Humboldt University Berlin, Germany
Faculty of Agriculture and Horticulture
Department of Agricultural Economics and Social Sciences
Agricultural Extension and Communication
Prof. Dr Uwe Jens Nagel

Socioeconomic Analysis of the Income Structure of Small Scale Farmers in Morona Santiago, Ecuador

Anne Trümner

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ForLive

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The collection of data used within this study was initialized by Eckart von Reizenstein and financed by Intercooperación and ForLive.

Summary

The present study gives an insight into the income structure of small scale farmers in the province of Morona Santiago, Ecuador. It delineates a detailed analysis of the different income sources of rural households while giving a particular insight into the differences regarding the income composition of the indigenous population and the settlers. Furthermore the proportion of production for subsistence in relation to the production for commercialization purposes is emphasized. This way the study aims at providing a comprehensive portrait of the rural household income situation in the Amazon region.

The survey is based on the support of Servicio Forestal Amazónico (SFA), a local NGO working in the field of sustainable forest management in Macas. Regarding the international research background the study is embedded within the two projects ForLive and PEN (Poverty Environment Network), who both work within the context of forest conservation and poverty reduction while using different approaches.

The data used for the analysis was collected within a quantitative inquiry in the province of Morona Santiago initialized by PEN and processed with the help of excel. It refers to hundred rural households, fifty Colono and fifty Shuar families that were queried about their incomes two times within a six month survey period.

Summing up the results, it can be assumed, that the main income source of rural households investigated in Morona Santiago is forestry, providing 28% of the total rural household income. The sector might be of even greater importance, when taking into account all related activities, e.g. carpentry or incomes from joiner employments, which are accounted to own business and wages within this study. The second most important income source is livestock (21%), followed by agriculture (18%). Moreover, wage incomes (16%), incomes from own business (11%), other income sources (4%), and incomes from fishery and aquaculture (2%) contribute to the livelihood of small scale farmers in the Amazon. The total annual income of an average rural households amounts to 5238,93 US$.

It can be concluded, that the ethnical affiliation influences the income composition of Shuar and Colonos. Both depend on forestry as their main income source and no significant difference between Shuar and Colono could be detected (Shuar 28%, Colonos 29%). Livestock (21%) along with incomes from own business (21%), constitute the second most important income sources for Colonos. Shuar make up 22% of their income from livestock and only 3% from own business, whereas agriculture

(27%) is the second most important income source, which is of minor importance for Colonos (5%). With respect to wages, no severe differences display, as they account for 17% of the total Shuar income and for 15% of the Colono income. Other income sources like remittances and financial support from NGos, government or similar add up only 1% to Shuar households and 7% to Colonos. Fishery and aquaculture contribute 2% in both cases. The total annual income of an average Shuar household is 5496,71US$ and respectively 4852,59US$ in an average Colono household.

Taking into account these results, it can be concluded that the differences are not as severe as often assumed. It seems that the living conditions in the rural areas do not provide many options for distinguished land use forms but both populations have to make a living from the available resources. However, this might be distinct with regard to the indigenous population not living as close to the main roads as the investigated communities. As the proportion of Shuar who do not live close to the roads is significantly high, the study can not claim to be representative for the whole Shuar population.

Rural households gain the highest incomes from those sectors where the proportion of production for commercialization is high. These sectors are livestock and forests, with commercialization rates of 62% (livestock) and 85% (forest).

The ethnical affiliation influences as well the proportions of subsistence production and production for commercialization. However, this influence is more significant with respect to the different income sectors (livestock, forestry, agriculture, fishery and aquaculture) than within the total proportions of production for subsistence and commercialization, where the two groups show off similar results.

The results of this study can only be rated as trends, because the reliability can not be fully guaranteed, due to possible biases. Nevertheless, the main conclusions, which can be drawn from the analysis, is the following: on the one hand there is a heavy need for increased technical assistance in the field of sustainable resource management in order to conserve the remaining forests in the Amazon region and enhance income possibilities and living condition of the local population at once. On the other hand the results show an influence of the ethnical affiliation on the income structure what has to be taken into account within any development efforts.

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1 Introduction to Ecuador

1.1 Geographic Description

Map 1: Ecuador; Codeso 2006

Ecuador is located in north-western South America, right at the equator (1°27'06" latitude north; 5°0'56" latitude south; between longitudes 75°11'49" and 81°0'40" east), as the name implies. It is bounded by Colombia on the north, by Peru on the east and south, and by the Pacific Ocean on the west (Corrales et al 2000). The Republic of Ecuador covers a total area of 276,840 km^2 and includes the Galápagos archipelago, 1,552 km off the coast of the Manabí province, covering 7 800 km^2. The mainland can be distinguished into three regions: the western coastal plain, the central highland corridor and the eastern rainforest zone in the Amazon basin, known as the Oriente. These three regions are characterized by great differences with regard to climate, environment, population structure and cultural background (Economist Intelligence Unit 2006). The great variety of environmental conditions is a result of two major factors: first, the presences of the Andes, which divide the country from north to south, and second, the cold, dry Humboldt Current, which is responsible for the xerophytic vegetation found along the southern coast and reaching roughly as far as the equator (FAO 2003).

The coastal plain along the Pacific coast, ranging from 20 to 160 km wide and formed by alluvial deposits from the mountains in the north count for a little more than one fourth of the country. It is wet and swampy, whereas in the south, near the Peruvian border, deserts occur as a result of the drying effect of the Humboldt Current. In between, the remaining tropical forests cover much of the lowland. The highlands of the Sierra make up another fourth of Ecuador. Two parallel ranges of the Andes Mountains extend the length of the country from north to south with high plateaus between them. Mountain peaks rise over 6 000m, some of them are active volcanoes.

The remaining half in the east of Ecuador, the Oriente lowlands, is covered by thick tropical forests including the eastern foothills of the Andes as well as the Amazon River Basin. Two main rivers shall be mentioned: Rio Napo and the Pastaza, which are part of the Amazon River system and are draining the region. Still great parts of the Oriente, explicitly in the east near the Peruvian border are mostly undeveloped (FAO 2003).
The climate in the coastal region and the Oriente is generally hot and humid.
The mean annual temperature is about 24° C. Temperatures in the Sierra are cooler, depending on the elevation (FAO 2003).

1.2 Ecological Resources

Although Ecuador is one of the smallest countries in South America (1.5 percent of the continent) its wide diversity of plants and animal wildlife make it one of the most important countries in the world in terms of biodiversity, both for the total number of species and for the number of species in proportion to area (FAO 2003). With 0.2% of the world's surface, it holds 10% of all plant species and 18% of bird species (The Economist Intelligence Unit 2006). Ecuador still holds a forest cover on 12.4 million hectares, or 44.8 percent of its total land area. Most of the forests are found in the eastern, Amazon region. Tree species with commercial value include balsa (*Ochroma lagopus*), *Cedrela fissilis* and *Virolla spp.*, while the alluvial plains contain a major concentration of palm species (FAO 2003). Ecuador seeks to conserve its immense biodiversity in a network of more than 26 national parks and reserves, accounting for about 18% of the total country. One of the most important reserves is located in the sea: the Galapagos Islands. They are extremely valuable, due to high endemism and a unique flora and fauna. Nevertheless the technical capacity, personnel and political will necessary to enforce the rules to protect biodiversity have been lacking (The Economist Intelligence Unit 2006). Unsustainable management of the natural resources like unsustainable land use or intensive harvesting activities, lead to high annual deforestation rates (1,2%, 137000ha) and threaten biodiversity. Beside agricultural and livestock rearing activities, uncontrolled land settlement, the supply of wood for industry and fuel, accompanied by destructive exploitation methods seeking for resources like oil or gold are one of the main causes of deforestation (FAO 2003). Around 8.29m ha of land has the potential for agricultural use, of which 74% lie in tropical and subtropical zones. Climatic diversity facilitates the cultivation of a wide variety of crops. Moreover inland rivers, lakes and the long coast provide an abundance of fish and seafood (The Economist Intelligence Unit 2006).

1.3 Population

The total population is estimated at 13.2 million in 2005, according to the Instituto Nacional de Estadística y Censos (INEC), based on national census in November 2001. The ethical composition is very diverse and percentage estimations vary considerably due to fluid definitions: according to estimates from the Confederación de Nacionalidades Indígenas del Ecuador (Conaie) indigenous people account for about one-quarter of the population (The Economist Intelligence Unit 2006), while the Food and Agriculture Organisation gives a percentage of 52% of indigenous population (Corrales et al 2000). In the highlands Quichua form the vast majority while smaller indigenous populations live in the Amazon and the coastal regions. According to FAO another 40% are mestizo*s* with a mixed European-indigenous heritage. The remaining 8% originate from Spanish or African ancestors (Corrales et al 2000). About 95% of the population is Catholic, while other churches, mainly Protestants account for another 5% of the Ecuadorians. The official language is Spanish, but indigenous languages like Quechua, Jíbaro, Shuara, Colorado and some other ten languages are still widely spread. Illiteracy has decreased and is estimated to apply for 6.67% of the total population, 38% of them men, 62% women (Corrales et al 2000). Despite improvements since the 1970s, social indicators remain among the poorest in Latin America. Ecuador was ranked 82nd (out of 177 countries) in the 2005 United Nations Development Programme (UNDP) Human Development Index (The Economist Intelligence Unit 2006).

1.4 Politics

Ecuador has been a multiparty democracy since 1979. The largest political parties in terms of congressional representation are the centre-right PSC, the PRE and the centre-left Izquierda Democrática (ID). All have held power at some time since the transition to democracy in 1979. The country is divided into 22 provinces and 221 municipalities.
Political instability has always been characteristic for Ecuador, but has increased especially since 1996, resulting in slow pace of much-needed reforms. Social unrest has become an increasing feature of the domestic political scene (The Economist Intelligence Union 2006). The actual president is Rafael Correa (Allianza Paìs) who took over the power from Alfredo Palacio in the presidential elections in November 2006.

1.5 Economy

Oil and agricultural export products are the main pillars of the Ecuadorian economy. In 2005 Ecuador exported an average of 360,000 barrels of oil per day. With regard to the agrarian sector Ecuador is the world's leading banana exporter. During 2000-04, agriculture, forestry and fishing accounted on average for 10.3% of the GDP, while the share of the oil and mining sector (dominated by the extraction of crude oil) averaged 21.1% of the GDP. Exports accounted for an average of 28% of the GDP in 2000-04, and are dominated by commodities, increasing the economy's vulnerability to external shocks (The Economist Intelligence Unit 2006).

The Ecuadorian economy has been subject to several crises. The biggest crises occurred in the late 1990, when the GDP declined 7,3%. The instable political situation does not help very much emending the vulnerable economy.

One of the main burdens of the Ecuadorian state is the high external dept which has been substantiated by the oil shock in 1980. According to agreements with the international monetary fund, all incomes from the oil sector have to be used for paying off the debts. This makes a draft on 40% of the whole budget of Ecuador, and consequently decreases the funds for education or health programs (Paffenholz, Jarrín 2006).

2 Research background

The study is based on the support of Servicio Forestal Amazónico (SFA), a local NGO working in the field of sustainable forest management in Macas, province Morona Santiago. SFA originated from the Proyecto Agroforestal CREA-DED-GTZ (1992-2001) and was founded by local professionals with the aim to rent out technical assistance services, which promote sustainable forest management among local small-scale farmers. Since 2001 SFA is legally recognized by the approval of the Ecuadorian Ministry for the Environment (SFA webpage 2006). This study became possible because SFA is currently cooperating with two projects (PEN, ForLive) working in the field of forest conservation and poverty reduction that will be described briefly in this chapter in order to enable classification of the study within the field of ongoing international research on development subjects.

2.1 Poverty Environment Network (PEN)

The Poverty Environment Network (PEN) is a six year project, launched by the Centre for International Forest Research (CIFOR) in September 2004. It is coordinated by CIFOR, with financial support from the International Foundation of Science (IFS). PEN is working closely with resource persons in a number of universities and research institutes on all continents (PEN website 2006).

The objective of PEN is to study forest-poverty interactions with the help of systematic collection of high quality and comparable socio-economic data from a variety of tropical and subtropical forest settings. At the core of the PEN project is a detailed household income survey accounting under different biophysical and socioeconomic contexts where there is a significant interaction between humans and forests (PEN 2006). All calculations within this study referring to the economic situation of small scale farmers are based on the two data sets collected within PEN in Morona Santiago, Ecuador.

2.2 ForLive

The project ForLive was launched 1st of February 2005 and will conclude on the 31st of January 2009. It is coordinated by the University of Freiburg in Germany and financed at one counterpart by the INCO-programme of the European Commission providing a budget of 1.85 Million Euros, and at the other counterpart by significant contributions

from the involved partner organisations. The project consortium is composed by the following partners: University of Freiburg, the Instituto do Homen e Meio Ambiente da Amazônia (IMAZON) and the Universidad Federal Rural da Amazônia (UFRA), both from Brazil, the Asociación para la Investigación y el Desarrollo Integral (AIDER) in Peru; the Universidad Autónoma de Beni (UAB) in Bolivia, the Servicio Forestal Amazónico (SFA) in Ecuador, the University of Wageningen in the Netherlands, the Universidad de León in Spain, and the Centre for International Forestry Research (CIFOR).

The overall objective of the project is applying qualitative research methods to identify and analyse forest use strategies applied by small scale farmers in the Bolivian, Brazilian, Ecuadorian and Peruvian Amazon in order to assess and value their local viability and possible contribution to the ecological stabilization of landscapes and rural livelihoods and define possibilities to promote them as a basis for sustainable development in rural areas of the Amazon.

The methodology is based on the application of both Participatory Action Research (PAR) and traditional research approaches (ForLive website 2006). The project is based on the surveillance of a number of case study areas in the Bolivian, Brazilian, Ecuadorian and Peruvian Amazon. Two of those case study areas correspond with two the communities (Pajanak, 5ta Cooperativa) surveyed within PEN. Hence this study is connected to the ForLive project, providing additional information in the two cases, and therefore contributing to complete present knowledge about small scale farmer's living conditions.

3 Description of study area

3.1 Geographical and Political Setting

Map 2: Display of the research area in the province of Morona Santiago; SFA 2007

The research area Morona Santiago lies within the central-southern part of the Amazon region. The province of Morona Santiago shares borders in the south and in the east with the Republic of Peru. In the north it borders with the provinces of Tungurahua and Pastaza, and in the west with the provinces of Azuay, Cañar and Chimborazo. Its total extension is 24.154,55 km² on an altitude of 1070m above sea level. The climate is subtropical to tropical with an annual precipitation of 2500mm and temperatures at around 18-25º C.

The population amounts to 115.421 inhabitants with three ethnical affiliations, Colonos, Shuar and Ashuar. The province is politically subdivided into twelve cantons with the capital Macas. The current political authority is Jaime Mejía Reinoso, prefect of the province (Consejo Provincial de Morona Santiago 2006).

3.2 Cultural and Social Context – A Historical Review

Today two main ethnical groups inhabit the central-southern Ecuadorian Amazon: the Shuar, who are the indigenous residents of the area and the Colonos, who have migrated into the Amazon region from the Ecuadorian Highlands during the last century (Kautz 2004).

The Shuar belong to the tribe of the Jivaro Indians and together with the Achuar, Huambisa, Candoshi and Aguaruna, they form the largest indigenous population in the Amazon region of Ecuador (Carvajal et al, 1997). Nowadays, the Shuar occupy a territory of over 900.000 hectares, of which around 700.000 hectares are legally recognized (Carvajal et al 1997). This territory is only a very small part of their former ranges that corresponded with the borders of the whole province of Morona Santiago. Today the Shuar population is estimated to be around 110.000, divided into about 670 communities (Carvajal et al 1997). Their traditional language is shuar but as a consequence from colonization it is necessary for them knowing Spanish, too. Nowadays the main religion is Catholic, whereas indigenous elements have been incorporated into the new religion (Kautz 2004).

In the first decades of the twentieth century farmers from the highlands (the today Colonos) migrated into the up to that point relatively sparsely populated Amazon region. The migration process was mainly caused by the very harsh living conditions farmers faced in the Andean region, the agricultural crisis in the dry Highlands and moreover by the ´myth´ of fertile available land, that would easily lead to better living conditions (Kautz 2004). In the 1970s the migration process was stimulated even more by political agrarian and colonization reforms leading to the Law for Colonization in the Ecuadorian Amazon Region under the direction of the Instituto Ecuatoriano de Reforma Agraria y Colonizacíon (INCRAE) (Ham 2006). This law produced severe deforestation as it awarded those with property rights that cleared and converted the land into agriculturally used areas. The INCRAE was replaced about 30 years later by the National Institute of Agricultural Development (Instituto Nacional de Desarrollo Agrario - INDA) (Inter-American commission on human rights 1997).

The colonization process was aligned by severe intercultural conflicts. This was because the myth of available land was only partly true: the land was already inhabited by the Shuar. At that time their lifestyle was mainly characterized by hunting and gathering as well as a strong cultural and spiritual connection to their environment. Their property rights were not legally codified and consequently claiming indigenous land was easy for

the new settlers. Moreover, the colonists did not respect the indigenous population as equal inhabitants but considered them as wild and uncivilized people. As the state supported the settler's endeavors to colonize the "wild east" by legalizing claimed and cleared land, the Shuar lost great parts of their former territory. The indigenous culture became subject to the influence of missions which introduced the Christian religion and the western way of living, what resulted in substantial changes in the traditional lifestyle of the Shuar. Until today the relationship between Shuar and Colonos is characterized by distrust and skepticism and in former time even induced violent conflicts with deaths on both sides (Kautz 2004).

The current situation in Morona Santiago is heavily determined by the historical developments described, which is as well due to the fact that the region's colonization history is a very recent one. Especially the indigenous population is still suffering from the past development as it affected their traditional way of life in many ways and totally changed their environment, their traditions and their perceptions of them selves as well as their culture. Along with these consequences, land use changes occur as briefly described above. As in former times the main living base of the Shuar was the surrounding environment with its dense forests, today diverse forms of agriculture e.g. cattle ranching make up the livelihood. But still the income of Shuar and Colonos is not gained in the same way and the ethnical differences cause variations in the income structure as well.

In the past years immigration into the region stopped while a complementary development rises: Young people, mainly Colonos, migrate to the Highland areas and to larger cities, in search of better educational or employment opportunities. Sometimes even whole families emigrate because of disillusion.

Moreover the dollarizations lead to a deterioration of the economic situation which resulted in a raise of illegal emigrations especially into the United States in order to support the income situation of the family through remittances (Kautz 2004).

3.3 Ecological Context

Until today not all areas of Morona Santiago have been subject to human exploitation. The Amazon remains one of the places with the greatest biodiversity on planet earth (Myers 1988 according to Villacrés 2004). Especially in the Oriente of Ecuador high rates of endemism have been recorded and the discovery of new species happens frequently (Villacrés 2004). Nevertheless, this valuable ecosystem is under great pressure.

While the former indigenous land use was a rather moderate and extensive one, the new settlers brought along land use techniques like logging and intensive agriculture developed in the Andean areas but inappropriate for the Amazon region (Kautz 2004). They introduced great populations of livestock and incorporated more and more land, unaware of the ecological consequences (Pichon 1997b). As a result the sensitive forest ecosystems devastated, erosion became a severe problem, water availability decreased and the natural resource base indispensable for the local livelihood was exploited more and more.

As well the land use techniques of the indigenous people were affected by this development and in the past decades a shift from the former low- impact extraction and production practices to a more invasive land use must be recognized (Cosude-GTZ 2002). But recently indigenous associations developed in order to secure at least some property rights on land. As a result of this development of associations by the ´Federacion Shuar´, the land of the Shuar is theoretically registered, however, missing official land title documents of the property of individual families which often leads to conflicts (Kautz 2004).

However the new land use techniques did not pay off and therefore the great profit which the settlers hoped for did not come true. In fact the forests disappeared and agriculture is a restricted business because of weak soils demanding high amounts of artificial fertilizer accompanied by little success in livestock management.

3.4 Economical Context

For family livelihood of the Shuar, mostly a piece of agricultural land with the size of 1-2 hectares is used, the so-called ´aja´or ´huerta´ (Kautz 2004). Besides that, hunting and fishing, depending on the natural circumstances add to the livelihood conditions. Often small animals, such as pigs or chickens, fish or small pastures, as well as forestry reduce the need for hunting, by providing a small economic basis (Ham 2006).

Contrarily, the livelihood pattern of the Colonos boasts a stronger connection to western society patterns and thinking. The economic foundation of most Colonos is based on forest and pasture activities, the production and sale of agricultural products, and the support of family members living in the Ecuadorian Highlands or the United States (Kautz 2004). The contact with the market is mostly better, due to a better accessibility of the communities and the economic pattern of thinking stronger than that within the Shuar. All these elements contribute in general to a higher living standard of the Colonos and better education and employment perspectives (Kautz 2004). However, in

general, the small-scale, differentiated and subsistence-oriented livelihood pattern of the Shuar seems to be ecologically better adapted to the potentials of the region (Kautz 2004).

Two different types of economic activity can be distinguished in the research area: a subsistence oriented livelihood pattern with only producing for the market in case of emergency, resulting from the remote living areas of mostly Shuar groups, and market oriented thinking, which is characterized by production for the market and mainly is practiced by the Colonos (Kautz 2004).

4 Methodology

4.1 PEN research structure

Within the PEN project data is gained in a quantitative way. Information is collected with the help of the PEN prototype questionnaire (compare attachments) forming the basis for all data collection in the individual PEN studies in all countries. The questionnaire is the result of a long consultative process among PEN resource persons and partners (website PEN 2006).

The practical research is spitted into three types of quantitative surveys: Village surveys, annual household surveys and quarterly household surveys.

Within the village surveys data is collected that is common to all or show little variation among households. In total two village surveys are accomplished, one at the beginning of the fieldwork with the aim of collecting background information on the villages, and a second one at the end of the fieldwork period seeking for further information regarding the 12 months period covered by the surveys. (PEN 2006)

The household surveys are grouped into two categories, the annual and the quarterly household surveys. All general household information like demographics, assets, land use information etc. is collected in two annual household surveys, one at the beginning and one at the end of the fieldwork period (PEN 2006).

The aim of the quarterly household surveys is to collect detailed income information on all income sources (PEN 2006) of 100 family households accounting for a 12 month period. The present study can only refer to the first two survey quarters as the third and fourth still have to be elaborated. The same holds for the second part of the village and annual household survey.

4.2 Selection of study area

The selection of a study area is critical to the quality of the results. Within the research in Ecuador, the selection of the study area was done according to the PEN norms that refer to the criteria of Cavendish (2003). Cavendish stated that not all possible variations can be taken into account within one research area. Nevertheless, at least the following ones should be subject of the selection process: forest type, forest tenure, type of local agent, source of risk, levels of poverty, market distance, population density, and migrants (Cavendish 2003).

Beside the representative character of the communities and variation in the mentioned aspects, the choice of the study area in Morona Santiago was mainly driven by the following aspects: As explained earlier the province of Morona Santiago is ethically determined by two main groups, the indigenous people Shuar and the Colonos. With respect to this circumstance, 50 Shuar families and 50 Colono families were chosen for the interviews, which as well represents the average population composition In total eight communities were selected, four with indigenous population Ángel Rubin, Mutins, Pajanak, and San Luis, and another four with Colono population, 5ta. Cooperativa, 6ta. Cooperativa, 8tva. Cooperativa, and Santa Rosa. This selection allows a direct comparison of the income structures of these two distinct population groups of the province and adds a special value to the survey. Additionally only those communities were chosen, that had been in contact with SFA (Servicio Forestal Amazónico) before in order to facilitate the research process. Especially members of indigenous communities often distrust in qualitative studies because of worse experiences with this type pf research in the past. By choosing communities that had been working successfully with SFA before this problem was minimized.

The accessibility of the communities was another criterion. Only those communities could be queried, that could be reached without too high financial and time efforts.

4.3 Analysis of PEN data sets

As mentioned before, only the first six month of the full twelve month research period could be taken into account within the present study. The results from the first six month were extrapolated in order to obtain predications referring to one year as they are easier comparable with other investigations referring to the income sources.

Besides the analysis of the income structure, a further emphasis of the investigation was the assessment of farmer's subsistence production in relation to the amount of market

oriented production. As the PEN questionnaire includes information about market prices, as well as the amounts of production for subsistence and commercialization, the needed values can easily be calculated with the help of excel. In order to make use of the additional value the investigation of two distinct ethnical groups provides, a second priority lies in the analysis of variations within the income structure of Shuar and Colonos. The PEN quarterly household questionnaire includes income information that refers within the first part of the questionnaire (until section agriculture) to a period of 30 days, while the second part refers to a full quarter. In order to facilitate comparisons those section that only account for 30 days are extrapolated for a three month period as well.

Furthermore there is a lack of important data within the first quarter in the section of agriculture. Therefore, the whole data set referring to agriculture in first quarter is excluded from the calculations. In order to gain comparable results, the values for agriculture of the second quarter are extrapolated for a six month period.

4.4 Definition of the Term "Income"

The term "income" as it is used within this study, refers to the sum of subsistence and commercialization. Subsistence includes all goods that are consumed by the family who produced them. This could be for example the consumption of a chicken or the use of timber for construction purposes within the household. The total net value is calculated by the market price per selling unit multiplied with the amount of units consumed. The value of the subsistence production is added to the "income", because the concerned household does not need to buy the product but saves the costs. The core of this assumption is that it does not matter, whether the family consumed the product produced or whether it is sold. Additionally, the real monetary revenue from sales is part of the "income". This means that the "income" is the product of all monetary revenues plus the value of the products used for consumption.

5 Results

5.1 Income Structure of Small Scale Farmers in Morona Santiago

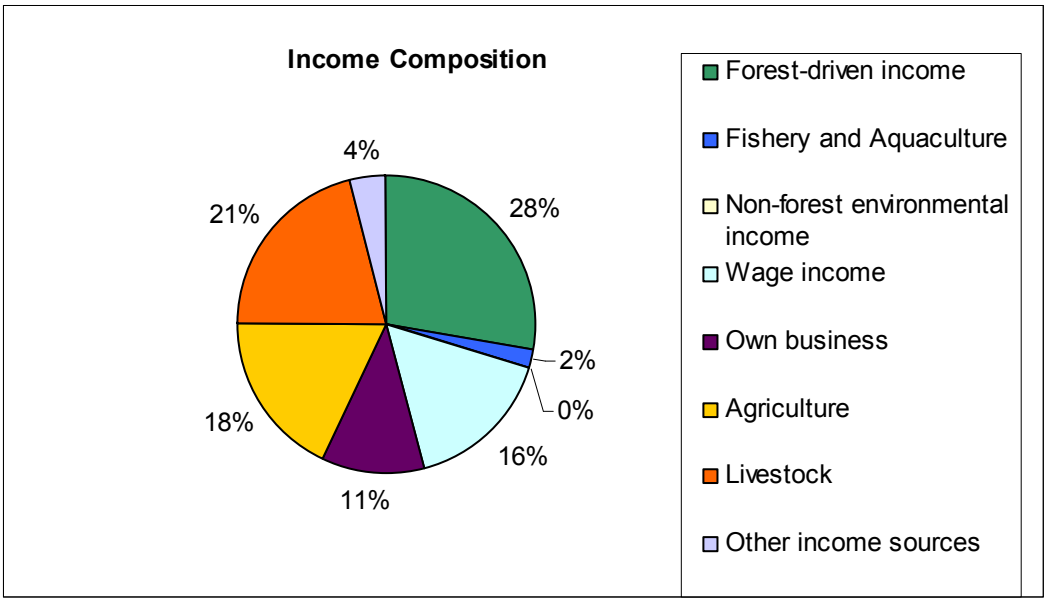


Diagram 1: Composition of income sources of rural households

Income Composition	Net Income US$
Forest-driven income	1459,57
Fishery and Aquaculture	97,34
Non-forest environmental income	0,30
Wage income	837,02
Own business	590,04
Agriculture	944,79
Livestock	1108,49
Other income sources	201,38
Total	**5238,93**

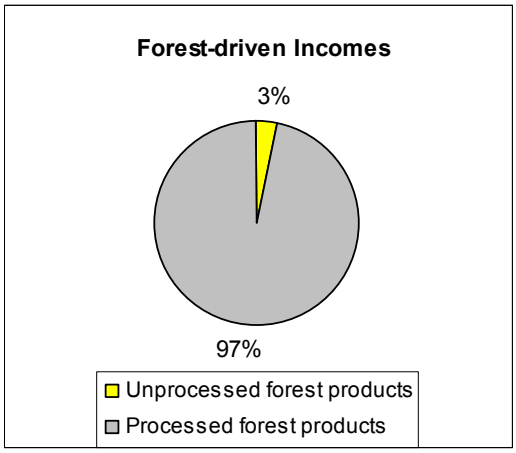
Table 1: Net average incomes of a rural household within one year in US Dollar

As can be learned from diagram 1, the main income source of small scale farmers surveyed within PEN in Morona Santiago is forestry (28%). Further important income sources are livestock (21%%), followed by incomes from agriculture (18%) wage incomes (16%) and incomes from own business (11%). Sources of minor importance are other income sources (4%) and fishery and aquaculture (2%). Nearly of no importance are non-forest environmental incomes.

Referring to table 1, the average total income of a rural household in Morona Santigo in one year is 5238,93 US$.

A detailed analysis of the different income sources is subject of the following chapters, in order to enhance comprehension of the total income composition.

5.1.1 Forest-driven Incomes



Forest-driven Incomes	Net incomes US$
Unprocessed forest products	49,96
Processed forest products	1409,61

Table 4: Net average value of unprocessed and processed forest products in US$ within one year

Diagram 4: Proportions of incomes from unprocessed and processed forest products within six month

Providing an average annual income of 1459,57 US$ to the small scale farmer, forest-driven incomes represent the base of livelihood in the rural areas of Morona Santiago. The proportional share of forest incomes on the total income composition amounts to 28%. When taking into account the whole forestry sector and all activities connected to it, the sum would be far higher than the value stated within this study. This is due to the fact, that the forest sector creates employments like those of saw men or joiners. Moreover, carpentry and other forest based businesses were counted to incomes from own business within this study, whereas they are actually closely linked to the forestry sector. Consequently one could assume that the forest sector is of higher importance than the results display.

Tree species of economic interest in the Amazon region are Dacryodes peruviana, Ocotea sp./ Nectandra sp., Cedrelinga cateniformis and Otoba sp. All together these species account for 63% of all economically valuable tree species (Gatter and Romero 2005)

The economic profits of the small scale farmer gained from forestry are determined by the market prices for selling unit, distance to road, minus the costs for sawing and transport of timber (Gatter and Romero 2005). Within the PEN investigation the sector forest-driven incomes was divided into incomes from processed forest products and unprocessed forest products. The last one only accounts for 3% of the total net income drawn from forest products, while processed forest products are of much greater value accounting for 97% of the total net income from forests. Forest products are mainly planks, called “tablas” and “tablones”, which are chunky sawn and of different thickness. Thicker planks value about 2 US$, while thinner ones are sold for about 0.80

US$ each. Prices depend as well on specie and quality of the wood. The planks are sold on the nearest place reachable for middlemen with their trucks.

Apart from processed and unprocessed forest products, forests provide additional benefits like land on which to grow crops, construction materials, game, wild fruit, fuel wood and traditional medicines. Moreover it is of cultural value especially for the indigenous population. Therefore rural households rely heavily on the forests for livelihood. Hence, the decline of the forest cover due to deforestation can have serious consequences for the living conditions of the rural families, as it leads to shortages of food and construction and fuel materials and endangers the most important income source of the rural population. However, in Ecuador, deforestation is taking place at a fast rate as a result of forest frontier expansion and colonization as well as due to the dependence of local forest smallholders on the forest resources and the absence of income alternatives. The problem is increased by the lack of effective promotion of sustainable forest management practices among forest smallholders and the wood industry, a weak public forest administration and the absence of an efficient forest control and verification system (Ham 2006). The high amount of illegally extracted timber exacerbates the situation.

5.1.2 Livestock

5.1.2.1 Analysis of Animal Species Composition

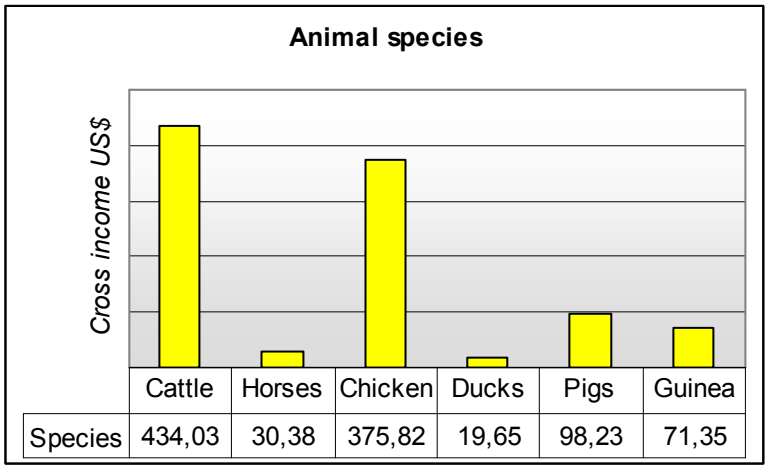


Diagram 2: Average gross incomes from animal species in a rural household within one year

Accounting for 21% of all incomes within rural households, livestock is the second most important income source. It adds up annually 1108,49 US$ to the livelihood of small scale farmers in the Ecuadorian Amazon.

The high income rates supplied by livestock confirm its rising importance in the province of Morona Santiago, which is as well lined out by the ministry within its

development plan for 2006-2010 (Plan Estratégico y Participativo para el Desarrollo Sustenable de la Provincia de Morona Santiago). Traditional animal species are pigs, horses, sheep and guinea pigs. However, nowadays the animal specie with the highest economic importance is cattle, accounting for 434,03 US$ annually. About 229.200 cows were counted by the ministry within the third statistical census. The most important cattle species are those that can be used multipurposely, witch means, they serve as sources for milk as well as for flesh. In whole Morona Santiago about 105.000 liters of milk are produced every day, which are either directly consumed by the producing families themselves, sold on local markets or processed further into products like cheese or butter (Reinoso 2006). Cattle and its products perform an important part of people's nutrition in Morona Santiago.

The commercialization of milk depends on sufficient infrastructure, because fresh products require quick transportation (Kautz 2004). Cattle bring in high prices on markets; an adult cow values about 200 US$. This means that cattle play an enormous role with regard to economic security and risk avoidance, as it serves as an indirect financial investment, which can easily be transformed into monetary value when needed. However, the output of selling cattle depends on sufficient infrastructure, too. If transport ways are long and middlemen are needed, the economic output for the local farmer can be low. Moreover, demands and prices declined in recent times, because national consumption needs are supplied to great parts by cheaper import products (Kautz 2004). Nevertheless, this does not seem to have any impact on the rising number of cattle breeders within the province. The number of cattle and their net value in US$ was very stable during the six month period investigated within PEN.

The second most important livestock specie is chicken accounting for an income of 375,82 US$ within one year. Chicken supply eggs and white flesh, while their breeding is fairly easy and inexpensive. About 188.000 eggs are produced weekly in the rural areas of Morona Santiago. Transportation of living animals, flesh or eggs is uncomplicated as well, due to the small size of the animals and their products (Kautz 2004).

Pigs add up another 98,23 US$ to the total annual income. Due to their size their transportation requires sufficient infrastructure. They are a valuable source of flesh but do not provide many additional services.

Additionally, guinea pigs are of some importance. They provide 71,35 US$ to the small scale farmer within one year. Fried guinea pig is regarded as a traditional delicacy

especially in Colono households. This custom still seems to endure, as the net value for guinea pigs can be regarded as rather stable with the first and second quarter of survey.
Sheep and goats are of nearly no importance, despite of being traditional breeds.
Furthermore horses and ducks supply 30,38US$ or respectively 19,65US$ to the annual family income. Horses have a relatively high economic value. Prices for adult horses amount to 150 US$. They are of minor importance with regard to flesh supply but facilitate transportation of people and products. Moreover, they are of great help with regard to the extraction of wood from the forest. Ducks supply white flesh but are generally kept with lower frequency within the rural communities.
Moreover, sheep and goats are very suitable with respect to sustainable management of ecologically sensitive areas. While farmers mentioned their breeding in the first part of the survey, they seemed to have disappeared within the second.

5.1.2.2 Analysis of Animal Products

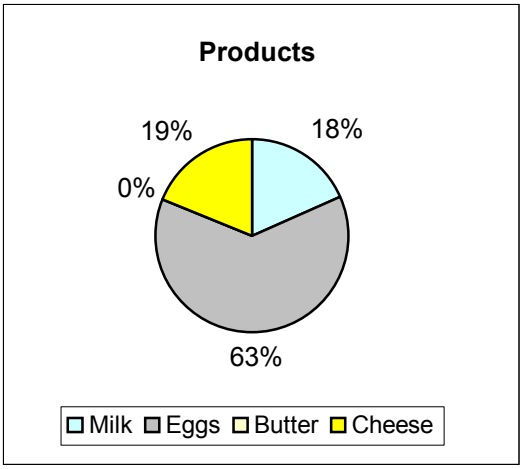


Diagram 3: Proportions of animal products

Products	Total Value US$
Milk	24,42
Eggs	84,21
Butter	0,08
Cheese	25,25
Total	**133,95**

Table 3: Total average value of animal products within the rural household in US$

The most important animal product is eggs. Their value account for 63% of the total value of animal products produced within one year. All other products that account for the left 37% total value are supplied by cattle (cheese 19%, milk 18%, butter). Remarkably, flesh does not play any role within the list of animal products.
The analysis of animal products underlines the conclusions drawn in chapter 5.1.1.1., as it can be clearly seen, that cattle and chicken are the most important income sources within livestock for rural households observed within PEN.

5.1.3 Agriculture

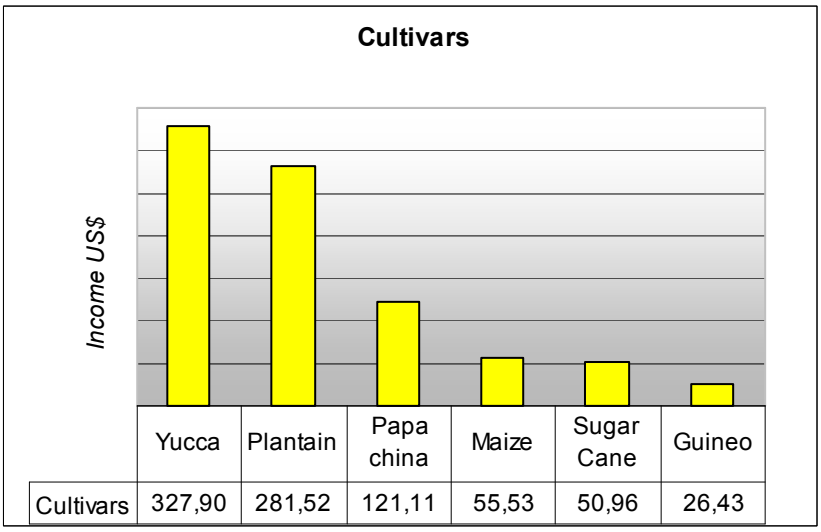


Diagram 5: Total average values of the main cultivars grown by a rural household within one year

Incomes from agricultural activities amount to 18% of the total income of rural households investigated. The main cultivars are yucca (327,90 US$), plantain (281,52 US$), papa china (121,11 US$), maize (55,53 US$), sugar cane (50,96 US$), and guineo (26,43 US$). Beside those main cultivars pelma, camote, onion and papaya are cultivated. In total agriculture supplies 944,79 US$ to the annual income.

5.1.4 Wage Incomes

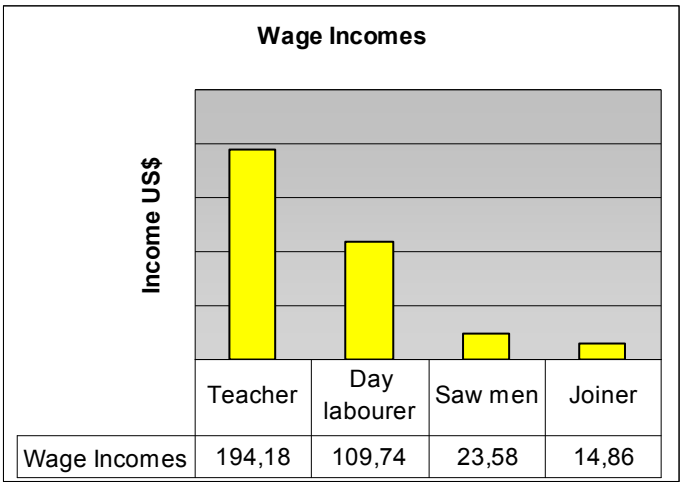


Diagram 6: Main types of average wage incomes in US$ within one year

Wage incomes make up 16% of the total income gained by the investigated families. The main economic contribution to the family income are supplied by household members who are teachers (194,18 US$), day labourers (109,74 US$), saw men (23,58 US$) and joiners (14,86 US$). However this does not necessarily reflect the most frequented employments. The salary of a joiner is by far lower than this of a teacher for example. The main wage activity is day labourer. While in the first quarter many persons called their employment day labourer, they seemed to differentiate this a little bit more within the inquiry of the second quarter, where much more different types of work were recorded. Besides the four professions described, the list of employments includes as

well: concierge, construction worker, cook, engineer, factory worker, herdsmen, mason, nurse, nursery teacher, parish council, secretary, stockbreeder, and watchmen. In total wage incomes contribute 837,02 US$ annually to the rural households.

5.1.5 Own Business

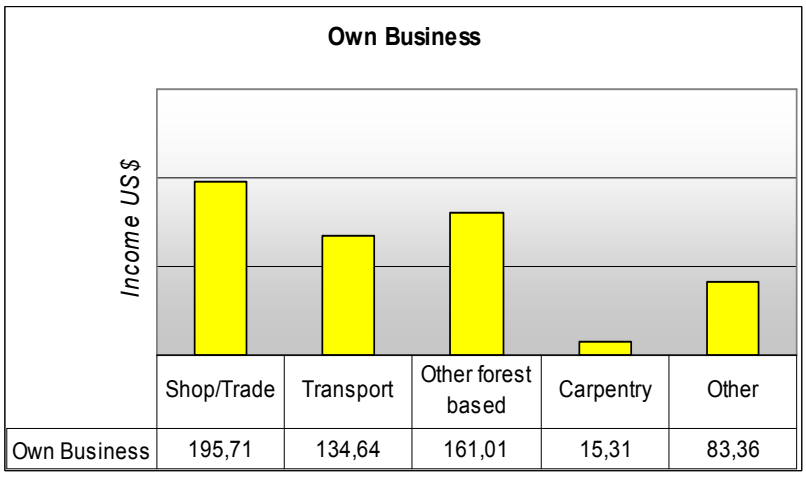


Diagram 7: Average incomes from own business in US$ within one year

Own businesses account for 11% of the total income. The main types of own business are shops or trade (195,71 US$), carpentries (15,31 US$) and other forest based activities (161,01 US$), and transport services (134,64 US$). Besides those categories, other types of own businesses are: running of a public telephone, provision of natural medicine, radio engineering, renting of horses and stockbreeding. All together those other own businesses averagely supply 590,04 US$ to the rural households within one year.

5.1.6 Other Income Sources

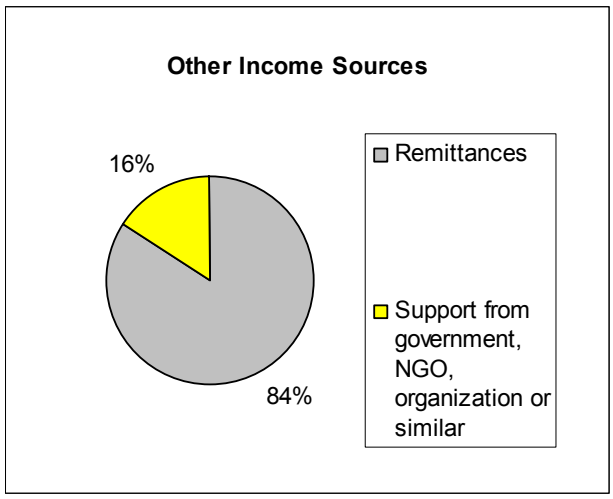


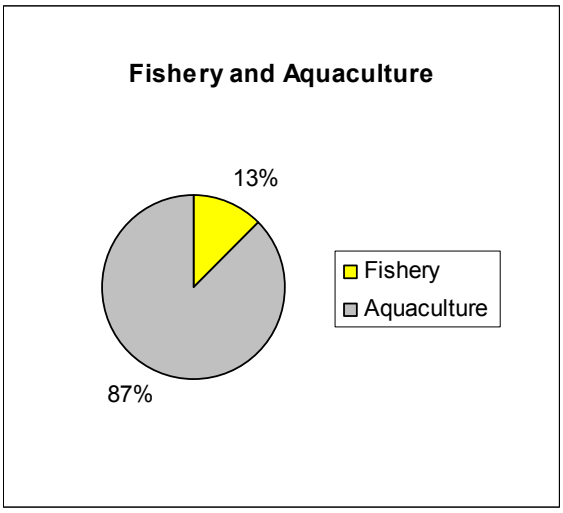
Diagram 8: Percentages of the main other income sources

Other Income Sources	Net Value US$
Remittances	**167,70**
Support from government, NGO, organization or similar	**31,66**

Table 8: Average net value of main other income sources in US$ gained within one year

Other income sources account for 4% of the total income. The two main sources of additional income are remittances (84%) and financial support from government, NGO, organization or similar (16%). Both values declined within the second quarter. Nevertheless, especially remittances add some income to the rural households. All together other income sources contribute 201,38 US$ annually. It seems that the willingness to immigrate in order to supply the family in Ecuador with remittances is far higher within the urban population. However, the trend might rise within the rural population as well during the upcoming years.

5.1.7 Fishery and Aquaculture



Fishery and Aquaculture	Net Value US$
Fishery	5,8
Aquaculture	67,32

Table 9: Average net value of fishery and aquaculture in US$ within one year

Diagram 9: Proportions of fishery and aquaculture on the total income

Fishery and aquaculture play a minor role with regard to the total family income. Together they account for 2% of the total income.

The term “fishery” considers only those fishing activities that account for fish exclusively caught from the wild (rivers, lake, and sea). Fishery contributes the minor part (13%) of the total income gathered within this sector. Aquaculture depends on ponds and accounts for the main part (87%) of all incomes gained within this sector. During the second quarter incomes from fishery declined a little, while those from aquaculture rose significantly. In total 201,38 US$ are supplied

5.1.8 Non-Forest Environmental Incomes

Incomes from non-forest environmental sources are of rather no importance and therefore not treated further within this study. The only products mentioned were leaves and palmito.

5.2 Influence of Ethnical Affiliation on Income Structure

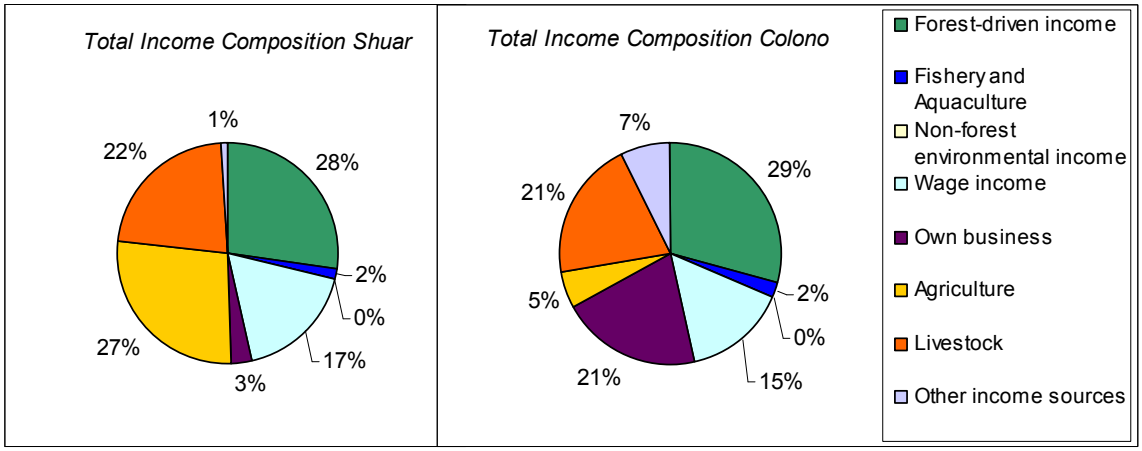
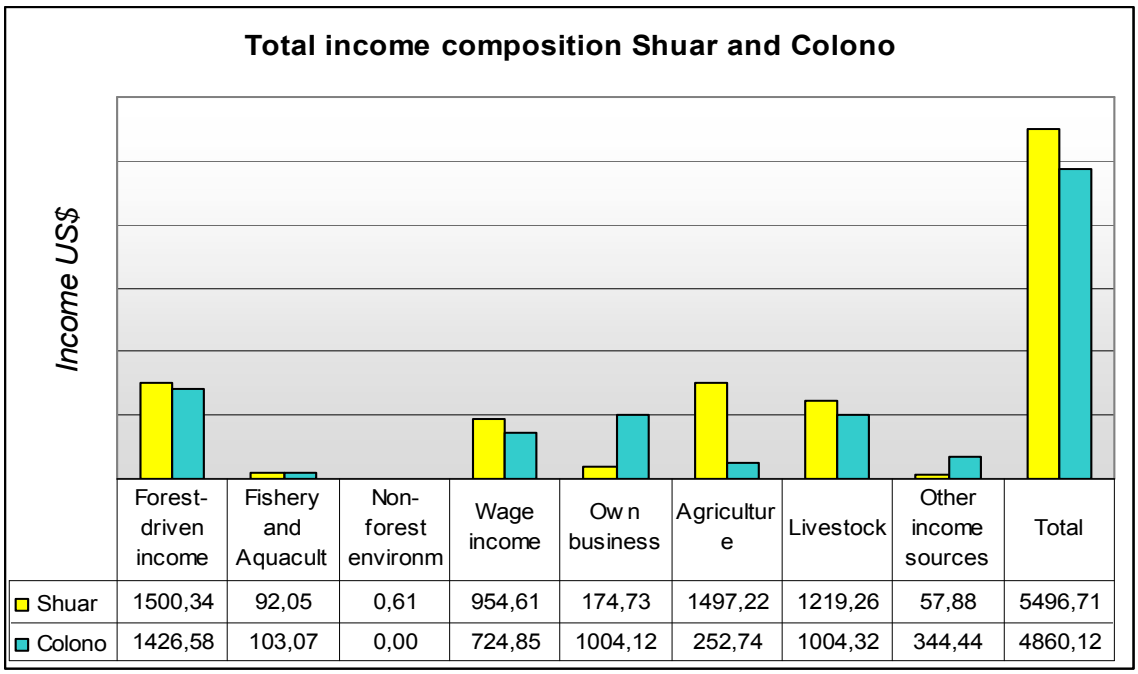


Diagram 10: Total income compositions of Shuar and Colonos



	Forest-driven income	Fishery and Aquacult	Non-forest environm	Wage income	Own business	Agriculture	Livestock	Other income sources	Total
Shuar	1500,34	92,05	0,61	954,61	174,73	1497,22	1219,26	57,88	5496,71
Colono	1426,58	103,07	0,00	724,85	1004,12	252,74	1004,32	344,44	4860,12

Diagram 11: Average net income composition of Shuar and Colonos within one year

The income structure and the total amount of income of all rural households investigated by PEN depend up to some extent on the ethnical affiliation of the families. The income composition distinguishes with regard to the importance of the different income sources. To give an example agriculture plays an important role for Shuar families, while it is of minor importance for Colono households (compare diagram 10+11). The total amount of income differs as well. The average annual income of a Shuar family amounts to 5496,71 US$, while Colonos have to make a living on 4860,12 US$.

5.2.1 Influence on Forest-driven Incomes

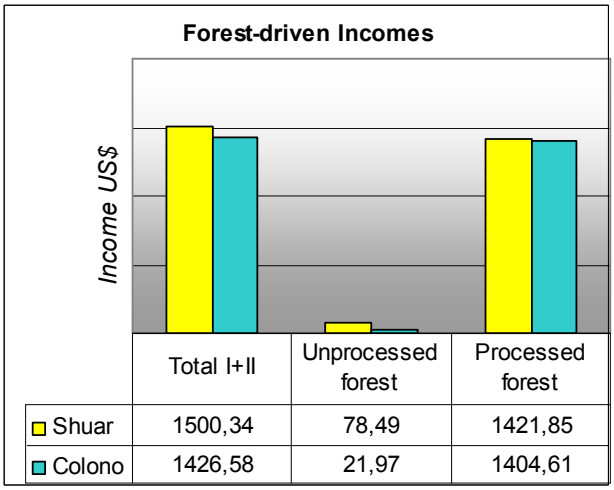


Diagram 12: Average values of forest-driven incomes within one year analysed with respect to ethnical affiliation

The contribution of forest-driven incomes to Colono and Shuar household incomes is very similar. The average Shuar household gains 1500,34 US$ in one year, while a typical Colono family gains 1426,58 US$. Nevertheless, forest-driven incomes make up a little higher proportion with respect to the composition of the total Colono income (29%) than to the composition of the total Shuar income (28%).

Unprocessed forest products are more popular within the Shuar population (78,49 US$ per household) than within the Colonos (21,97 US$). The values for processed products are similar (Shuar 1421,85 US$, Colono 1404,61 US$). However, the differences within the two population groups with respect to forest-driven incomes are not very significant. This result is amazing, as the Shuar are commonly regarded as very dependent on forest resources, due to their traditional background. The data gained by PEN shows, that dependence might have changed within time and that forest-driven incomes might have been replaced by other activities such as livestock or agriculture.

5.2.2 Influence on Livestock

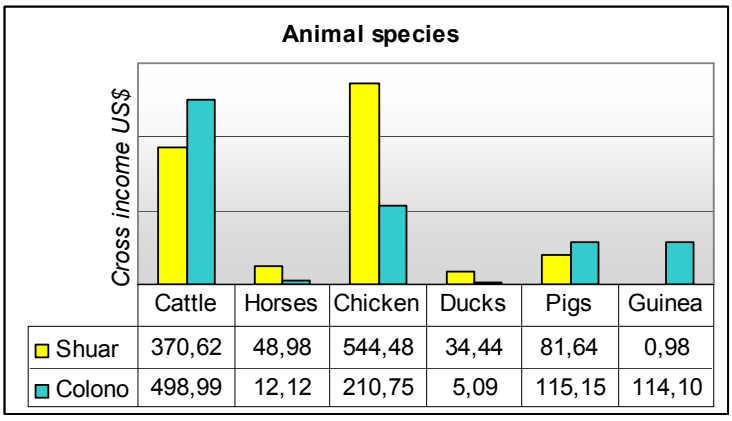


Diagram 13: Cross average annual incomes from livestock kept by Shuar and Colonos

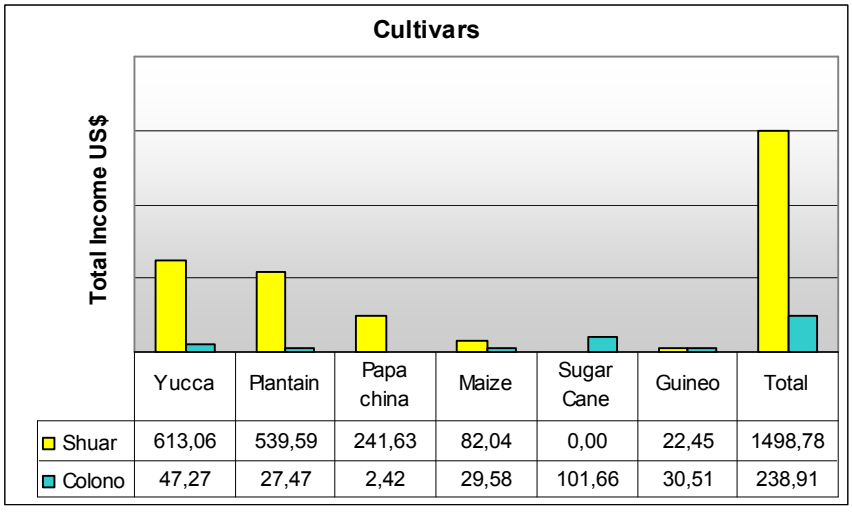
The amount of income from livestock amounts to 1219,26 US$ within an average Shuar household and respectively to 1004,32 US$ within a Colono household. Referring to the percentages of livestock with respect to the total income contribution, livestock accounts for 22% in Shuar households and

21% in Colono households. Again the difference within the two ethnical groups is not very significant. It is however remarkable, that the income of Shuar from livestock is slightly higher than this of Colonos, as Shuar do not breed high numbers of livestock traditionally. This might be a result of the higher investments, Colono families boast within livestock in relation to the very low coasts that Shuar households evince. As the costs are subtracted from the cross income value in order to calculate the net income, the resulting values do not necessary reflect the original income situation, where Colonos gained more income from livestock than Shuar. The higher cost might be explained by the preference of Colonos for cattle breeding, while Shuar are specialized in chicken. Whereas cattle require higher investments e.g. for fodder or veterinary coasts, the husbandry of chicken is comparatively cheap. Moreover, the income from livestock is the product of incomes from commercialization (selling of an animal) and subsistence (the family consumes the animal). As the flesh production regarding cattle is of minor importance and fewer animals are consumed, the value for subsistence is low, while it is rather high with respect to chicken.

Furthermore a significant difference can be observed with respect to guinea pigs. They are traditionally kept by Colonos. This custom was only partly adopted by the Shuar, which is proved by the very distinct incomes from guinea pig within the two population groups.

Pigs add up another 81,64 US$ to Shuar households and 115,15 US$ to Colono families. This means, that Colonos receive some more income from pigs than Shuar generally do. Therefore, Shuar gain more incomes from horses than Colonos generally do. Horses are not consumed but provide valuable aid with regard to the extraction of wood. Ducks are nearly only kept by Shuar, where they conctribute 34,44 US$, whereas they are of few importance for the Colono livelihood (5,09 US$).

5.2.3 Influence on Agriculture



	Yucca	Plantain	Papa china	Maize	Sugar Cane	Guineo	Total
Shuar	613,06	539,59	241,63	82,04	0,00	22,45	1498,78
Colono	47,27	27,47	2,42	29,58	101,66	30,51	238,91

Diagram 14: Main cultivars cultivated by Shuar and Colonos within one year

With respect to agriculture the two population groups differ significantly. While agriculture is the second most important income source for Shuar households, where it constitutes 27% of all incomes, it is of minor importance for Colonos (5%). As well preferences for cultivars differ within Shuar and Colonos. While yucca, plantain, papa china and maize are mainly cultivated by Shuar, sugar cane is only cultivated by Colonos. Guinero is cultivated by both population groups. It can be assumed, that the most important cultivars for the Shuar population are yucca and plantain, contributing 613,06US$ and respectively 539,59US$ to the annual income, whereas sugar cane is the most important cultivar for Colonos, adding 101,66 US$ to the annual income.

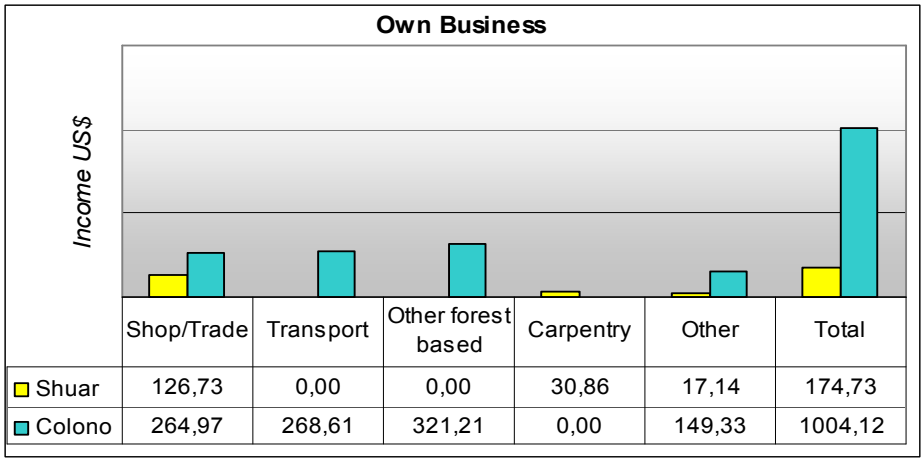
5.2.4 Influence on Wage Income

	Teacher	Day labourer	Saw men	Joiner
Shuar	535,59	96,00	48,98	32,69
Colono	50,91	233,33	94,06	0,00

Diagram 15: Average incomes by main professions of Shuar and Colonos within one year

Shuar families gain more income from wages (954,61US$), than Colonos (724,85 US$). When considering the main professions, significant differences can be observed. The profession of a teacher, which is the one with the highest salary per month, is mainly fulfilled by Shuar. The average Shuar household gather 535,95 US$ within one year, while Colonos only gain 50,91 US$ from this type of profession. While Colonos gain less by teaching employments, they earn more by day labourer activities (233,33 US$), than Shuar generally do (96 US$). Moreover, Colonos gain about the double (94,06 US$) by saw men employments than the average Shuar family (48,96 US$). Nevertheless, Shuar gather higher incomes by joiner employments, while this type of profession seems not applicable for Colonos. From these results it can be concluded, that Shuar generally fulfil professions where higher education levels are required. Furthermore, it is remarkable, that the average Shuar family has a higher total income by wages than a Colono family, which can as well be driven from the fact, that Shuar fulfil professions with higher daily/monthly salaries.

5.2.5 Influence on Own business

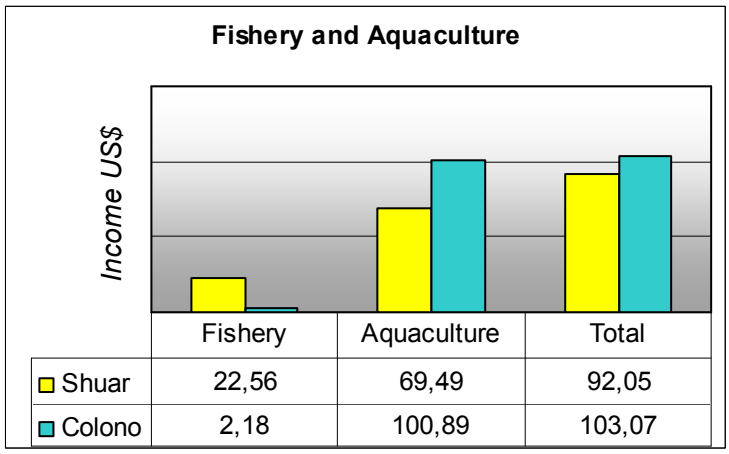


	Shop/Trade	Transport	Other forest based	Carpentry	Other	Total
Shuar	126,73	0,00	0,00	30,86	17,14	174,73
Colono	264,97	268,61	321,21	0,00	149,33	1004,12

Diagram 16: Incomes in US$ from main types of own businesses within one year, with respect to the ethnical affiliation

With regard to incomes from own businesses, the income rates of an average Colono household (1004,12 US$) are far higher than those of a Shuar household (174,73 US$). While for a Colono family incomes from own business are equally important like incomes from livestock, they are of low importance for Shuar households. While Colonos gain averagely 321,21 US$ from other forest activities and transport services, Shuar do not participate in this kind of business. Shops and trade (Colono 264,97 US$) as well as other income sources (149,33 US$) add a significant part to the average Colono household income. Shuar gain about half of this amount from shops and trade (126,73 US$) and only 17,14 US$ from other types of business. The only kind of business that is more commonly within Shuar (30,86 US$) than Colonos, is carpentry. With respect to the total amount of income gained within the sector own businesses, Colonos obviously dominate.

5.2.6 Influence on Fishery and Aquaculture

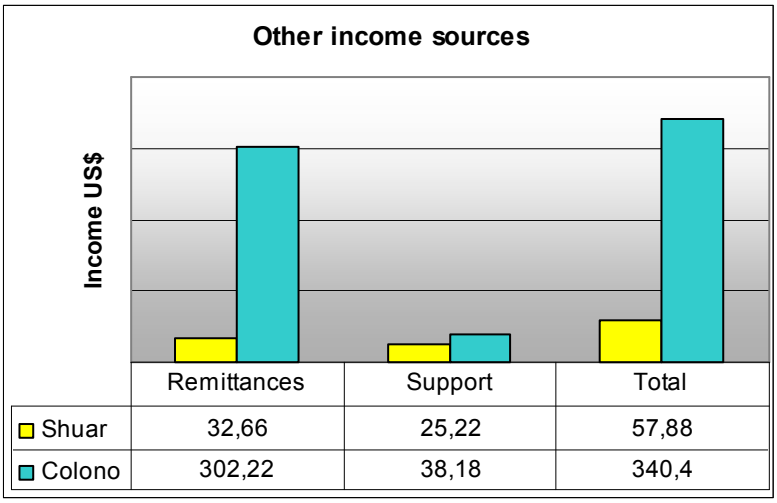


	Fishery	Aquaculture	Total
Shuar	22,56	69,49	92,05
Colono	2,18	100,89	103,07

Diagram 17: Average incomes from fishery and aquaculture in US$ within one year, separated by ethnical affiliation

Fishery and aquaculture seem not to depend on the ethnical affiliation as the contribution in both cases is only 2% (Shuar 92,05 US$ total, Colono 103,07 US$ total) Nevertheless a distinction can be made with respect to the two subdivisions fishery and aquaculture. While Shuar gain more fish from the wild (22,65 US$) than the average Colono family (2,18 US$), the opposite applies for aquaculture, where the average Shuar family gains less (69,49 US%) than a Colono family (100,89 US$).

5.2.7 Influence on Other Income Sources



	Remittances	Support	Total
Shuar	32,66	25,22	57,88
Colono	302,22	38,18	340,4

Diagram 18: Remittances and support from government, NGO, organization or similar in US$ within one year separated by ethnical affiliation

Incomes from other income sources (remittances and support from government, NGO, organization or similar) are clearly dependent on ethnical affiliation. While other sources contribute noteworthy 340,40 US$ to the income of the average Colono household, only 57,88 US$ are supplied to Shuar households. Especially with regard to remittances, the differences are obvious. While a Colono family obtains 302,22 US$ from relatives in foreign countries, Shuar only gain 32,66 US$ within one year. The results show, that immigration is more common within Colono families than within Shuar, which might be more enrooted within their homeland.

With regard to support from government, NGO, organization or similar both groups are supplied with a similar amount (Shuar 25,22 US$, Colono 38,18 US$), nevertheless, Colonos obtain a little more.

5.2.8 Influence on Non-forest Environmental Incomes

Non-forest environmental incomes are of nearly no importance for both groups.

However, the only surplus within this part was mentioned by a Shuar household.

5.3 Production for Subsistence and Commercialization

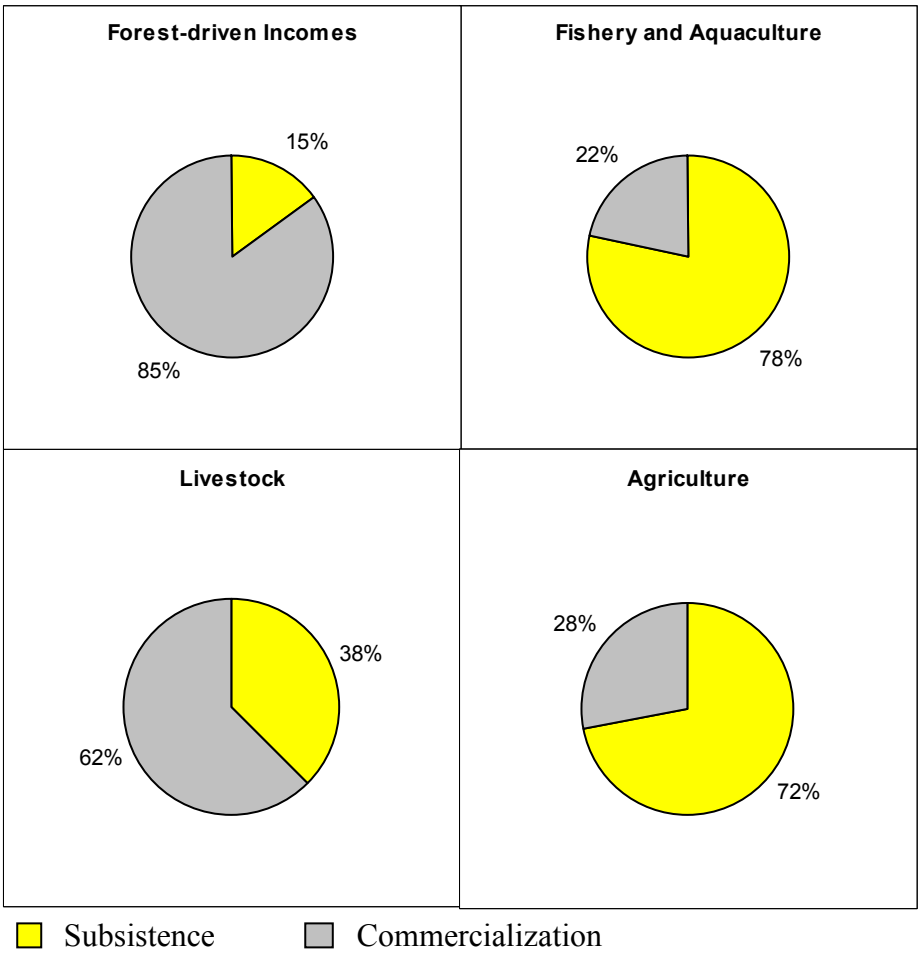


Diagram 19: Comparison of subsistence production versus production for commercialization purposes within six month

From diagram 19 can be learned, that subsistence production and production for commercialization purposes vary greatly within the different sectors. 85% of the forest products production is sold on local markets. As well the livestock sector is subject to trade (62% commercialization). However, the proportion of subsistence production is higher with regard to agriculture (78% subsistence), and fishery and aquaculture (72% subsistence).

These results are especially remarkable when considering the composition of the main income sources (compare diagram 1). Forest-driven incomes (29%) and livestock (21%) account for the main part of the total income of rural households in Morona Santiago. It can be concluded, that rural households gain the highest incomes from those sectors (forestry, livestock), where the proportion of production for commercialization is high.

5.4 Influence of Ethnical Affiliation on Production for Subsistence and Commercialization

5.4.1 Influence on Forest-driven Incomes

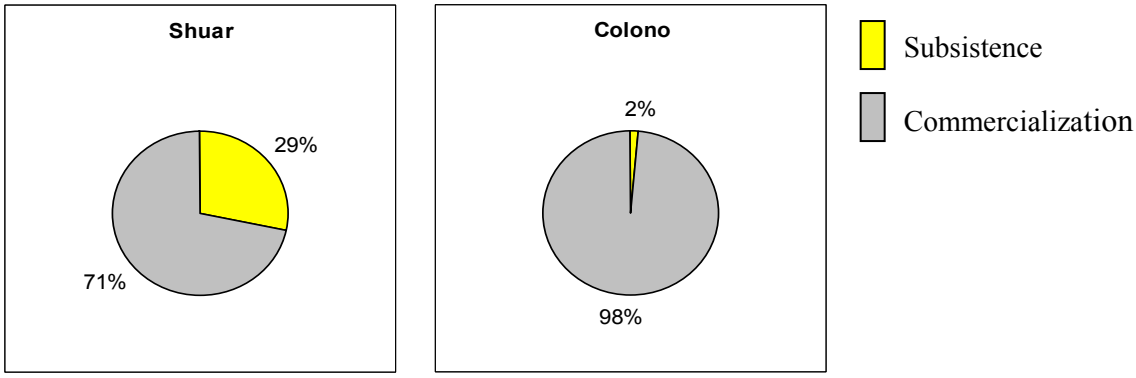


Diagram 20: Influence of ethnical affiliation on subsistence production and production for commercialization purposes within forest-driven incomes

The proportion of commercialization is very high within the forest sector (85% in total). This fact accounts for both population groups, Shuar and Colonos. Nevertheless, the proportion of subsistence production is still 29% within the Shuar households, while it is only 2% in Colono households. The proportion of subsistence production within the Shuar population seems to be very high. It is not quite clear, in which way the extracted forest products are used within the households. It is possible, that the values do not absolutely congruent with the reality.

5.4.2 Influence on Fishery and Aquaculture

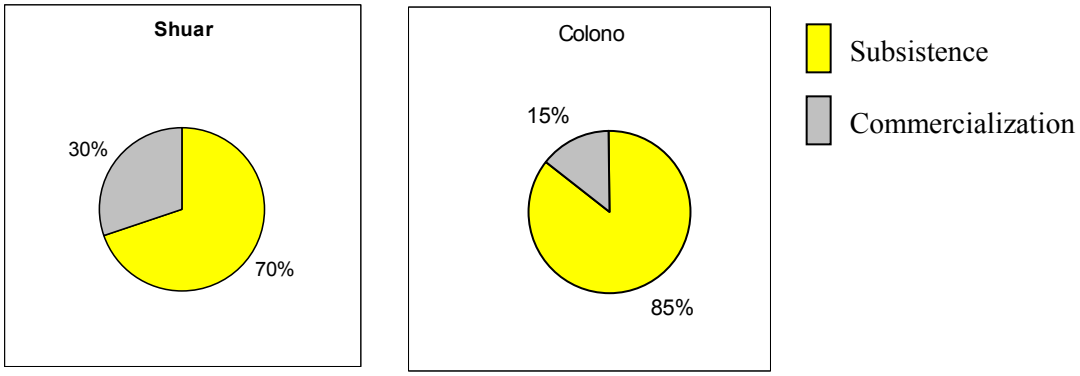


Diagram 21: Influence of ethnical affiliation on subsistence production and production for commercialization purposes within fishery and aquaculture

There can be seen some influence of the ethnical affiliation on subsistence production and production for commercialization purposes within fishery and aquaculture as well. While Shuar gain 30% income by selling fish, Colonos only gain 15% income by trading activities within this sector. Nonetheless, the sector in general is of minor

importance with regard to the total income composition, as it only accounts for 2% of the total household income in both cases. However, fish can be regarded as a valuable source of protein within the daily nutrition. It seems that Colono families consume more fish than Shuar, which is confirmed in diagram 16.

5.4.3 Influence on Livestock

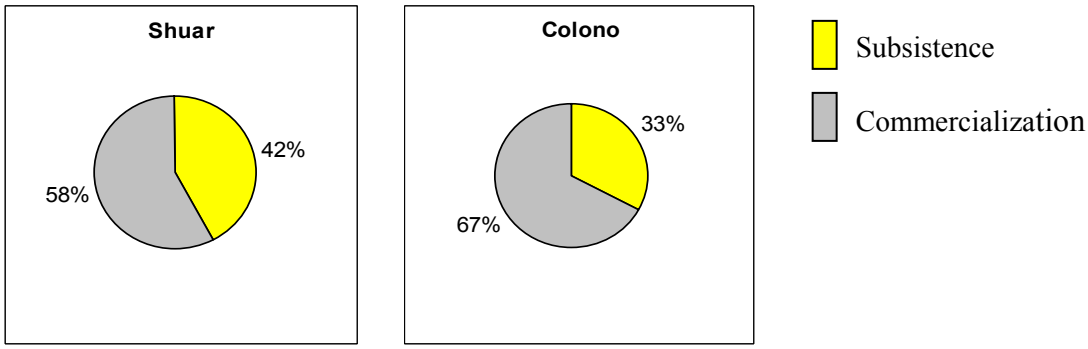


Diagram 22: Influence of ethnical affiliation on subsistence production and production for commercialization purposes within livestock

The percentage of production for commercialization is generally high within the livestock sector (62%). However, it can be seen in diagram 22 that the percentages for Colono families (67% commercialization) are somewhat higher than for Shuar families (58% commercialization).

5.4.4 Influence on Agriculture

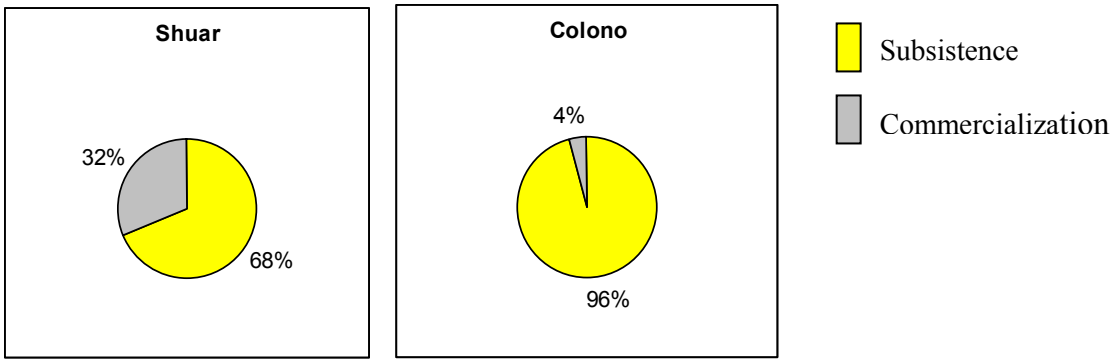


Diagram 23: Influence of ethnical affiliation on subsistence production and production for commercialization purposes within agriculture; own elaboration

Within the agriculture sector, significant differences between the two population groups can be observed. While Shuar gain 32% by commercialization of agricultural products, Colono only gain 4% by trade. These results again correspond with the total income values. While Shuar obtain 27% of their total income within the agricultural sector, it is of minor importance (5%) for Colono families.

6 Conclusions

Summing up the results lined out in the previous chapters, it can be assumed, that the main income source of rural households investigated within PEN in the six month survey period is forestry. Moreover, it can be concluded, that the ethnical affiliation has some influence on the income composition of Shuar and Colonos. Furthermore, rural households gain the highest incomes from those sectors (forestry, livestock), where the proportion of production for commercialization is high. It can be assumed, that the ethnical affiliation has as well some influence on the proportions of subsistence production and production for commercialization. This influence is more obvious with regard to the different income sectors (livestock, forestry, agriculture, fishery and aquaculture) than within the total proportions of production for subsistence and commercialization, in which the two groups show off similar results.

Referring to the proportion of forest-dependent income in relation to the total Shuar household income, it can be concluded, that the assumption referring to the indigenous population as more forest dependent, is not necessarily right and has to be revised. The difference between Colonos and Shuar with respect to the total incomes gained from forestry amounts to 1% only. It seems that land use techniques of the indigenous population have changed within time and were strongly influenced by the introduction of livestock breeding. Due to the conversion of forests into agricultural land and pastures, the forest cover declined strongly during the last century which might be another reason for the sinking importance of forest as main income source. Today, forest-driven incomes account for 28% of the total income of Shuar, while agriculture (27%) and livestock (22%) have become important income sources as well. Nevertheless, forests still remain the most important income source. In reality the contribution of the whole forestry sector is far higher, than only the values for forest products that had been the basis for the calculation of forest-driven incomes in this study. Consequently one could assume that forestry will remain the main income source of the rural population.

However, during the interviews it was not considered, whether the extraction of wood adding to the rural households income, was done illegal or within the legal frameworks, respectively the forest management programs aligned by the state. It seems that the forest management programs that provide the management criteria for sustainable forest management are in most cases not applied by the rural households. This is due to a lack

of knowledge, insufficient technical assistance in forest management, lack of reforestation programs, insufficient support of alternative income sources, and unrealistic regulations. Illegal logging therefore remains a problem in the province of Morona Santiago (Ham 2006). A great part of the illegally extracted wood is not used in the households (15%), but sold on the markets (85%). Sustainable forestry seems less lucrative to the small scale farmers. Financial incentives promoting sustainable forestry could make a valuable contribution to conserving the remaining forests, while at the same time supporting the livelihood of the rural population.

According to the conclusions drawn in chapter 5.3, it should be lined out again, that the two sectors forestry and livestock have the highest potentials to economically support rural households. The results display a connection between the high rates of production for commercialization and the high income rates obtained in these sectors. An improved infrastructure and enhanced access to economic resources enabling investments could help to increase incomes from commercialization.

However, especially activities based on forest exploitation and livestock breeding are likely to be harmful to local ecosystems and therefore often unsustainable. Deforestation has already destroyed a significant part of the Amazon rainforest. An increased exploitation could have dramatic consequences for the environment which though is the base for all income generating activities contributing to the livelihood of both population groups, Shuar and Colonos. Nevertheless, the rural population has fairly low options for alternative income generating activities. In order to make use of the economical potential forestry, livestock and agriculture provide to the rural households and encourage sustainable land use at the same time, there is a vast need for technical assistance in sustainable resource management. Therefore it is absolutely recommendable to support local NGOs, operating in the field of sustainable land use. Until today the impact of these organizations is not very high as they do not reach all rural households in the Amazon. Many smallholders do not receive any type of resource management support from organizations yet (Ham 2006). Therefore, the impact of local NGOs has to be strengthened, in order to conserve the ecosystem and enhance peoples living conditions at once.

The results show differences between the two population groups, Shuar and Colonos. While both gather their main income from forestry, the income composition varies strongly with regard to agriculture and incomes from own business. The average Shuar household has a slightly higher income than the average Colono household. On the

other hand, Shuar families have generally more children, therefore the amount of income per head is smaller that within the Colono families.

Taking into account the differences, it is obvious, that a specific treatment of the two groups within the rural development plans is required. Nevertheless, it is remarkable, that the differences are not as severe as often assumed. It seems that the living conditions in rural areas do not provide many options for distinguished land use forms but both populations have to make a living from the available resources. The results give the impression that the previous differences between the two ethnics declined to some extend. Today both live in the same environment and adapted to the new circumstances. However, within this survey only those communities were queried that are easily accessible. It is very certain, that the indigenous population not living as close to the main roads as the investigated communities and who lives in a more traditional way evinces a very distinct income structure. As the proportion of Shuar who do not live close to the roads is significantly high, the study can not claim to be representative for the whole Shuar population. As there is a higher amount of Shuar who does not live close to the roads than Colonos, this circumstance might result in more differences regarding the income structure, caused indirectly by the ethnical affiliation

7 Discussion

7.1 Reflection on Research Methodology

7.1.1 Quantitative Research

Quantitative research is the systematic scientific investigation of quantitative properties and phenomena and their relationships. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships.

Quantitative research is doubtless able to provide valuable results, but it has to be appraised critically. One problem of quantitative research is the missing adjustment on the queried person. Every person is requested to answer the same questions but does not necessarily understand them in the same way like other persons interviewed. This means, every queried person has its own interpretation of the questions and will

therefore response in an individual way. This circumstance influences the comparability and the representative character of the results.

Moreover, the selective perception within qualitative research can be problematic. It occurs because only those parameters are measured, that had been determined by items previously. Additionally the observers are not independent in all cases and might therefore influence the results.

Although a distinction is commonly drawn between qualitative and quantitative aspects of scientific investigation, a combination of both approaches can be very fruitful (Brüsemeister 2000). It seems recommendable to complete the quantitative results of the PEN survey by qualitative surveys e.g. of the ForLive project in order to secure their reliability and generate a more complete understanding of the socioeconomic situation in the rural households.

7.1.2 Collection of PEN Data

PEN aims at providing comparable and representative data of high quality. Nevertheless, especially quantitative data collection includes some risks to data quality. This applies as well for the data assembled in Morona Santiago and should therefore be mentioned here.

Collection of PEN data in Morona Santiago was carried out by different interviewers. Every interviewer has its own special way of doing interviews. This can lead to differences within data quality and accuracy. Possibly as a result of this circumstance some inaccurateness occurred within the survey. In some cases not all questions asked for were fully answered and therefore some values, e.g. market prices of animals or cultivars had to be reconstructed on averages calculated on the basis of the available information. Furthermore, important data was missing within the first quarter in the section of agriculture.

Likewise not all small scale farmers could provide full and detailed information on all sections of the questionnaire. Occasionally it was difficult for some of them to estimate every single value correctly. It happened e.g. that not all types of cultivars or animal species present on the farm could as well be completely recorded within the PEN survey, because the farmer would simply forget to mention them.

Furthermore manipulation through suggestions and examples given by the interviewer can not be fully excluded. Occasionally it might have seemed appropriate to the interviewer to ask e.g. for some plant species that had not been mentioned by the farmer yet but seemed very likely to occur on the farm or to give some examples on topics that

were difficult to answer for the farmer. However this kind of help can bias results as it includes suggested points but might excludes those not mentioned.
Moreover, the interviews were done rapidly. It is very improbably, that the interviewer could get a deeper insight into the farm in a very short time span.
Also not all persons interviewed within the first quarterly survey could be interviewed during the second one. In the second quarterly survey three persons are missing, one Colono household of the 5ta.Cooperativa and two Shuar households of Ángel Rubin. This circumstance as well leads to biased results when comparing the total values of the first and the second survey period.
The outcomes of this study could not be discussed and revised with the queried farmers, which might have helped to ensure the correctness and quality of the data. Moreover, the results are not necessarily accessible for the rural households investigated, what impedes feedback.

7.1.3 The PEN Questionnaire

The PEN questionnaire is a deliberately designed tool. However, it might be helpful to revise some of its details in order to enhance data quality and facilitate possessing.
All the income questions refer to a particular time frame: past month (30 days), past 3 months (90 days) or past 12 months (365 days). The quarterly household survey questionnaire which is the central data source of this study refers mainly to incomes within a 30 days time frame. This applies for the sections forest-derived income, fishery and aquaculture, non-forest environmental income, wage income and income from other own business. However, the time frame for all following sections (income from agriculture, income from livestock and other income sources) changes into a 90 days period. This provokes some difficulties. At the one hand it might be difficult for the interviewer and the farmer to change during the interview to a different time frame which might lead to mistakes. On the other hand it complicates data possessing and analysing. It is not possible to directly compare values of all sources of income as they refer to different time frames which would bias the results. Therefore values have to be extrapolated which might lead to incorrect data as one has to assume that income was exactly the same in the following month like in the 30 days period examined within the survey. As it does not become quiet clear why this distinction in 30 and 90 days time frames is necessary it would be recommendable to conform it.
Moreover some difficulties occur with regard to the net value/income calculation. Within the sections agriculture and livestock the costs are gathered in an extra table. On

the one hand this is beneficial because it allows detailed information about the costs character. On the other hand it is difficult to determine the exact proportion of costs for the distinct parts livestock values and livestock services and products. A special problem applying to this study was dividing costs into the sections subsistence and commercialisation. However, it might not be possible for a farmer to exactly distinct the costs for the different sections within agriculture and livestock. Moreover it was not the assigned aim of the PEN questionnaire to enable studies on monetary income (cash) und non-monetary income. The possibility of using the data set for further studies can be regarded as a special value of the PEN survey.

7.2 Reflections on the Definition of "Income"

As explained in the methodology, the term "income" within this study refers to the sum of subsistence and commercialization. It is however questionable, whether one could indeed assume that monetary income can be equated with subsistence production. Generally the term "income" refers to monetary revenues, only. Therefore, some misunderstandings could occur when comparing the values of income from this study with results that do not take into account the subsistence proportion. Moreover, the earnings from sells can be disposed of for what ever the rural household presumes necessary, e.g. expenses for education or health. This is not the case with the "incomes" from subsistence production. The monetary value of products that are directly consumed can not be transformed into other essentials. The value is not freely disposable but bounded to the certain product. Strictly speaking, one could not assume the equality of the both sectors subsistence and commercialization, because only commercialization supplies "real" revenues.

7.3 Refection on the Reliability of the Results

Considering the difficulties lined out in the previous chapters, the reliability of the results should be object of discussion. Due to the obstacles mentioned in the previous chapters, e.g. inaccuracy, missing data, different interview styles, lack of time, manipulation of answers, skeptics of the farmer, difficulties with regard to the understanding of the questions, and the problems quantitative research provides, it is probable, that the results are not fully congruent with the reality in the field.

Despite the selection of the case study area and the interview partners was done carefully, a main criterion was the existing contacts of the communities with SFA and moreover, the accessibility. Therefore the representative character can not be guaranteed for the whole province of Morona Santiago, as for example communities, situated very far from the main road might show distinct income structures.

Furthermore, the data sets were incomplete in some parts. Therefore extrapolations had to be done, in order to obtain comparable results. This can have a biasing influence on the absolute values of the diagrams and lowers the quality of the results.

Moreover, some severe changes from the first to the second quarter were observed. It did not become quite clear, why these changes occurred but they might cause doubts on the reliability of the data.

In addition, quantitative research can only be a momentary record. The results listed in this study do not take into account the broader context of the families investigated. Quantitative recording of data can hardly glimpse behind the storefront, because it is done within short time. Therefore, it can not ensure the correctness of data, because of missing background information. Additionally it might happen, that interview partners distrust in the investigation, as it is not possible, to build up a trustful relationship previous to the interviews. Consequently the farmers might not give correct answers in all cases. On the other hand, this danger could have been defanged a little by the good contacts of SFA with the investigated families.

Despite of the constraints on the reliability of the results mentioned here, the diagrams can display trends. Fortunately, the number of households investigated was quite high. The amount of 197 data sets referring to the income situation of 100 families in Morona Santiago is a good base for quantitative conclusions. Moreover, the interviewers were very reliable, what ensures data quality up to some extent. However, the results presented in this study should not be perceived as fully reliable facts.

The study is only referring to a survey period of six month. It is recommendable to compare the results of the first six month with the full data set of the one year's survey period and as well with other qualitative data samples, that were done in the same research area, in order to examine the reliability and gain a more complete picture of the income structure of small scale farmers in the province of Morona Santiago.

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ATTACHMENTS

ATTACHMENT 1	PEN PROTOTYPE QUESTIONAIRE
ATTACHMENT 2	DATA SHEETS INCOME SOURCES

Quarterly household surveys (Q1-Q4)

Note: All incomes are asked for the past month (past 30 days), except for the last sections on crops, livestock and other income sources where the recall period is 3 months.
Note: The researcher should list the most common products in the various tables, based on RRAs and pre-testing of the questionnaire. After asking about these pre-listed products, the enumerator should ask if there are any other products not mentioned that the household has harvested/collected over the past 1 (3) month(s).

Control information

Task	Date(s)	By who?	Status OK? If not, give comments
Interview			
Checking questionnaire			
Coding questionnaire			
Entering data			
Checking & approving data entry			

A. Identification

1. Identification of the household.

1. Household name and code	*(name)	(HID)
2. Village name and code	*(name)	(VID)
3. District name and code	*(name)	(DID)
4. Name and PID of primary respondent	*(name)	(PID)
5. Name and PID of secondary respondent	*(name)	(PID)

B. Direct forest income (income from unprocessed forest products)

1. What are the quantities and values of raw-material forest products the members of your household collected for both own use and sale over the past month?
Note: Income from plantations is defined as forest income, while agroforestry income is categorized as agric. income (H).
Note: The quantities of unprocessed forest products used as inputs in making processed forest products should only be reported in section C, table 2, and not in the table below.

1. Forest product *(code-product)*	**2. Collected by whom ?[1)]**	**Collected where?**		**5. Quantity collec-ted (7+8)**	**6. Unit**	**7. Own use (incl. gifts)**	**8. Sold (incl. barter)**	**9. Price per unit**	**10. Type of market** *(code-market)*	**11. Gross value (5*9)**	**12. Tran-sport/ marketing costs (total)**	**13. Purch. inputs & hired labour**	**14. Net income (11-12-13)**
		3. Land type *(code-land)*	**4. Ownership** *(code-tenure)*										

1) Codes: 1=only/mainly by wife and adult female household members; 2=both adult males and adult females participate about equally; 3=only/mainly by the husband and adult male household members; 4=only/mainly by girls (<15 years); 5=only/mainly by boys (<15 years); 6=only/mainly by children (<15 years), and boys and girls participate about equally; 7=all members of household participate equally; 8=none of the above alternatives.
Note: Answers in columns 3 and 4 should be consistent with land categories reported in village questionnaire (V1D01) and in the annual household questionnaire (A1C).

C. Forest-derived income (income from processed forest products)

1. What are the quantities and values of processed forest products that the members of your household produced during **the past month?**

1. Product *(code-product)*	**2. Who in the household did the work?[1)]**	**3. Quantity produced (5+6)**	**4. Unit**	**5. Own use (incl. gifts)**	**6. Sold (incl. barter)**	**7. Price per unit**	**8. Type of market** *(code-market*	**9. Gross value (3*7)**	**10. Purch-ased inputs & hired labour**	**11. Trans-port/ marke-ting costs**	**12. Net income excl. costs of forest inputs (9-10-11)**

1) Codes: 1=only/mainly by wife and adult female household members; 2=both adult males and adult females participate about equally; 3=only/mainly by the husband and adult male household members; 4=only/mainly by girls (<15 years); 5=only/mainly by boys (<15 years); 6=only/mainly by children (<15 years), and boys and girls participate about equally; 7=all members of household participate equally; 8=none of the above alternatives.

2. What are the quantities and values of *unprocessed* forest products used as inputs (raw material) to produce the *processed* forest products in the table above?

*Note: Avoid double counting with section B: only products used an inputs are recorded in the table below, and these quantities should **not** be included in what is recorded in section B.*

1. Processed (final) products *(code-product)*	**2. Unprocessed forest product used as input** *(code-product)*	**3. Quantity used (5+6)**	**4. Unit**	**5. Quantity purchased**	**6. Quantity collected by household**	**Collected where?**		**9. Who in the household collected the forest product?[1)]**	**10. Price per unit**	**11. Value (3*10)**
						7. Land type *(code-land)*	**8. Ownership** *(code-tenure)*			

1) Codes as in the table above.

Note: The products in column 1 should be exactly the same as those in column 1 in the table above.

Note: Columns 7,8,9 should be left blank if no collection by household. Column 10 (price) should be asked even if only from collection, but if not available, see the Technical Guidelines on valuation.

Note: Answers in columns 7 and 8 should be consistent with land categories reported in village questionnaire (V1D01) and in the annual household questionnaire (A1C).

D. Fishing and aquaculture

1. How much fish did your household catch **exclusively from the wild** (rivers, lake, sea) during **the past month**?

1.Type of fish (list local names) *	**Collected where?**		**4. Total catch (kg) (5+6)**	**5. Own use (incl. gifts)**	**6. Sold (incl. barter)**	**7. Price per kg**	**8. Gross value (4*7)**	**9. Costs (inputs, hired labour, marketing)**	**10. Net income (8-9)**
	2. Land type *(code-land)*	**3. Owner-ship** *(code-tenure)*							

Note: Answers in columns 2 and 3 should be consistent with land categories reported in the village questionnaire (V1D01) and in the annual household questionnaire (A1C).

2. How much fish did your household catch **from ponds (aquaculture)** in **the past month**?

1. Type of fish (list local names)*	**2. From where? [1)]**	**3. Total catch (kg) (4+5)**	**4. Own use (incl. gifts)**	**5. Sold (incl. barter)**	**6. Price per kg**	**7. Gross value (3*6)**	**8. Costs (inputs, hired labour, marketing, etc.)**	**9. Net income (7-8)**

1) Codes: 1=Pond owned by households; 2=Pond owned by group of which household is a member; 3=Pond owned by community/village; 4=Pond owned by others and persons can buy fishing rights (include costs in column 7); 9=Other, specify:

E. Non-forest environmental income

1. In addition to forest products and fish included in the previous tables, how much of **other wild products** (e.g., from grasslands, fallows, etc.) did your household collect **in the past month**?

1. Type of product *(code-product)*	**Collected where?**		**4. Quantity collected (6+7)**	**5. Unit**	**6. Own use (incl. gifts)**	**7. Sold (incl. barter)**	**8. Price per unit**	**9. Gross value (4*8)**	**10. Costs (inputs, hired labour, marketing, etc.)**	**11. Net income (9-10)**
	2. Land type *(code-land)*	**3. Owner-ship** *(code-tenure)*								

Note: Answers in columns 2 and 3 should be consistent with land categories reported in the village questionnaire (V1D01) and in the annual household questionnaire (A1C).

F. Wage income

1. Has any member of the household had paid work over **the past month**?

Note: One person can be listed more than once for different jobs.

1. Household member (PID)	**2. Type of work** *(code-work)*	**3. Days worked past month**	**4. Daily wage rate**	**5. Total wage income (3*4)**

G. Income from own business (not forest or agriculture)

1. Are you involved in any types of business, and if so, what are the gross income and costs related to that business over **the past month?**

Note: If the household is involved in several different types of business, you should fill in one column for each business.

	1. Business 1	**2. Business 2**	**3. Business 3**
1. What is your type of business?[1)]			
2. Gross income (sales)			
Costs:			
3. Purchased inputs			
4. Own non-labour inputs (equivalent market value)			
5. Hired labour			
6. Transport and marketing cost			
7. Capital costs (repair, maintenance, etc.)			
8. Other costs			
9. Net income (2 - items 3-8)			
10. Current value of capital stock			

1) Codes: 1=shop/trade; 2=agric. processing; 3=handicraft; 4=carpentry; 5=other forest based; 6=other skilled labour; 7=transport (car, boat,…); 8=lodging/restaurant; 19=other, specify:

H. Income from agriculture – crops

1. What are the quantities and values of crops that household has harvested during **the past 3 months**?

1. Crops *(code-product)*	**2. Area of production** (m^2)	**3. Total production (5+6)**	**4. Unit (for production)**	**5.Own use (incl. gifts)**	**6. Sold (incl. barter)**	**7. Price per unit**	**8.Total value (3*7)**

2. What are the quantities and values of inputs used in crop production over **the past 3 months** (this refers to agricultural cash expenditures)?
Note: Take into account all the crops in the previous table.

1. Inputs	**2. Quantity**	**3. Unit**	**4. Price per unit**	**5. Total costs (2*4)**
1. Seeds				
2. Fertilizers				
3. Pesticides/herbicides				
4. Manure				
5. Draught power				
6. Hired labour				
7. Hired machinery				
8. Transport/marketing				
19. Other, specify:				
20. Payment for land rental				

I. Income from livestock

1. What is the number of ADULT animals your household has now, and how many have you sold, bought, slaughtered or lost during **the past 3 months**?

1. Livestock	**2. Beginning number (3 months ago)**	**3.Sold (incl. batter), live or slaught-ered**	**4.Slaught-ered for own use (or gift given)**	**5. Lost (theft, died,..)**	**6. Bought or gift received**	**7. New from own stock**	**8. End number (now) (2-3-4-5+6+7)**	**9. Price per adult animal**	**10. Total end value (8*9)**
1. Cattle									
2. Buffalos									
3. Goats									
4. Sheep									
5. Pigs									
6. Donkeys									
7. Ducks									
8. Chicken									
9. Horses									
10. Guinea pigs									
11. Rabbit									
12. Turkey									
13. Guinea fowl									
14.									
19. Other, specify:									

2. What are the quantities and values of animal products and services that you have produced during **the past 3 months**?

1. Product/service	**2. Production (4+5)**	**3. Unit**	**4. Own use (incl. gifts)**	**5. Sold (incl. barter)**	**6. Price per unit**	**7. Total value (2*6)**
1. Meat [1)]						
2. Milk [2)]						
3. Butter						
4. Cheese						
5. Ghee						
6. Eggs						
7. Hides and skin						
8. Wool						
9. Manure						
10. Draught power						
11. Bee hives						
12. Honey						
13. Curdled milk						
14.						
19. Other, specify						

1) Make sure this corresponds with the above table on sale and consumption of animals.
2) Only milk consumed or sold should be included. If used for making, for example, cheese it should not be reported (only the amount and value of cheese).

3. What are the quantities and values of inputs used in livestock production during **the past 3 months** (cash expenditures)?
Note: The key is to get total costs, rather than input units.

1. Inputs	**2. Unit**	**3. Quantity**	**4. Price per unit**	**5. Total costs (3*4)**
1. Feed/fodder				
2. Rental of grazing land				
3. Medicines, vaccination and other veterinary services				
4. Costs of maintaining barns, enclosures, pens, etc.				
5. Hired labour				
6. Inputs from own farm				
9. Other, specify:				

4. Please indicate approx. share of fodder, either grazed by your animals or brought to the farm by household members.

Type of grazing land or source of fodder		**3. Approx. share** (%)
1. Land type *(code-land)*	**2. Ownership** *(code-tenure)*	
Total	100%	

J. Other income sources

1. Please list any other income that the household has received during **the past 3 months**.

1. Type of income	**2. Total amount received past 3 months**
1. Remittances	
2. Support from government, NGO, organization or similar	
3. Gifts/support from friends and relatives	
4. Pension	
5. Payment for forest services	
6. Payment for renting out land (if in kind, state the equivalent in cash)	
7. Compensation from logging or mining company (or similar)	
9. Other, specify:	

ATTACHMENT 2

Forestry

Trimestre I Total	Valor neto	Substistencia	Comercialización
Productos forestales no procesados	752,05	732,85	19,2
Productos forestales procesados	9836,8	1517,5	8319,3
Silvicultura total 1 mes	10588,85	2250,35	8338,5
Silvicultura total 3 meses	31766,55	6751,05	25015,5
Trimestre II Total			
Productos forestales no procesados	70,2	20,2	50
Productos forestales procesados	13363	1411	11952
Silvicultura total 1 mes	13433,2	1431,2	12002
Silvicultura total 3 meses	40299,6	4293,6	36006
Total Trimestre I + II (6 meses)	**72066,15**	**11044,65**	**61021,5**
Ingreso Famila	*729,78*	*111,84*	*617,94*
Trimestre I Shuar			
Productos forestales no procesados	585,8	566,6	19,2
Productos forestales procesados	5706,8	1509,5	4197,3
Silvicultura total 1 mes	6292,6	2076,1	4216,5
Silvicultura total 3 meses	18877,8	6228,3	12649,5
Trimestre II Shuar			
Productos forestales no procesados	55,2	5,2	50
Productos forestales procesados	5905	1411	4494
Silvicultura total 1 mes	5960,2	1416,2	4544
Silvicultura total 3 meses	17880,6	4248,6	13632
Total Trimestre I + II (6 meses)	**36758,4**	**10476,9**	**26281,5**
Trimestre I Colono			
Productos forestales no procesados	166,25	166,25	0
Productos forestales procesados	4130	8	4122
Silvicultura total 1 mes	4296,25	174,25	4122
Silvicultura total 3 meses	12888,75	522,75	12366
Trimestre II Colono			
Productos forestales no procesados	15	15	0
Productos forestales procesados	7458	0	7458
Silvicultura total 1 mes	7473	15	7458
Silvicultura total 3 meses	22419	45	22374
Total Trimestre I + II (6 meses)	**35307,75**	**567,75**	**34740**

Forest-driven Incomes	Net Value US$
	Total I + II
Unprocessed forest products	49,96
Processed forest products	1409,61

Forest-Driven Incomes	Value US$	
Family	*Shuar*	*Colonos*
Total I+II	1500,34	1426,58
Unprocessed forest products	78,49	21,97
Processed forest products	1421,85	1404,61

Fishery and Aquaculture

Trimestre I	Valor neto	Substistencia	Comercializaciòn
Pesca de ambientes naturales	106,75	106,75	0
Pesca de estanques (acuacultura)	291,85	291,85	0
Pesca y acuacultura total 1 mes	398,6	398,6	0
Pesca y acuacultura total 3 meses	1195,8	1195,8	0
Trimestre II			
Pesca de ambientes naturales	95,5	95,5	0
Pesca de estanques (acuacultura)	1108	756,1	351,9
Pesca y acuacultura total 1 mes	1203,5	851,6	351,9
Pesca y acuacultura total 3 meses	3610,5	2554,8	1055,7
Total Trimestre I + II (6 meses)	**4806,3**	**3750,6**	**1055,7**
Famila	*48,67*	*37,98*	*10,69*
Trimestre I Shuar			
Pesca de ambientes naturales	104,75	104,75	0
Pesca de estanques (acuacultura)	59,5	59,5	0
Pesca y acuacultura total 1 mes	164,25	164,25	0
Pesca y acuacultura total 3 meses	492,75	492,75	0
Trimestre II Shuar			
Pesca de ambientes naturales	79,5	79,5	0
Pesca de estanques (acuacultura)	508	280,1	227,9
Pesca y acuacultura total 1 mes	587,5	359,6	227,9
Pesca y acuacultura total 3 meses	1762,5	1078,8	683,7
Total Trimestre I + II (6 meses)	**2255,25**	**1571,55**	**683,7**
Trimestre I Colono			
Pesca de ambientes naturales	2	2	0
Pesca de estanques (acuacultura)	232,35	232,35	0
Pesca y acuacultura total 1 mes	234,35	234,35	0
Pesca y acuacultura total 3 meses	703,05	703,05	0
Trimestre II Colono			
Pesca de ambientes naturales	16	16	0
Pesca de estanques (acuacultura)	600	476	124
Pesca y acuacultura total 1 mes	616	492	124
Pesca y acuacultura total 3 meses	1848	1476	372
Total Trimestre I + II (6 meses)	**2551,05**	**2179,05**	**372**

Fishery and Aquaculture	Net Income US$
	Total I+II
Fishery	5,8
Aquaculture	67,32

Fishery and Aquaculture	Net Income US$	
	Shuar	*Colono*
Fishery	22,56	2,18
Aquaculture	69,49	100,89
Total	92,05	103,07

Non-forest-environmental incomes

Trimestre I	Valor neto	Substistencia	Comercialización
Ingresos ambientales total 1 mes	5	5	0
Ingresos ambientales total 3 meses	15	15	0
Trimestre II			
Ingresos ambientales total 1 mes	0	0	0
Ingresos ambientales total 3 meses	0	0	0
Total Trimestre I + II (6 meses)	**15**	**15**	**0**
Familia	*0,15*	*0,15*	*0*
Trimestre I Shuar			
Ingresos ambientales total 1 mes	5	5	0
Ingresos ambientales total 3 meses	15	15	0
Trimestre II Shuar			
Ingresos ambientales total 1 mes	0	0	0
Ingresos ambientales total 3 meses	0	0	0
Total Trimestre I + II (6 meses)	**15**	**15**	**0**
Trimestre I Colono			
Ingresos ambientales total 1 mes	0	0	0
Ingresos ambientales total 3 meses	0	0	0
Trimestre II Colono			
Ingresos ambientales total 1 mes	0	0	0
Ingresos ambientales total 3 meses	0	0	0
Total Trimestre I + II (6 meses)	**0**	**0**	**0**

Wage incomes

Trimestre I	**Ingreso neto**
Salarios total 1 mes	6988
Salarios total 3 meses	20964
Trimestre II	
Salarios total 1 mes	6788
Salarios total 3 meses	20364
Total Trimestre I + II (6 meses)	**41328**
Familia	**418,51**
Trimestre I Shuar	
Salarios total 1 mes	4407
Salarios total 3 meses	13221
Trimestre II Shuar	
Salarios total 1 mes	3389
Salarios total 3 meses	10167
Total Trimestre I + II (6 meses)	**23388**
Trimestre I Colono	
Salarios total 1 mes	2581
Salarios total 3 meses	7743
Trimestre II Colono	
Salarios total 1 mes	3399
Salarios total 3 meses	10197
Total Trimestre I + II (6 meses)	**17940**

Wage Incomes	**Income US$**
	Total I+II
Teacher	194,18
Day labourer	109,74
Saw men	23,58
Joiner	14,86

Wage Incomes	**Income US$**	
	Shuar	*Colono*
Teacher	535,59	50,91
Day labourer	96,00	233,33
Saw men	48,98	94,06
Joiner	32,69	0,00

Own business

Trimestre I	**Ingreso neto**
Negocios propios total 1 mes	4111
Negocios propios total 3 meses	12333
Trimestre II	
Negocios propios total 1 mes	5600
Negocios propios total 3 meses	16800
Total Trimestre I + II (6 meses)	**29133**
Familia	**295,02**
Trimestre I Shuar	
Negocios propios total 1 mes	259
Negocios propios total 3 meses	777
Trimestre II Shuar	
Negocios propios total 1 mes	1168
Negocios propios total 3 meses	3504
Total Trimestre I + II (6 meses)	**4281**
Trimestre I Colono	
Negocios propios total 1 mes	3852
Negocios propios total 3 meses	11556
Trimestre II Colono	
Negocios propios total 1 mes	4432
Negocios propios total 3 meses	13296
Total Trimestre I + II (6 meses)	**24852**

Own Business	**Income US$**
	Total I+II
Shop/Trade	195,71
Transport	134,64
Other forest based	161,01
Carpentry	15,31
Other	83,36
Total	590,04

Own Business	**Income US$**	
Familia	*Shuar*	*Colono*
Shop/Trade	126,73	264,97
Transport	0,00	268,61
Other forest based	0,00	321,21
Carpentry	30,86	0,00
Other	17,14	149,33
Total	174,73	1004,12

Agriculture

Trimestre I	Valor neto	Substistencia	Comercializacion
Gastos	418,5		
Agricultura total 3 meses	19612,65		
Trimestre II			
Gastos	77,45		
Agricultura total 3 meses	23324,45	16778.9	6568
Total Trimestre I + II (6 meses)	**46648,9**		
Familia	**472,39**		
Trimestre I Shuar			
Gastos	40		
Agricultura total 3 meses	16391,8		
Trimestre II Shuar			
Gastos	22		
Agricultura total 3 meses	20290	13817	6440
Total Trimestre I + II (6 meses)	**36681,8**		
Trimestre I Colono			
Gastos	378,5		
Agricultura total 3 meses	3220,85		
Trimestre II Colono			
Gastos	55,45		
Agricultura total 3 meses	3034,45	2961,9	128
Total Trimestre I + II (6 meses)	**6255,3**		

Cultivars	Total Income US$
	Ix2
Yucca	327,90
Plantain	281,52
Papa china	121,11
Maize	55,53
Sugar Cane	50,96
Guineo	26,43
Total	**863,45**

Cultivars	Total Income US$	
	Shuar	*Colono*
Yucca	613,06	47,27
Plantain	539,59	27,47
Papa china	241,63	2,42
Maize	82,04	29,58
Sugar Cane	0,00	101,66
Guineo	22,45	30,51
Total	1498,78	238,91

Livestock

Trimestre I	Substistencia	Comercialización	Ingreso
Animales	9403	26001	35404,00
Servicios y productos	3535,6	434	3969,60
Gastos			-3680,30
Ganandería total 3 meses	12938,6	26435	*35693,30*
Trimestre II			
Animales	6840	9855	16695,00
Servicios y productos	2193,4	494,95	2688,35
Gastos			-345,00
Ganandería total 3 meses	9033,4	10349,95	*19038,35*
Total Trimestre I + II (6 meses)	**21972**	**36784,95**	**54731,65**
Familia			**554,24**
Trimestre I Shuar			
Animales	6091	14071	20162,00
Servicios y productos	1093,5	249	1342,50
Gastos			-105,00
Ganandería total 3 meses	7184,5	14320	21399,50
Trimestre II Shuar			
Animales	4226	2700	6926,00
Servicios y productos	1141,75	449,5	1591,25
Gastos			-45,00
Ganandería total 3 meses	5367,75	3149,5	8472,25
Total Trimestre I + II (6 meses)	12552,25	17469,5	**29871,75**
Trimestre I Colono			
Animales	3312	11930	15242,00
Servicios y productos	2442,1	185	2627,10
Gastos			-3575,30
Ganandería total 3 meses	5754,1	12115	14293,80
Trimestre II Colono			
Animales	2611	7155	9766,00
Servicios y productos	1051,65	45,45	1097,10
Gastos			-300,00
Ganandería total 3 meses	3662,65	7200,45	10563,10
Total Trimestre I + II (6 meses)	9416,75	19315,45	**24856,90**

Livestock	Cross Income US$
	Total I+II
Cattle	434,03
Horses	30,38
Chicken	375,82
Ducks	19,65
Pigs	98,23
Guinea Pigs	71,35

Livestock	Cross Income US$	
	Shuar	*Colono*
Cattle	370,62	498,99
Horses	48,98	12,12
Chicken	544,48	210,75
Ducks	34,44	5,09
Pigs	81,64	115,15
Guinea Pigs	0,98	114,10

Other income sources

Trimestre I	**Ingreso neto**
Otras fuentes total 3 meses	7695
Trimestre II	
Otras fuentes total 3 meses	2248
Total Trimestre I + II (6 meses)	**9943**
Familia	**100,69**
Trimestre I Shuar	
Otras fuentes total 3 meses	595
Trimestre II Shuar	
Otras fuentes total 3 meses	823
Total Trimestre I + II (6 meses)	**1418**
Trimestre I Colono	
Otras fuentes total 3 meses	7100
Trimestre II Colono	
Otras fuentes total 3 meses	1425
Total Trimestre I + II (6 meses)	**8525**

Other Income Sources	**Net Income US$**
Remittances	167,7
Support from government, NGO, organization or similar	31,66

Other Income Sources	**Income US$**	
	Shuar	*Colono*
Remittances	32,66	302,22
Support	25,22	38,18
Total	57,88	340,4

Total income composition

Income Composition	Net Income US$
Forest-driven income	1459,57
Fishery and Aquaculture	97,34
Non-forest environmental income	0,30
Wage income	837,02
Own business	590,04
Agriculture	944,79
Livestock	1108,49
Other income sources	201,38
Total	**5238,93**

Income Composition	Net Income $	
	Shuar	*Colono*
Forest-driven income	1500,34	1426,58
Fishery and Aquaculture	92,05	103,07
Non-forest environmental income	0,61	0,00
Wage income	954,61	724,85
Own business	174,73	1004,12
Agriculture	1497,22	245,21
Livestock	1219,26	1004,32
Other income sources	57,88	344,44
Total	**5496,71**	**4852,59**