

Supplementary Tables

Table S1. Forest area in Nghe An province

Year	Plantation forests		Natural forests		Forest cover		Average annual change	
	Ha	%	Ha	%	Ha	(%)	Area (ha)	%
1990	32,148	1.95	53,8743	32.73	570,891	34.68	-	-
1995	34,903	2.12	591,310	35.92	626,213	38.04	11,064	1.94
2000	74,641	4.53	641,755	38.98	716,397	43.52	18,037	2.88
2005	84,189	5.11	669,256	40.66	753,446	45.77	7,410	1.03
2010	106,139	6.45	656,519	39.89	762,658	46.33	1,842	0.24
2016	190,057	11.54	787,003	47.81	977,060	59.35	35,733	4.69

Sources: [1,2].

Table S2. Presence of forests in poor communes in Nghe An province, Vietnam.

Communes	Unit	Plantation forests			Natural forests			Total forests		
		1990	2000	2016	1990	2000	2016	1990	2000	2016
DC1	Th ha	5.9	2.9	8.8	10.8	7.4	18.2	24.6	5.8	30.4
	%	7.0	3.4	10.4	12.8	8.8	21.6	29.2	6.9	36.1
DC2	Th ha	10.0	125.6	135.6	28.7	156.7	185.4	84.0	167.1	251.1
	%	2.3	28.5	30.8	6.5	35.6	42.1	19.1	38	57.1
EDC	Th ha	1.6	382.2	383.7	9.1	439.4	448.4	49.6	558.4	608
	%	0.2	43.9	44.1	1.0	50.5	51.5	5.7	64.1	69.8
Total	Th ha	17.3	508.9	526.2	48.2	602.7	650.9	156.9	730.5	887.4
	%	1.25	36.61	37.86	3.47	43.36	46.82	11.28	52.55	63.84

Notes: Th ha denotes thousands of hectares. DC, EDC denotes difficulty commune level (level 1, 2) and especially difficult commune according to government document 582/2017/QĐ-TTg, respectively.

Table S3. Poverty line in Vietnam and the World in 2008-2020

Year	Vietnam				World
	Rural		City		
	VND month ⁻¹	USD day ⁻¹	VND month ⁻¹	USD day ⁻¹	
2008	290,000	0.59	370,000	0.75	1.25
2010	360,000	0.62	450,000	0.77	1.25
2011-2015	400,000	0.57	500,000	0.71	1.25
2016-2020	700,000	1.02	900,000	1.32	1.90

Sources: <http://www.molisa.gov.vn>; www.gso.gov.vn; <https://data.worldbank.org>; <https://www.vietcombank.com.vn>

Table S4. Descriptions of candidate variables used in the regression model of household income and forest dependence in uplands of Vietnam.

Name	Descriptions	Unit	Sources
<i>Dependent variables</i>			
Household income	Total income per household per year	\$	(Field survey)
<i>Independent variables</i>			
Gender	Gender of the household head. Binary variable (Female, Male)	0, 1	(Field survey)
Age	Number of years old of the household head	Year	(Field survey)
Education	Number of years that the household head spend on studying/learning at school/college/university	Year	(Field survey)
Labor size	Number of working people in a family	Person	(Field survey)
Bank loan	Having a loan from the bank. Binary variable (No, Yes)	0, 1	(Field survey)
Leadership	Taking charge of leadership at local level (e.g, village). Binary variable (No, Yes)	0, 1	(Field survey)
Agriculture training	Having agricultural training. Binary variable (No, Yes)	0, 1	(Field survey)
Allocated forestland	Binary variable (No, Yes)	0, 1	(Field survey)
Self-allocate forestland	Binary variable (No, Yes)	0, 1	(Field survey)
Rent forestland	Binary variable (No, Yes)	0, 1	(Field survey)
Forestland	Area of forestland	m2	(Field survey)
Rice land	Area of paddy rice land	m2	(Field survey)

Table S5. Products of plantation forests and shifting cultivation, associated with methods used to estimate them.

Products	Plantation forests			Shifting cultivation	
	Literature	Field survey	PF-CCM	Literature	Field survey
Food				X	X
Wood	X	X	X		
Carbon	X	X	X	X	X
Food revenue				X	X
Wood revenue	X	X	X		
Carbon revenue			X		

Note: X = Yes

Table S6. System of scale designed to collect the data to analyze the constraints of plantation forests using principal component analysis. Each factor group includes a set of statement (symbol) that corresponds to respective question in questionnaire. A system of scale with a total of 34 Likert questions on a 5-point scale. These questions were designed to capture the five different levels of constraints of plantation forests. For example, the quality of land is shown on a 5-point scale in which 1 and 5 refer to the least and best quality of land, respectively.

Original factor	Definition of factors	Symbol
Factor 1	Land capital	LAND
	Area of forestland is small	LAND1
	Quality of forestland is poor	LAND2
	Location of forestland away from home	LAND3
	The slope of forestland is high making it difficult to work	LAND4
	The boundary of a part or whole family's forestland is not clear enough making it uncomfortable to use stable	LAND5
Factor 2	Financial capital	CAP
	The family finds it difficult to obtain loans	CAP1
	The amount that the family can loan is small	CAP2
	The time for the loan is short	CAP3
	The interest rate of the loan is high	CAP4
	The family has a little or no self-capital	CAP5
Factor 3	Labor capital	LAB
	The family has few labors	LAB1
	The family laborers have poor health	LAB2
	The family laborers have limited education	LAB3
	The family laborers have little or limited knowledge and practical experiences in plantation forest	LAB4
	The family laborers have little or no social connection to others in village/local.	LAB5
Factor 4	Trees/seedling	TRE
	Lack of information on forest seedling	TRE1
	The family has limited choice for forest seedling	TRE2
	The quality of forest seedling is limited/poor/low	TRE3
	The price/cost of forest seedling is high to my family	TRE4
	The selling-seedling place is far from my home, or is inconvenient to access forest seedling	TRE5
Factor 5	Agriculture-forestry extension service	KNL
	There is little or no contact with agroforestry extension	KNL1
	There is little or no support from agroforestry extension	KNL2
Factor 6	Market and consumption	CON
	The family has little information on the selling price of forest products	CON1
	The price of forest products is unstable	CON2
	The local price of forest products is low/unreasonable	CON3
	There are observations that the selling price is dominated by trader	CON4
	The consumption of forest products from the local factory is limited/unstable	CON5
Difficulty, Constraints	The difficulty/constraint of forest practices	DIF
	The family finds it difficult to secure land capital	DIF1
	The family finds it difficult to obtain forest seedling	DIF2
	The family finds it difficult to secure financial capital	DIF3
	The family finds it difficult to the labor force for plantation forest	DIF4
	The family finds it difficult receiving support from agroforestry extension	DIF5
	The family finds it difficult selling forest products	DIF6
	The family finds it difficult in overall plantation forest	DIF7

Note: Original data were obtained from field surveys during December 2017 and January 2018; personal calculation.

Table S7. Results of explanatory factor analysis of components used to generate the factor groups

Component/ factor	Symbol	Observed variables	Factor (component)									
			1	2	3	4	5	6	7	8	9	10
Financial capital	X1	CAP2	0.560									
		CAP3	0.792									
		CAP4	0.805									
		CAP5	0.643									
Agriculture extension	X2	KNL1		0.897								
		KNL2		0.876								
Market sustainability	X3	CON2			0.800							
		CON3			0.832							
House location	X4	TRE5				0.795						
		CON5				0.621						
Market price	X5	TRE4					0.724					
		CON4					0.686					
Health	X6	LAB1						0.816				
		LAB2						0.643				
Seed/tree	X7	TRE2							0.727			
		TRE3							0.605			
Land capital	X8	LAND4								0.782		
Cooperation	X9	LAB5									0.720	
		CON1									0.611	
Education	X10	LAB3										0.762

Note: Original data was obtained from two field surveys in Chau Thai commune, during December 2017 and January 2018; personal calculation.

References

1. JICA The Study on Potential Forests and Land Related to “Climate Change and Forests” in The Socialist Republic of Viet Nam. **2012**.
2. Khuc, Q.; Tran, B.Q.; Meyfroidt, P.; Paschke, M.W. Drivers of deforestation and forest degradation in Vietnam: An exploratory analysis at the national level. *For. Policy Econ.* **2018**, *90*, 128–141, doi:10.1016/j.forpol.2018.02.004.