Gender, land use and land use change in Vietnam:

Coffee as commodity driver of land use change in the Central Highlands of Vietnam

Technical Report to IIED

Prepared by

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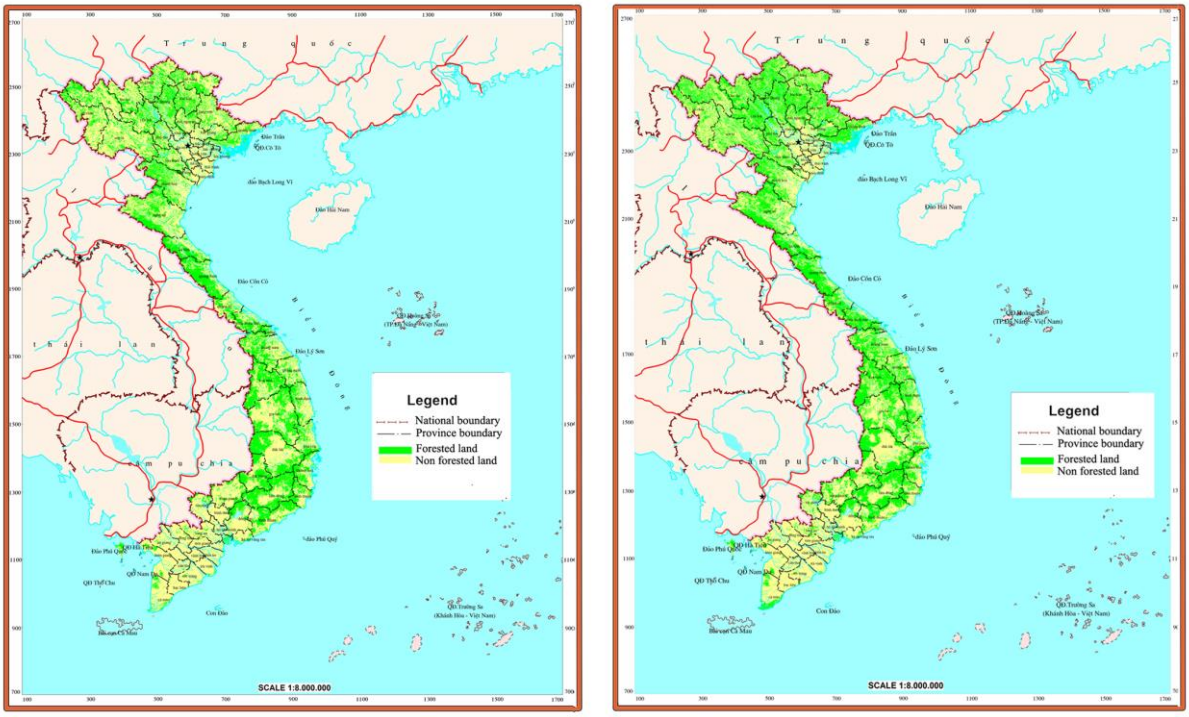
I. Introduction

Since losing between 33% to more than half of its forest cover from 1943 to early 1990s (Sunderlin, & Huynh, 2005; Scheyvens, Hyakumura & Seki, 2007; Meyfroidt & Lambin, 2008), the Government of Vietnam (GOV) has been implementing policies and programmes aimed at curbing deforestation and accelerating reforestation (Do & Catacutan 2014). Among others, Programme 661 is the largest reforestation programme that began in 1998. Targeting five million hectares to achieve 43% forest cover by 2010, Programme 661 also aims to create jobs and increase rural incomes, achieve socio-political stability, and transform forestry into an economically vibrant sector (Do & Catacutan 2014). As a result of myriad policy interventions, the Ministry of Agriculture and Rural Development (MARD 2011) in 2011, reported that the country's forest cover has reached 39.5% with a net increase of 18.6% in 10 years (2000-2010) (Figure 1). Subsequently, Vietnam received global attention for making it to the latter stage of the forest transition (Meyfroidt & Lambin, 2008, 2011; Angelsen et al., 2009; Mertz et al., 2012; Do & Catacutan 2014).

However, concerns about forest quality remain, as the country's forests have been transformed into young and poorly stocked forests (Lambin & Meyfroidt, 2010; Socialist Republic of Vietnam [SRV], 2011; Do & Catacutan 2014). Forest changes in Vietnam are a result of mixed causes (Do & Catacutan 2014). On one hand, the direct drivers of deforestation and degradation are agricultural expansion, infrastructure development, unsustainable logging and forest fires, while population and migration, weak forest management capacity, and limited funding for forest protection are indirect drivers (De Koninck, 1999; SRV, 2008; Hoang et al., 2010; Pham et al., 2012; Do & Catacutan 2014). On the other hand, agricultural expansion through specialization of commodity tree-crops such as coffe, is driven by economic and political responses to forest and land scarcity, economic growth, land privatization, land-use zoning, food crop intensification, and market liberalization (Sunderlin & Huynh, 2005; Meyfroidt & Lambin, 2011; Do & Catacutan 2014).

The country's drive toward land use specialization, for example, through coffee in the Central Highlands may raise concerns to REDD+ and other stakeholders. First, lucrative commodity crops may incentivize forest conversion. Second, major land use change could have differential impacts on men and women, in affected communities. Economic drivers such as market liberalization for coffee and other lucrative commodity crops can be counterproductive to REDD+ efforts if the government's economic interest from conversion is not matched with efforts to mitigate negative impacts. This type of driver should be addressed within sustainable forest and management and REDD+ frameworks.



Year 2000 Year 2010

FIGURE 1 Changes in Vietnam's forest cover (2000-2010)

In relation to REDD+ implementation in Vietnam, Do & Catacutan (2014) examined the country's 'readiness' with respect to the functions that need to be fulfilled, and found that Vietnam's reforestation experience does not foretell REDD+ readiness. Its readiness level as perceived by in-situ stakeholders only ranged from low to medium across all functions. The authors recommend several actions to move the country beyond its current state of REDD+ readiness as follows: i) shift its focus from replanting policies to a balanced policy approach so that local people are able to access a wide array of benefits not only from REDD+ but also other relevant programmes; (ii) refine the National REDD+ Action Plan, and amend relevant forest policies to reverse drivers of deforestation and degradation; (iii) remove policy and institutional bottlenecks through reforms in forest and land laws, as well as jurisdictional processes, to address tenure and carbon rights, equitable benefit sharing, and conflict resolution, and (iv) enhance inter-agency collaboration and broaden sectoral participation, to include private sector and indigenous peoples' representation in decision-making processes. Furthermore, we argue that REDD+ should not only be concern about reducing emissions, but should likewise, seek to address drivers of deforestation and degradation.

We report on a study conducted by researchers from the World Agroforestry Centre (ICRAF) in Vietnam and Tay Nguyen University in Dak Lak, in the Central Highlands. Of relevance to the 2nd recommendation above, our study focused in the Central Highalnds to (i) understand the drivers of forest conversion into coffee plantation; (ii) describe the coffee value chain, as primary driver of forest change; (iii) understand how men and women participate and benefit from coffee value chains; and (iv) examine the tradeoffs of forest conversion to coffee plantations, in view of a landscape approach to REDD+ implementation. This report however, focuses on initial results only, particularly on the first three objectives.

II. Methodology

Site overview: Population, demography and socio-economic characteristics of the Central Highlands

The Central Highland region of Vietnam consists five provinces namely, Dak Lak, Dak Nong, Kon Tum, Gia Lai and Lam Dong. Based on the 2013 national statistics, Dak Lak is the most populated province with 1,822,800 people and a density of 139 people/km^2 while the least populated is Kon Tum with 473,300 people and a density of 49 people/km^2(GSO, 2015). In 1970s, the Government designated the Central Highlands as the New Economic Zone (NEZ), and supported mass migration, mostly Kinh people to the region. Consequently, the Kinh became the dominant group in the region (70% of total population), and ethnic minorities such as the E'de and H'Mong, who account for 48% of Dak Lak's population in 1975, decreased to about 20% in 1997. The remaining 10% are migrant ethnic minorities from the Northern highlands, such as the Tay and Nung (FAO, 2007). The dominant ethnic minority groups in the five provinces are Xo Dang in KonTum, Gia Rai in Gia Lai, Ede in Dak Lak, Nung in Dak Nong, and Co Ho in Lam Dong (GSO, 2015).

Gia Lai province has the most number of poor households (53,389), but Kon Tum has the highest poverty rate with about 20% of households classified as poor, while Lam Dong has the least number of poor households (12,200)(MOLISA, 2014). With the exemption of Kon Tum province, the main income sources in the region are agriculture and forestry. In 2012, this accounts for 42.2%, 49.8%, 61.7% and 44.6% of incomes in Gia Lai, Dak Lak, Dak Nong and Lam Dong provinces, respectively, whilst it is public and private-sector employment for Kon Tum (GSO, 2014).

It was claimed that the living standard of people in the Central Highlands has improved significantly with coffee production. Coffee accounts for about 85-90% of household incomes. However, because of high dependence on coffee, some households could suffer from income shocks when the price of coffee drops. In fact, many farmers went bankcrupt when the coffee price dropped to 4,000 VnD/kg in 2002-- Greig's study (2005) even showed that some men turned to alcoholism while others moved to find jobs in bigger cities, leaving their coffee farms under the care of their wives, while others simply shifted to other crops.

Data collection and analysis

Our study relied on literature reviews on the following topics: (i) land use change and drivers in the Central Highlands; (ii) evolution of the coffee industry, its size, output and benefits, and a stratified survey and key informant interviews of 182 male and females from three types of coffee value chains, in the province of Dak Lak and Dak Nong. Table 1 presents the distribution of respondents by type of actor and gender, across three studied value chains. The data was analyzed using descriptive statistics. NPV analysis of coffee production was also carried for a 30 year period.

TABLE 1 Distribution of respondents by gender, and type of value chain

Type of value chain	Actor(s) in the value chain	Total respondents	No. of Males	No. of Females	Province	Data collection technique
Producer-Local Company	Farmer/Producer	41	27	14	Dak Lak, Dak Nong	Survey
	Middle Man	5	0	5	Dak Lak	Personal interview
	Agent	6	4	2	Dak Nong	Personal interview
	Company leader	4	3	1	Dak Nong	Personal interview
Producer-National Company	Farmer/Producer	53	18	35	Dak Lak	Survey
	Agent	2	1	1	Dak Lak	Personal interview
	Trung Nguyen Company leader	2	1	1	Dak Lak	Personal intervies
Producer-Multi National Company	Farmer/Producer	65	40	25	Dak Lak	Suvey
	Agent	2	2	0	Dak Lak	Personal interview
	Nestle Company leader	2	2	0	Dak Lak	Personal interview
Total		***182***	***98***	***84***		

III. Central Highlands: The coffee capital of Vietnam

Coffee was first introduced to Vietnam in the 1850s, but the industry was not developed until the end of the war in 1970s. The coffee industry was collectivized after the country's union in 1975, but remained poorly developed. It was during the Doi Moi reform in 1986, an era of land privatization, that the coffee industry started growing rapidly, as private enterprises were permitted again. The 1990s therefore, saw a boom in coffee production in Vietnam, making it the world's third exporter after Brazil and Ecuador, and the world's second in 2000 (Dang & Shively, 2008). Coffee has since then, the second largest agricultural export commodity of Vietnam.

Drivers of forest conversion to coffee

As mentioned above, major forest conversions to coffee in the 1990s can be linked to the Doi Moi reform, but other economic and demographic drivers also play important roles. First was the designation of the Central Highlands as NEZ in 1975, and second was the government migration programme in the 1990s, which provided cash incentives for people to move from densely populated lowland areas to the Central Highlands. Coupled with these programs were the land allocation policies that facilitated distribution of land use rights. During this period, both local and migrant households were entitled to convert 10 hectares of forests into perennial crops, especially coffee. At the same time, many state coffee farms began allocating plots to workers, converting them from members of cooperatives, to tenants or leasers responsible for the production of a given parcel of land (Sylvie Doutriaux et. al., 2008). In 1993, besides increasing the land

contract from 40 to 50 years for perennial crops, the revised Land Law of 1988 also facilitated changes in the land market, by allowing people to rent, buy and sell their land rights.

The sharp increase of coffee price in the 1990s, further encouraged migrants to secure lands in the Central Highlands, either by squatting or purchasing land use rights from native highlanders. There were reported incidents of land grabbing by migrants - in fact, many local people decided to sell their swidden fields, which are far from home, to migrants, instead of being nervous that migrants can simply take it (Derek Halls, 2011). A mix of policy reforms therefore led to most coffee plantations being owned by migrants. According to a survey in 1998 by T.H. Nguyen, 4% of migrants in Dak Lak received lands from the Government, 47% purchased from local people or earlier migrants, and 46% cleared the forest.

Consequently, the physical, social, and economic landscape of the region has transformed completely. Dak Lak for instance, changed completely as the 6,000 hectares of coffee in 1975 grew to become 130,000 hectares in 1997. This made local people aware of the market value of their land, and as a result, many of them asserted claims to the lands they had farmed. To aid in the development of the land market in the wake of the 1993 Land Law (amended 1988 Land Law), a process of issuing households with land-use certificates (LUCs) began. Ethnic minority people did not however, benefit from this policy because the lands granted for a long house with many nuclear families inside were not sufficient. This result in separating their long-house into single houses. Additionally, the land certificate only bore the name of only the senior man of the family, while some ethnic minorities has matrilineal traditions where the women are heads of their households (Sylvie Doutriaux et. al., 2008). This problem was however, resolved in 2004 with a further revision of the Land Law, titling the names of both the husband and the wife in LUCs (IFPRI, 2009). Recently, Article 126 of the amended Land Law in 2013, stipulates that farmers who directly plant coffee can be given LUCs of up to 50 years without fees, and ethnic minorities are tax exempt. Farmers in the delta areas can also avail LUCs of up to 10 hectares for coffee production, while it is 30 hectares in mountainous regions.

As a result, the forest cover in the Central Highlands had become unstable. A sharp decline was observed from 90% in the 1960s to 57% in 1995, and to less than 50% in the late 1990s (Dang Thanh Ha and Shively G, 2005). Within 20 years (1980s - 2000s), about 20,000 hectares of forests were converted into public and private coffee plantations in Dak Lak province alone. Alarmed by rapid forest conversion, the government shifted its strategy and promulgated forest protection and reforestation policies. Subsequently, the natural forest in the Central Highlands partially recovered to 54% in 2010, despite losing 288,158 hectares to planted forest, 80,209 hectares to coffee, 119,700 hectares to other perennial crops, 83,000 hectares to annual crops, and 166,200 hectares to shifting cultivation, over a 10 year period (2000-2010). But overall, forest cover change was negative, and can be attributed to the land transfer schemes, especially for coffee and cocoa plantations (Tran Van Con, 2013), as well as to infrastructure development and urbanization.

Key players in Vietnam's coffee industry

Ninety-five percent of Vietnam's coffee are grown in private farms, while the remaining 5% is with VINACAFE, a state-owned company (FAO, 2007; IPSOS, 2013). The institutions described below are key players in Vietnam's coffee industry.

VINACAFE manages 40 state coffee farms totalling 27,000 hectares, and has 58 member enterprises including processors, traders, and service providers providing credit, fertilizer, irrigation, research and roasting. Through these enterprises, government controls 5% of coffee production in Vietnam. VINACAFE is supervised by MARD and technically supported by research and development institutions; among others, the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), Dak Lak Agricultural Extension Centre, Western Agroforestry and Scientific Institute in Dak Lak (WASI), Ba Vi Research Centre (BRC), specifically set up for Arabica research in North Viet Nam.

Vietnam Coffee and Cocoa Association (VICOFA) was established in 1990 as an independent business association, to help organize the coffee sector and develop coffee policy. It has over 100 members consisting of enterprises, companies, firms for producing, processing, purchasing and exporting coffee and cocoa, and research institutions all over Vietnam (VICOFA, 2014).

Privately owned companies account for about 85% of total coffee export, and play important roles in the sector. According to a report of IPSOS, by 2013, Vietnam has approximately 150 registered coffee processors and exporters, including a number of joint ventures with international partners, as well as thousands of small and unregistered local businesses. The leading players are Nestle and Trung Nguyen company (IPSOS, 2013).

Foreign-owned enterprises or FDIs, which specialize in coffee export are relatively small compared to local companies, but their market share has surged over recent years, threatening domestic coffee companies. In 2012, 12 enterprises with foreign investments account for 60-65% of the total coffee with foreign players (IPSOS, 2013). However, the Ministry of Industry and Trade, in 2013 banned FDIs from directly collecting coffee, to support local companies compete in the global market.

Size and capacity of Vietnam's coffee industry

The output of coffee production in Vietnam is influenced by many factors, among others, location of farms, soil quality, availability of irrigation water, level of input application such as fertilizer, quality of planting material, and management practices. This results in wider variability in yields across different provinces; however, yields in prime production areas can reach 3.5 tonnes/ha (Haggar et al., 2012). According to the International Coffee Organization (ICO), Vietnam produced 25 million 60-kg bags of robusta coffee, accounting to 1.32 million tons in 2012. Coffee export reached $2.7 billion, contributing 2% of the annual GDP, and providing livelihoods to 2.6 million people in which 600,000 are smallholder farmers (The Guardian, 2012); whereas domestic consumption accounts for only 5 to 7% of total coffee production (The Guardian, 2012; IPOS, 2013). Further in the first half of 2014, Vietnam exported 573,000 60-kg bags (or 34 tons) of soluble coffee products to 64 countries worldwide, marking the highest peak of exports in recent five years (USDA, 2015). Importing countries include Germany and US (2 million), Spain, Italy and Belgium (1.2 million), and Japan, South Korea, Poland, France, the UK (0.5 million) (BBC, 2014). The transparent and

competitive Robusta market in Vietnam benefits farmers well when 90% of Free On Board price comes to the famers (FAO, 2007).

According to MARD, the area under coffee in 2015 is 670,000 hectares. About 95% of coffee production is Robusta while Arabica, which is mainly grown in Lam Dong, Son La and Quang Tri, makes up the remaining 5% of total production. Figure 2 shows the distribution of coffee and farmers involved, across key producing areas in the Central Highlands. The largest coffee production areas are in the provinces of Dak Lak, Lam Dong, Dak Nong and Gia Lai, which account for 86% of the total coffee prodcution area in the country. Dak Lak alone produces about 43% of national coffee output, while Lam Dong and Gia Lai contribute an additional 41%.

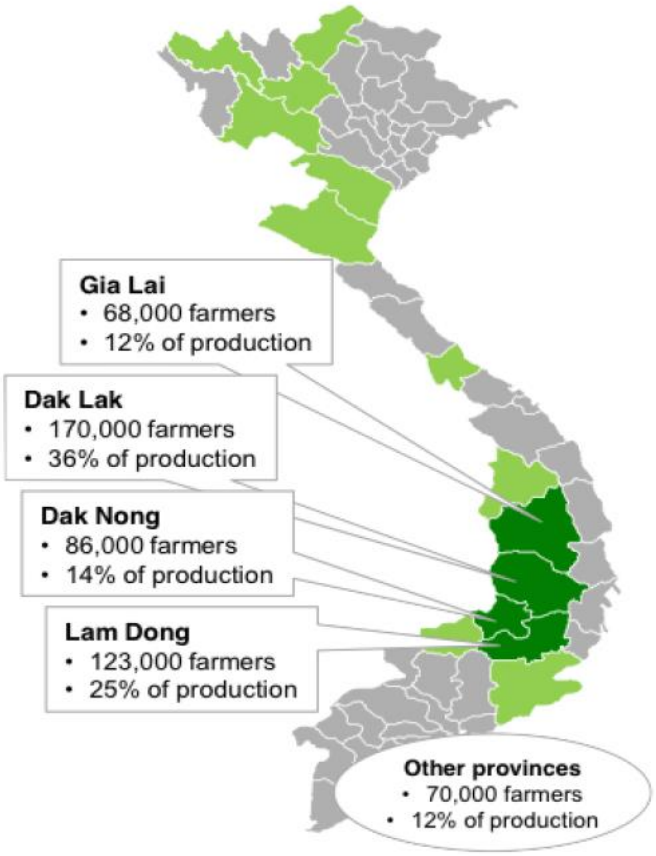


FIGURE 2 Main coffee production areas in the Central Highlands

Source: Sustainable Land and Water Program (2015)

IV. Contextual background---Women's rights, power and equity in Vietnam

Our interest on women in the coffee value chain is based on the claim that any land use change will result to differential impacts on gender, as well as different types of social groups in a given context. Examining the position of women in the Vietnamese society is thus, useful in understanding the context that impinge on women's roles in the value chain, as well as the benefits derived from forest conversion to coffee.

In Vietnam, many gender-related policies have been issued to improve women's access to benefits in social and economic development. Historically, the Vietnam's Women

Union (VWU) was established in 1946 to look after women's issues and promote gender equality. In 2006, the National Assembly issued a Law on Gender Equality, with subsequent policies that all aimed to improve women's capacity to access technology, training, financial resources, as well as encourage women to get involved in social and political activities. The Law states in Article 12, that women and men are equal in managing enterprises, accessing information, capital resources and labor market. The Article also states the provision of incentives to enterprises that employ more females, and provide financial support for women working in rural areas. The President of Vietnam also approved a 5-year National Program on Gender Equality (2011-2015) with 5 projects that focus on awareness raising on gender equality and roles of women, improving the capacity of government institutions, female leaders and officials at different levels, reducing gender inequality, and providing consultancy services for women. Furthermore, in August 2014, the Ministry of Justice issued Circular 17/2014/TT-BTP on integrating gender issues on legal documents, and involving the VWU and women in developing them.

Significant progress has been also achieved in terms of women's rights to land. As mentioned above, before 2004, LUCs have only space for the name of the senior man in the family; however, this has been rectified by the revised Land Law in 2004 (Deininger & Jin, 2008), and since then, women were no longer discriminated in terms of land rights, and now benefit from their investment on land (IFPRI, 2009). The policy condition in Vietnam is thus, conducive to women's development, in terms of basic rights to productive resources and livelihood opportunities, as well as participation in decision-making at various levels of the society.

V. Coffee value chain in the Central Highlands

Description of coffee value chains

We examined three main types of coffee value chains found in the Central Highlands. The first type is one where farmers sell their produce to a local company through a middleman or agent. The second type involves farmers selling their produce to a national coffee company (Trung Nguyen Company) through an agent, while the third involves a multi-national company (Nestle).

Value chain 1: Coffee producers--middlemen/agent—local company. Several of this value chain type exist in the Central Highlands; however for this study, we only focus on one that operates in Dak Nong province. This value chain is considered 'local' although, the coffee would eventually end up somewhere, even abroad. An Phong, a 'purchase and process' company is a key actor in this chain. The company has 36-40 agents across five districts in Dak Nong who directly buy coffee beans from farmers, and facilitate procurement and supply of farm tools and inputs through a 'crop loan' scheme, usually with high interest rates (usually 24%). Some agents also sort their coffee beans, to sell at a better price.

An Phong Company buys 95% of their coffee directly from agents, and 5% directly from farmers. In 2014, it purchased about 12,000 tons of coffee beans, which is approximately 20% of the total coffee production in the southwest region of the Central Highlands (Dak Nong and Binh Phuoc provinces). From the farm, coffee is classified as pre-processed, and polished for export, or resold to export companies and FDIs. The Company does not have any contract, commitment, or any investment for the agent or farmer.

Usually, agents would sell 50% of purchased coffee to An Phong Company and the remainder to other companies within the region, and in Ho Chi Minh City. Some middlemen are also involved in this value chain, in fact, five women were included in our survey; however the volume involved is only between 5 and 10% of the total production chain. Each agent would purchase coffee from plantations between 236 and 518 hectares, which means that the 36 agents would cover 8,527 to 18,663 hectares of coffee plantation. The average purchased volume is 23, 879 tons/year. Figure 3 presents the schematic diagram of this value chain and the distance between actors, while Figure 4 shows the traded volumes. With an average price of 40,000 VnD/kg in 2014, the total traded coffee in this provincial value chain is about 12,000 tons/year, amounting to 477 billion VnD/year.

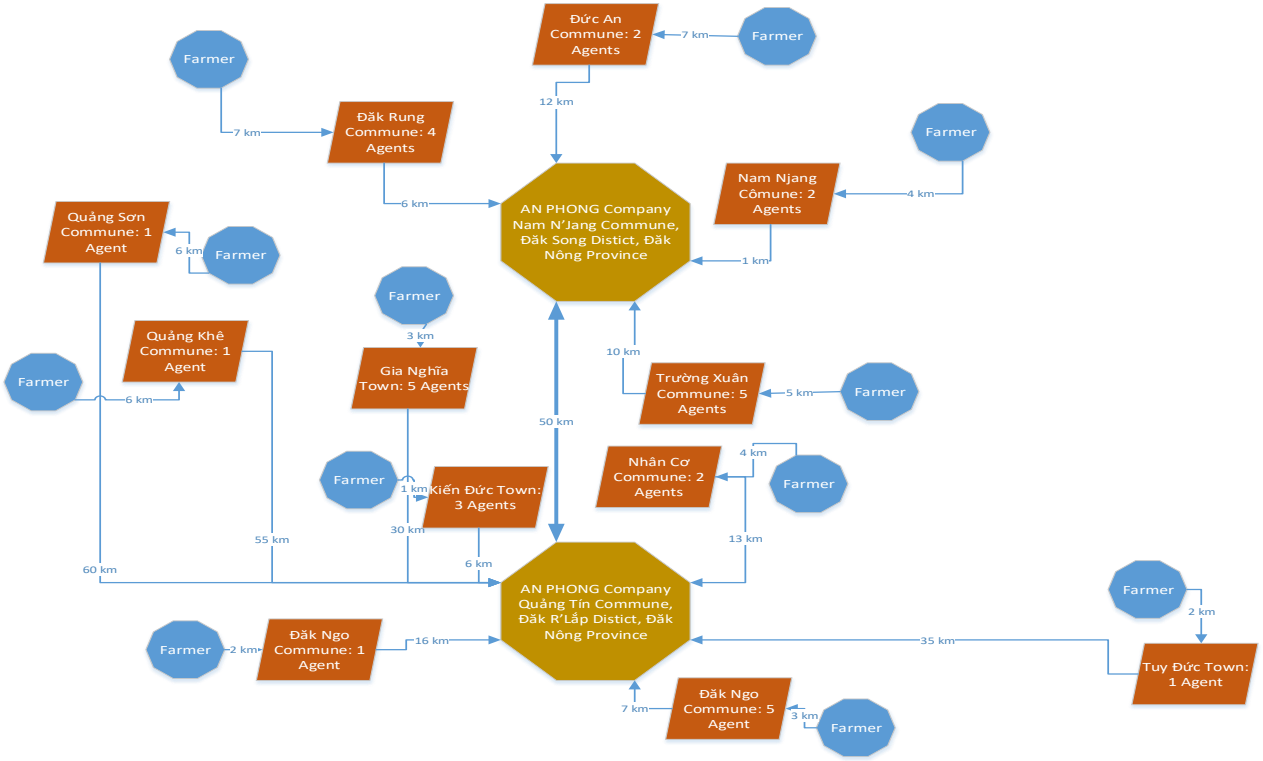


FIGURE 3 Schematic diagram of coffee value chain 1

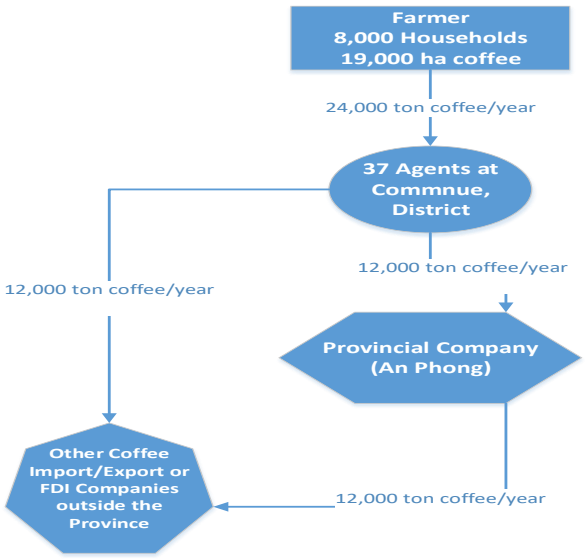


FIGURE 4 Schematic diagram of traded volumes in value chain 1

Value Chain 2: Farmers- agents -Trung Nguyen Company. This value chain was formed in 1996 to ensure sustainable supply of coffee to Trung Nguyen's roasting factory in Buon Ma Thuot City, Dak Lak province. Trung Nguyen is a Vietnamese-owned coffee company who successfully popularized its brand name. The Company, which is headquartered in Dak Lak province and Ho Chi Minh City, employs a total of 5,000 staff and operates through 26 franchisees and 12,000 kiosks that are distributed across 63 provinces of Vietnam. It also owns four factories for roasting (in Buon Ma Thout City), instant coffee (in Binh Duong and Saigon), and packaging for exporting to China (in Bac Giang). The Company's asset in 2014, amounts to 10,000 billion VND (~444,500,000 USD). It has now penetrated in 60 countries, and is currently working on penetrating the US market, as well. However, our study only covered the value chain of Trung Nguyen's Company in Dak Lak with 'roasting' as a primary focus.

Six agents are involved in this chain, but they have no exclusive contract with Trung Nguyen company, and therefore, has no obligation to sell all their coffe to the company. Likewise, Trung Nguyen has no direct relationship with farmers. This situation has created problems for the Company, with respect to securing the supply of coffee beans.

The total number of farmers involved in this chain is only 600, covering 500 hectares of coffee plantation, and supplying 1,000 tons of coffee beans annually, to Trung Nguyen factory who in turn, processes the beans into powder and instant coffee. This chain is relatively small since the factory does not need large volumes of beans to process into soluble coffee. With the average price of 40,000 VnD/kg in 2014, the total value of traded coffee in this chain was 40 billion VnD/year. The distance between actors in the chain is depicted in Figure 5 and the traded volumes in Figure 6.

To address the issue of supply, the Company has begun establishing a direct link with farmers, by forming a network of farmer leaders under a new marketing arrangement. In this scheme, farmer leaders receive a share of 100 VnD for every kilogram of coffee sold, and 400,00 VnD/month for communicating, advising farmers and purchasing coffee on behalf of the company.

Overall, 77% of the actors expressed satisfaction in their involvement in these value chains, and most of them (80%) think that the arrangements were rather informal. Sixty nine percent also felt they are part of a bigger value chain.

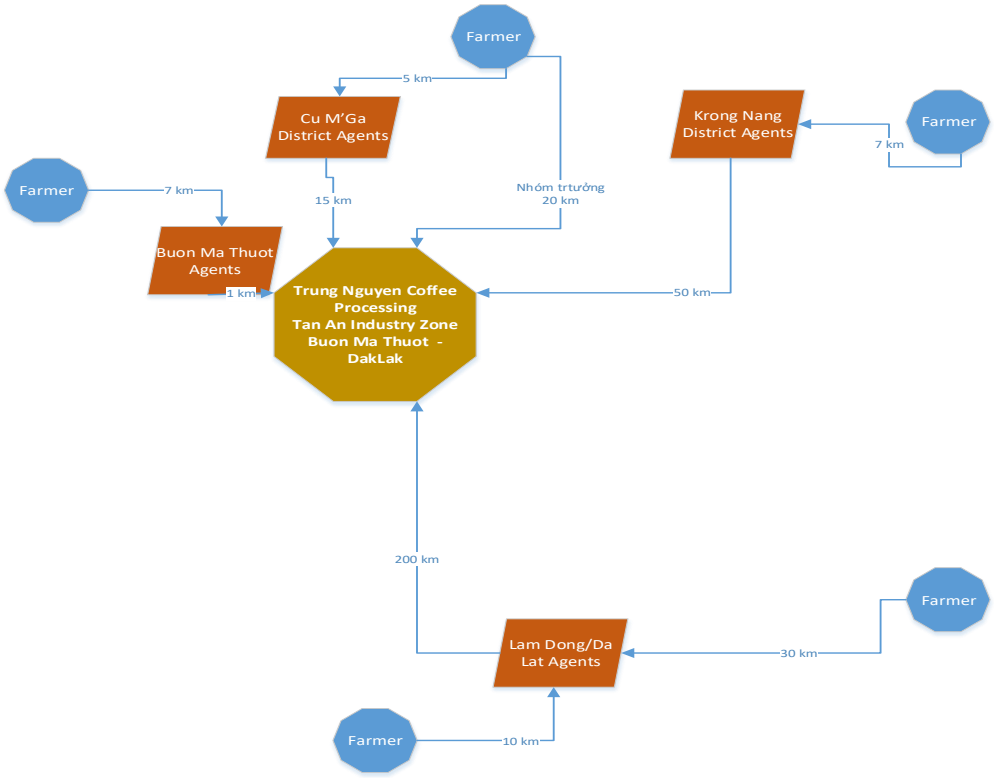


FIGURE 5 Schematic diagram of coffee value chain 2

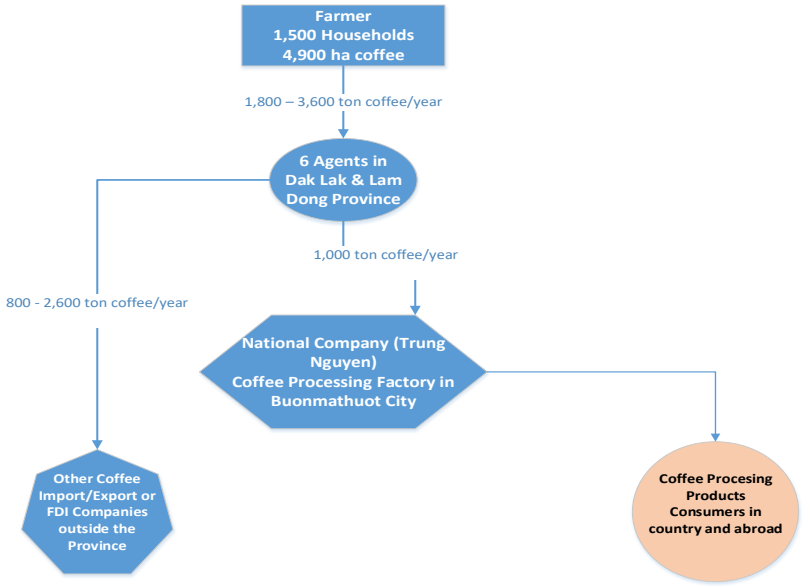


FIGURE 6 Schematic diagram of traded volumes in value chain 2

Value chain 3: Nestle began buying coffee in Vietnam in 2011, with the aim of creating a stable source of high quality coffee that meets international standards such as the 4C

(Common Code for Coffee Community), UTZ, Rainforest Alliance, and Fair Trade. Operations in Vietnam are guided by Nestle's global programme or 'Nescafe Plan', which provides support for farmer trainings, technical consultations, workshops, and assistance for regenerating old coffee gardens.

The 4C coffee value chain in Vietnam is quite long and complex, involving farmers, agents, company buyers/shippers, Nestrade or Nestle procurement, Nestle processing factories, and consumers. Nestle's coffee plantations are found in Dak Lak, Dak Nong, Gia Lai and Lam Dong with a size of about 30,000 hectares, and over 18,000 farmers involved.

The Vietnamese Government does not allow foreign companies to purchase coffee directly from farmers, so Nestle formed a network of 26 agents (Figure 7). On average, each agent covers 600 households, each with three hectares of coffee. In total, the 26 agents would cover 46,800 hectares, although only 30,000 are part of the Nestle 4C program. In total, the 26 agents collect 100,000 tons of coffee, but only 60,000 tons are sold to Nestle, corresponding to a total value of 2,400 billion VnD/year—the rest are sold to other companies (Figure 8). Nestle has five factories located in Dong Nai province, employs 2,000 staff nationwide, and has a total investment 450 million USD.

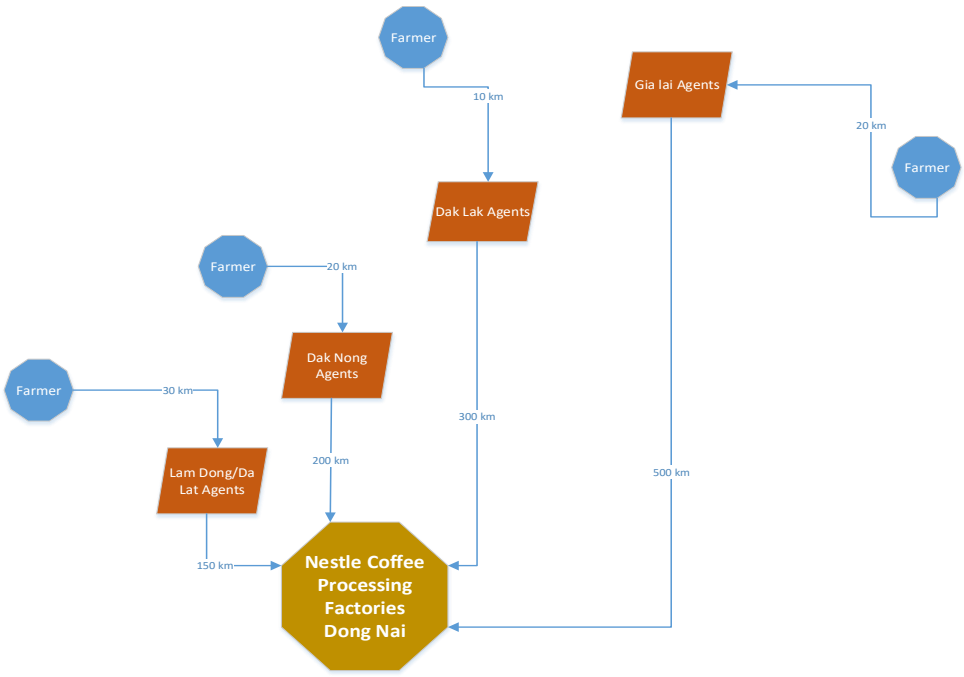


FIGURE 7 Schematic diagram of coffee value chain 3

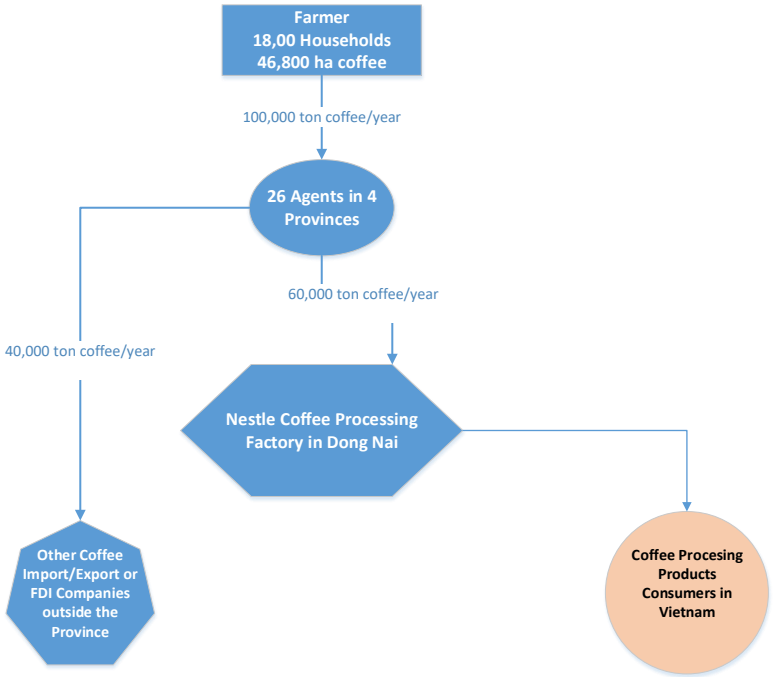


FIGURE 8 Schematic diagram of traded coffee in value chain 3

Who sets the price for coffee?

Coffee prices are mainly dictated by the global market (World coffee exchange in London). No company or agency imposes a price on coffee, and the government do not also regulate it. Based on international trading prices, agents/dealers and companies purchase coffee beans from farmers to benefit from a price difference of 200–300 VnD/kg. However, the export price difference can be raised to 1,000 VnD/kg. In 2014, the average farm gate price was 40,000 VnD/kg, but Trung Nguyen paid 100 VnD/kg more than the regular price to secure their supply, while Nestle puts premium to their coffee and paid 300 VnD/kg more.

Socio-economic characteristics of surveyed actors in three coffee value chains

Table 2 shows a summary of key socio-economic characteristics of surveyed actors in three studied value chains. As shown, 52% of respondents are between 30 and 50 years old, followed by >50. The least number of respondents were under 30, suggesting that young workers tend to move out of agriculture. Most middlemen were elderly, while agents were between 30-50 years old. Additionally, more than half of interviewed company representatives were under 30 years old, suggesting that many young entrepreneurs may be involved in the coffee business. Only representatives from Nestle were in their 50s.

The Kinh people dominate the value chain (62% of respondents). Indigenous or native ethnic minorities followed at 37%, and migrant ethnic minorities at 1%. The first and third value chains are dominated by Kinh farmers (81 and 86%, respectively), followed by indignenous ethnic minority farmers (15%) and 5% migrants. The 'Ede' minority group dominate the second chain since most of Trung Nguyen's coffee are planted on their lands.

Up to 75% of respondents across three value chains have attended high school; only few have university degrees and were mostly involved in the Trung Nguyen and Nestle value chains. Most middle men have also attended high school while the agents or agency owners were mostly university graduates. In terms of household size, 50% of respondents were a family of four; only 18% has 8 members.

Majority of interviewed farmers (64%) belong to the middle income group; only 17% are considered above the middle-income group, 5% poor and 14% near poor[1]---the latter are mainly ethnic minority households in remote areas, in which, production is hampered by low investment and high loan interest rates. Farmers started shifting to coffee in the 1980s, from annual crops such as maize, rice, cassava, beans, and natural forests. As reported by men and women, the reasons for shifting to coffee are shown in Table 3, in which, the most common were to increase income, suitability of land for coffee, and the simple cultivation techniques used in coffee farming. As shown in Table 4, coffee is the dominant land use/crop followed by pepper, rubber and cashew. The average size of coffee farms is 1.57 hectares, and the main annual crops planted were cassava and rice.

[1] The GoV defines the socio-economic status of households based on annual incomes as follows: Poor= < 4.8 million VnD/year; Near poor= up to 6.2 million VnD/year; Average= >6.5 million VnD/year

TABLE 2 Socio-economic characteristics of interviewed actors across three coffee value chains

Unit: %

Value chain		Age Group (Year)			Ethnic Group			Education level					Family size			Economic status			
Type	Actors/respondents	<30	30 - 50	>50	Kinh people	Native ethnic minority people	Ethnic migrant people	Illiterate	Primary School	High School	University	Post University	4 per.	6 per.	>8 per.	Poor	Near poor	Aver-age	Rich
Farmer - Local Company	Farmers		61.0	39.0	80.5	15.0	5.0	5.0	32.0	63.0	0.0	0.0	48.8	31.7	19.5	12.2	9.8	43.9	34.0
	Middleman		40.0	60.0	100.0	0.0	0.0	0.0	40.0	60.0	0.0	0.0	40.0	40.0	20.0	-	-	-	-
	Agent		100.0		100.0	0.0	0.0	0.0	17.0	67.0	16.7	0.0	66.7	16.7	16.7	-	-	-	-
	Company leader	50.0	50.0		100.0	0.0	0.0	0.0	0.0	25.0	75.0	0.0	100.0	0.0	0.0	-	-	-	-
Farmer - Trung Nguyen Company	Farmer	30.0	41.5	28.0	0.0	100.0	0.0	24.5	17.0	55.0	3.8	0.0	67.9	11.3	20.8	5.7	20.8	73.6	0.0
	Agent		50.0	50.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	-	-	-	-
	Company	50.0	50.0		100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0	-	-	-	-
Farmer - Nestle Company	Farmer	1.5	50.8	47.7	86.0	14.0	0.0	0.0	25.0	74.0	1.5	0.0	38.5	44.6	16.9	0.0	10.8	69.0	20.0
	Agent		100.0		100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	50.0	50.0	0.0	-	-	-	-
	Company		50.0	50.0	100.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	100.0	0.0	0.0	-	-	-	-

TABLE 3 Reasons for shifting to coffee by gender

Chain	Men	Women
1	To increase income Coffee has less problems with pests and diseases Suitable to land and weather	To increase income Simple/easy cultivation techniques Easy to sell For long-term income
2	Coffee has high economic value For stable income	High economic value compared to other crops Land suitable for coffee
3	Appropriate to climate and soil type For high and stable income Long term business High price Cooperatives promote coffee growing Planting techniques are not difficult	High economic efficiency Land is suitable for coffee For stable and long-term income Simple/easy cultivation techniques

TABLE 4 Land use(s) of respondents by value chain type

Land uses/tree, crops planted	Chain 1 (ha)	Chain 2 (ha)	Chain 3 (ha)	Total
Coffee	67.6	54.1	108.8	230.5
Maize	1.6	0.5	1.5	3.6
Fruit trees	3.0	0.7	0.0	3.7
Cassava	3.9	0.0	0.0	3.9
Rubber	10.8	11.2	0.0	22.0
Cashew	9.1	1.2	1.3	11.5
Pepper	21.8	0.0	0.6	22.4
Bean	0.0	0.0	0.7	0.7
Rice	1.4	2.2	1.8	5.4
Total	119.2	69.8	114.7	303.7

Both men and women reported to have taken loans from state financing institutions, borrowed from parents, and used own savings to establish coffee farms. The establishment cost differ by gender and type of value chain, with the third type being the most expensive, perhaps due to the production standards imposed by Nestle's 4C programme (Table 5). The second value chain has the least establishment cost, since the coffee plantations are mostly located in remote lands of the 'Ede' people where labor is cheap. However, the average establishment cost for both genders and across three value chains is 41 million VnD/hectare. It is worth noting that women across three value chain types incur higher investment cost than men. The study didn't dig deep into this issue, but this may be linked to labor availability as women tend to hire more labourers than men, albeit, other factors such as water availability, distance to main road, and farm location also help explain the variation in establishment costs.

TABLE 5 Establishment cost for 1 hectare of coffee plantation

Chain/Gender	Average (VND)	StdDev
1	**39,833,333**	**28,127,597**
Female	58,846,154	36,523,614
Male	29,086,957	14,025,117
2	**25,062,500**	**19,413,097**
Female	27,205,882	21,642,802
Male	19,857,143	11,501,553
3	**59,229,508**	**80,105,637**
Female	76,250,000	121,735,369
Male	48,189,189	30,140,263

Who benefits what, and how much?

On average, the farmer's net income for every kilogram of coffee produced and sold, is 38% (less 38% production cost and 24% loan interest—assuming the farmer has to pay a loan). As reported by key informants, the profit distribution among actors for every kilogram of coffee sold, is 72% for farmers, 24% for agents, and 5% for the buying company. However, it is expected that the Company profits more through processing and diversifying their products and providing services, such as cafes; in fact, Trung Nguyen Company reported a minimum profit of 15% from overall investment, with '3 in 1 instant coffee' as the highest earner, accounting to 37% of total company revenues.

The Nestle value chain is quite different—farmers sell their coffee at a slightly higher price compared to the first and second value chains. Nestle puts premium to their coffee produced under the 4C standards, by topping up 300 VnD/kg to the regular price. The agents' profit is also reportedly higher in this chain. However, similar to Trung Nguyen Company, Nestle's overall profit could not be ascertained since interviewed company representatives would not disclose this type of information.

We also asked farmers if their incomes increased after converting to coffee, and almost all (143) responded positively, with women reporting a higher increase of up to 225 and 263% in the first and second value chains, respectively. In the third value chain, men reported a higher increase of up to 282% compared to women who reported an increase of 196% only. However, women in general, expressed dissatisfaction from these incomes, as they yearn for more income in the family—this behaviour is expected, as women are often more affected from the pressure of being in charged of household budgeting—a role played by many women in Vietnam.

Apparently, all actors in the value chain benefit quite fairly. Farmers benefit from standard pricing on coffee due to their access to market information--- some farmers even have access to market prices in London, so they can sell their coffee with the right price. However, the problem, especially amongst poor and ethnic minority households lies in the rising cost of fertilizers, chemicals and other inputs; accordingly, farmers could lose up to 30% of their profit to the cost of inputs and loan repayment.

NPV Analysis

Coffee production undergoes through five stages over a 30-year cycle (Table 6). Peak production usually starts on the 8th year with an average maximum yield of 2.8 tons/year, and declines on the 17th year (the post-production stage). We analyzed three scenarios of NPVs for 1 hectare of coffee over 30 years, wherein the discount rate was 4.5%/year (Vietnamese government rate, and assumed constant over 30 years), the initial investment cost was 41 million VnD/hectare, and considering the price history of the last 10 years (Table 7), the prices used were 37.75 million VnD/ton at median price, 47.2 million VnD/ton at 25% above the median, and 28.3 million VnD/ton at 25% below the median price. The NPVs as follows: 221 million VnD at median price, 318 million VnD at 25% above the median, and 123 million VnD at 25% below the median, respectively. The break-even point is in the 8th year when production starts to peak. Using the median price of 37.75 million VnD/ton, the cumulative income for coffee over 30 years would be 980.4 million VnD/hectare, or about 33 million VnD/hectare, annually (Figure 9). In sum, the NPV of coffee production over 30 years in the Central Highlands is high, making it attractive for farmers to invest in coffee production.

TABLE 6 Yield and production cost at different growth stages

Stages	Age (years)	Productivity (ton/ha)	Cost (mil. VND/ha/year)
Establishment	0-1	0	41
Pioneer stage	2-3	0.3 – 0.5	15 – 20
Early Production	4-7	0.5 – 1.8	12 – 15
Peak production	8-16	1.8 – 2.8	14 – 25
Post Production	17-30	0.6 – 1.2	10 – 15

TABLE 7 Average price of Robusta coffee in Dak Lak province (2005-2015)

Year	Unit price (VND/kg)	Date of price recording
2014 – 2015	40,000	Apr.2015
2013 – 2014	40,000	Apr.2014
2012 – 2013	43,000	Apr.2013
2011 – 2012	38,500	Apr.2012
2010 – 2011	50,000	Jun.2011
2009 – 2010	37,000	Dec.2010
2008 – 2009	23,600	Aug.2009
2007 – 2008	33,200	Apr.2008
2006 – 2007	21,700	Aug.2007
2005 – 2006	20,500	Aug.2006

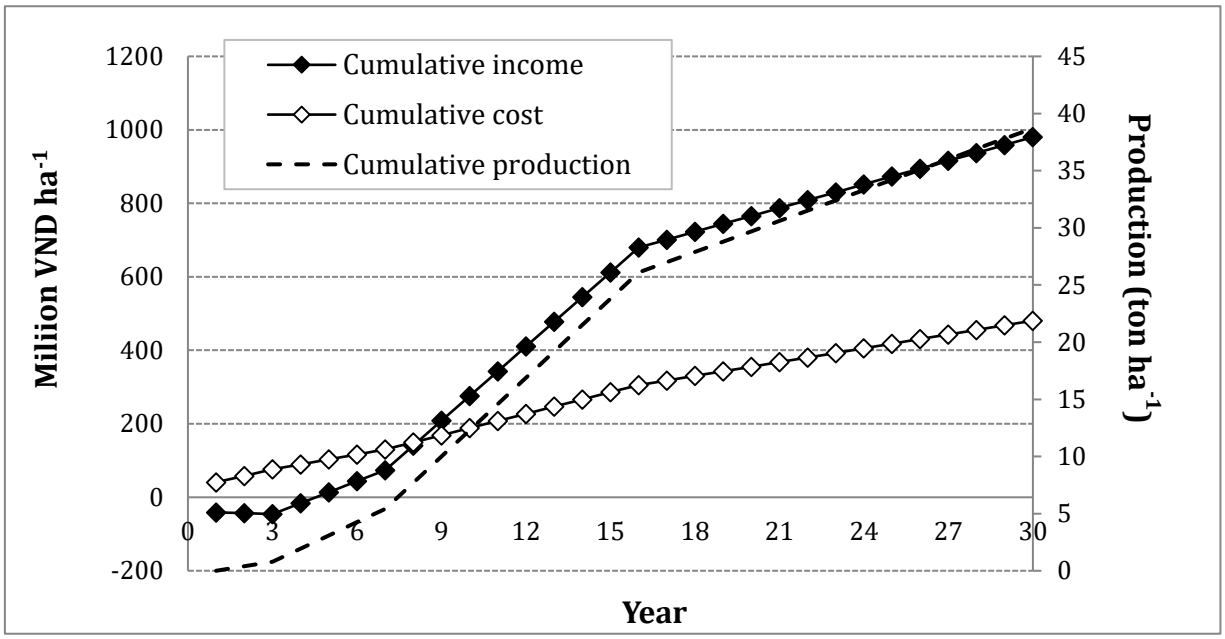


FIGURE 9 Cumulative cost, yield and income of coffee production in 30 years

What are the challenges, issues, risks and opportunities?

Despite the positive economic performance of coffee value chains, men and women reported common problems such as lack of capital to expand, or replace old coffee trees, unusual weather patterns, high interest rates, and water shortage. Irrigating coffee fields has become a serious problem since the last decade, as forest conversion has caused ecological balance, particularly the inability to regulate water resources (ICARD & OXFAM 2002). Irrigation will thus, become a source of major expenditure in coffee production in the near future. Table 8 shows the strengths, weaknesses, opportunities and threats of the coffee industry, as a whole.

TABLE 8 SWOT analyses of coffee value chains

	Strengths	**Weakness**	**Opportunities**	**Threats**
Value chain 1	Actors are all local, and have good social relations	No quality control and does guarantee stable supply	Close proximity between actors	Multinational companies may expand their operations and compete with local companies.
Value chain 2	Has capacity to invest in farmers to ensure stable supply; can offer flexible pricing; pays agents and farmers on time	Currently does not have a good procurement network	Trung Nguyen has the largest market share in Vietnam	Agents divert the supply to other companies.

Value chain 3 C	Has strong supply network; supports farmer training; has potential to invest in sustainable coffee development bringing long-term effectiveness of the value chain	Nestle could not work with farmers directly	International standard certification	Lack of policy for foreign companies to directly conduct business with producers may create problems associated with low traceability of coffee materials.

VI. Drivers-commodity-gender nexus

A combination of policy reforms, socio-economic programs, and global market forces has altogether, driven forest conversion, particularly to coffee in the Central Highlands. The GoV's policies and programs in as early as 1975 were propitious, as the world's coffee market was at the same time, growing rapidly. The GoV was quick, in its effort to seize global economic opportunities, with consequences to the nation's forest resources. As the forest was fast shrinking, the economy was also rapidly growing—but what does this change brought to the lives of local people? Our analysis is quite straightforward; showing that forest conversion to coffee brought significant economic improvements to both men and women, albeit this did not come without challenges. Both men and women reported an increase in incomes from coffee production; however, surprisingly, more men than women were feeling the strain of having to do more work in their coffee farms compared to previous land uses—this is particularly felt by farmers who have to follow certain practices required under Nestle's 4C coffee program. Almost equally, women (69) and men (73) however, reported changes in farming roles since converting to coffee. We compared our data with that of OXFAM who conducted a similar study in 2002, and found that more roles are now jointly performed by both genders than it was more than a decade ago. Indeed, recent reports, including World Bank (2011) cited increasing roles for women, ranging from farming and farm ownership, to managing export companies and dominating the international trade. According to a survey of the International Trade Centre in 2008, women in Vietnam make up 50% of in-country trading, and many coffee enterprises are under the management of female managers such as the Huy Hung Coffee Company and Dao Heuang Group. Currently, women accounts for 10% of the executive board of Vietnam Coffee and Cocoa Association (VICOFA).

At farm level, activities that are more jointly performed are weeding, fertilizing, watering, pruning, applying loans, harvesting, hauling and packing, and marketing, whilst the more gender demarcated roles are drying coffee for women, and seedling and land preparation, spraying and buying farm inputs for men (Table 9). Decisions on how much to sell and what to invest from incomes, are also made jointly --this finding is similar to what we found in the northwest region of Vietnam. Relatedly, more women are in charge of financial management or keeping incomes, which also agrees with our findings in the northern-central coastal region of Vietnam. Unsurprisingly, housework, such as cooking food, cleaning and washing clothes are still a woman's domain while

more men attend community–level activities. Interestingly, very few tasks are performed by hired labour.

TABLE 9 Gender roles in coffee production, household and community activities

Activities	**Men (n=98)**	**Women (n=84)**	**Both**	**Hire**
Seedling preparation	91	4	45	1
Land preparation	60	14	23	0
Weeding	9	1	65	4
Fertilizer	17	1	79	6
Spraying	69	1	20	11
Watering	47	1	42	10
Pruning	13	1	80	6
Buying farm inputs	85	7	52	0
Applying loans	35	16	95	0
Harvesting	3	1	39	7
Drying coffee	7	17	119	1
Packing, hauling	44	5	80	2
Marketing	42	24	80	0
Deciding to sell	24	13	109	0
Deciding what to invest	36	7	103	0
Recording farm activities, incomes, expenditures	34	33	27	0
Financial management	5	91	50	0
Take care of children	19	62	65	0
Washing clothes	42	85	19	0
Cleaning the house	35	80	31	0
Cooking	0	108	38	0
Attending children's needs	10	24	112	0
Participating in community activities	38	19	89	0

A closer look at the survey results revealed that gender roles in the coffee value chain is not necessarily demarcated; like men, women play significant roles; however, adding these roles to housework performed by women brings more burden. This perhaps, explains why more women than men (in the survey) were less satisfied with their incomes from coffee production. This behaviour may be linked to the drudgery on women who perform dual roles at home and in coffee farms. However, the fact that decisions on income utilization are jointly performed and women in general, are the family's financial manager suggests that they have some degree of control over income and income sources, with positive impacts on their children as well. Many authors (Lundberg & Pollack, 1991; Thomas, 1997; Menon et al., 2014) argue that resources concentrated in the hands of women may do more for children than those concentrated in the hands of men. Also, women's control over financial resources has well-documented effects on human-capital outcomes for themselves and their children through cooperatively bargained processes (Menon et al., 2014). That women often holds the purse, suggests a positive gender relations, which was probably reinforced by pro-women policies mentioned above. In particular, Vietnam's Land and Marriage and Family Laws, which require LUCs obtained by husband and wife during the marriage to

be considered their common property, with both their names inscribed in it (Menon *et al.* 2014*),* clearly promote women's rights to access and control productive resources, which in turn, can improve their livelihoods, and better their lives. However, households could never be assumed to be egalitarian units of equal income distribution (Coe 2008), and power dynamics within households is complex and impervious, that it cannot be quickly and comprehensively understood.

Clearly, there is a direct link between conversion to coffee and shifting gender roles, but for the women in Central Highlands, the shift to coffee may have been essential to improve their livelihoods and positions in society. Coffee production requires more labour especially during planting and harvesting, so women are often co-opted, especially in smallholding families who could not afford paid labour, while those with higher educational attainment and entrepreneurial skills, are involved in the upper end of the value chain. The direct benefits from coffee production are expressed in increased incomes, and as our survey has shown, more than half of the respondents are in the middle-income population. The profit-distribution amongst different actors in the value chain is promising, with the largest share (72%) for every kilogram of coffee produced, going favourably to farmers, which can be attributed to the government's policy that prohibit multi-national companies to directly engage with farmers, as a means to safeguard farmers against unscrupulous business practices. Optimistically, as long as the global market is stable, and government policies on safeguards are in place, farmers will likely continue to plant coffee and increase their participation in the value chain; however, if left unabated, this process can at the same time, lead to further conversion of current land uses, including forests.

It is worth noting that majority of farmers in the lower end of the chain (production) are in the 30-50 age bracket while the young ones (<30) are in the mid to higher end of the chain. While this study is nowhere comprehensive, this finding suggests an impending generational issue in the coffee industry. As the younger generation is getting more educated, and have created a career away from agriculture to become entrepreneurs and company managers, farmers may need to import labour outside the region, or women will face the brunt of labour scarcity---this situation will spur further changes in women's roles and trigger rising costs of coffee production, thus lowering profits.

V.II Conclusion and recommendations

We conclude that forest conversion to coffee in the Central Highlands of Vietnam provide net positive returns to investment, with about 2.6 million people benefiting from a well-organized and highly-competitive coffee industry. The higher NPVs of coffee production suggest that Vietnam may well continue as an important player in the world market. The significant roles women play in the value chain places them in the mainstream economy, and their participation in major decisions such as on income utilization, suggests gender equality in Vietnam, which could have been reinforced by pro-women policies that enable women to better their lives, and improve their position in society. However, the industry's success came at the expense of forest conversion with reported negative consequences on water quantity (due to lowering ground water). Our study did not look at the ecological trade-off of coffee expansion, but highly recommends analysis of these trade-offs, in order to inform policy makers about the potential long-term negative consequences of their decisions. Market liberalization and government ambitions to position Vietnam in the global coffee industry are clearly driving coffee conversion from forests and other land uses. These drivers could not be fully addressed within the REDD+ framework, but the negative impacts should be

mitigated so that REDD+ objectives, at least, partially can still be achieved. To do this, we recommend (i) regulating further expansion of coffee in forest lands and in critical watersheds, (ii) ensuring forest connectivity with coffee within a broader landscape, (iii) promoting and providing incentives for sustainable coffee production, and (iv) developing social safeguards to cushion the coffee industry from future market shocks.

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