ha per pilot farmer)	Labor for experiment implementation and
Collection upland rice variety	400 000	0.6 ha (0.1 ha per pilot farmer)	activity assessment (weight)
3. Mice control			
Training on mice control strategy	pm		
Mice trap	1 500 000	450 units (10/HH)	
Metal mice trap	1 200 000	45 units (1/HH)	
4. Alternative to herbicide in rubber plantation			
Brush cutter	9 000 000	4 Honda slashing machine (1/10 HH)	Gasoline, maintenance, assessment
5. Pig livestock system improvement			
5.1 Race improvement			
Improved race from Vietnam	4 400 000	1 male + 2 females	
5.2 Animal health improvement			
Training on animal health management	pm	Village veterinarians	
Fridge / boxes for vaccines & drugs	1 000 000		
Revolving fund for vaccines & drugs	1 000 000		
6. Orchard (fertility) management			
Training on composting	pm		
Small equipment	700 000	Lime, mollass, plastic tank, ear marker	
7. Small equipment for labor reduction			
Hand-jab seeders	1 800 000	9 hand jab seeders from Saya	Maintenance, assessment
TOTAL (LAK)	**21 500 000**		

EFICAS Project
Community-based Agricultural Development Plan (CADP) 2015
Ban Houayvangkao, Mai district, Phongsaly Province

Content

1. VILLAGE MAIN CHARACTERISTICS

- GPS coordinates: 21°11’ 886’’N – 102°41’445’’E
- Location: 450 m asl, 6 km from Mai district capital (Fig. 1 and 2).
- Accessibility: easily accessible
- Size (2015): 45 HH, 242 inhabitants, 840 ha
- Ethnic group: 100% Khmu
- External supports:
    - Past supports from PRF, FAO, CARE, MCC, GAA for infrastructure improvement and food security (+ SRI experiment with GAA support)
    - PLUP implemented in 2010 by GAA
    - On-going contract with private sector on rubber (Chongtianluey, China), and Mansakhou (Cana, Chansooksaengon , Laos)

Fig 1. Houayvangkao location in Mai district (MoNRE, 2011)

Fig 2. Houayvangkao landscape (Google earth, 2014)

2. LANDSCAPE UNITS / LANDSCAPE USE

5 main agricultural landscape units identified (Fig. 3):

- **Lowland paddy rice area** (27 ha)
- **Rubber area** (17 ha)
- **Cardamom area** (12 ha)
- **Upland vegetable and garlic production area** (3,5 ha)
- **Livestock area**

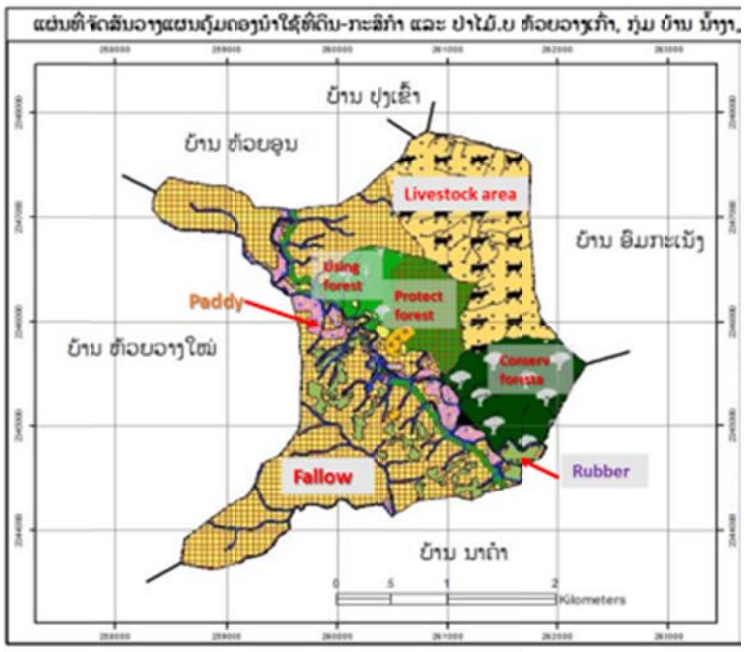

Fig 3. Houayvangkao main landscape units location

3. ACTIVITY PLANNING 2015

Activities planned for 2015 are related to 2 topics: vegetable production and fish pond management improvement.

1. Vegetable production

Context:

- Main current cash crop in the village
- Good market opportunity, village being located close to Mai district capital
- Main problems related to:
  - Limited production during wet season due to insect pressure whereas market demand is high,
  - No permanent selling stall at the market (roaming outside the market according place available)

3 proposed activities: Green house construction, compost and bioinsecticide production, and support to vegetable producer group establishment

1.1 Green house construction
Objective of limiting insect damage on vegetable during wet-season production
Support from project: material for plastic cover
Monitoring of green house impact on wet season vegetable production and sale (qty), insect pressure and damage (%), and green house system profitability (cost-benefit analysis).

1.2 Compost and bioinsecticide production
Support from project: Training and financial support for experiment on composting and bio-repellent.
Monitoring of labor requirements (e.g. compost and bio-insecticide production, transportation, and application) and impact on vegetable production and health

1.3 Vegetable producer groups
Contribution to the emergence of (organic) vegetable farmers groups to increase farmers capacity to organize/ negotiate vegetable transportation, selling place in Mai market, and production volume
Monitoring: number of groups established, impact on vegetable activity organization and profitability.

2. Fish pond management

Context: Fish production is the second village income after vegetable
Proposed support related to:

- Fish species: diversification of fish species raised together to improve feed recycling, e.g. tilapia with pa pak, panai, grass fish
- Improved water and feed management:
    - Broadcast of lime and animal manure in the fish pond before filling with water
    - Forage sown around the fish pond to limit erosion and improve animal feed

Support from project: Training and financial support on lime, forage seeds, fry.
Monitoring: input and labor requirements, cost-benefit analysis.

4. TENTATIVE BUDGET

Project support of about 21,5 millions LAK (2,700 USD) for 2015, not including training cost (details below).

Activity	**Project support (LAK)**	**Description**
1. Vegetable production		
Green house	17 000 000	Plastic cover
Compost and bio-insecticide	1 600 000	lime, jars
Farmers organization	pm	
2. Fish production		
Lime (CaCO3)	500 000	
Forage seeds	800 000	Stylo, paspalum, nepiar
Fry	1 500 000	
TOTAL (LAK)	**21 400 000**	

EFICAS Project
Activity plan 2015
Hattham technical service center (TSC), Mai district, Phongsaly Province

Content

1. TSC MAIN CHARACTERISTICS

- GPS coordinates: 21°10'N – 102°47'E
- Location: 970 m asl, along the road
- Accessibility: easy, 8 km far Mai district capital
- Size (2014): 7,25 ha
- Creation date: Dec 2009
- Status: Provincial TSC (Mai, Samphan, Khua districts)
- Nb of staff: 13 (3 government, 6 contract, 4 volunteer)
- TSC partners: NUDP, Vietnam government (Dien Bien Phu province)
- Source of finance: GoL, Vietnam Gov, project (NUDP), Gift (MAF), internal (activity revolving fund: animal drug, fish and fingerlings, pigs)

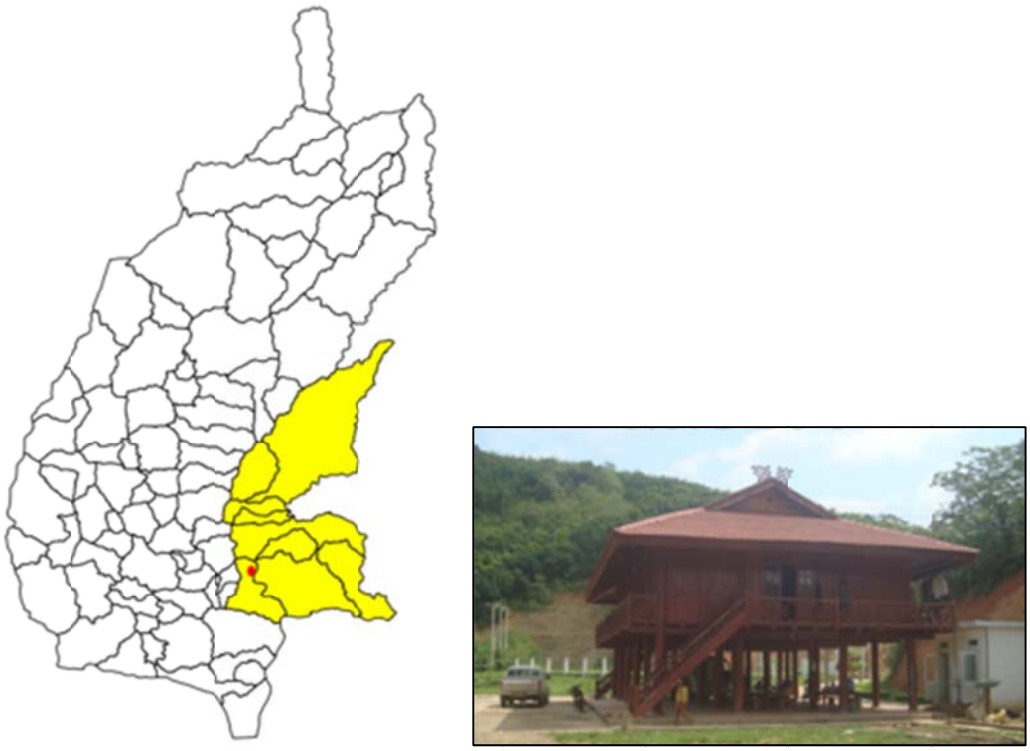

Fig 1. Hattham TSC location in KB Sophoun, Mai district (village boundaries MoNRE, 2011)

2. TSC MAIN FACILITIES AND ACTIVITIES

Hattham TSC main infrastructure, facilities, material, inputs available
(inventory from NUDP lot C)

● Office (use as dormitory) ● toilet
● storage room ● electricity (inconstant)
● water (inconstant)
● fishpond ● fish and frog breeding station (Fig. 3)
● pig pen ● cattle pen ● poultry pen
● mushroom house ● egg incubator (2)
● hand-tractor ● motorbikes (2) ● truck
● LCD ● computer (..)● printer
● projection screen
● fingerlings ● piglets
● drugs for animal treatment

Fig 3. Hattham TSC boundaries and facilities (Google earth, 2014)

Hattham TSC main activities
(currently only at TSC)

1. Fingerlings production *(4 species)*
2. Piglet production *(cement pigsty of 112 m2, 10 animals remaining on the 35 initially introduced)*
3. Cow breeding *(cement cattle pen of 32 m2, 5 F1 introduced in 2013 – 4 females and 1 male)*
4. Poultry raising *(15 improved race chicken, and 26 improved race ducks introduced; activity not funded any longer by Province; individual raising - volunteer)*
   Remark: Main observed problems related to the implementation of activities 1 to 4:
   - *No strategy and revolving fund related to animal feed*
   - *Poor animal and activity management certainly due to the absence of incentives for the staff responsible of the activity*

5. Small area planted with stylo, mulato, napier, cassava
6. Test of lowland glutinous Vietnamese rice variety *(0.25 ha, crop damage by TSC cattle roaming)*
   Remark: Main problem for the implementation of activity 5 and 6 related to cattle roaming in the TSC

7. Test of 3 Vietnamese maize hybrids *(LVN 10, LVN 66 and HT 818; 0.4 ha; used for pigs)*
8. Cassava production (*0.6 ha; for pig consumption*)
9. Fruit tree plantation (*131 seedlings of litchi, mango, longan, papaya, pomelo etc. but high plant mortality*)
10. Provide drug for animal treatment *(but no figures available)*
11. Mushroom, vegetable, insect production *(mainly for volunteer subsistence)*

3. ACTIVITY PLANNING 2015

Activities planned for 2015 (Planning process supported by NUDP – lot C)

- **Activities at the TSC**
  - Forage plantation
  - Fruit tree nursery
  - Continue on-going activities and gross margin (GM) calculation for each post

Remark:

- **Activities management will not improve unless staffs involved are interested in activity outputs and benefits**
- **Need to take stock of the experience in sharing benefits from other TSCs (e.g. 60-20-20 for activity maintenance, admin costs, and staff responsible respectively)**

- **Outside the TSC**
  - Farmers needs assessment in 5 villages
  - Piglet production
  - Demonstration on cattle fattening
  - Calculate GM for each activities

Activities supported by EFICAS Project

6 proposed activities: 5 at the TSC (tree nursery, animal manure increased valorization, forage plot establishment, plant material collection, test of agricultural equipment), 1 outside the TSC (support to activity implementation and monitoring in EFICAS target villages).

Activity 1: tree nursery
Support from project: material to build a nursery for:
- Fruit tree seedling production (*but only based on a village need assessment and in partnership with Vietnamese fruit tree Center*),
- Forage legume tree seedling production to support shading (coffee) and fencing activities in EFICAS project target villages.

Monitoring: input and labor requirements for nursery and seedlings production; seedlings quality and mortality rate.

Activity 2: Animal manure increased collection, transformation and valorization
Context: no animal manure collection and recycling despite important animal activities (pigs, cattle) and valorization opportunity (e.g. vegetable, fruit trees, crops, fish ponds).
Support from project: training on composting, financial support for experimenting composting and biogas production.
Monitoring: input and labor requirements for manure collection, transformation and recycling; manure fluxes monitoring (Fig. 4), cost-benefit analysis.

Fig 4. Monitoring of manure fluxes within the TSC

Activity 3: Forage plot establishment
Support from project: seeds, material for forage plot fencing, training on forage management.
Monitoring: input and labor requirements for forage plot establishment and management; forage plot management (e.g. number of cuts per year, fertility management) and use (fresh, dry, silage etc.).

Activity 4: Plant material collection
Support from project: seeds and seedlings of pigeon pea and cassava (collection according to availability); inoculant for stick lack production
Monitoring: production (grain, tuber, stick lack), gross margin analysis

Activity 5: Test of agricultural equipment
Introduction of local-made hand jab seeder for TSC experiment implementation (corn, pigeon pea) and demonstration to visiting farmers (if any).
Monitoring: practicability and sowing quality, farmers interest (if any).

Activity 6: Support to activity implementation and monitoring in EFICAS target villages
3 main supporting activities in Mai and Samphan EFICAS project villages (according needs):
- Implementation and monitoring of activities schedules in villages Community-based Agricultural Development Plan (CADP)
- Participation to the data collection for project baselines (socio-economic and agri-environmental)

4. TENTATIVE BUDGET

Project support of about 20 millions LAK (2,500 USD) for 2015.

Activity	Project support (LAK)	Description
1. Fruit tree nursery		
Net	600 000	2 rolls black net
Wire	100 000	10 kg wire
Plastic bag	300 000	30 kg
Seeds	250 000	Fruit seeds
2. Animal manure increased valorization		
Training on composting	pm	
Biogas construction	5 000 000	
Protected area for composting	500 000	
Lime (CaCO3)	500 000	100 kg
Balance	650 000	
3. Forage plot		
Forage seeds for cattle	1 500 000	0.2 ha
Forage seeds for fish	1 000 000	0.1 ha
Fencing	1 250 000	10 rolls barber wire
Transportation cost	800 000	All inputs
4. Plant material collection		
Cassava seedlings	500 000	0.1 ha
Pigeon pea seeds	300 000	0.2 ha
5. Small agricultural equipment		
Hand-jab seeder	600 000	3 hand-jab seeder
6. Support to activity implementation and monitoring in intervention villages		
Perdiem technician	5 000 000	Basis 1 week/month
Gasoline	1 000 000	
TOTAL (LAK)	**19 850 000**	