

RESEARCH PROPOSAL FOR MASTER DEGREE IN FORESTRY

“Research in economic and environmental impacts of some agroforestry models in the Northern mountainous regions of Vietnam”

Name of MSc. student: Nguyen Van Chung
Speciality: Management of forest resources
Code: 60 62 68
Supervisor 1: Dr. Le Quoc Doanh
Supervisor 2: MAgri. Ha Dinh Tuan

INTRODUCTION

1. The importance of the research topic

Mountainous lands (mostly sloping land) occupy 3/4 of 32.929 million hectares of Vietnamese territory. These are diverse ecological systems with high development potential but they are very fragile. The Northern mountainous regions are the most difficult regions where sloping lands occupy 90% of the region, of which 51% have high sloppiness and 38.4% have the soil layer of less than 50 cm. That is why the introduction of agro-forestry models plays very important role in improvement of people living standards and protection of natural resources.

However, it is necessary to assess their economic and environmental impacts to identify more effective models to promote their application to larger scales to make sure that their will contribute to the increase of farmers income and protection of environment. In this context, we decide to carry out a research topic **Research in economic and environmental impacts of some agro-forestry models in the Northern mountainous regions of Vietnam.**

2. Objectives of the research topic

- Impacts of some agro-forestry models in the Northern mountainous regions of Vietnam assessed.
- Factors behind the impacts of the models analyzed.
- Solutions for improvement of existing models proposed.

3. Scientific and practical values of the research topic

3.1. Scientific value

- The research results will contribute to improvement of scientific basis for development of agro-forestry models in the Northern mountainous regions (NMR).
- The research results will serve as scientific basis for orientation in sustainable exploitation and protection of natural resources in NMR.

3.2. Practical values

- The research will help farmers in mountainous regions in more effective agriculture and forestry production while not damaging the ecological environment.
- The research will contribute to the increase of farmers' income.

4. Research objects and scale

4.1. Research objects

- Different main trees: Litchi, mango, Acacia, Eucalyptus, etc.
- Intercropped species: Fodder crops, annual food crops (peanut, soybean...), etc.
- Animals: Buffaloes, cows, goats, chickens, etc.

4.2. Research sites

- The research will be carried out in:
 - + Phu Tho town of Phu Tho province
 - + Van Chan district of Yen Bai Province.

4.3. Time: 2009 - 2010

PART I. LITERATURE REVIEW

1. Agro-forestry research and development in the world and in Vietnam

1.1. In the world

2.2. In Viet Nam

PART II. MATERIALS, CONTENTS AND METHODS OF RESEARCH

2.1. Materials

- Different trees, crops, animals in AF systems, soil nutrition in AF systems;

2.2. Contents

- Survey on natural, socio-economic conditions at the research sites,
- Biological characteristics of plant species the target AF systems;
- Assessment of economic effectiveness of AF models.
- Assessment of environmental impacts of AF models.
 - + Ability for soil protection, land use efficiency and sustainability,
 - + Ability to keep soil moisture, protection of water resources and relationship between AF with water source stabilization, clean water and water for irrigation,
 - + Ability to control environment pollution (soil, water, air...)
- General assessment of AF models,
- Recommendation of solutions to improve the effectiveness of AF models.

2.3. Methods

2.3.1. Collection of data and information

- Through domestic and international sources, specialized institutions,
- Through surveys and interview of the households that apply AF models, 10 households per site.

2.3.2. Methods for survey of standard samples

- Identification of soil protection ability

Method 1: Digging soil traps at the foot of the hills with and without AF models. The dimensions of the traps are 80 x 80 x 50 cm. After each rain, the eroded soil accumulated in the traps will be collected and weighted for calculation of soil erosion.

Method 2: Marking 3 plots of 4m² each in AF and non-AF areas, then put 5 sticks in each plots with definite above ground height. At the end of rainy season, measure the height of the above ground parts of sticks to calculate the amount of eroded soils.

- Identification of soil moisture

From standards plots, 3 soils samples are taken at 20cm depth. The samples are dried at 105⁰C until the weight is not changes. The difference in initial and dried weights is used for soil moisture calculation.

Relative soil moisture is the ratio (%) of water content to initial weight of a soil sample and is calculated by following formula:

$$A\% = \frac{(W_1 + W_2) - W_3}{W_2} \cdot 100, \text{ where:}$$

W_3 : Weight of aluminum container plus soil after drying (g).

W_1 : Weight of aluminum container (g).

W_2 : Weight of initial sample (g)

2.3.3. Other methods

Calculation of economic efficiency using the following formula:

$$LN = \sum Bt - \sum Ct, \text{ where:}$$

LN: Benefit from AF models,

$\sum Bt$: Total revenue from AF models,

$\sum Ct$: Total expenditures for AF models.

Ecological effects:

+ The amount of eroded soils is calculated using the following formula:

$$D = \frac{P}{S} \cdot 10000, \text{ where:}$$

D : Amount of eroded soil (T/ha).

P : Amount of soil collected in the traps (kg).

S : Area of survey plots (m²).

- Comprehensive effects

Survey and interview of households on income, expenditures, strength, difficulties of ach models, selection of highly efficient models and recommendation for their application.

2.3.4. Data analysis methods

- Data are treated by computerized programs and Excel soft ware.

PART III. EXPECTED RESULTS AND DISCUSSION

1. Expected results

- Highly efficient AF models identified and recommended for the Northern mountainous regions.
- Environment impacts of targeted AF models assessed.
- Solutions recommended for improvement of AF models.

PART IV. CONCLUSIONS AND SUGGESTIONS

Approval by supervisor