Tropentag 2015, Berlin, Germany
September 16-18, 2015

Conference on International Research on Food Security, Natural Resource Management and Rural Development
organised by the Humboldt-Universitätzu Berlin and the Leibniz Centre for Agricultural Landscape Research (ZALF)

# Alternative Livelihood Strategies of Forest Dependent Ethnic Minorities within a REDD+ Implementation Area in Bac Kan Province, Vietnam

Nui Nguyen Hai[1], Martin Reinhardt Nielsen[2], Ida Theilade[2], Lam Nguyen Thanh[1], Son Cao Truong[1]

[1]*Vietnam National University of Agriculture, Vietnam*
[2] *University of Copenhagen, Dept. of Food and Resource Economics, Denmark;*
*Corresponding email: hainui@gmail.com*

## 1. Introduction

For centuries, forest has been a key component of rural livelihood. They are important both socially and economically (Panta, Kim et al. 2009). Millions of people around the world depend on forest products and services for their daily needs (Mutamba et al. 2005;Vedeld, Angelsen et al. 2007). They provide a source of income to rural households as well as a safety net for people in times of scarcity or emergency. Therefore, stimulating incomes from forest has been perceived as a possible strategy to improve incomes among rural households (Pokorny, Johnson et al. 2012). However, the level of reliance on forest environmental products differs between households. Reliance reflect different livelihood strategies determined by household capitals (Babulo, Muys et al. 2008)**.**

Bac Kan is a mountainous province that has the largest forest cover in Vietnam. REED+ activities have started being implemented in BacKan since 2014 with the aim to conserve the natural forest while supporting local development through carbon payments. However, it is unclear whether REDD+ carbon payments will cover potential household welfare losses due to associated restrictions on forest use. This study examines forest dependence as a livelihood strategy of ethnic minorities in the BacKan province of Vietnam.

## 2. Material and Methods

We employed the concepts of household livelihood strategies and reliance on income (subsistence and cash) from harvesting of forest products. The share of forest income in total household income (i.e. forest reliance) was used to define three mutually exclusive livelihood strategy groups. The livelihood strategies have three levels in relation to forest reliance: LS1: "less reliant" on forest income; LS2: "moderate reliant" on forest income; LS3: "high reliant" on forest income. The relevant data was collected by a structured household survey (n=245) in four communes in Ba Be and Nary districts.

## 3. Results and Discussion

### *3.1. Household income shares and extent of forest reliance*

Table 1 presents household income share of total income by income sources and livelihood strategy. Overall, crop income, derived from rice, maize and others agricultural production, contribute most income to households in the study area. Forest income share is approximately equivalent to livestock income share. However, reliance on income sources differs between livelihood strategy groups. The main income source for low forest reliance households (LS1) is off-farm employment including as officers, factory workers, and small scale businesses and these households obtain less than 20% of total income from forests. On average, more than 90% of LS1 households' income originates from non-forest products.

Moderate forest reliant households (LS2) are most dependent on crop income and obtain 28% of total income from forest collection. Nearly 60% of high forest reliance household's (LS3) total income originates from forest income. Additionally the number of high forest reliance households is high and this will have implications for implementation of REDD+.

**Table 1.Household income shares in total income (by income sources) and extent of forest reliance**

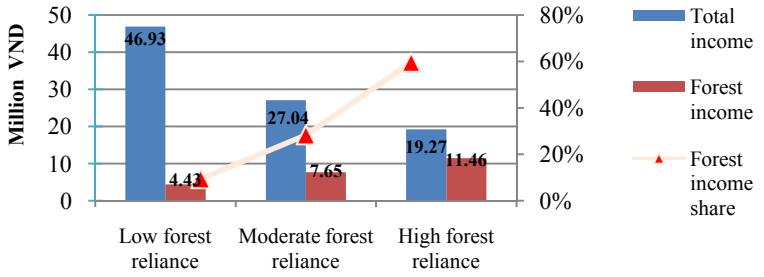
| Forest income share | | Reliance on forest income | Livelihood strategy | No. of HHs | Ave. crop *(%)* | Ave. livestock *(%)* | Ave. off-farm *(%)* | Ave. others *(%)* |
|---|---|---|---|---|---|---|---|---|
| Range | Average | | | | | | | |
| <=20% | 9.43 | Low forest reliance | LS1 | 91 | 24.98 | 23.75 | 34.59 | 7.25 |
| (20–40%] | 28.30 | Moderate forest reliance | LS2 | 87 | 34.75 | 18.56 | 13.73 | 4.66 |
| >40% | 59.49 | High forest reliance | LS3 | 67 | 29.83 | 4.99 | 4.13 | 1.56 |
| All | 23.20 | | | 245 | 28.68 | 19.15 | 23.42 | 5.55 |

*Note: Ave. = average; HHs = households; (20–40%]the interval excludes '20' and includes 40%'.*

### *3.2. Livelihood outcome by livelihood strategies*

Figure 1 shows the average total household and forest income for each livelihood strategy group. Average total household income in the study area is 34.56 million VND per year (equivalent to 1,538 US dollars). Low income households tend to rely more on forest income than higher income households. In addition, households who are more forest reliance have higher absolute forest income compared to households with other livelihood strategies.

**Figure 1. Average household income by LS**




*Note: 1 million VND = 44.51 US dollars*

Table 2 present a student t-test of the significance of the differences between mean total incomes among household livelihood strategy groups. The result reveals that mean total income of highly forest reliant households is significantly lower than less forest reliance households at the 1% level. Mean absolute income on the other hand is significantly higher for less forest reliant households (LS1> LS2>LS3 respectively). Considering income a measure of household welfare, the result suggests that high forest reliance households overall are more vulnerable than households with alternative livelihood strategies as well as more likely to experience negative impacts from REDD related restrictions on access to forest products.

**Table 2: Two-cluster t-test of equality of mean total household income**

| Hypothesis | Difference of twomeans | Standard errors | t - value | Degree of freedom | p-value | Decision |
|---|---|---|---|---|---|---|
| H0: LS1=LS2; Ha: LS1>LS2 | 19.90 | 3.56 | 5.5916 | 176 | 0.0000 | Reject H0*** |
| H0: LS2=LS3; Ha: LS2>LS3 | 7.77 | 2.47 | 3.1457 | 152 | 0.0010 | Reject H0*** |
| H0: LS1=LS3; Ha: LS1>LS3 | 27.67 | 3.80 | 7.2762 | 156 | 0.0000 | Reject H0*** |

Notes: H0 = no difference in mean total household income between livelihood strategies. Ha = households with higher forest reliance have lower mean income; *** significance at the 1% level.

### *3.3. Livelihood outcome and extent of forest reliance by ethnic minorities*

There are 54 ethics groups living in Vietnam. 53 of these ethnic minorities account for approximately 16% of the Vietnamese population, equivalent to 13 million people (Vietnamese GSO, 2009). However, poor households that are also ethnic minorities accounted for more than 47% of poor households in the country. About 66% of ethnic minorities live below the poverty line (Oxfam and ActionAid. 2013). In the study area, the three main ethnic minorities are Tay, Nung and Dao ethnic groups. Vietnam has identified the development of sustainable livelihoods for its ethnic minorities as one of the most important priorities at all levels of government in implementing the economic strategy of the social state. Despite specific objectives to promote rural households escape from poverty supported by a number of programs and projects, ethnic minorities' livelihoods have not developed in accordance with expectations. Consequently, more attention to ethnic minorities' livelihoods are required particularly in REDD+ implementation areas that may change tenure systems and hence negatively affect forest reliant livelihoods through changing access to forest resources.

Figure 2 shows that the Dao relies more on forest than other ethnic minorities. More than 41% of the Dao ethnic households have high forest reliance livelihood strategies (LS3). The Nung ethnic minority includes least households with high forest reliance livelihood strategies. Table 3 reveals that mean forest income share of the Dao ethnic minority is significantly higher than the other ethnic minorities at the 1% level. The difference between the Tay and Nung ethnic groups is not statistically significant. The Dao ethnic

group tends to have less cropland and live further from the commune centre than the others ethnic groups in the study area. However, although the Dao tents to rely more on forest collection, there is no significance difference in absolute forest income between these ethnic groups.

**Figure 2. Forest reliant livelihood strategies for Ethnic Minority groups**

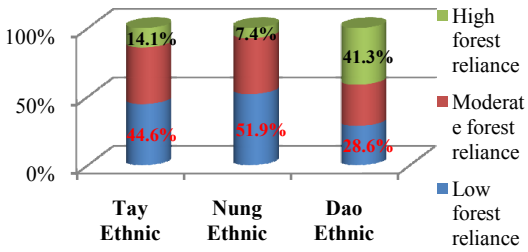



**Figure 3. Average forest income share for Ethnic Minority groups**

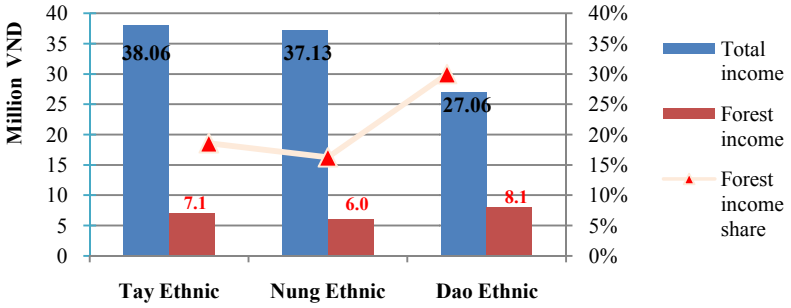



**Table 3: Two-cluster t-test of the equality of mean forest reliance of ethnic minorities**

| Hypothesis | Difference of twomeans | Standard errors | t - value | Degree of freedom | p-value | Decision |
|---|---|---|---|---|---|---|
| H0: Dao=Tay; Ha: Dao>Tay | 12.98462 | 2.944155 | 4.4103 | 216 | 0.0000 | Reject H0*** |
| H0: Tay=Nung; Ha: Tay≠Nung | 1.926143 | 3.724107 | 0.5172 | 117 | 0.6060 | Accept H0 |
| H0: Dao=Nung; Ha: Dao>Nung | 14.91077 | 4.759493 | 3.1328 | 151 | 0.0010 | Reject H0*** |

Notes: H0 = no difference in mean income forest share between ethnic minorities; Ha = the Dao has the highest mean forest income share among ethnic minorities; *** significance at the 1% level.

On average, total household income of the Dao ethnic group is nearly 30% lower than that of the Nung and Tay ethnic groups that are not significantly different. As is also the case when not considering ethnic affiliation the poor tend to be more forest reliant than the richer. In other words, the Dao ethnic group has the highest level of forest reliance but the least total income.

### *3.4. Livelihood outcome and extent of forest reliance by wealth*

According to the decrees of the Vietnamese government on the definition of poverty in rural area (Vietnamese Government, 2011), a household is poor if each member earns an average income less than VND 400,000 (17.8 US dollars) per month. Households below this norm are certified as poor by the Vietnamese government.

**Figure 4. Forest reliant livelihood strategies by wealth**

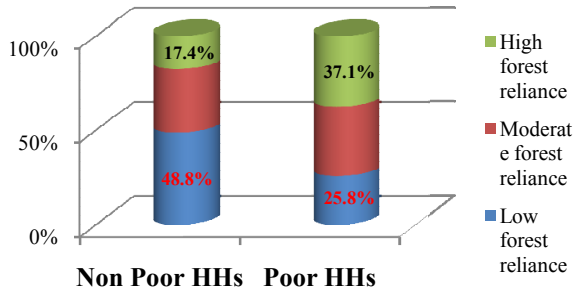
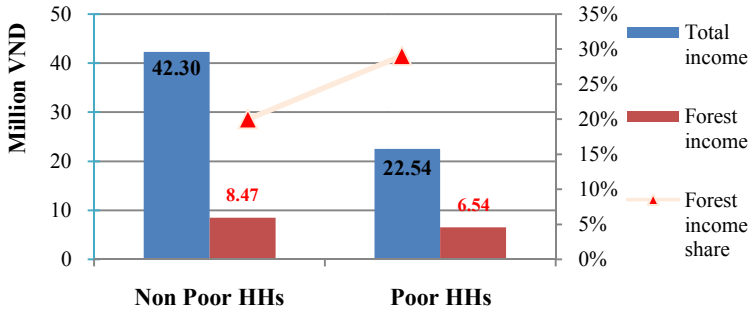



**Figure 5. Average Forest income share by wealth**




As shown in figure 4, nearly half of the non-poor household has low forest reliance livelihood strategies and only one sixth have a high forest reliance livelihood strategy. In comparison, a quarter of the households with poverty certificates have a lowforest reliance livelihood strategy whereas more than the double number has a high forest reliance livelihood strategy. In fact the mean forest reliance of the poor is 8.1% higher than that of the non-poor. The difference is statistical significance at the 1% level (table 4). In other words, poor household has higher forest reliance than non-poor household. Notwithstanding, non-poor households on average have 1.93 million VND higher absolute forest income than poor households. The difference is statistical significance at the 1% level. This means that although poor household relies more on forest collection they obtain lower forest income than non-poor household. This may express different effectiveness in exploiting forest resources between the two types of household although a range of alternative explanations including lower labor force availability, or lower access to forests determined by distance or social capital are also possible. These differences are in turn based on the inherent differences between poor and non-poor households such as determined by their income, assets and social status. On average, the total

household income of the poor is significantly lower than the non-poor at the 1% level. In absolute terms the difference is around 19.76 million VND per household per year (equivalent to 879 US dollars).

**Table 4: Two-cluster t-test for the equality of mean forest reliance, forest income and total household income by wealth groups**

| t-tested criteria | Hypothesis | Difference of two means | Standard errors | t - value | Degree of freedom | p-value | Decision |
|---|---|---|---|---|---|---|---|
| Mean forest reliance | H01: Non Poor = Poor; Ha1: Non Poor < Poor; | 8.109238 | 2.741152 | 2.9583 | 243 | 0.0017 | Reject H0*** |
| Mean forest income | H02: Non Poor = Poor; Ha2: Non Poor > Poor; | 1.927788 | 0.8102667 | 2.3792 | 243 | 0.0091 | Reject H0*** |
| Mean total income | H03: Non Poor = Poor; Ha3: Non Poor > Poor; | 19.76142 | 2.839659 | 6.9591 | 243 | 0.0000 | Reject H0*** |

Notes: H01 = mean forest income share is not different between poor and non-poor households;
Ha1 = mean forest income share of poor household is higher than non-poor household;
H02 = mean forest income is not different between poor and non-poor households;
Ha2 = mean forest income of non-poor household is higher than poor household;
H03 = mean total income is not different between poor and non-poor households;
Ha3 = mean total income of non-poor household is higher than poor household;
*** = significance at the 1% level.

## 4. Conclusions and recommendations for REDD+ implementation

The livelihood strategies of rural households in Bac Kan of Northern Vietnam derives from various sources of which crop income is the most important and income from forest collection is the second one. In addition, the number of forest dependent households is high. Households with a high forest reliance livelihood strategy tend to obtain lower total income. And poor household rely more on forest income than non-poor household. However, although poor household relies more on forest products they obtain lower absolute forest income than non-poor household. Comparing ethnic minorities the Dao ethnic group is both the poorest and the most reliant on forest income.

Hence, implementation of REDD+ will if restricting access to forests potentially have negative implications onhousehold welfare of the poor and ethnic minorities and particularly the Dao ethnic group in Bac Kan. REDD+ Carbon payment needs to be substantial and distributed at the village level to offset such negative welfare implications of restrictions on forest resource use. The benefit sharing mechanism needs to be framed appropriately and transparently and implementation of REED+ activities and support for developing rural livelihoods has to be balanced appropriately. The focus should be on the poor and the Dao ethnic minority.

## References


Babulo, B., et al. (2008). "Household livelihood strategies and forest dependence in the highlands of Tigray, Northern Ethiopia." Agricultural Systems**98**(2): 147-155.

Mutamba, M., et al. (2005). "Forests-Based Livelihoods and Poverty Reduction: Paths from Local to Global Development." FORESTS IN THE GLOBAL BALANCE – CHANGING PARADIGMS**5**.

Oxfam and ActionAid. (2013) Poverty reduction models in some ethnic minority communities in Vietnam. available at http://www.ngocentre.org.vn/webfm_send/5619 (access on 15/09/2015)

Panta, M., et al. (2009). "Households' Characteristics, Forest Resources Dependency and forest availability in central Terai of Nepal." Journal Of Korean Forest Society**98**(5).

Pokorny, B., et al. (2012). "Market-based conservation of the Amazonian forests: Revisiting win–win expectations." Geoforum**43**(3): 387-401.

Vedeld, P., et al. (2007). "Forest environmental incomes and the rural poor." Forest Policy and Economics**9**(7): 869-879.

Vietnamese Statistical Yearbook, 2009, Vietnamese General Statistics Office

Vietnamese Government, decision number 09/2011/QD-TTg of The Prime Minister on setting norms on poor households and households in danger of falling into poverty for the 2011-2015 period.