

# Annex – examples of experiments

This annex provides examples of Idea Sheets, Experiment Sheets, Activity Plans etc., which should give you an idea of the variety of experiments that can be thought of, and on the way outsiders and villagers filled in the different types of sheets. Most examples are from Vietnam, some are from India. Many of the Vietnam examples are from a Social Forestry Programme, whereas the remaining ones from Vietnam, and those from India are from programmes with an agricultural focus. In some cases, a combination of experiment design and activity plan was called «Action Sheet»; so please do not get confused about this expression. In most examples the names of the involved people and date and place were left out, since they are of no use to the readers of this document. Note that most examples were translated from Vietnamese and the English outcome is not always correct in terms of official language rules.

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2. Germination techniques for cinnamon seeds
3. Durian grafting technique
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## A. Idea Sheets

### Idea Sheet 1

#### Topic

Planting timber trees (Dau Do, Sao Xanh) in allocated natural forest

#### What do we want to investigate?

- Find out which one is stronger, the young seedlings picked from the forest or the ones germinated in the nursery
- Find out what is appropriate clearing dimension

#### Why do we want to investigate this?

- Economic value
- Enriching the forest for the next generations

#### Persons involved in developing the idea

Dieu Mip, Thi Chen, Thi Noch, Thi Grang, Cau, Toan, Phuong, Tuoi, Sen

#### Date and place

March 2000, Thon Hai (Dak R'Tih), Vietnam

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### Idea Sheet 2

#### Topic

Rattan management in allocated natural forest

#### What do we want to investigate?

- To find out the appropriate rattan management technique
- Does it need:
  - + clearing around the rattan bush
  - + pruning
  - + fertilizer in the first year?

#### Why do we want to investigate this?

- Increase income
- Domestic use
- Protect forest

## Idea Sheet 3

### Topic

Plant cinnamon in natural forest (in open places)

### What do we want to investigate?

Appropriate size of seedling for planting

### Why do we want to investigate this?

Increase income from allocated forest

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## Idea Sheet 4

### Topic

Planting fruit trees in home garden such as orange, mandarine, durian, mango, rambutan, ginger, pineapple and princess jackfruit

### What do we want to investigate?

Nobody does it at the village; therefore we want to find out whether it is suitable to local conditions

### Why do we want to investigate this?

- Meet local fruit requirements
  - Unstable coffee price ⇒ diversifying income sources
  - Take advantage of empty land in home gardens
-

## Idea Sheet 5

### Topic

Planting cinnamon in coffee garden

### What do we want to investigate?

- Technique to cultivate cinnamon
- Appropriate spacing of cinnamon, with monospecies planted, interplanted with coffee and line planting around coffee gardens

### Why do we want to investigate this?

- Economic value (bark used as medicine and spice)
  - Protection function for coffee trees
  - Soil enrichment
  - Easy to be harvested
- 

## Idea Sheet 6

### Topic

Bee raising in natural forest

### What do we want to investigate?

Find out the way to raise bees in natural forest

### Why do we want to investigate this?

- Take advantage of coffee flower, rubber flower and wild flowers in natural forest
  - Easily consumed product
  - Has good market
-

## Idea Sheet 7

### Topic

Rattan propagation techniques

### What do we want to investigate?

Two suggested techniques to propagate rattan for planting in natural forest:

- Pick young rattan plant in the forest, take care of it in home nursery and bring it back to the forest
- Find out a technique for mass propagation from seed

### Why do we want to investigate this?

- Need high numbers of rattan plants in rainy season
  - Nursery technique for rattan product
- 

## Idea Sheet 8

### Topic

Planting young rattan in natural forest

### What do we want to investigate?

So far no experience and no trials in rattan planting in natural forest

⇒ need to do a trial to know whether the planted rattan can survive and develop as well as natural rattan

### Why do we want to investigate this?

- Protect natural forest
- Increase income
- Regular income because it is easy to sell in local area and in other places
- Preserve natural rattan which gradually becomes rare
- Domestic demand
- Contribute to confirm the ownership of natural forest

## Idea Sheet 9

### Topic

Cinnamon germination in the nursery

### What do we want to investigate?

Find out appropriate nursery technique for cinnamon in local area

### Why do we want to investigate this?

- To have a local supply source for seedlings
  - The price of seedlings is lower if we ourselves can do the nursery
- 

## Idea Sheet 10

### Topic

Propagation methods of rattan (*Song Bot, Korlet*)

### What do we want to investigate?

Be able to propagate rattan at home

### Why do we want to investigate this?

We want to have many seedlings at the same time to be planted in forest

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## Idea Sheet 11

### Topic

Planting timber trees (*Sao* (*Hopea* species)) in open space in natural forest

### What do we want to investigate?

There are already seedlings. Try to plant them in natural forest to see if they can survive

### Why do we want to investigate this?

- Timber for the next generations
- Enrich poor forest by precious timber trees



## Idea Sheet 12

### Topic

Planting Beautiful Lady jackfruit (*To Nu*) in poor hill land near coffee garden but far away from water source

### What do we want to investigate?

- To find out whether Beautiful Lady jackfruit can survive and produce fruit
- To find out whether Beautiful Lady jackfruit planting can decrease the erosion

### Why do we want to investigate this?

- Sell fruits
  - Take wood and timber
- 

## Idea Sheet 13

### Topic

Planting *Dong* along streams in forest (*Dong* leaves are used for wrapping sticky rice cakes)

### What do we want to investigate?

- To find out if this plant can survive
- To find out whether its leaves are as big as natural ones

### Why do we want to investigate this?

- Easy to sell
  - Improve the livelihood
-

## Idea Sheet 14

### Topic

Planting pepper in natural forest

### What do we want to investigate?

- to find out if it can survive and produce fruit
- to find out which trees can be used as pepper trellis
- to find out in which kind of forest pepper can survive (dense or clear forest; old or young forest)

### Why do we want to investigate this?

- It is worth to take a trial because this idea is new
  - Preserve forest trees (used as pepper trellis)
  - Increase income
  - Already seen people using live trees as pepper trellis
- 

## Idea Sheet 15

### Topic

Planting rattan (*Song Bot*) in natural forest

### What do we want to investigate?

To find out if it can survive because nobody has not done such thing

### Why do we want to investigate this?

- Preserve natural forest
- Increase income

## Idea Sheet 16

### Topic

Planting bamboo (Luong) in natural forest

### What do we want to investigate?

To find out whether it survives in natural forest

### Why do we want to investigate this?

- Utilise bamboo shoots
  - Take bamboo poles for making domestic tools
  - Preserve and enrich forest
- 

## Idea Sheet 17

### Topic

Propagation methods for precious timber tree (Cam Lai)

### What do we want to investigate?

To find out the best way to propagate seedlings of Cam Lai

### Why do we want to investigate this?

Make a trial to plant it in soft soil (in coffee garden or natural forest) because Cam Lai grows only on stony soil in the natural forest

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## Idea Sheet 18

### Topic

Planting timber trees (Cam Lai) in natural forest

### What do we want to investigate?

- To find out whether Cam Lai can survive in soft soil (no stones)
- The timber has high quality?

### Why do we want to investigate this?

- The current natural forests have no longer precious timber trees
- For next generation

## Idea Sheet 19

### Topic

Raising mushroom on dried, fallen trees in natural forest

### What do we want to investigate?

- To find out which species have high productivity
- To find out which species produce big and high quality mushroom

### Why do we want to investigate this?

- There are many dried, fallen trees in natural forest
  - Diversification of food resource for family
  - Sell it to increase income
  - Take advantage of dried, fallen trees in natural forest
- 

## Idea Sheet 20

### Topic

Planting pepper, using live poles (*Cassia (Muong Den)*, *Erythrina (Cay Vong)*)

### What do we want to investigate?

To compare the productivity of pepper plants

- when using wooden pole and live one as pepper trellis
- when using *Cassia* and *Erythrina* trees as pepper trellis

### Why do we want to investigate this?

- *Erythrina (Cay Vong)* is available in local area
  - Cheap, appropriate for poor households (who have not enough money to buy wooden poles)
  - Wooden poles are expensive (60.000 VND/one)
  - Forest protection organisation catches anyone who cuts forest trees for wooden poles
  - Leaves can be used as cattle feed and compost
-

## Idea Sheet 21

### Topic

Planting durian seedlings and grafted durian in coffee garden

### What do we want to investigate?

- To find out the function of durian as wind barrier and shading tree
- To compare the effectiveness of coffee and mixed coffee/durian plantation

### Why do we want to investigate this?

- To set up wind barrier for coffee
  - Durian gives first harvest in short time and fruit production lasts for a long time.
  - To know what is more advantageous, grafted or seed-grown durian
  - Increase income
- 

## Idea Sheet 22

### Topic

Cinnamon nursery

### What do we want to investigate?

To find out the nursery technique for cinnamon plant production

### Why do we want to investigate this?

- Want to plant cinnamon on the upper part of coffee garden because there is a difficulty of watering coffee plants there
  - High demand in local area
-

## Idea Sheet 23

### Topic

Planting *Muong Hoa Vang* as hedgerow in coffee garden

### What do we want to investigate?

To find out whether such a hedgerow functions as wind barrier, shading, erosion protection in coffee garden

### Why do we want to investigate this?

- The current coffee garden is in bad condition due to strong wind
  - Stop erosion in sloping land
  - Increase the productivity of coffee in the garden with hedgerow
- 

## Idea Sheet 24

### Topic

Technique to graft durian

### What do we want to investigate?

To find out whether we can graft durian in the village

### Why do we want to investigate this?

- High demand
  - Do not know how to graft durian
  - Grafted durian quickly produces fruit
  - Saplings can be sold at high price (25000VND/plant)
-

## Idea Sheet 25

### Topic

Plant timber trees (*Dau Do, Sao Xanh*) in natural forest

### What do we want to investigate?

- To find out which seedlings are stronger, the young ones picked in natural forest or the germinated ones in nursery
- Appropriate clearing dimension

### Why do we want to investigate this?

- It is possible to take the seeds and germinate them in the nursery
  - High economic value
  - Forest enrichment and value for next generations
- 

## Idea Sheet 26

### Topic

Mixed cropping of leafy vegetable and sun hemp

### What do we want to investigate?

To grow leafy vegetable and sun hemp together and assess how far this will be useful. A small portion of the field will be allotted to grow only the leafy vegetable and the rest will have mixed crop (leafy vegetable and sun hemp). This will be used as a trial to compare the yield and also the profit.

### Why do we want to investigate this?

- Sun hemp hay will be available during summer
  - A portion of the sun hemp can be left for seed purpose which can either be sold or used for next season
  - Selling of leafy vegetable yields income
  - Feeding of sun hemp increases the fat content of milk
  - Animals get more protein
  - The health of the animal is improved
-

## Idea Sheet 27

### Topic

Enrichment of paddy straw (stack treatment)

### What do we want to investigate?

To improve the nutritional value of paddy straw by stack treatment

### Why do we want to investigate this?

- As green fodder is available during summer months, the treated urea straw when fed to milk animals, will yield the same amount of milk as in other seasons
  - Farmers with more milk cattle can adopt this method as it saves time and labour
  - It is economical for the farmers
- 

## Idea Sheet 28

### Topic

Relay cropping after harvest of paddy crop

### What do we want to investigate?

Relay cropping of Pillipesara and sun hemp after paddy crop harvesting, in order to have more leguminous fodder grass for animals available and for a more effective utilization of land in between two crops

### Why do we want to investigate this?

- There is a gap of two months time between two paddy crops. So far the land is kept vacant in this time. With relay cropping the farmers get some fodder for their animals.
-



## Idea Sheet 29

### Topic

Breeding of improved variety of sheep

### What do we want to investigate?

To improve the flock of Deccan black sheep by cross-breeding with the Nellore type of brown sheep

### Why do we want to investigate this?

- Brown lambs grow faster and gain more weight compared to the black variety
  - There is no need to remove hairy wool if the sheep are of brown type
  - Disease resistance is more in brown variety when compared to black variety of sheep
- 

## Idea Sheet 30

### Topic

Dual purpose sorghum under rainfed condition

### What do we want to investigate?

To cultivate a new *Jowar* variety which yields more fodder and more grains.

### Why do we want to investigate this?

- We think we can obtain more *Jowar* and more fodder through cultivating DPS under rainfed conditions.
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## B. Experiment Sheets

### Experiment Sheet 1

#### Topic

Planting fruit trees (mango, orange, mandarine, rambutan, durian, princess jackfruit, ginger) in coffee gardens

#### What do we want to investigate?

Whether various types of fruit trees are suitable for cultivation in the village

#### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- Intensification of land use
- Nutrition improvement
- Diversification and increase in household income

#### What exactly do we want to find out? What are the questions which the experiment should answer?

- Which fruit trees are the most suitable ones under the existing conditions?
- Is this type of orchard suitable in current situation?

#### What will be the design of the experiment?

Jackfruit and mango planted on boundaries

Orange: 12 plants (6 x 5 m)

Mandarine: 15 plants (6 x 5 m)

Custard apple: 40 plants (4 x 5 m)

Durian: 8 plants (10 x 12 m)

Rambutan: (10 x 12 m)

Total area: 8000 m<sup>2</sup>

#### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- Yield, quality, economics of each tested species
- Economic potential of whole orchard

#### Where can we get additional information regarding this experiment?

Extension centre in Dak R'Lap

Long Dinh research centre

Tay Nguyen University

## Experiment Sheet 2

### Topic

Germination techniques for cinnamon seeds

### What do we want to investigate?

Find out a locally functioning germination technique for cinnamon

### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- Need cinnamon for planting, but seedlings are expensive compared to those produced at home
- Farmers do not know seed germination techniques
- Seeds are not available locally
- Forestry enterprise has already done this, and can provide technical assistance
- Some farmers were trained
- Want to have more seedlings for planting

### What exactly do we want to find out? What are the questions which the experiment should answer?

Find out germination techniques of cinnamon in home conditions

- seed treatment
- germination
- management at home

### What will be the design of the experiment?

Seed treatment, then put in polythene bags, management, gradually reduce shade

### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- Number and quality of seedlings
- Quality: height, leaf stages, survival rate, strength of seedlings

### Where can we get additional information regarding this experiment?

Quang Tan forestry enterprise

Farmers trained already

## **Experiment Sheet 3**

### **Topic**

Durian grafting technique

### **What do we want to investigate?**

Find out suitable grafting technique: bud grafting, canopy grafting

### **Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?**

- Unsuccessful grafting in home garden before
- Extension will assist in grafting techniques
- Will be able to produce large quantities of good quality durian seedlings
- Save money because grafted seedlings from outside are expensive

### **What exactly do we want to find out? What are the questions which the experiment should answer?**

- Suitable techniques of grafting
- Rate of survival
- Number of fruits for each harvest
- Quality of the fruits

### **What will be the design of the experiment?**

Find out suitable age for root stock: 6 months, 12 months; bud grafting, canopy grafting

### **What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?**

- Growth of grafted durian
- Survival rate
- When is the first harvest?
- Economics

### **Where can we get additional information regarding this experiment?**

Extension centre, Tay Nguyen university, Long Dinh research centre

## Experiment Sheet 4

### Topic

Propagation of *Song Bot* rattan in nursery

### What do we want to investigate?

Find out technique of propagation

**Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?**

- There is need for seedlings
- Soil is suitable, Song Bot was tested in the area
- No available experience in Song Bot propagation
- So far seeds are not seen, small plants in the forest are scarce
- Labour/maintenance is not complicated (maintenance needed only in the first year)

**What exactly do we want to find out? What are the questions which the experiment should answer?**

- Suitable methods to produce seedlings from trunk, root, seeds
- What treatment must be applied for each organ to get seedlings
- Best techniques in nursery (watering, fertilisers applied, shed)

**What will be the design of the experiment?**

*(Drawing)*

**What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?**

- Number of surviving seedlings
- Measure: quality, height, colour

**Where can we get additional information regarding this experiment?**

Literature in library

## Experiment Sheet 5

### Topic

Planting Sao (Hopea species) in depleted forests

### What do we want to investigate?

Can Sao planted by people survive in the forest?

### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- Availability of seedlings (propagation technique known)
- Sao is a tree which grows naturally in the area
- Current forest is very poor
- Create timber for next generations
- Contribute to natural forest conservation
- Successful experiment can be replicated

### What exactly do we want to find out? What are the questions which the experiment should answer?

- Can it survive?
- Comparison of survival rate between seedlings from nursery and those taken from the forest
- Find out what is the most easy method for planting (less cost and suitable for farmers)

### What will be the design of the experiment?

- Selection of site in the forest
- One plot will be planted with nursery seedlings (100), one with bare root plants (100)

### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- If 4/10 survive ⇒ success (after 1 year)
- Quality of plants
- Cost of inputs, labour, seedlings

### Where can we get additional information regarding this experiment?

Quang Tan forestry enterprise

## Experiment Sheet 6

### Topic

Planting pepper using live poles (Cassia and thorn *Vong*) in gardens

### What do we want to investigate?

- Capacity of producing fruit of pepper on live poles
- Yield of pepper on 2 types of live poles

### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- Planting pepper on live poles can reduce cost
- Increase income for households
- Planting pepper on live poles can create shade for pepper, so reduce watering

### What exactly do we want to find out? What are the questions which the experiment should answer?

- Can Cassia and thorn *Vong* be used as live poles for pepper?
- Which live pole is the best for pepper?
- How do live poles compare with the commonly used timber poles, e.g. economically, concerning labour requirements, longevity etc.?

### What will be the design of the experiment?

- 20 pepper plants for each type of poles
- Doing experiment in separate plots for comparison

### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- If 15/20 survive ⇒ success
- Pepper bear fruits after 3 years of planting ⇒ success
- After 5 years, each pole gives 1 kg of dried pepper ⇒ success
- Yield of pepper on each type of pole

### Where can we get additional information regarding this experiment?

- Experience exchange with other places (Gia Nghia, Dak Nong)
- Thanh Son farm

## C. Experiment Sheets and Activity Plans

### Experiment Sheet 7

#### Topic

Planting grafted durian and durian grown from seeds in coffee gardens

#### What do we want to investigate?

- Yield of coffee with and without durian
- Yield of grafted durian and durian grown from seed
- Compare quality and yield of fruit of grafted durian and durian grown from seed
- Overall income from coffee gardens with grafted durian and durian grown from seed

#### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- It would be good to have durian as shade for coffee
- Grafted durian is expensive, so want to try whether durian grown from seed is beneficial too
- High price of durian and easy to market, so increase income for households

#### What exactly do we want to find out? What are the questions which the experiment should answer?

- Find out efficiency of durian trees as shade for coffee
- Compare grafted durian and durian grown from seeds to see which type is better
- Whether durian affects coffee yield

#### What will be the design of the experiment?

Total area for trial: 3000 sq.m., divided into 3 plots, each plot 1000 sq.m.: coffee with grafted durian, coffee with durian planted by seeds, coffee alone

#### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- Yield of coffee
- Ability of durian to bear fruits
- Costs for labour and inputs
- Prices of the 2 types of durian
- Overall income from 3 plots

#### Where can we get additional information regarding this experiment?

Dak R'Lap extension station, household gardens in Dak Mil, Tay Nguyen University



## Activity Plan

Activity	Month												Responsibility		
	1	2	3	4	5	6	7	8	9	10	11	12		Materials	
1. Study visit to Long Khanh				x										vehicle, accommodation, per diem	SFSP, TN Uni, enterprise
2. Site selection			x												TN Uni, Ext., HHs
3. Experiment design				x											TN Uni, Ext., HHs
2. Making pits for planting					x										13 households
3. Manuring (organic, phosphate)					x									NPK + Organic manure (NPK)	Households, TN Uni, Extension
4. Looking for suitable seed and seedlings			x	x	x									seed and grafted seedlings (205 each)	TN Uni, SFSP
5. Transportation of seedlings to the site					x										Households
6. Planting					x										Households
7. Fencing					x										Households
8. Observation (replacement of dead plants)					x	x	x	x	x	x	x	x		seedlings	Households
9. Fertilising with inorganic fertiliser (3 times)						x		x	x					410 kg of NPK	Households
10. Follow-up								x			x				Households, TN Uni, Extension
11. Weeding							x		x						Households
12. Watering												x			Households
13. Progress reports						x			x						Commune ext.

Grafted seedlings: 205; seedlings from seeds: 205; total area: 5 ha with 13 households. Organic manure: 4100 kg; NPK: 410 kg; pesticide: Paradan: 8 kg, Avil: 1 litre  
13 households: Dieu Lanh, Dieu Glah, Dieu Rath, Dieu Tam, Thi Loi, Thi Gion, Thi Dem, Thi Djang, Dieu Ndal, Thi Don A, Thi chen, Thi Noch, Thi Nonh

## Experiment Sheet 8

### Topic

Planting princess jackfruit on uphill where soil is poor and far from water sources

### What do we want to investigate?

- Whether the jackfruit can survive
- Whether the jackfruit can bear fruits
- Whether the jackfruit can reduce soil erosion

### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- No one has planted the jackfruit uphill yet
- We can sell the fruit
- Timber can be used for households use and firewood
- Can be used as cattle grazing area
- Large areas with poor soil in the village will be utilized

### What exactly do we want to find out? What are the questions which the experiment should answer?

Find out whether the jackfruit is suitable and brings income for family on the poor soil areas

### What will be the design of the experiment?

10 households participate, each household 0.1 ha

Density of the trees: 3m x 5m, 4 x 5, 5 x 5, depending on topography of the area

### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- 7 out of 10 survive ⇒ successful
- After 3-5 years, the trees bear fruits ⇒ successful

### Where can we get additional information regarding this experiment?

Extension station in Long Khanh, Dong Nai

Tay Nguyen University

## Activity Plan

Activity	Month												Materials	Responsibility	
	1	2	3	4	5	6	7	8	9	10	11	12			
1. Study trip to Long Khanh, Dong Nai				x										vehicle, accommodation, per diem	SFSP, TN uni, enterprise
2. Site selection				x										vehicle, accommodation, per diem	Ext., TN uni, farmers
3. Experiment design				x										vehicle, accommodation, per diem	Ext., TN uni, farmers
4. Clear vegetation				x											10 households
5. Making pits for planting					x										10 households
6. Manuring, filling up the holes					x									organic manure	10 households
7. Fencing					x										10 households
8. Transportation of seedlings and fertilisers to the sites						x								500 seedlings, vehicle, fertilisers	SFSP, TN uni, ext.
9. Planting						x								seedlings	Farmers, Ext.
10. Maintenance							x	x	x	x					Farmers, Ext.
11. Fertilising							x			x				Inorganic fertilisers, vehicle, accom. per diem	SFSP, Ext, TN uni, farmers
12. Replacement of dead plants							x		x					seedlings	Farmers, Ext.
13. Observation						x	x	x	x	x	x			vehicle, accommodation, per diem	Ext, TN uni, farmers
14. Protection work										x	x				Farmers
15. Progress reports						x									

## Experiment Sheet 9

### Topic

Management of 3 types of rattan (*Song Bot, May Ruot Ga, May Cat*) in allocated natural forests

### What do we want to investigate?

- Find out suitable management practices
- Compare productivity of non-managed rattan and managed rattan

### Why exactly do we want to investigate this? What is the underlying problem or opportunity? What would be the benefit if the experiment is successful?

- Rattan would have more rapid growth, quick harvest
- Increase household income
- To contribute to the management and preservation of natural forest

### What exactly do we want to find out? What are the questions which the experiment should answer?

- Comparison of economic efficiency with and without maintenance
- Compare the differences between rattan with and without fertiliser
- Rattan bushes in experiment must be cleared around the bush, weak branches must be pruned

### What will be the design of the experiment?

Select 1 ha of natural forest with 3 types of rattan, clearing around the bushes, pruning of weak branches. Using green manure in the forest and inorganic fertiliser (NPK)

Select 20 bushes for each type (relatively similar) and put fertilisers as mentioned before

### What do we need to know to be able to tell whether the experiment was successful? What will we measure (quantitative data)? What will we discuss and judge (qualitative data)?

- Growth rate of rattan (length of branches, quality of rattan: crispy or flexible)
- Comparison of length, girth in each bush
- Labour, input and other costs
- Income from each type of fertiliser used

### Where can we get additional information regarding this experiment?

- Local experiences from other villages
- Extension centre and research organisation

## Activity Plan

Activity	Month												Responsibility		
	1	2	3	4	5	6	7	8	9	10	11	12			
1. Selection of experiment plots			x											3 colour paints	Dieu Miep, 9 HHs, TN Uni, Extension, Enterprise
2. Clearing small bushes				x											10 households
3. Embedding					x									Scissors	10 households
4. Fertilising					x				x					Bags to carry fertilisers, NPK 60 kg, 1 bush/2 times/year	10 households, TN Uni
5. Observation			x	x	x	x	x	x	x	x	x	x	x	paints, ruler,	10 households, TN Uni, Ext
6. Measurement		x					x								10 households, TN Uni, Ext
7. Harvesting after 3 years					x	x	x	x	x						10 households

## D. Action Sheets

### Action Sheet 1

#### 1. Name of experiment

New rice variety (Q63) with new practices for summer/autumn crop on terrace fields

#### 2. Place

Nam Cam village, Cao Thuong commune, Ba Be district

#### 3. Involved persons

Farmers	Supporting persons	Others
Nhat, Nhat, Si, Nam	Helvetas staff, extensionists, farmer trainers	

#### 4. What will be done?

- Plant and manage Q63 in summer/autumn crop from April to July
- Each household plants on 500m<sup>2</sup>

#### 5. Reasons for doing this experiment

- Never uses Q63 before
- Increase the yield, income for HHs

#### 6. What question will be answered?

- Is it possible to cultivate Q63 in Nam Cam
- Yield in comparison with local variety
- Learn about the appropriate practices for Q63

#### 7. Expected results

- Higher yield: 7 ganh/500 m<sup>2</sup>
- New practices can be expanded to other villagers
- Q63 is suitable for local use

#### 8. Assessment and evaluation

##### 8a. Criteria for measurement

- Length of the ears
- Number of grains per ear
- Number of ganh/500m<sup>2</sup>
- Labour requirements, investment

## 8b. General evaluation

- Field visit
- Pilot harvest
- Economic results

## 9. Action plan

Activity	People	Time	Material
1. Design experiment and a journal format to keep track of on-going activities	PO, farmers	24.03	
2. Form an implementation group (group leader, participants), discuss and agree on experiment design, journal format	PO, farmers	24.03	
3. Have a look and select experiment field and practice fields	PO, FT, HHs		
4. Seed, training on IPM method	PO, IPM farmer trainer	03.00	
5. Soil preparation for sowing	HHs, FT	04.00	Green manure
6. Taking care	HHs, FT		
7. Soil prepare for transplanting	HHs, FT	05.00	Green manure, fertiliser
8. Transplanting	HHs, PO		
9. First weeding and hoeing and 1st application of fertilizer	HHs	06.00	NPK fertilizers
10. Second weeding and 2nd fertilizer application	HHs	07.00	K fertilizer
11. Field visit	HHs	07.00	Journal
12. Sample harvest	HHs, PO	07.00	
13. Final evaluation and, plan for future	Nam Cam		Documents, papers

## Journal book for experiment

### 1. Experiment layout

Who does what, where

### 2. Diary

No.	Activities	HH 1	HH 2	HH 3	Others
1	Date of sowing				
2	Date of transplanting				
3	First fertiliser application				
4	First weeding				
5	Take care, find out pests				
6	Second weeding				
7	Second fertiliser application				
8	Applying fertiliser when young flowers come up				
9	Date of flowering				
10	Date of maturity				

11	Field visit and sample harvest				
12	Harvest				
13	Final evaluation				

### 3. Criteria for evaluation

Variety	Criteria	HH1	HH 2	HH3
	Field area			
	Kg of seeds			
	Average length of 10 ears			
	Number of grains/10 ears			
	Number of ganh/500 m <sup>2</sup>			
	Number of labour hours			
	Investments (for fertilizer, insecticide and fungicide, seed)			

### 4. Field visits – observations, comments and solutions suggested by visiting person(s)

No.	Date	HHs present	Findings, remarks	Solutions	Name/signature of visitor
1					
2					
...					

### 5. Evaluation within experiment group or experiment interest group

- Growth duration of the plant
- Yield
- Economic data

### 6. Final evaluation of experiment

- Lessons learnt: good, bad, what to be improved
- Programme for next crop experiments (next year)
- Proposal/recommendation to share the results of experiment (with the communes, district)



## Action Sheet 2

### 1. Name of experiment

Production of non-seed persimmon seedlings in local nursery

### 2. Place

Khuoi Tang village, Cao Thuong Commune, Ba Be district

### 3. Involved persons

Farmers	Supporting persons	Others
Hoang Van Thang, Nguyen Van Chu	Khanh, Helvetas staff, Babe ARDO staff	Son (TNUN)

### 4. What will be done?

- Produce persimmon seedlings by 2 methods: root cutting and grafting
- Hoang Van Thang: 300 seedlings
- Nguyen Van Chu: 200 seedlings
- Start in November 2000 and finish by March 2002

### 5. Reasons for doing this experiment

- Lack of the seedlings
- Seedlings produced with local method (root cutting) do not grow well
- Farmers do not trust the seedlings in the market even if they look good (high plant)
- Local variety is of good quality, good price

### 6. What questions will be answered?

- The persimmon which produce roots itself die soon
- Learn method to graft, make roots
- Able to produce persimmon seedlings

### 7. Expected results

- Successful seedlings: 80%
- High quality seedlings to be sold to farmers
- Expand the knowledge largely to the villagers, commune

## 8. Assessment and evaluation

### 8a. Criteria for measurement

- Measurement:  
Number of seedlings alive after grafting, root cutting  
High quality of seedling after grafting and root cutting which can be sold

### 8b. General evaluation

## 9. Action plan

Activity	People responsible	Time	Material
1. Design experiment and journal format to keep track of on-going activities	Khanh, HHs	07.00	
2. Form an implementation group (group leader, participants), discuss and agree on experiment design, journal format	Khanh, HHs		
3. Have a look and select experiment garden	Khanh, HHs, ARDO	08.00	
4. Design the garden	Khanh, HHs		
5. Look for varieties, fertilizer	Khanh, ARDO	11-12.00	Varieties, fertiliser
6. Soil preparation, fence making	HHs		Working tools
7. Sowing	HHs, Khanh, ARDO	01.01	Variety
8. Take care, protection	HHs		
9. Training on grafting, root cutting	ARDO, Khanh, HHs		Technical documents, Journal book
10. Grafting	ARDO, Khanh, HHs	12 – 01.02	Scissors, knife, plastic bag, chemicals
11. Take care	HHs		Journal
12. Summary, plan for future	Nam Cam		Documents, papers

## Journal book for experiment

### 1. Experiment chart

Who does what, where

### 2. Diary

No	Activities	HH 1	HH 2	Others
	Date of sowing			
	Date of emergence			
	Number of shoots			
	Date of grafting, root cut			
	Numbers of well growing graft, roots			
	Date of exporting			
	Evaluation			

Note: No numbers here, leave space for more activities to be inserted like information on weather conditions etc.

### 3. Criteria for evaluation

Variety	Criteria	HH 1	HH 2
Non-seed persimmon	Number of seedlings alive after sowing		
	Number of seedling alive after grafting, root cutting		
	Number of seedlings with quality enough to be sold		

### 4. Solutions applied

No.	Date	HHs present	Findings, remarks	Solutions	Name/signature of visitor
1					
2					
...					

### 5. Evaluation within conducting group

Comparison of the two methods (grafting, root cutting)

- Grafting: ... .. % seedling alive
- Root cutting: ... .. % seedlings alive

### 6. Summary of experiment

- Lessons learnt: good or bad things, what to be improved
- Programme for next experiment (next year)
- Proposal/recommendation to share the results of experiment (with the communes, district). Should be able to answer the question: why the local practice does not work (the seedlings die soon).

## Action Sheet 3

### 1. Name of experiment

Variety screening experiment of Bioseed (hybrid), CV1 and Q2 (non hybrid)

### 2. Place

At Nam Cam village, Cao Thuong commune, Ba Be district

### 3. Involved persons

Farmers	Supporting persons	Others
Nhey, Yeu, Nheu	Le Thi Luong – Helvetas staff, Nong Thi Loan – IPM farmer trainer of Cao Thuong commune, Hoang Thi Sen – farmer trainer on IPM from other commune	

### 4. What will be done?

- Test the suitability of the 3 varieties for the summer/autumn crop on hill land (screening experiment of 3 varieties)
- Each household gets 1 kg of each variety, total 3 kg per household on the area of 600 m<sup>2</sup>
- Use new cultivation techniques to plant maize
- Arrange one field per household for the experiment, not too far away (easy to access). Should not be flooded in rainy season
- The other two do the experiments in the home field according to their traditional practices and their economic condition

### 5. Reasons for doing this experiment

- Local maize varieties are degenerated, too low yield which cause shortage of food
- These new varieties have never been planted before
- To learn appropriate cultivation techniques

### 6. What question will be answered?

- Are these varieties suitable to local conditions for autumn season on slopy land?
- Which one is the best?
- Which has the highest yield?
- How do the new technologies for these differ from those for local varieties?
- Which varieties will be able to produce seed locally for next crop?
- How to combine new technology and local knowledge. What to keep, what to be replaced?

## **7. Expected results**

- Able to select the suitable one for producing seed for next crop
- Have enough food for daily consumption of people and animals
- Expand the knowledge and experiences gained and extend them throughout the village

## **8. Assessment and evaluation**

### **8a. Criteria for measurement**

- How many seed per cob (count 10 cobs for each variety)
- How many plants have 2 cobs?
- Weight of fresh cobs from a given area (how many baskets of fresh cobs per area)
- How many fallen plants in a certain area

### **8b. General evaluation**

- Is the duration shorter or longer than local variety (how many days)
- Which variety has high pest resistance compared to local varieties
- Number of cobs eaten by termites after 2 months of storage

## 9. Action plan

Activity	People in charge	Time	Material
1. Design a experiment and journal format to keep track of on going activities	Helvetas staff, farmers	24.03	Papers, format
2. Form an experiment group (group leader, discuss and agree on experiment sheet, journal format)	Luong, Loan, 3 HHs	03.00	
3. Field visit and select experiment fields and site preparation (site selection, design experiment layout)	Luong, 3HHs, farmer trainers	03.00	
4. Prepare and distribute seeds and technical guidelines (papers on IPM on maize)	Luong, Loan, Sen	Before 30.03	6 kg of Q2 and CV1 (NB help) 3 kg of Bioseed purchased by BB IPM Guidelines
5. Soil preparation and setting up the experiment fields	HHs, Loan		P fertilizer for each experiment field
6. Sow maize.	HHs, Loan, Luong	10-12.03	Seeds
7. Re-sow death plants, thinning (keep 2 plants/hole)	HHs, Loan	20-27.03	Seeds
8. First earthing-up and hoeing and fertilizer application, discussion on the site (when 2/3 of the plants have 3 to 4 leaves)	Luong, Loan, Sen, 3 HHs, interested farmers		N&P fertilizers, journal
9. Second earthing-up and hoeing and fertiliser application, discussion (when 2/3 of plants have 7 to 9 leaves)	Luong, Loan, Sen, 3 HHs, interested farmers		N&P fertilizers, journal
10. Field visit, discussion before harvest (2/3 of the plant have corn cover turning yellow) and discussion, do pre-evaluation of experiment measures, count fallen plants and set the day for harvesting and do evaluation of each experiment	Luong, Loan, Sen, 3 HHs, interested villagers		Journal
11. Harvest and evaluation (weigh, count the seeds)	HHs, Loan, Luong		Journal
12. Final evaluation of the experiment and plan for future	Luong, Loan, commune leaders, villagers of Nam Cam		Documents, papers

From 6 to 10 steps, the PTD experiment is combined with IPM-FFS (transfer techniques and discuss at the field in practical way).

## Journal book for experiment

### 1. Experiment layout

Name of HH, field size, who does what, where (how are the practices and experiment fields arranged)

### 2. Diary work

No	Activities	HH 1	HH 2	HH 3	Others
1	Date of sowing				
2	Date of beating up				
3	Rate of germination Growth status Weather impact on plants (e.g. draught, rain)				

4	First earthing up, hoeing and fertiliser application (NPK) Pests (date of appearance, date of pesticide application) Diseases (when, how treated)				
5	Second hoeing, earthing up and fertiliser application				
6	The date that 2/3 of plants have cob cover turning yellow (ripening)				
7	Harvesting day				
8	Final evaluation				

### 3. Criteria for evaluation

Variety	Criteria	HH 1	HH 2	HH 3
CV 1	<ul style="list-style-type: none"> <li>• Fallen plants</li> <li>• Number of basket/ 600m<sup>2</sup></li> <li>• No. of plants having 2 cobs</li> <li>• Number of cobs eaten by termites</li> </ul>			
Q 2	...			
Bioseed	...			

### 4. Field visits – observations, comments and solutions suggested by visiting person(s)

No	Date	HHs present	Observations and comments	Solutions suggested	Name/signature of visitor
1					
2					
3					

### 5. Evaluation within experiment group

- Prioritize / determine variety as the best one: 1. ... due to ..., 2. ... due to ..., 3. ... due to ...
- Determine which variety is best for seed production: ... because ...

### 6. Final evaluation of experiment

- Lessons learnt: good, bad, what to be improved
- Programme for next crop experiments (next year)
- Proposal/recommendation to share the results of experiment (with the communes, district)

## Action Sheet 4

### 1. Name of experiment

Trial on growing some new vegetable species

### 2. What will be done?

- Grow vegetables in vegetable gardens in May and harvest them in September
- The households sow the seeds and transplant them after 40 days
- Helvetas project will support them with seeds and the group heads will divide the seeds among the groups

### 3. Reasons for doing this experiment

- Local cabbage and kohlrabi are no longer good; they yield small kohlrabi and cabbages and low percentage of forming heads.
- They want to make trial on growing onion
- Lung Rao is a good place for growing vegetables and there is a market for it

### 4. What question will be answered?

- Whether cabbage will make big heads and the percentage of forming heads is better?
- If kohlrabi will be big?
- To find out if farmers can grow onions in Lung Rao? Will they get big onions?
- Can they produce cabbage and onion seeds at Lung rao?

### 5. Expected results

#### Cabbage

- Big heads and 90% of cabbage plants will form heads
- Farmers can produce seeds for at least 5 years
- They can sell them with high price
- The whole village can grow this kind of vegetable
- It's less affected by pest and diseases

#### Kohlrabi

Big kohlrabi, high prices, less pest and the whole village can grow it

#### Onions

Onions can grow well at Lung Rao with big onions and can produce seeds

### 6. Assessment and evaluation

#### 6a. Criteria for measurement

- Count the number of plants which offer big head and the number of plants which yield at all



- weigh each head to see how many kilo per head

#### 6b. General evaluation

- Interest group and farmers in the village will visit each garden to assess which garden is good and which garden is bad to draw experience
- The possibility to sell them to markets: Can the farmers sell them for high price?
- How many other households would want to grow these new species?

#### 7. Action plan

No.	Activities	Involved persons	Schedule	Material needed	Remarks
1	Formation of 3 groups according to what they are interested in	3 groups - cabbage, - onion, - kohlrabi	May		3 interest groups
2	Seeking for seeds	Helvetas staff	May		Funds, document
3	Soil preparation for seed sowing at small garden	The 3 groups and their group heads	Mid May	Seeds	Farmers will prepare manure, fences and material to cover seed beds
4	Preparation of soil in big gardens, fencing	Every household of the groups	Mid June		
5	Evaluation of nursery gardens	Households, group heads and village head, helvetas project staff	End of June	Notebooks, pens	Group heads will note down comments and observations
6	Begin to transplant vegetables		End of June	Young plants	Nursery men
7	Looking after the vegetables (water, fertilizer, pesticide)	Households	From June to November	Manure, fertilizers, pesticides	Each household will do it by themselves
8	Pre-harvest evaluation	Households, villagers, commune, helvetas project staff	September	Pens, notebooks	Some products
9	Harvest	Households	September - November	Manure, fertilizer	Roots of some cabbage which offer big heads
10	Production of seeds for next crops (cabbage, onion)	Households	November to March	Supporting poles	

## **Action Sheet 5**

### **1. Name of experiment**

Growing soy bean DT 84 in autumn season

### **2. Place**

Hilly fields of interested farmers at Thai Hoc commune, Lung Rao village, Nguyen Binh district

### **3. What will be done?**

- To explore the suitability of soya-bean grown according to technical guidance on soil for maize
- Each household will do the experiment in an area of not more than 200 m<sup>2</sup>

### **4. Reasons for doing this experiment**

- Their old soya-bean variety is long duration and low yield
- Farmers mostly grow soya-bean according to their traditional practices
- Soya-bean leaves make soil more fertile

### **5. What questions will be answered?**

- Is the variety DT 84 high yielding under the local conditions?
- Is DT 84 suitable in autumn season in the soils of Lung Rao commune?
- Will the involved households learn and follow the technical guidance?

### **6. Expected results**

- Soya-bean DT 84 will offer high yield and is suitable with the conditions of soils in Lung rao
- Households will learn and know how to grow soya-beans according to the technical guidance

### **7. Assessment and evaluation**

#### **7a. Criteria for measurement**

- Weigh or measure the quantity of harvested soya-beans and compare them with initial seeds
- Time from sowing to harvesting

#### **7b. General evaluation**

- Make comparison on yield, growing duration of DT 84 with old local varieties
- How many more households would want to grow this variety of soya-bean
- Evaluate the influence of farming techniques to yield
- Make assessment in plenary to find out what is good, what is not good, to draw experience

## 8. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	Remarks
1	Formation of interest group	Interested farmers, head: Mr. Dieu	May		
2	Clarification of each household's area	Group head with interested farmers	Beginning of June		Group head: responsible for clarification of area Helvetas staff: responsible for seeds
3	Learning new techniques designing one model plot on land of one household	Interest group Helvetas project staff	Mid June	<ul style="list-style-type: none"> <li>• Seeds</li> <li>• Nitrogen fertilizer</li> <li>• Potassium</li> </ul>	Notebook and pens for group head
4	Sowing soya-bean	Farmers help each other	Mid June		
5	Looking after soya-bean	Interest group Helvetas project staff	June, July, August	<ul style="list-style-type: none"> <li>• Potassium</li> </ul>	One model plot, then each household will follow
6	Pre-harvest evaluation	Interest group Helvetas project staff	August, September		General comments
7	Harvest	Household	September		
8	Post-harvest evaluation	Group head with interested farmers			Weighing the yield / 200 m <sup>2</sup>
9	Propaganda and encouragement for this soya-bean and ready to supply the seeds to other farmers	Interest group	After September		

## **Action Sheet 6**

### **1. Name of experiment**

Trial on growing of autumn maize

### **2. What will be done?**

- Exploring the suitability of three maize varieties DK 888, CV1, Q 2 as an autumn crop
- This trial will link with the program of IPM Farmer Field School on maize
- 5 households will do the experiment on one variety each on an area of 200 m<sup>2</sup> / household

### **3. Reasons for doing this experiment**

- Autumn maize grain is easier to preserve (than others)
- Farmers here want to have a short duration, high yield maize variety for autumn crop
- They want to have maize varieties which can be used for own production of seed

### **4. What question will be answered?**

- Which maize variety can be grown as an autumn crop with high yield and is easy to preserve (the grain)?
- Which variety they can use to produce seeds themselves?

### **5. Expected results**

- They can identify a high yielding maize variety which is easy to preserve (the grain)
- A maize variety suitable to produce seeds themselves
- To increase family income and have more fodder for animals

### **6. Assessment and evaluation**

#### **6a. Criteria for measurement**

- Follow the criteria and ways for measurement from IPM class on maize
- Weigh the yield
- Percentage of rotten cobs for each variety 2 months after harvest

#### **6b. General evaluation**

- Among the three maize varieties, which variety offers highest yield and has least rotten cobs
- In which variety there are more farmers interested in growing it on a larger scale
- Evaluation on criteria from IPM class on maize
- Discussion to select variety for seed production
- Discussion to find out what is good, what is bad (in the experiment)

## 7. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	Remarks
1	Formation of IPM group of village, selecting group head	Interested farmers	May		IPM class of the commune consists of 30 participants
2	Field trip to IPM class at Don Ru, Tam Kim	Farmers, Helvetas project staff, Mr. Dang, Mr. Heo	May		Project staff and IPM teachers will contact with IPM class in Don Ru
3	Clarification of experimental areas, requirements for seed and fertilizer	Group head	End of May		Project staff in charge of finding out seeds and fertilizer
4	Learning and keeping track with technical guidance from IPM class	Farmers, Mr. Dang, Mr. Heo	From June to October	Documents, seeds, fertilizer	Learning through 7 steps
5	Pre-harvest evaluation	IPM class	October		
6	Harvest	Group head and farmers	October		Weighing the yield per area
7	Post-harvest evaluation	Group head and interest group	December		Count the rotten cobs

## Action Sheet 7

### 1. Name of experiment

Planting *Do Trong* (a medicinal plant) in home gardens

### 2. Place

Mr. Chieu's home garden at Lung Rao village, Thai Hoc commune, Nguyen Binh district

### 3. What will be done?

- grow *Do Trong* to find out its suitability in the local condition
- one household will plant between 10 and 20 trees as a trial in their medicinal plant garden

### 4. Reasons for doing this experiment

- there aren't any *Do Trong* trees in their garden and they want to have many kinds of good medicinal plants/trees for the family and the neighbours
- they can obtain some experiences in growing this tree, if their soil will be suitable
- they can sell this medicine (*Do Trong*) to traditional pharmacies

### 5. What question will be answered?

- Will this tree grow well in their garden?
- How many years will it take to get the medicine?
- How can they get the medicine? They will use the bark, leaves, roots?
- What is the best technique to grow and look after *Do Trong*?
- Can they propagate it? Their grandsons and granddaughters want to plant it also?

### 6. Expected results

- They can raise *Do Trong* at Lung rao and after two years they can get medicine
- They can use both leaves and bark as medicine
- *Do Trong* is easy to grow and look after and will offer much medicine
- *Do Trong* can be propagated for other villagers

### 7. Assessment and evaluation

#### 7a. Criteria for measurement

- number of trees surviving after planting and growing well / number of planted trees

#### 7b. General evaluation

- discussion and comments on growing process of the trees
- exchange experiences with other people on how to grow and use the medicine
- anyone who needs medicine and seeds can come and ask for

## 8. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	material needed	remarks
1	Looking for seeds	Helvetas project	Sept, Oct	Young trees	Instructional documents
2	Begin to grow	Mr. Chieu	?		
3	Looking after the trees	Mr. Chieu	After growing the trees		
4	Observation	Mr. Chieu		Notebook, pens	
5	Finding out the use of medicine and harvest	Mr. Chieu, Helvetas project and experienced persons			How to use the medicine?
6	Evaluation	Mr. Chieu, Helvetas project, experienced persons and medicine users	Two years after growing		Usage documents, experience ...

## **Action Sheet 8**

### **1. Name of experiment**

Growing some fodder plants for domestic animals (priority 5)

### **2. What will be done?**

- Find and grow to see the suitability, yield, use of some local and imported grasses as fodder for cattle and pigs;
- Which grass can offer green leaves in winter season and can be harvested in the whole year as elephant grass, Desmodium, stylo
- The types of grasses can be grown around the houses and fallow hilly fields

### **3. Reasons for doing this experiment**

- There is a shortage of green fodder for domestic animals in winter
- Lots of labour is needed to seek for fodder in forests for cattle and pigs

### **4. What question will be answered?**

- Which kinds of grass are green all year round and can be cut many times and can be stored?
- Which grass is most preferable to cattle and pigs?
- Which grass can be propagated and by what way?

### **5. Expected results**

- They can find out some grass varieties which are always green in winter and can be cut many times.
- They can obtain hay for winter season.
- They can find some kind of grass which are preferred by both cattle and pigs.
- Some of grass varieties can be propagated to larger areas.

### **6. Assessment and evaluation**

- According to criteria from PRA – marking and selecting the experimented grasses



## 7. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	remarks
1	Formation of interest group	Interest group, group head Mr. Hin	May		
2	Selection of grass varieties	Interest group and Helvetas project staff	Early May		Elephant grass can be grown on May
3	Technical instruction	Interest group and Helvetas project staff	From June onwards	Varieties and documents	Right on the field
4	Begin to grow grass	Households	From June onwards		
5	Making fence	Households	June	Poles, branches	Farmers will do themselves
6	looking after the grass	Households	July		
7	Cutting the grass to make hay	Households	from August onwards		Each household will evaluate the time and quantity of grass cut
8	Post harvest evaluation	Households, villagers, Helvetas project staff	June 2000	Notebooks, pens	Group head's notebook
9	Propagation of seeds for other interested farmers	The whole group	After June 2000		

## **Action Sheet 9**

### **1. Name of experiment**

Growing wheat in spring season.

### **2. What will be done?**

- growing wheat in terraced fields in winter-spring season to see its suitability in local condition
- area of experiment: 1000m<sup>2</sup>
- time of experiment: 6 months

### **3. Reasons for doing this experiment**

- farmers want to change cropping mechanism
- it is impossible to supply water for this field in winter time
- there are a lot of terraced fields in the village

### **4. What question will be answered?**

- Will wheat be suitable in local conditions?
- Will it offer high economic value?
- Will it possible to be enlarged?
- Are there any difficulties in protecting it?

### **5. Expected results**

- This wheat variety will grow and develop well at Na roong village.
- It will offer higher economic value as compared with other agricultural crops.
- It will enable to increase family's income.
- More and more farmers in the village and commune want to grow wheat.

### **6. Assessment and evaluation**

#### **6a. Criteria for measurement**

- Yield
- Growth duration
- Economical effectiveness is higher than other crops

#### **6b. General evaluation**

- Its suitability in local conditions
- Its possibilities to resist to pest and diseases
- Its possibility to be enlarged

## 7. Action plan

No.	activities	involved persons	schedule (lunar calendar)	material needed	remarks
1	soil preparation	Bau Mui Kieu	Oct 1999		
2	seeking for seeds	Helvetas project staff	Sept 1999		
3	technical training and guidance	technician(s) in charge of the experiment	Oct 1999	documents, technical guidance	
4	preparation for fertilizers	Helvetas project staff	Oct 1999	chemical fertilizers	
5	making fences	Bau Mui Kieu	Sept 1999	poles, branches	
6	sowing seeds	Bau Mui Kieu technician			
7	observation and looking after wheat	Bau Mui Kieu technician	Oct 1999 - March 2000	fertilizers, pesticides	
8	field trip evaluation check plot harvest	Bau Mui Kieu technician villagers	March 2000	scale, ruler, weigh data for report	
9	harvest	Bau Mui Kieu	March 2000		
10	final report	Bau Mui Kieu technician	April 2000	journals	

## **Action Sheet 10**

### **1. Name of experiment**

Trial on growing spring water melon.

### **2. What will be done?**

- Three water melon varieties (Chinese, Taiwanese, American) will be grown in rice paddy fields as a spring crop.
- The cultivated area per household: 300m<sup>2</sup> / 3 varieties

### **3. Reasons for doing this experiment**

- There were some villagers who had grown water melon this year, but yield and quality of the melons weren't high; so they want to grow these 3 varieties as trial.

### **4. What question will be answered?**

- Which of these varieties will offer high yield with good quality and be suitable in local conditions?
- Will these new varieties offer more and big fruits which are sweet?

### **5. Expected results**

- They hope to select a good water melon which offer high yield, good quality (more and big fruits) and be suitable in local condition

### **6. Assessment and evaluation**

#### **6a. Criteria for measurement**

- Weight of fruits
- Yield
- Quality
- Economic effectiveness
- Growth duration

#### **6b. General evaluation**

- Which variety is suitable in local condition?
- Pest and diseases level
- Color of pulp
- Comparison of quality among these varieties
- Possibility to enlarge them

## 7. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	Remarks
1	Seeking for seeds	Helvetas project staff	October 1999		
2	Soil preparation	Households	November 1999		
3	Technical guidance	Responsible technician	November 1999	Documents	
4	Preparations for fertilizer	Helvetas project staff	December 1999		
5	Sowing of watermelon seeds	Households, responsible technician	January 2000	Seeds Fertilizers	
6	Observation and looking after	Households, responsible technician	January - April 2000		
7	Field trips and evaluation	Households, villagers, responsible technician	April 2000		
8	Harvest	Households	April 2000		
9	Final report	Households, responsible technician	May 2000	Journal	

## **Action Sheet 11**

### **1. Name of experiment**

Growing some short duration rice varieties as spring crop.

### **2. What will be done?**

- 3 short duration rice varieties Q 2, Khang dan, Kim cuong will be grown as a spring crop
- Scale per household: 600 m<sup>2</sup> / 3 rice variety (each variety on 200 m<sup>2</sup>)
- Time of experiment: 6 months

### **3. Reasons for doing this experiment**

- After spring crop rice paddies are left fallow
- Farmers haven't got experiences with short duration rice varieties
- They have enough conditions to grow spring rice (enough water available in the fields)

### **4. What question will be answered?**

- Which variety will be short duration, high yield and suitable in local condition to put into production in spring season?

### **5. Expected results**

- Farmers can obtain a short duration, high yield, rice variety which is suitable in local condition
- Which rice variety can be enlarged to larger area?

### **6. Assessment and evaluation**

#### **6a. Criteria for measurement**

- Growth duration
- Yield

#### **6b. General evaluation**

- Pest and disease level
- Area will be covered by this rice variety in the following year

## 7. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	Remarks
1	Soil preparation	Households	November 1999		
2	Seeking for seeds	Helvetas project staff	December 1999		
3	Technical training or guidance	Responsible technician	January 2000	Document	
4	Preparation for fertilizers	Helvetas project staff	January 2000		
5	Sowing of seeds and transplanting seedlings	Households, responsible technician	January - February 2000	Seeds, fertilizers	
6	Observation and looking after	Households, responsible technician	February - May 2000	Fertilizers Pesticides	
7	Field trip, evaluation, check plot harvest	Households, villagers, responsible technician	May 2000	Ruler, scale	
8	Harvest	Households	May 2000		
9	Final report	Households, responsible technician	June 2000	Journals	

## Action Sheet 12

### 1. Name of experiment

Growing some maize varieties in autumn season.

### 2. What will be done?

- Checking the suitability of two maize varieties Q2 and TS5 in autumn season
- The scale of the experiment: 4 households will carry out the experiment with 2 varieties on the area of 500 m<sup>2</sup> / household
- Method: applying the method from IPM class on maize

### 3. Reasons for doing this experiment

- Farmers have never grown autumn maize before
- Local maize variety is degenerate, low yield, high plant, which is easy to fall
- They want to have two maize crop

### 4. What question will be answered?

- Can they obtain a short duration, short term and high yield maize variety, which is suitable as an autumn crop in their locality?
- Will this variety easy fall as the local one?
- Will it be resistant to diseases as the local variety?

### 5. Expected results

- They can obtain a short duration, short stem and high yield maize variety.
- This variety can be grown in autumn season.
- TS 5 and Q 2 maize varieties will offer higher yields as compared with the local variety.
- A good variety can be chosen for seed production in the village.

### 6. Assessment and evaluation

#### 8a. Criteria for measurement

- Number of plants fallen
- Percentage of rotten grain after 2 months
- Growth duration
- Other criteria from IPM class on maize

#### 8b. General evaluation

- Quality of maize grain
- Solution for pest and diseases
- Possibility for preservation of grain and seeds



## 7. Action plan

No.	activities	involved persons	schedule (solar calendar)	material needed	remarks
1	formation of group and picking up group head	interest group	July 1999	notebook, pens	
2	study tour to learn about growing techniques	interest group, Helvetas project staff, households	July 1999		
3	finding seeds	Helvetas project staff	July 1999	fund	
4	soil selection and preparation, designing of experimental plot	interest group, households, IPM teachers	August 1999		
5	preparation for fertilizers	Helvetas project staff, households	August 1999	chemical fertilizers (Helvetas project)	manure (households)
6	sowing maize	interest group, households, IPM teachers	August 1999	seeds fertilizers	
7	looking after plants and observation on pest and diseases	interest group, households, IPM teachers	August - October 1999	notebook, pens	
8	field trip for evaluation				
9	harvest	interest group, households	November 1999		
10	final report	interest group, households	November 1999	notebook, pens	
11	seminar	interest group, households, technicians and villagers	November 1999	fund, data, paper, pens	

## Action Sheet 13

### 1. Name of experiment

Propagation of Vai Thieu (improved litchi) by bud grafting

### 2. What will be done?

- to explore how the grafted improved litchi buds survive on the local mother litchis
- how the grafted improved litchi develop in nursery garden after 1 or 2 years
- the scale of the experiment:

Farmers	Nursery garden	
	Area m <sup>2</sup>	Number of trees
Nong Van Ung	10	50
Nong Hoang Khanh	4	25
Nong Van The	4	25
Nong Van Hoan	4	25
Nong Van Lanh	4	25

### 3. Reasons for doing this experiment

- local litchi develop well but the quality of the fruits is low
- the local litchi is less affected with diseases compared with other fruit trees

### 4. What question will be answered?

- Will the whole group be successful with grafting?
- Will 70 % of grafted buds survive?

### 5. Expected results

- they can propagate improved litchi for their families and for local requirement
- they will have improved litchi to transform their mixed gardens
- they can increase their income

### 6. Assessment and evaluation

#### 6a. Criteria for measurement

- surviving rate of grafted buds in nursery gardens
- surviving rate of grafted trees after planting
- How do the grafted litchi develop in growing?

#### 6b. General evaluation

- technique that should be added to litchi bud grafting
- Pest and disease situation
- Possibility to enlarge litchi propagation

## 7. Action plan

No.	Activities	Involved persons	Schedule (solar calendar)	Material needed	Remarks
1	- Formation of interest group, - Field trip - Training on grafting techniques	Interest group, Helvetas project staff	15 - 30.06.99	Fund, note books, pens	
2	Collecting litchi seed + young litchi	Interest group and households	15 - 30.06.99		In village
3	Germination of seed, soil treatment, making seed beds, manure preparation	Interest group and households	From 20.06. to 01.07.99		In each household
4	Sow seeds into earth balls, and looking after the young litchi (mother trees)	Interest group	From 25.06. to 05.07.99	Watering pot and sprays	
5	Clarification and selection of mother litchi for grafting	Interest group and households	December 2000		Households
6	Finding buds for grafting and then do grafting	Interest group, Helvetas project staff, Mr. Bang	September 2000	Grafting buds, knives, scissors, plastic, paper	
7	Looking after	Interest group and households	September to October 2000	Watering pot and sprays	
8	Observation on criteria for evaluation	Interest group and households, Helvetas project staff, villagers and communes	1 month after the grafting is done	Pens and notebooks	

## Action Sheet 14

### 1. Name of experiment

Trial on growing consecutive late autumn crop after spring rice in 1999 with 3 rice varieties: Lai, Khang dan and Bao thai lun.

### 2. What will be done?

- To explore the suitability of these three rice varieties
- Group discussion on different growing periods of rice
- To find out which rice variety can be grown after spring rice crop
- Scale of experiment:

Name	Scale	Seeds
Nong Van Tuyen	1000 m <sup>2</sup>	Lai
Nong Van The	300 m <sup>2</sup>	Khang dan
Nong Van Cau	300 m <sup>2</sup>	Bao thai lun

### 3. Reasons for doing this experiment

- They have never done late summer rice before.
- They can't do ratoon crop on sandy soils.
- These rice varieties have been grown in early spring and in summer season rice crop (Lai, Khang dan)

### 4. What question will be answered?

- Will it be possible for farmers here to grow these rice varieties in autumn season (or late summer rice)?
- Will these varieties offer high yield?

### 5. Expected results

- Lai and Khang dan varieties will offer the yield of 80 % of the main crop (spring crop) in 1999.
- Bao thai lun will offer the same yield as Lai in main crop.

### 6. Assessment and evaluation

#### 6a. Criteria for measurement

- Observation on growth duration of each variety
- Weigh to see the yield after harvest

#### 6b. General evaluation

- How the rice grows and develops?
- The influence of pest, diseases and weather on these rice varieties.

## 7. Action plan

No.	Activities	Involved persons	Schedule (solar calendar)	Material needed	Remarks
1	Formation of group - picking up group head	3 interest groups	20 June 1999	Notebook and pens	
2	Seeking for seeds	Helvetas project staff	June 1999	Seeds	
3	Preparation of the soil and nursery	Households	27-30 June 1999	Seeds	
4	Transplanting rice seedlings	Households		Seedlings, fertilizer	
5	Group discussions according to growth duration of rice	Interest group and teacher from IPM class	According to techniques from IPM class	Notebooks and pens	
6	Looking after rice	Households	According to techniques from IPM class	Fertilizer	
7	Evaluation	Interest groups	?		
8	Harvest	Households	?		
9	Final report	Interest groups and households	After harvest	Data for report	

## **Action Sheet 15**

### **1. Name of experiment**

Trial on Q 63 ratoon crop in autumn season 1999

### **2. What will be done?**

- Exploring the growth and development of ratoon crop and its ability to offer yield
- The experiment will be conducted on harvested rice fields of spring 1999
- Group discussion will be made according to each development period of ratoon crop

### **3. Reasons for doing this experiment**

- To recheck the advice and encouragement on technique of ratoon crop
- Farmers here have never done ratoon crop before
- They can save labour, seeds and fertilizer
- To increase crops
- There is still water on the field so farmers can't grow other crops

### **4. What question will be answered?**

- Will ratoon rice will offer higher yield?
- Can we enlarge the area of ratoon crop in the village?
- Can we save labour?

### **5. Expected results**

- Ratoon crop will offer the yield of 60 % as compared with spring crop

### **6. Assessment and evaluation**

#### **6a. Criteria for measurement**

- Observation on growth duration (days/crop)
- Weighing the yield (kg/m<sup>2</sup>)
- Making economic balance like IPM on maize

#### **6b. General evaluation**

- Evaluation on growth and development periods of ratoon rice and solution for pest and diseases

## 7. Action plan

No.	Activities	Involved persons	Schedule (lunar calendar)	Material needed	Remarks
1	Formation of group - picking up group head	Interest group	June 1999	Notebooks and pens	
2	Applying manure and fertilizers to feed young rice buds	Interest group	Oct 1999	Chemical fertilizers	According to technical guidance
3	Harvesting of 1999 spring rice	Interest group	August 1999		Households
4	Observation and looking after ratoon rice	Interest group	October 1999	Chemical fertilizers	
5	Group discussion	Interest group			
6	Evaluation	Interest group, households, villagers	September 1999	Notebooks and pens	
7	Harvest	Households	October 1999		
8	Final report	Interest group and households	November 1999	Data for report	