

## ORIGINAL ARTICLE

# Migration patterns and land use by immigrants under a changing frontier society in the Peruvian Amazon

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**ABSTRACT** One of main factors identified as explaining forest loss and degradation in the Selva (the Peruvian Amazon) is the migration of people from the Sierra (Andes highlands), where agricultural conditions are severe, to forest areas in the Selva in search of new land. This paper aims at clarifying the characteristics and process of migration based on interviews with local people near Pucallpa, Ucayali Department, where forest loss and degradation has advanced in recent decades. In the study area, forest loss and degradation progressed by commercial logging after construction of a road connecting between Lima and Pucallpa in 1943. After logging, stock-farming companies and immigrants entered the area, and land uses other than high forest have been expanding. Today, the study area is occupied by people who have immigrated since the 1960s. Many of them earned income by logging until the 1980s, while today almost of them make a livelihood by agriculture, stock farming, or tree planting. As a result of these economic activities, there are substantial areas of mixed shrubs and grass in the study area today. This paper clarifies two points. First, the majority of immigrants were born not in the Sierra, but in the Selva, for instance as part of the expanding population in the Departments of San Martín and Amazonas. The main stream of migration is from parts of the Selva where immigrants had started reclamation in earlier days to other parts of the Selva with still abundant forests (such as the study area). Second, most migrants were not born in a rural area, but in Pucallpa, a developing urban area in the Selva. Pucallpa is also an important place for step migrants who stayed there for a while and worked temporarily before immigrating to the study area. The urban area has gained an important role in migration to forests in the Selva as a place of birth of migrants and for its function in step migration.

**Key words:** forest loss and degradation, Pucallpa, road development, migration, urban development

## INTRODUCTION

The Amazon Basin, which contains the world's largest tropical rain forest, has an area of around 6,500,000 km<sup>2</sup>, and extends to six countries: Brazil, Peru, Bolivia, Colombia, Ecuador, and Venezuela. The Peruvian Amazon, where degradation and loss of forests have also progressed in recent decades, occupies the second largest forest area, 740,000 km<sup>2</sup> (11%), following Brazil's (56%, around 3,630,000 km<sup>2</sup>; according to Horisaka 1997), and is important for ecosystem and biodiversity conservation as well as for local people's livelihoods.

Degradation and loss of forests along the roads have occurred in the Peruvian Amazon in association with immigration (Morales 2007, Ugarte-Guerra 2009, Figure 1), which is the same phenomenon observed in the Brazilian Amazon cases. One of major causes of deforestation in the Brazilian Amazon has been agricultural activities practiced by immigrants entering forests along roads constructed

there (Laurance and Williamson 2001; Imbernon 1999)<sup>1</sup>. In Brazil, however, degradation and loss of forests progressed more rapidly and to a greater extent, because of greater progression of road development; because the migration was more strongly supported by national policies; and because the area of cultivation of commercial crops was larger (Imbernon 1999). Reports and discussion concerning problems on degradation and loss of Amazon forests have largely examined cases in the Brazilian Amazon, while only a few studies have examined the relationship between migrants and deforestation in the Peruvian Amazon (Imbernon 1999).

Peru is divided into 3 topographical areas: the "Costa" along the coast, the "Sierra" in the Andes highlands, and

<sup>1</sup> For example, after opening of the Amazon highway in 1980s in Rondonia State, a number of peasants from the South and Northeast of Brazil entered the forests of Rondonia, looking for free land for agriculture. As a result, Rondonia State became the largest deforested area in the world in the 1980s.

the "Selva" in the east, corresponding to the Peruvian Amazon. Degradation and loss of forests have been progressed in the Selva (Oliveira et al. 2007; Imbernon 1999). The rate of deforestation there was high in the 1980s and 1990s in the Departments of Amazonas and San Martín (Perz et al. 2005), while in recent years deforestation has progressed in the Departments of Ucayali and Madre de Dios (Oliveira et al. 2007). Immigration of indigenous people of the Sierra into the Selva and consequent reclamation of the forests is identified as one of causes of the deforestation (Perz et al. 2005; Oliveira et al. 2007; Ugarte-Guerra 2009). Commercial logging is given as another cause (Oliveira et al. 2007).

Migration of indigenous people living in the Sierra occurred even in the 1940s, and their main destinations were urban areas in the Costa, such as Lima, and forest areas in the Selva. Previous migration studies have mainly targeted those migrating to urban areas (Skeldon 1997, Morales 2007), which is the predominant group in terms of numbers. A reason for migration to the Selva is to look for appropriate land for agriculture, since the conditions for agriculture in the Sierra are severe, with frequent drought and an overall shortage of suitable land (Morales 2007).

This paper aims to make clear the characteristics of migration of local people, based mainly on interviews with migrants to forests near Pucallpa, Ucayali Department<sup>2</sup> where, as already mentioned above, degradation and loss of forests have progressed in recent decades (INIA 2007, Ugarte-Guerra 2009, also see Fig. 1).

## STUDY AREA AND METHODOLOGIES

Ucayali Department is the location of the Ucayali River, in the upper stream of the Amazon Basin. In an east-west geographical cross-section from the Pacific Ocean to Ucayali Department, from the coastal plain the altitude rises dramatically to more than 6,000 m in the Andes highlands, and then goes down to the lowland Selva. The altitude of Pucallpa is around 150 m. Annual rainfall is around 1,500 mm, and in the rainy season, from November to April, monthly precipitation is constantly over 100 mm. This contrasts with the Andes highlands, where generally rainfall and temperatures are lower than in the Selva (Pulgar Vidal 1996).

The population of the department is around 432,000 (2007). The growth rate of population from 1981 to 1991 was 5.6% and from 1993 to 2007 was 2.2%. The number

<sup>2</sup>The territory of Peru is divided into 25 departments (administrative areas).

of immigrants into Ucayali from 2002 to 2007 was 32,350, and the main departments of origin for these immigrants were Huánuco, Loreto, and Lima. In the same period, the number of emigrants from Ucayali was 30,467, and the main departments of destination were Lima, Huánuco, and Loreto (INEI). Pucallpa is the capital of Ucayali Department. The population of the city is about 270,000 (2007).

In Ucayali Department, degradation and loss of forest have progressed along a trunk road (Federico Basadre road) connecting Pucallpa with Lima, especially in the area within about 100 km from Pucallpa (Imbernon 1999). The study area is along the three branch roads extending from towns located along the trunk road between 30 km to 60 km from Pucallpa (Fig. 1). This area was selected for this research, because of its characteristics of frontier, which both degraded forests and other land uses from forests, and high forests little affected by human activities are observed. On satellite images, there are few high forest areas observed near the trunk road and its branch roads; such forests are distributed far from the roads.

There is a small town named Campo Verde, located about 30 km westward along the trunk road from Pucallpa. Branch road A extends around 20 km northward from Campo Verde to a village named Nueva Requena located on the Aguaytia River, a tributary of the Ucayali River. Branch road B extends around 60 km southward from Campo Verde to a village named Tournavista located on the Pachitea River, another tributary of the Ucayali River. There is a small town named Neshuya located about 25 km along the trunk road from Campo Verde. Branch road C extends around 30 km northward from Neshuya to a village named Curimaná located on the Aguaytia River. The trunk road is paved, but almost of the branch roads are unpaved. Sometimes in the rainy season only 4-wheel-drive vehicles can pass because of the bad condition of the branch roads, and often even those cannot pass because of flooding.

In the field, land use along 3 branch roads—A, B and C—was examined by reading a satellite image (SPOT, taken 14 Feb. 2010) and checking on the ground. Interviews were conducted for a total of 68 households (21 for Branch road A, 20 for B and 27 for C). We asked about place of birth, birth year, process of migration from the birthplace to the present location, reasons for the migration, livelihood, land use, and land acquisition. Another series of interviews was conducted with people living in Pucallpa for a long time to inquire about changes of forests and land use. We made trips to the Andes highlands and to villages along the Ucayali River to identify the places of origin of migrants. The fieldwork was conducted in February 2008 and in

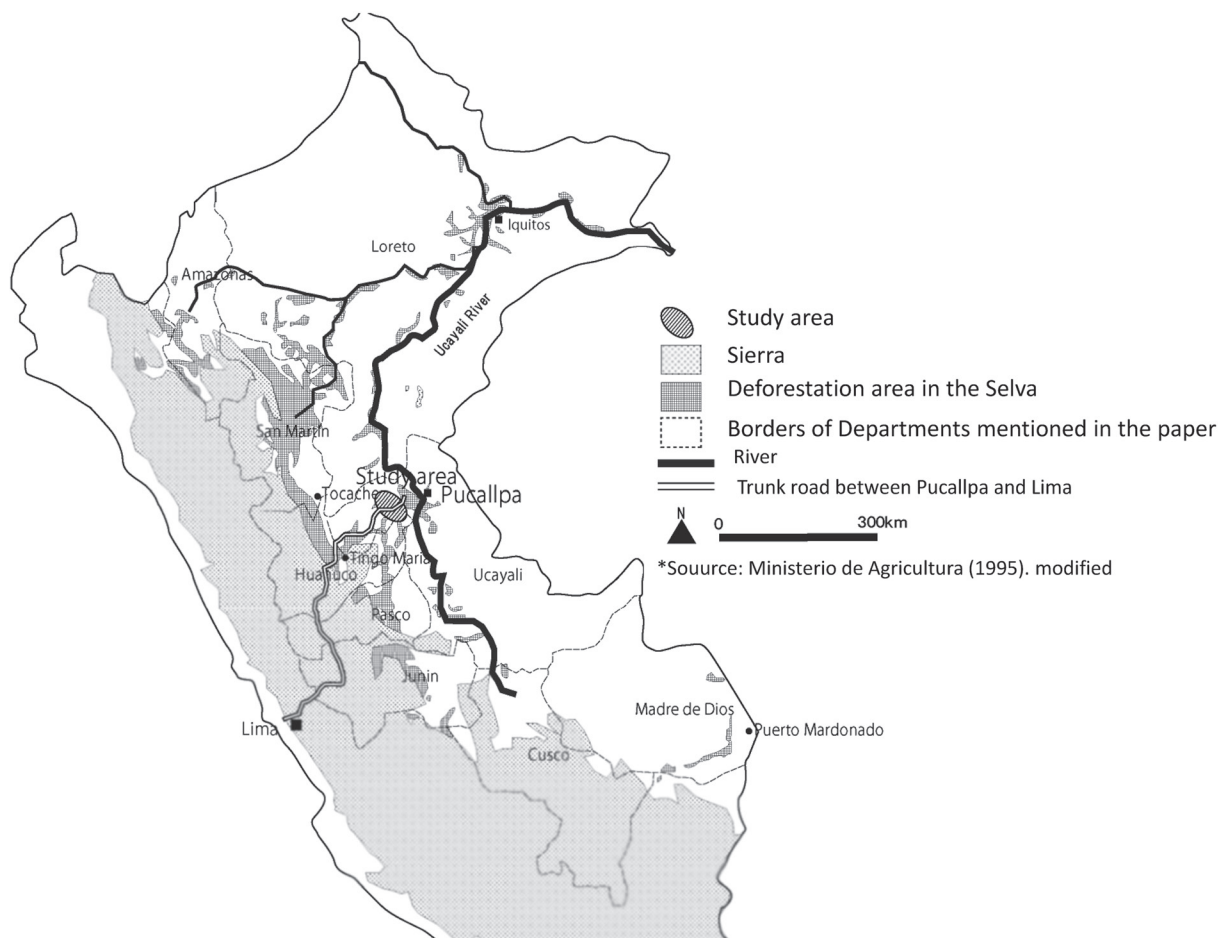


Fig. 1. Deforestation in Selva, Peru.

February to March 2011 for the study area, September of 2009 and 2011 for the Andes, and September 2012 for the Ucayali River.

## RESULTS AND DISCUSSION

### Process of land-use changes in and around the study area

**Process of land-use changes:** After the construction of the trunk road between Pucallpa and Tingo Maria in 1943, transportation by vehicle from Pucallpa to Lima became possible for the first time (Vivanco Pimentel 2010). At that time the population of Pucallpa was around 2,500 (ibid.). After opening the road, logging along the trunk road started. The logs were sawed in Pucallpa and the lumber taken to Lima. After the 1970s, logging still continued by companies obtaining concessions for large areas. Companies engaged in stock farming then came into the study area. A boom for oil and natural gas exploitation occurred in Pucallpa and its

surroundings from the mid 1970s to mid 1980s. Pucallpa has grown through this development process. In Peru terrorism became active from the mid 1980s to the beginning of the 1990s and the many of companies around the study area withdrew, fearing the threat of the terrorists. At that time, coca was cultivated, especially between Tingo Maria and Tocache (Fig. 1) where the altitude is 500 to 600 m a.s.l.

Nueva Requena, Curimaná, and Tournavista at the ends of Branch roads A, B, and C already existed as local centers of logging activity along the rivers before the roads were opened, and people could reach them from the trunk road on foot or by horse or ox. Branch roads A and B were constructed in around 1980 and 1968 (Vivanco Pimentel 2010) for logging. Trees along Branch road C were also logged by private companies when the road was opened by the government in around 1982 for natural gas exploitation. Even before the construction of branch roads, logging of trees in some parts of each branch road area started for commercial purposes by companies and local people.

In each branch road migrants mainly started settling

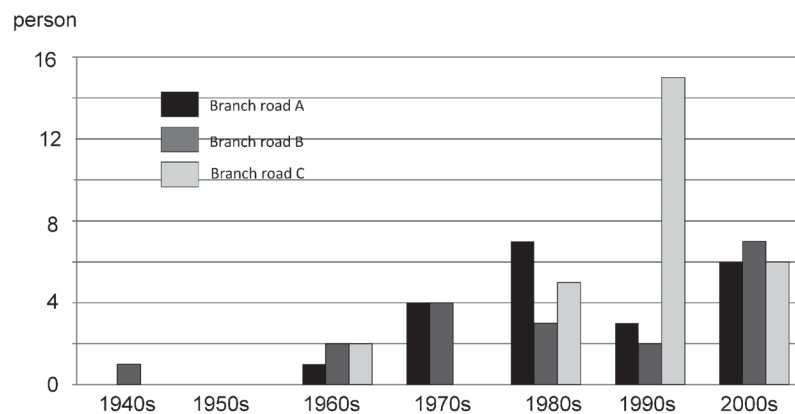


Fig. 2. Year of immigration to the study area.

from the 1960s (Fig. 2). Only one person had arrived in the 1940s at Tournavista, located on the Pachitea River. He came there with his father to do logging, which at that time had just started along the river. Even before the individual branch roads were constructed, there had been paths passable on foot or by horse or ox, and people had resettled along them.

**Distribution of local people and land reclamation:** Campo Verde and Neshuya are small towns with markets, shops, small hospitals, and government offices. Passing through these towns and entering the branch roads, local people live along the roads and their branches, with their houses built in isolation or in gatherings of a few houses. The smallest administration unit is a “*caserío*.” For example, in the area between Neshuya and a point 16 km from Neshuya along Branch road C, there are 13 *caserío* in a band 5 km wide from the branch road. Each *caserío* contains 64 to 360 people (Campos Cabezas and Andres 2010), and the average population is 195 per *caserío*. The distribution and size of each *caserío* is more or less similar among Branch roads A and B, and the remainder of Branch road C.

When someone wants to settle in the study area, it is permitted to reclaim an area 200 m wide along the road and 1 to 3 km (depending on area and period) back from the road. For example, since Branch road C appointed as a part of National Forest until 1990s, the reclamation was limited to a depth of 2 km back from the road. That depth of 2 km can be read from a row of forest with height of 5–10 m in the Figure 3. Lands up to 2 km from the road are called the first lot, then lands from 2 to 4 km the second lot, and from 4 to 6 km the third lot. Later arriving immigrants, would reclaim land in the second or third lot, if the first lot were full and they could not find land there.

A land the immigrants reclaimed and occupied is called “*fundo*,” which consists of their house, farming area

of annual and fruit crops, pasture and fallow lands. The fundo distribution creates a mosaic landscape of several types of vegetation as shown in Fig. 3.

Some immigrants purchased their lands from the farmers who arrived earlier, after arriving at the study area and working for several years as a tenant farmer. On the other hand, some just occupied land that had been used by companies that had withdrawn. Our interview of 63 respondents revealed that they possess land whose area is from 0 to 830 ha, and the average is 57 ha. Of these respondents, 5 persons (8 %) are landless: 3 of them cultivate rented land, 1 is a tenant farmer, and 1 is a school teacher. 25 persons (40 %) possess land certification<sup>3</sup> issued by the Ministry of Agriculture, while the others do not. They said that so far there had been no major inconvenience from not having the certification, although the value of the land might be lower.

**Land uses initiated by immigrants:** A map showing the land use within 5 km to either side of each branch road was made (Fig. 3). The land use was classified into: “forest more than 10 m high<sup>4</sup>” (“high forest,” photo 1), “forest with height 5–10 m,” “mixed shrubs and grass” (photo 2), “grassland<sup>5</sup>” (photo 3), “oil palm garden” whose size is 1–5 hectares, and “small town area.” The forest with height 5–10 m and the mixed shrubs and grass areas are locally called “*plumas*”.

Along Branch roads A and B, land use is mainly mixed shrubs and grass, with grassland and forest with height 5–10 m dotted within it. The grassland is distributed near the

<sup>3</sup> It is named “Certificado de Formalización de la Propiedad Rural.”

<sup>4</sup> Trees, such as *Tabebuia serratifolia*, *Terminalia oblonga*, *Calycophyllum spruceanum*, *Cedrelinga catenaeformis*, and *Schizolobium amazonicum* are observed.

<sup>5</sup> Grasses, such as *Brachiaria decumbens*, *Imperata brasiliensis*, *Rottboellia exaltata*, and *Baccharis floribunda* are observed.



Photo 1. Forest more than 10m high.



Photo 2. Mixed shrubs and grass.



Photo 3. Grassland.

branch roads. It is maintained by periodical burning of grass in the dry seasons, and cattle are extensively pastured. There were 4 interviewees who raise cattle, with the number of cattle being 20–70, an average of 41 head. The mixed shrubs and grass areas are land restored from grassland without burning for a certain period.

A reason for larger areas of mixed shrubs and grass and grassland along Branch road A and B than those along

C may be that livestock companies had developed the areas for grazing before the immigrants entered there<sup>6</sup>. In contrast, as mentioned already, along Branch road C high forests still remained until the 1980s and the area was designated National Forest, and as a result reclamation of the lands by immigrants was controlled. This seems to be a reason for a larger area of forest with height 5–10 m still remaining.

Forest more than 10 m high remains in areas far from the trunk road and its branch roads (Fig. 3). In the area where high forest remains along the Aguaytia River, however, the forest was logged and is dotted with forest with height 5–10 m and mixed shrubs and grass. The logs were carried to sawmills located in Nueva Requena, Tournavista, and Curimaná, sawed there, and then transported to Pucallpa and Lima. Logging operations had once been performed along each of the branch roads. For example, along Branch road A, high forest still remained until the 1980s, and people logged the trees by saw<sup>7</sup>. Since then, however, they have not done that because no more big trees remain there.

Farming lands in which people living along the branch roads cultivate crops such as cassava, maize, sugar cane, and wet paddy are dotted in among the mixed shrubs and grass and grassland. Many of these lands are less than 1 ha in size, although some are 5–10 ha where owners hire wage laborers to produce crops. Surplus production is mainly taken to Pucallpa. In recent years, brokers from Lima come directly to the study area by truck to purchase cassava. They come to farming land with about 20 laborers, and for a land of around 4 ha, harvest the product in half a day and take it away with them.

Some households form a home garden around their house by planting useful trees, such as fruit trees. They say that there is a problem with these trees dying due to fire from outside their *fundo*, especially in the dry season. Fire is one of the big problems for reforestation programs by the government and international organizations conducted around the study area.

Some small plots of pepper gardens are seen along part of Branch road B. These are the remains of a pepper farming project operated by the government from the later part of the 1960s to the first part of 1970s, and today almost

<sup>6</sup> Forests more than 10 m high still remain around only Nueva Requena of Branch road A. A reason for this might be the distribution in that area of low-lying and swampy areas with low value for reclamation.

<sup>7</sup> They sawed trees, such as Caoba (*Swietenia macrophylla*), Tornillo (*Cedrelinga catenaeformis*), Cedro (*Cedrus spp.*), and Shihuahuaco (*Dipteryx micrantha/Dipteryx odorata*).

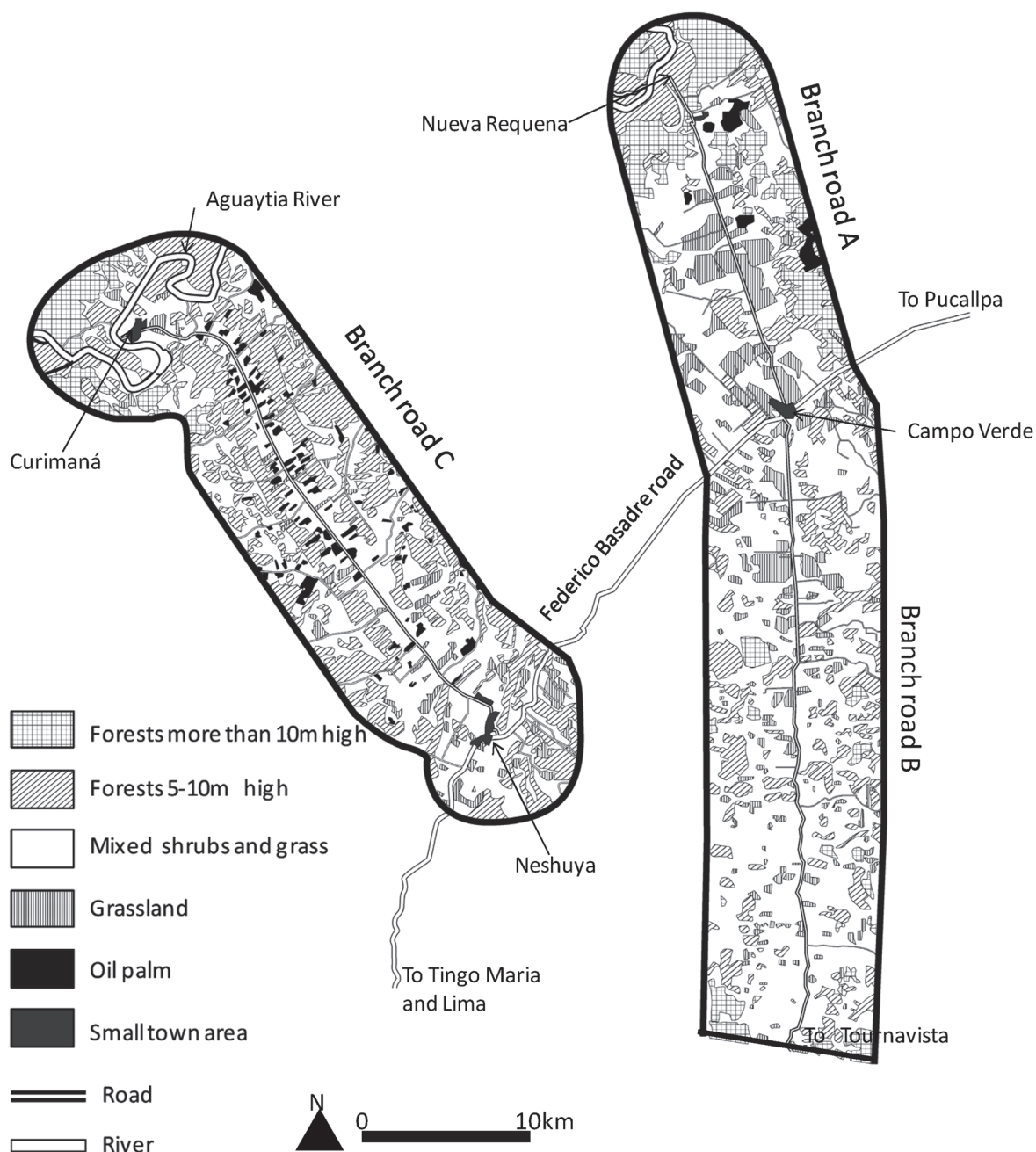


Fig. 3. Land uses along the 3 branch roads.

all of the pepper gardens have been abandoned. The abandoned pepper gardens are observed on the satellite image as “mixed shrubs and grass.”

Along Branch road A and in the areas near the Aguaytia River that sometimes flood, *Bolaina blanca* (*Guazuma crinita*), a fast growing tree, is planted. The wood harvested is sold to sawmills nearby and represents an important source of income. From the sawmill, in many cases the lumber is transported directly to Lima. The government and international organizations such as the World Agroforestry Centre (ICRAF) encourage local people

to plant *Bolaina*. The tree can be harvested at around 4 years. Along and around Branch road A, around 500 families plant it, averaging 4 or 5 ha for each family. The planting areas are dotted among the forest with height 5–10 m and mixed shrubs and grass areas.

Along Branch road C, in comparison with Branch roads A and B, the grassland is smaller and the area is dotted with many oil palm gardens, each of 1 or 2 ha. The oil palm gardens date back to the United State International Development Agency (USAID) project for encouraging local people to plant oil palm in the first part of the 1990s.

The local people harvest the fruits, with family members providing the labor, and take them to a factory with an oil press located near Neshuya. In areas far from the branch road, oil palm plantations consisting of several hundred hectares developed in recent years by commercial enterprises are seen. Along Branch roads A and B there are few oil palm gardens developed by local people. Other commercial crops grown by local people are cacao and aguaje (*Mauritia flexuosa*), although they are produced on a small scale.

We understood from interviews with local people that the original vegetation along the trunk and branch roads was mainly high forest, but it has since been changed to forest with height 5–10 m, mixed shrubs and grass, grassland and oil palm garden. The land-use conversion was started in the 1940s by logging companies and small groups of local people and livestock companies, and after the 1960s was continued by immigrants. Projects and policies conducted by government and international agencies sometimes affected the land use in the study area.

### Process of migration

**Birthplaces and places of origin:** Among the heads of households we interviewed, nobody was born in the study area. Pucallpa city area was the birthplace with the most people (6 persons, 10%). Then 4 persons (6%) were born in around Huánuco and Puerto Inca. Although both belong to Huánuco Department, the former is in the Sierra where the altitude is around 2,000 m, and the latter is in the Selva where the altitude is around 200–300 m. A further 3 persons (5%) were born in areas which belong to the Departments of San Martín and Amazonas. Since there are 11 persons (17%) born in the Sierra, and 41 (65%) in the Selva, the number of persons born in the Selva is predominant.

According to the interview, most of the parents or grandparents of those born in the Selva in the Departments of Ucayali, Huánuco, San Martín, and Amazonas originally came from the Sierra. For example, in San Martín Department migration from the Sierra was already active from the 1950s to the 1970s (Schjellerup 2000), well before the period of active migration started in the study area, and migration had already occurred even before that period. The current generation, the children and grandchildren of those migrants, may now migrate to the study area. As reasons for their migration, they point out a lack of fertile land in the areas where they had lived.

The birthplaces of migrants from the Sierra are not evenly distributed. In the study area, migrants were mainly

born in Huánuco, which is adjacent to Ucayali Department, or in the departments of La Libertad and Cajamarca, which are located to the north of Huánuco (Fig. 1). There are few migrants from the departments to the south of Huánuco. According to our interviews conducted in the Sierra, from Pasco and Junín, which are the departments located to the south of Huánuco, people migrate to Lima and seldom to Pucallpa. People from an area near to Cusco migrate to Puerto Maldonado (Fig. 1) as well as to Lima.

11 persons (17%) came from towns and local communities along the Ucayali River other than Pucallpa. There are several local communities where indigenous people<sup>8</sup> live, such as Sipibo and Conibo. Although they cultivate plantains, cassava, and maize, and achieve an almost self-contained livelihood in their villages, there are some people who go out to urban areas, such as Pucallpa, to earn cash. In the study area, there seem to be only a few indigenous people from the Ucayali River basin, and no indigenous people were included among the interviewees.

Step migration is noted as one of characteristics of the migration (Fig. 4). There are 42 persons (67%) who resettled to the study area after migrating to other areas, while 26 persons relocated to the study area directly from their birthplaces. Among the 42 persons, 10 persons arrived at the study area as a second place for resettlement, 17 persons as a third, 6 persons as a fourth, and 1 person as a fifth. Before arriving in the study area, many had settled in Pucallpa. They worked there for a while in manufacturing (factories), construction work, and timber or wood-related industries, and then they found and purchased lands in the study area.

**Reasons for migration:** In the study area, although there have been no substantial migration policies or big migration projects like those observed in the Brazilian Amazon, there have been relatively small projects, and people resettled to participate in them. For example, as already mentioned, in an area of Branch road B where there was a project to promote pepper cultivation in the 1970s, people resettled to participate in it. In the 1990s a reason for many people immigrating to Branch road C was to participate in a project for oil palm cultivation.

In the 1980s, there were many people migrating to an area at the foot of the Sierra, between Tingo María and Tocache (Fig. 4). As already mentioned, they were dedicated to cultivating coca (9 of the interviewees). On the other

<sup>8</sup> Although the ethnic composition of Peru is diverse, mestizo (who have both Hispanic and Native American parentage) and indigenous people (whose presence predates European immigration) account for the major part. Some ethnic groups of the indigenous people live in the Ucayali river basin.





## CONCLUDING REMARKS

This paper has examined migrants and their land use in Ucayali Department where there has been progressive degradation and loss of forest. In the study area, immigration is one of major factors behind degradation and loss of forests, although logging and stock-farming companies also affected much the forests. The previous studies insisted that road development was an important factor causing immigration into the Amazon basin. In the case of this paper, construction of the trunk road and branch roads became a factor that led to logging and conversion to other types of land use from high forest.

Previous studies mentioned that people settling in the Selva (Peruvian Amazon) migrated from the Sierra, coming from areas with worse agricultural conditions in terms of climate and soils (Perz et al 2005; Oliveira et al. 2007). This paper, however, clarified that such migration patterns have changed, affected by the changes of the Selva as a frontier area in these decades. Today the Selva itself, where immigration had been observed from an early date, became an area supplying migrants. The majority of migrants do not come from the Sierra but from the Selva, such as the Departments of San Martín and Amazonas. The generation born in the Selva that represents the children and grandchildren of those who had immigrated from the Sierra migrated into the study area. It can be said that parts of the Selva, following progressive development by migrants from earlier days, are today losing the characteristics of a frontier, and people there have migrated to the study area, which has greater frontier characteristics.

Another finding of this paper is that an urban area developed in recent decades also became an area supplying migrants. Pucallpa is the place where the biggest number of the migrants was born. It is notable that the areas supplying migrants are not only rural areas, but include such urban areas that have grown in the Selva. Pucallpa is also an important place for people doing step migration from other departments to stay for a while and work in construction and wood processing before migrating again to the study area looking for new land. Consequently, it can be said that nearby urban areas such as Pucallpa became important for migration to rural Selva as a birthplace and also as a step for migrants. This may be a recent trend following urbanization, and has not been pointed out by previous studies. Urban area where lots of people can gather played an important role for the case of *invación* in Branch road B when many families resettled at once. Hereafter, as free lands and forests are going to disappear, the study area

including Pucallpa will become a supply area of migrants for new frontiers of the Selva.

One point of focus, hereafter, may be land use change by cultivating commercial crops for domestic and international markets. As Imbernon (1999) pointed out, large scale cultivation of commercial crops was not observed in the Peruvian Amazon, unlike the Brazilian Amazon. In recent years, however, a few cases of such changes were seen, including for example the expansion of oil palm plantations and Bolaina planting, and purchasing cassava by brokers from Lima. Large scale land uses, such as by large monocrop plantations, may appear in the study area depending on the domestic and international markets. It is necessary to draw attention to the movement of migrants under such changing society in the Selva.

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