



**TAY NGUYEN UNIVERSITY**  
**Vietnam Network for Agroforestry Education**  
**VNAFE**



# **Training Workshop and Dialogue**

## **Promoting Agroforestry for Climate Change Mitigation and Adaptation**



ASSOC. PROF. DR. BAO HUY  
DR. VO HUNG  
DR. NGUYEN THI THANH HUONG

**Tay Nguyen University, Vietnam, 8 – 9 December, 2011**

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## SUMMARY

Mitigation and adaption concepts, impact analysis of climate change to agriculture and forestry, solutions for climate change through Agroforestry including application of GIS, and dialogues related to situations and solutions for promoting agroforestry were covered as part of a training workshop and dialogue held in Tay Nguyen University on 8-9 December 2011.

The training workshop/dialogue was divided into two parts. Firstly, attendees worked in teams or individuals to contribute their ideas with given problems/questions. The workshop provided trainees useful materials on promoting agroforestry for climate change mitigation and adaptation, and GIS data for analysis land use change. A short practice with GIS was done by individual in GIS laboratory. Secondly, the key people who are in different management positions were invited to take part in dialogue part. Plenty of ideas and solutions were gained through the dialogue.



# Training/workshop

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## **1 Background and training workshop objectives**

There is no way to completely avoid the negative impacts of climate change. This is considered the result of natural phenomena under indirect and direct impacts of human. So far in many parts of the world have experienced on how to deal with climate change. One of the strategic policies is to strengthen the mechanisms of adaptation through suitable agriculture and forestry activities through agroforestry, especially for farmers.

Vietnam is an agricultural country, with 70% of the population accounts involved in agricultural and forestry production. The farmers are certainly vulnerable to climate change due to produce with small scale. With the reality, except for policy of capital support, information and knowledge on climate change should be provided to the farmers so that they can identify the basis of seasonality, species selection, and technique of planting. Agroforestry, a land-use management system that combines the production of agricultural crops with the woody perennials, livestock and/or aquatic resources, is one of the interventions that are being considered in climate change mitigation and adaptation.

With the financial support of the Asia-Pacific Network for Global Change Research (APN), Network for Agroforestry Education in Vietnam (VNAFE) represented by the University of Tay Nguyen organized a Training workshop and Dialogue on "Promoting Agroforestry for Climate Change Mitigation and Adaptation". The participants were technicians, lecturers and forestry and agricultural staffs who come from the different provinces belonging to the Central Highlands.

The attendees are expected to be able to

- Explain concepts of global climate change (GCE) and effects of GCE to agriculture and forestry
- Define potential solution for climate change mitigation and adaptation through agroforestry promotion
- Assess land use change with emission of green-house gas and solutions of agroforestry development for reducing emissions.

## 2 Training workshop program, method, and participants

### 2.1 Training program

The training/workshop was held 1.5 days, from 8 – 9 December, 2011 in Tay Nguyen University

Table 1: Program/Method of the training

<b>Id</b>	<b>Topics</b>	<b>Method/Materials</b>	<b>Time</b>
1	<b>Climate change concept</b>		
	Climate change	Presentation Flashlight	Morning 8/12/2011
	Mitigation and adaptation with climate change Effect of climate change to agriculture and forestry	Presentation  Phillip 5/9/4	
2	<b>Agroforestry and climate change</b>		
	General awareness Solution for climate change mitigation and adaptation in agriculture and forestry	Presentation  Brainstorming	Afternoon 8/12/2011
	Reducing emissions through agroforestry Application of GIS in monitoring land use change and CO <sub>2</sub> emission. Agroforestry as solution to reduce CO <sub>2</sub> emission	Presentation Practice on computer and ArcGIS about Land use/land cover mapped from SPOT 5	Morning 9/12
3	<b>Agro forestry and climate change (cont.)</b>		
	Adaptability with climate change through agroforestry	Presentation General discussion	Morning 9/12

### 2.2 Training participants

Twenty two people participated in the training/workshop. They are young lecturers of the Universities, staffs of agriculture extension centers, researchers of Science and Technology Institute of Forestry and Agriculture, and staffs of forestry departments.

Table 2: List of participants of the training

<b>Id</b>	<b>Full Name</b>	<b>Position</b>	<b>Agency Name</b>
1.	Lê Công Trường	Deputy of Forest Department	Forest Department of Daknong Province
2.	Triệu Thị Lăng	Lecturer	Tay Nguyen University
3.	Trần Thị Xuân Phần	Lecturer	Tay Nguyen University
4.	Hoàng Thị Trà Mi	Staff	Extention Center of Buon Ma Thuot City
5.	Đinh Thị Hiệp	Staff	Extention Center of Gia Lai Province
6.	Nguyễn Tấn Vinh	Staff	Extention Center of Daklak Province
7.	Cao Thị Hoài	Lecturer	Tay Nguyen University
8.	Phan Thị Hằng	Lecturer	Tay Nguyen University
9.	Hoàng Trọng Khanh	Lecturer	Tay Nguyen University
10.	Hồ Tiến Cương	Head of Science and Technology	Extention Center of DakNong Province
11.	Hồ Đình Bảo	Lecturer	Tay Nguyen University
12.	Hồ Công Vũ	Head of silvicultural department	Forestry Department of Kontum Province
13.	Huỳnh Cao Thoại	Staff	Forestry Department of Gia Lai Province
14.	Lê Thị Ánh Tuyết	Staff	Forestry Department of Daklak Province
15.	Nguyễn Thị Tình	Lecturer	Tay Nguyen University
16.	Hoàng Thị Ái Duyên	Reseacher	Tay Nguyen Science and Technology Institute of Forestry and Agriculture
17.	Hoàng Hải Long	Reseacher	Tay Nguyen Science and Technology Institute of Forestry and Agriculture
18.	Nguyễn Thị Phương Uyên	Staff	Forestry Department of Daklak Province
19.	Phạm Đoàn Phú Quốc	Lecturer	Tay Nguyen University
20.	Lê Đăng Pha	Staff	Department of Science and Technology of Daklak
21.	Phạm Ngọc Tuấn	Lecturer	Da Lat University
22.	Nguyễn Thị Ngọc Quyên	Lecturer	Tay Nguyen University

### 3 Output workshop

#### 3.1 How does climate change affect Forestry and Agriculture?

4 groups were established with 5 people each. The question above was done by Phillip method (5/9/4). The ideas were divided into four main aspects, and indicated in table below:

Table 3: Climate change effects to Forestry and Agriculture

Forestry	Natural resource	Agriculture land	Likelihood
<ul style="list-style-type: none"> <li>- High risk of forest fire</li> <li>- High risk of natural resource decrease</li> </ul>	<ul style="list-style-type: none"> <li>- Flooding</li> <li>- Drought</li> <li>- Lack of fresh water</li> <li>- Lessen under-ground water due to loss of forest</li> </ul>	<ul style="list-style-type: none"> <li>- Narrow cultivation land</li> <li>- Desertification</li> <li>- Salt invading</li> <li>- Erosion</li> <li>- Degradation of soil</li> <li>- Seasonal change</li> <li>- High risk of pest for crops</li> <li>- Influence of crop structure</li> </ul>	<ul style="list-style-type: none"> <li>- Poverty</li> <li>- Likelihood decrease especially people living near the sea and whose job of salt industry</li> </ul>



Figure 1: Group discussion of climate change effect to forestry and agriculture

### 3.2 Which are solutions for mitigation climate change

Brainstorming method was used to collect the ideas from attendees; various ideas were given and divided into different groups. Ranking was done by choosing the three key ideas from attendees. The result is indicated in table below

Table 4: Solutions for adaptation with climate change

<b>Id</b>	<b>Group solutions</b>	<b>Mark</b>	<b>Ranking</b>
1.	- Plantation - Replantation - Forest enrichment	13	1
2.	- Sustainable slopping cultivation - Agroforestry - Crop diversity - Perennial crop with annual crop	12	2
3.	- Forest protection and development - Vegetation protection - Vegetation increase - Reduction of forest logging and destruction - Sustainable exploitation - Forest fire control	12	2
4.	- Biogases - Economic use of energy	3	3
5.	- Reuse of harvested products - Limit of combusting harvested sub-products	3	3
6.	- Change of cultivate traditional	2	
7.	- Application of science and technology in forestry and agriculture - Land use planning	2	
8.	- Suitable water use	2	
9.	- Benefit sharing in environment services of forest	1	
10.	- Gene conservation	1	
11.	- Pest management - Limit of pesticide and chemical fertilizer	1	
12.	- Increase of crop quality	1	

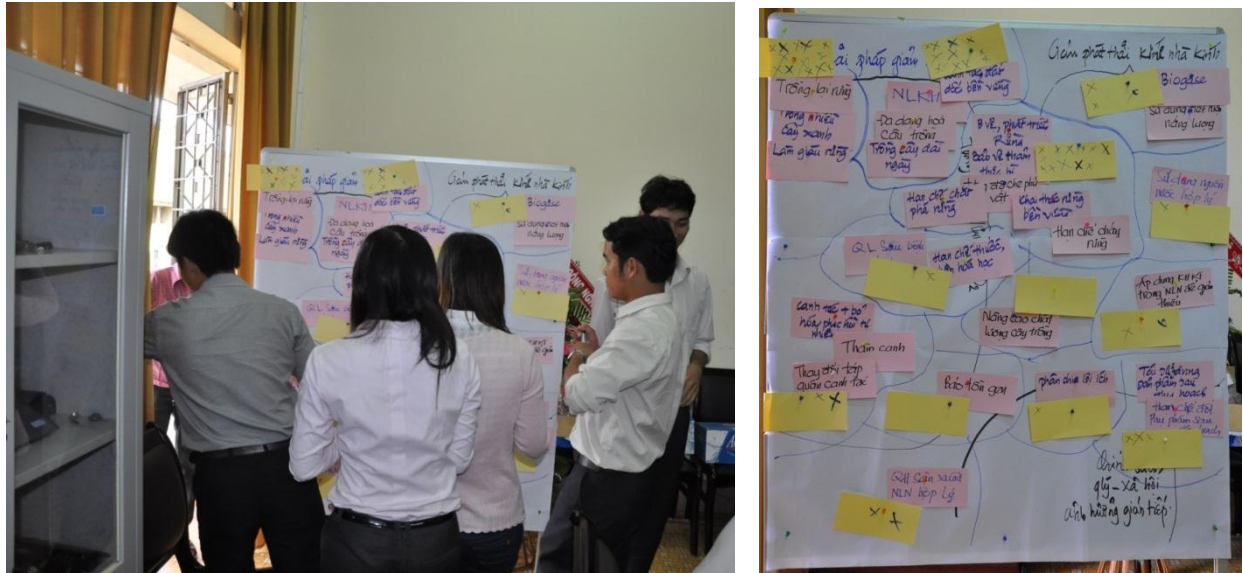


Figure 2. Votes for mitigation solutions

### 3.3 Which are solutions for adaptation with climate change

Similar above, brainstorming method was employed to collect the solutions from the attendees. Set of ideas grouped and ranked as follows:

Table 5 Solutions for adaptation with climate change

Id	Group solutions	Mark	Ranking
1	- Agroforestry development - Sustainable agricultural development - Cultivation on contour lines	11	1
2	- Suitable crop structure - Adaptive cross-breeding creation - Seed selection	8	2
3	- Appreciate social policy - Monitoring and prediction system	8	2
4	- Sustainable exploitation of forest - Suitable use of natural forest - Bench for forest fire control	4	3
5	- Research CO <sub>2</sub> absorption - Application of advance technology science - Scientific research for agroforestry on farm	4	

<b>Id</b>	<b>Group solutions</b>	<b>Mark</b>	<b>Ranking</b>
6	- Embankment for preventing erosion - Designing irrigation system for water balance	3	
7	- Forest reforming - Plantation - Forest enrichment - Forest maintaining	2	
8	- Change traditional cultivation	1	
9	- Gene conservation	1	
10	- Bench fire control	1	
11	- Integrated pest management	1	
12	- Preserving protection forest	1	
13	- Selection of suitable seasonal	1	



Figure 3. Votes for adaptation solutions

### 3.4 How to apply GIS in monitoring emissions from land use change

A review of GIS application in analyzing land use change and emission was given, simultaneously, carbon sequestration and CO<sub>2</sub> absorption was calculated based on the

areas resulted from land use change analysis using ArcGIS along with the available results of carbon studies.

A data set of district land use image files of 2003 and 2009 which classified from SPOT 5 data were provide to attendees in order to practice GIS with land use change analysis.

In this assignment, the attendees were required to map land use change using ArcGIS. The results were stored in two different formats. One is spatial image, another is presented in attribute table. Based on the attribute tables of land use and land use change areas, calculations of carbon and CO<sub>2</sub> of 2003 and 2009 were done. An agroforestry scenario applied to replace the class of agricultural land was applied to compare changes of carbon stored as an example.

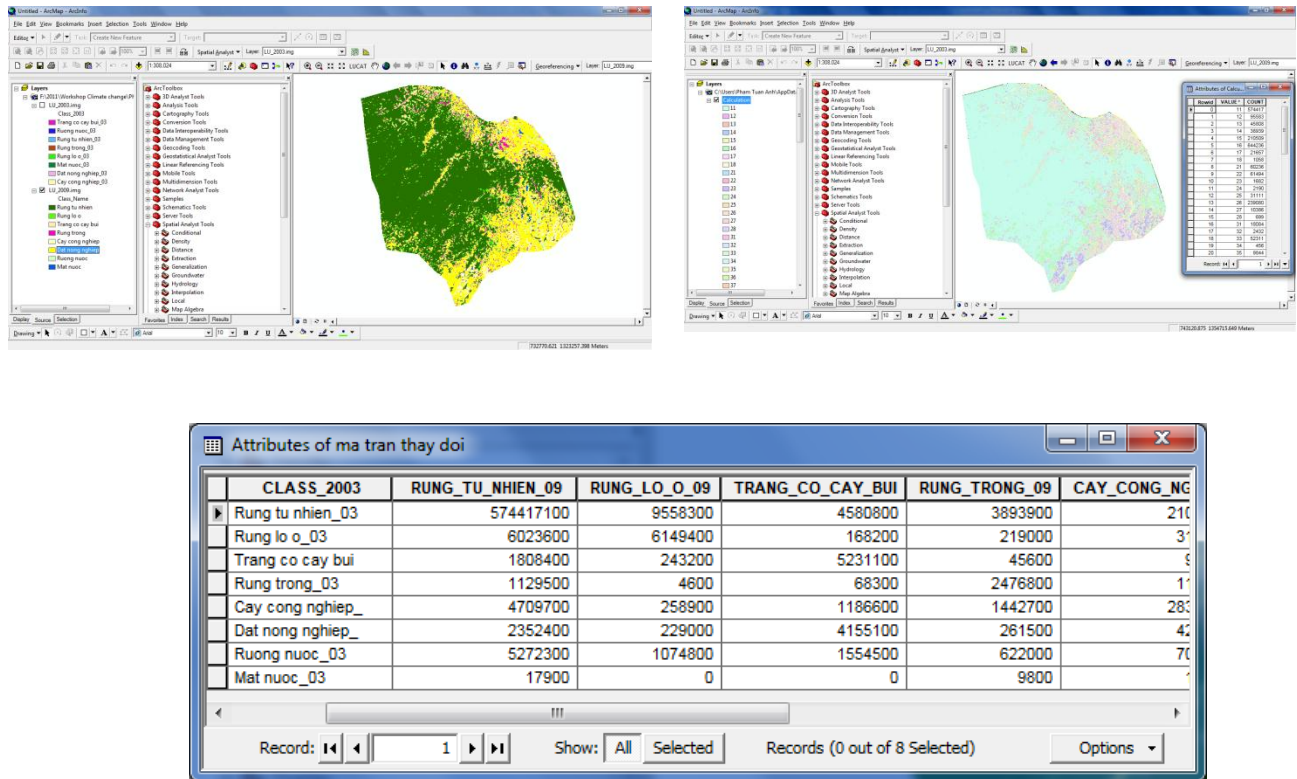


Figure 4. Land use change and emissions analysis using ArcGIS

# Dialogue

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## **1 Dialogue objective, method and topics for discussion, participants**

In Vietnam, as reason of economic efficiency, so many land areas cultivated in monoculture crops or industrial tree either, especially on slopes this method has been an unsustainable way.

In the situation of climate change, there is a need to improve the land use system, including agroforestry to recognize as the solution to mitigate and adapt to climate change.

But there is still lack of the institutions, organizations and policies to support farmers apply agroforestry.

So this dialogue was to propose policy solutions for developing argroforestry in order to mitigate and adapt global climate change

Method of the dialogue:

- Presentation of summary on climate change, its affect to agriculture and forestry, agroforestry as solution for mitigation and adaptation
- The guest was asked to discuss/answer four main topics:
  1. Why has not agroforestry performed in all slopping land area? While many monoculture land use with too much water?
  2. Is there any policy to support farmers to promote agroforestry currently? If so, how to conduct?
  3. In the context of climate change, to sustainable farming methods agroforestry is the solution to mitigate and adapt. In order to apply in large scale, what is required of institutions, organizations and policies?
  4. How should the value of environmental services of agroforestry be recognized?

The dialogue not only got answer from the Guest but also as panel discuss among young people who are working for farming system and managers.

Participants of the dialogue: Seven guests who are managers/leaders of province, agriculture-forestry companies, agriculture and forestry department, provincial extension centers; all participants of the training also were involved in the dialogue.

After finishing the training, the dialogue was held in haft a day on 9 December, 2011

Table 6: The Guests of the dialogue

<b>Id</b>	<b>Full Name</b>	<b>Position</b>	<b>Agency Name</b>
1.	Phạm Tuấn Anh	Vice Chair	People's committee of Dak Mil District
2.	Nguyễn Trương Bình	Director	Forestry company of Lak
3.	Phạm Thế Minh	Director	Forestry company of Madrak
4.	Lê Văn Dĩ	Director	Forestry company of EaWy
5.	Trần Văn Khoa	Expert	Protection Department
6.	Nguyễn Tuấn Khải	Director	Extension Center of Dak Nong Province
7.	Ngô Nhân	Deputy Director	Extension Center of Dak Lak Province



Figure 5. Dialogue session

## 2 Outcome of the dialogue

The dialogue topics focused on 4 questions. Below is the result of the dialogue, discussion.

### 2.1 Why has not agroforestry performed in all sloping land area? While many monoculture land use with too much water

- The policy institutions are the main reasons: 1) land ownership is unclear, many projects have taken land, however, many projects have currently not continued. As a result the lands appropriated by them have not used leading to be waste while the local farmers have not enough land to cultivate; 2) the land use planning was not based on rationality and requirement but only concerned how to disburse budget;

3) lack of supports for instructions on transfer crop structure in their fields as well as lack of mechanism for the transferring land use and 4) market for products is also a problem.

- Farmer has not aware of the impact of climate change on their lives
- The government has not made clear its role in directing farmer to promote agroforestry, most farmers cultivate their land in spontaneity.
- It is difficult to carry out the established mechanism in practice. Lack of resources and funding, particularly the lack of synchronization mechanisms in order to promote agroforestry
- Despite the policy of cultivation land for the ethnic groups was issued, the implementation and management have not been of asynchronous and unreasonable
- Most slope lands are used by business owners and the poor people. For investment restrictions the business owners are not applied agroforestry in their lands, meanwhile, the poor are for the purpose of immediate economic, they also do not apply agroforestry
- Despite the scale of investment and training for agroforestry are implemented, the spread is limited. Therefore, policy mechanism to spread the good models should be concerned.
- Presently, the FLITCH project support 400 USD per ha to promote agroforestry, but the implementation is very low. The cause is of difficulty to culture perennials on farmland.
- Due to difficult in mechanization, rubber farmland are planted in monoculture way.
- There were some policies aiming to facilitate agroforestry such as program of 135 and 178, but general guidelines are not specific and therefore it is difficult to implement.
- People do not have benefit from the environmental value; there is no regional planning for production, hence farmer's production is spontaneous and running ahead of economic goals.
- No mechanism of administrative penalty for land use which does not follow the land use planning has been issued.
- The conversion of forest to monoculture rubber plantations under government policies have destroyed forests and affected the environment due to using chemicals and mechanized farming on a large scale.

- Although there are regulations of using sloping land, they end at recommendation levels but there is no legal to bind.
- It is difficult to change traditional farming practices
- Agroforestry in sloping land requires high investment of resources, finance, and technique, and difficulty of transportation and mechanism.
- It is difficult to loan capital.
- Finding a suitable conditions for agroforestry in specific place is still limited
- Duration of agroforestry to provide effective economic is long
- Most of the experimental models focus on households of ethnic minorities. But because of economic difficulties, it is difficult to encourage or spread.

## **2.2 Is there any policy to support farmers to promote agroforestry currently? If so, how to conduct?**

- Information of technology and science was provided.
- Many organizations promote agroforestry with different models. However the implementation of the model sometimes overlaps or inconsistencies on the same local
- Some models were carried out based on the ideas of farmer in Daklak
- Biogas for rural people to save energy, reduce emissions into the environment while reducing fuel from logging were made.
- There is policy to support to farmer in Acacia plantation in previously forested areas cleared was done.
- Up to now in Vietnam lack of law or policy to apply agroforestry on the sloping land.

## **2.3 In the context of climate change, to sustainable farming methods agroforestry is the solution to mitigate and adapt. In order to apply in large scale, what is required of institutions, organizations and policies?**

- Regulations and policies should be clearly and specifically of benefit sharing the environment to apply agroforestry, especially poor people are mainly interested in the short-term economic.
- Agroforestry policy must come directly to the people, not theoretical paper
- Rules on the use of cultivation on steep slopes to ensure environmental sustainability should be clearly issued

- Land use rights must be clear
- Approaches in agroforestry should be concerned
- The policy on product market should be considered.
- Policy support for agroforestry products
- The role of the state in sustainable agroforestry production should be clear
- Support for policy loans
- Plan and policies of implement on agroforestry farming landscape
- Policies to support farmers for cooperatives with a rational organization to focus on production, which can be commodities.
- Institutions to support changing farming practices and crop structure are necessary.
- Forest land allocation policy to people with benefit sharing mechanisms and clear should be done.
- There are legal mechanisms such as taxation of crops harming the environment (rubber) or use more water (coffee)
- Development of agroforestry into a national program
- Exemption for agroforestry products should be concerned.

#### **2.4 How should the value of environmental services of agroforestry be recognized?**

- Specific policies of benefits from the environment for agroforestry especially poor people should be defined.
- Policy of payment for environmental services should be issued.
- Planning and policies on agroforestry farming landscape should be done.
- PES and REDD should include agroforestry.
- The economic benefits between two forms of agroforestry and monoculture by the certificate for the model and demonstrate the efficiency and reduce CO2 emissions should be harmonize solved.

# Conclusion and recommendation

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The training/workshop provides opportunity for sharing information/experiences of issues related to climate change with agroforestry among the people coming from different agencies and positions. The method used in the workshops is designed to encourage maximum engagement from participants. As a result many useful ideas of issues and solutions were contributed from the attendees. GIS was practiced with small function of land use change and emission control analysis made attendees feeling more active and attracted.

Through the training workshop, climate changes were defined affecting to natural resources such as forest, underground water, flooding and drought; agricultural land like erosion, desertification, crop pest; and livelihood as poverty, unemployment, and so forth.

Of which twelve solution groups for mitigation of climate change were given, the three groups were selected with the highest marks. They are pertaining to 1) Forest such as plantation and forest enrichment; 2) Sustainable agroforestry on slopping land; and 3) sustainable forest management and vegetation increase.

Fourteen solution groups were shown to adapt with climate change. The four groups with the highest marks are related to 1) Sustainable cultivation on slopping e.g. agroforestry; 2) Seed selection and creation, and suitable crop structure; 3) Social policy and prediction system; and 4) Sustainable forest management and exploitation.

GIS application is also determined as a solution in monitoring and prediction of changes of carbon sequestration.

The results gained from the dialogue indicate that policy and mechanism in land use and land tenure are very important to apply agroforestry as solutions to mitigate and adapt with climate change. The support for farmer in techniques capital and providing information are need to consider, especially, policies of environment value payment from agroforestry should be high take into account.

# Materials for training workshop/dialogue

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- Bao Huy, Vo Hung, and Nguyen Thi Thanh Huong, 2011. Workbook: Agroforestry with Climate Change. VNAFE
- Classified images of 2003 and 2009 based on SPOT 5 data of Tuy Duc District, DakNong Province, Vietnam
- Promoting Agroforestry for Climate Change Mitigation and Adaptation, 2010. Policy Brief, SEANAFE. The University of the Los Banos.