Farmers' practices and the metabolic rift

An analysis of the interconnections between coffee production and climate change adaptation in the Nicaraguan mountain region

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Abstract

Climate smart territories are proposed as the solution to the perceived problems of poverty, food insecurity, gender equality, degradation of eco-systems, and climate change vulnerability, in the mountain region in Nicaragua. By educating farmers and rural families the practices that lead to these problems can be changed.

In order to reflect upon the proposed solution fieldwork was conducted with two coffee producing families that work with the project in order to get a better understanding of the situation of the families and their farming practices. These insights provided the point of departure to position the families in a broader context in relation to the history of coffee production and connections to other localities. Using a world-system perspective in combination with the particularities of the families in the following I will reflect upon the strategy to change farmers' practices that can lead to environmental and social justice.

The findings indicate that environmental and social injustice are not the consequence of coffee production but essential to coffee production in Nicaragua. Coffee production is the transformation of landscapes by rearranging the physical and the social systems through which it operates. The coffee producing landscape now coincides with ideas about biodiversity and climate change adaptation. In these interests the coffee producing landscape of environmental and social injustice is maintained.

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Introduction

The mountain region in central Nicaragua has a history of environmental and social crises, and many different proposed solutions to these crises. One of the most recent proposed solutions, by the 'Mesoamerican Agroenvironmental Program' (MAPNoruega), is to create so called 'climate smart territories' in order to overcome the manifold problems faced by the rural population. Within climate smart territories the problems are tackled in a holistic manner, integrating different actors who work together with the aim of achieving a collaboratively defined goal. Central to this approach is the idea to stimulate farmers to adopt practices that do not cause environmental degradation and that simultaneously contribute to an increase in farming output. Increased production and improvements in the value chain will lead to higher revenues for the farmers and families. Rural families will hereby become more adaptive to future crises.

Fieldwork with two families with whom MAPNoruega is working made me question however, whose crisis it is that has to be solved. It seems that MAPNoruega's approach to work within the social and political context, as they state, limits the possibility to contribute to a more just situation. In this thesis, I argue that what is needed is a more thoroughly analysis of the root causes of the environmental and social crises, from the perspective of the ones who do not benefit from the current socio-ecological system. This means to blur the boundaries in the object-subject distinction by not only reflecting upon the situation of the rural population, but as well including MAPNoruega in the analysis. By doing this I want to answer the research question: to what extent can changing farmers' practices in relation to coffee production halter environmental degradation and marginalisation of rural families in the mountain region of Nicaragua? Thereby, I want to critically reflect on ideas that are offered as solutions to overcome situations of environmental and social injustices, but which might be producing or reinforcing an unjust situation.

In the first chapter of this thesis I will go into the methodological and theoretical background that guides the research. In the first part of the second chapter I will give background information on MAPNoruega and elaborate on its implementation strategy. In the second part of this chapter I will describe the process of coffee production from my experience with two families. Chapter three is dedicated to the historical process of coffee production in Nicaragua and the position of the families in relation to other processes on a wider scale. In the discussion I will use this new perspective to reflect upon the strategy of the project and to

position the landscape of coffee production in relation to other interests. This will lead to the conclusion that environmental and social injustice are not the consequence of coffee production but essential to coffee production in Nicaragua, and that other actors use the physical and social structure of coffee production for their interests.

1. Methodology and Theory

The approach of MAPNoruega to reach rural sustainable development is mainly based on the idea that better or more education will lead to improved practices that do not cause environmental degradation or social inequality. MAPNoruega aims to take into consideration social aspects of environmental degradation, but the approach seems to be limited to collaboration between different actors in order to implement technological and market based solutions. The social perspective in this sense thus is meant to deal with questions of governance. But according to Blaikie (1985), it is not sufficient to just get social scientists aboard in order to persuade the target population to implement technological solutions. In order to come to a more comprehensive understanding of environmental and social problems it is necessary to analytically integrate the physical system with the social and economic systems (Blaikie 1985, 79).

According to Hornborg (2011, 6) it is necessary to go beyond the narrow focus on technological and market based approaches, and to expose the different interests at stake when discussing environmental and social issues. Therefore it is necessary to address power, conflict, and inequalities in order to be able to truly question sustainability issues. This means to connect location-specific and place-based concerns with "non-place-based or non-location specific networks of economic social and political relations acting directly and indirectly upon land users" (Blaikie 1985, 81). And to acknowledge the existence of different social groups with different interests and that social relations of power shape landscapes (Paulson and Gezon 2005, 17). Not only material resources are part of the struggle but also competing discourses and representations about the environment, such as the social construction of environmental knowledge (Paulson and Gezon 2005, 6).

In order to engage in this way with environmental problems it is necessary to acknowledge that science and the political cannot be separated from each other. The idea that scientific knowledge is objective has been challenged by Haraway (1988, 581) who stated that knowledge created by science is always dependent on one's position. So too in relation to

environmental problems, science and scientists, are embedded in the social-ecological systems and "view the world from a particular socio-political position that both reflects and shapes the knowledge they produce [and thereby reflecting] particular interests and political-economic configurations" (Nadasdy 2010, 44). Acknowledging that scientific knowledge is political does not make it less reliable, and it does not mean that science is inherently bad or regressive. Scientific knowledge can be progressive and it is the challenge to use science in such a way that it enables marginalised people to increase control over their lives. Therefore it is necessary to reflect upon whom the knowledge is serving and with what aim (Harding 1991, 5-10).

This distinction between pure, objective science, and applied social science is challenged by the perspective of activist research in which political commitment and scholarly research are combined (Hale 2001, 13). This is research that is inspired by the real life problems experienced by participants in order to "understand the root causes of inequality, oppression, violence and related conditions of human suffering" (Hale 2001, 13). It is thus not only important that research results are in line with scientific standards of knowledge production, but as well that the knowledge acquired can be used to guide action (Greenwood and Levin 1998, 76; Hale 2001, 15). The aim is to have a collaborative process of knowledge construction that goes beyond the use of people as informants who can give knowledge, or raw data, that is being used in another context (Burman n.d., 21). As Hale (2001, 13) argues, this does not mean that all knowledge is equally valid, and it is still possible to obtain better explanations by thorough empirical knowledge and theoretical understanding.

In order to get an understanding of the lives of the people with whom MAPNoruega is working I will take on an ethnographic approach. As (Madison 2005, 9) states, critical ethnography offers the meeting place in which participant and researcher both are part of the process of knowledge construction. This knowledge translated into the description of their perceptions and practices in combination with a world-system perspective will lead to a more thorough understanding of the processes at place in order to answer the research question. In relation to marginalisation I will use Blaikie's definition: "Used in the context of peasants in lesser developed countries, marginalisation has tended to imply the process by which they lose the ability to control their own lives (where they live and derive their income, what crops or stock they produce, how hard and when they work)" (Blaikie 1985, 25).

Theory

The idea of collaborative research seems to contradict the use of theory. However the intention is not to take a theory and place this on top of people, nor to come to conclusions that are not in line with the possibilities or desires of the people involved. Theory in this sense is used in order to explore the possibility for other answers than currently 'given', and should be subject to continuous verification and reflection.

A perspective that contributes to the exploration of possibilities and constraints for change is a dialectical approach (Harvey 1996, 12). Central to this approach is the idea that things that seem to have a permanent character, with defined boundaries, don't exist without the flows and processes that create, sustain or undermine them. This means, there are no unchanging entities but "elements or things [that] are constituted out of flows, processes, and relations operating within bounded fields which constitute structured systems or wholes" (Harvey 1996, 50). The boundaries of these systems are constructed in which the part makes the whole and vice versa, hereby interchanging object-subject and thus cause-effect and complicating the simple causal argument (Ibid., 52). So the important question is how such things that seem permanent and solid are created, sustained or undermined.

Situations that seem stable, and permanent, are not homogeneous but internalize contradictions which continuously support and undermine the system at the same time. These contradictions lead to oppositional forces which can become nodal points for creativity in the form of transformative behaviour. Therefore, it is important to not look for order but what produces order by analysing how the system is maintained and to identify the moments for transformation (Ibid., 55-59). One of the aspects of this thesis is thus to see how certain processes have crystallized in the material practice or in the physical landscape in the mountain region of central Nicaragua. What are the continuities and what maintains them? In order to expend the scale of flows and processes that shape, and have shaped, the local and place-based concerns that are part of this research, it is helpful to make use of the world-systems perspective.

According to Wallerstein (2004) the current system is a capitalist world economy. The world economy covers a geographical zone within which there are many different political units loosely tied together but not bounded by one political structure. It is not one political structure nor a homogeneous culture, but the efficacy of the division of labour that holds the system together. This division of labour leads to an exchange of goods, capital and labour. The

priority to the endless accumulation of capital is what characterises it as a capitalist system. Hereby, it is punishing those who act differently and rewarding those who follow this logic (Wallerstein 2004, 23-24). Following dependency theory, Hornborg argues that the 'punishment' and the reward are part of the same coin. The privileged position of some actors within the world system is not the consequence of a privileged position in time, but in space. That is the world system is characterised by unequal exchange between different actors, in which one's loss is the other one's win (Hornborg 2011, 18).

The unequal exchange between core and peripheral areas leads to the exhaustion of natural resources, environmental degradation, and health issues in peripheral areas (Hornborg 2011, 15) . According to Foster, Clark, and York (2010, 208) it are the contradictions inherent to the division of labour that lead to the exploitation of labour and the environment. This derived from Marx idea of the metabolic rift, which was based on the idea of a rift between the town and the country. Where long distance trade and the separation of humans from the soil erupted the nutritional cycle, degradation of the soil in the country and pollution the environment in the city were the consequences (Moore 2000, 125). Foster, Clark, and York (2010, 72) state that the ecological rift is the product of a social rift, on a global level represented by a global rift or unequal exchange. Moore (2011, 4-6) revisited his argument by stating that environmental degradation is not the consequence of capitalism but that capitalism is an ecological regime of environmental transformation in itself.

Schneider and McMichael (2010) agree that Marx's idea of the metabolic rift was based on a simplistic and static notion of soil degradation. His concepts according to them was dis-embedded from the practice of farming and they argue however for a more thoroughly analysis on the different practices in relation to the environment (Schneider and McMichael 2010, 461-465). By distinguishing for example between capitalism, modernisation, and industrialisation they show that there have been agricultural practices that were capitalist and modern but because of their dependence on ecological inputs and methods not industrial, and therefore ecologically sustainable. From a social perspective however it was not sustainable as it was exploitative (Schneider and McMichael 2010, 472-473). Therefore there is a need to "evaluate the relative embeddedness […] and define abstract concepts" (p.475-476). Adding farmers practices thus contributes as an analytical tool to the simplistic notion of division of labour and the long distance trade as the cause of environmental degradation.

Research design and limitations

Field research was conducted during the period of my internship with the project MAPNoruega. The setting where the fieldwork took place was in the rural area just outside of a small village called 'El Cuá' in the department of Jinotega. El Cuá is one of the three municipalities within the area that has been chosen to implement the concept of climate smart territories. The two families that were selected by the coffee cooperative are living in the rural fringe of El Cuá. The coffee cooperative is a partner of MAPNoruega and has received funding from them.

The main sources of empirical data are participant observations during my stay with the families and the official documents of MAPNoruega. I stayed with each family for a period of ten days in order to get familiar with the practices of coffee production, and the environmental and social context in which they live. During this time I was continuously living with them in their house and helping with the daily activities. Although activities on the farm are considered to be gendered, I could participant in both the male and the female domain. I would also join when there were activities off the farm, such as a gathering on a school or bringing coffee to the cooperative.

The internship with MAPNoruega thus made it possible for me to engage with the families, my affiliation with the project however also limited the freedom to have an open dialogue about questions that were more in the interest of the participants and me. Because my entrance in the lives of the families was 'requested' by the project, they could see me as someone who is there to observe and report back. As the request to stay with families was on a very short notice, people that had a close connection to the cooperative were asked to host me for ten to thirteen days. Another aspect was the design of the research I was carrying out for MAPNoruega: the objective of the research was to give feedback on the successes of the collaboration in relation to food security, gender equality, and perceptions on climate change. Although I could negotiate for a more in-depth research design, the assignment remained to gather objective data that could be used for a comparison. The focus of the assignment on the household in itself was another obstruction in my objective to get a better understanding on the relations between different members of the family and others in the community. However the biggest limitation probably is that I cannot interact with the people in the phase of writing. And by turning away from the field, as Ingold (2011, 242) argues, I am separating the phase of data collection from the phase of analysis, making it more likely that I write about people than with people.

2. The project and the farmers' practices

MAPNoruega

The region selected by MAPNoruega for the implementation of the climate smart territory is positioned in the mountain region in central Nicaragua (Nicacentral). This region is different from the lowlands on the pacific side and the more tropical region on the Caribbean side. According to MAPNoruega the problems faced in the region are high poverty rates[1], food insecurity, gender inequality, degradation of ecosystem services, and vulnerability to climate change. The project is funded by the Norwegian embassy in Nicaragua and is a follow-up on previous projects in collaboration between Scandinavian countries and the 'Tropical Agricultural Research and Higher Education Center' (CATIE for its acronym in Spanish) who implements the project (CATIE 2013, 3).

CATIE is a regional centre, based in Costa Rica and with members from several countries in South and Central America. The objective of CATIE is to increase knowledge in agriculture and the management of natural resources. Next to sustainable rural development in the region, MAPNoruega's objective is thus to learn from the experiences in Nicaragua and generate knowledge that can be transferred to other cases. Therefore they situate the need for the project in the context of global problems and argue that the regions where the climate smart territories are implemented[2] are representative for various other regions in Central America and other tropical regions in the world (CATIE 2013, 6).

Central to the project area in Nicaragua is the nature reserve Peñas Blancas, which besides its characteristic white steep cliffs is mainly defined by cloud forests and the almost always present mist. Although there are of course local differences, which are mainly due to in altitude and vegetation, the area is known for its humidity and fresh climate. The altitude of the reserve ranges between 800 and 1745 meters above sea level and there are different types of vegetation, or soil uses, ranging from intensive agriculture to tropical forests. Many streams and rivers originate from the reserve, and this water is being used by the surrounding communities and villages for consumption and production (Bolt-González 2012, 1-3). Agricultural production is allowed within the reserve because of which there are some tensions between conservation and production interests, mainly the production of coffee

[1] According to the project document 79-90% is poor and 36-49% is extremely poor (CATIE 2013, 8).
[2] The other region where MAPNoruega is working is the area where the borders of Honduras, Guatemala, and El Salvador meet, around nature reserve El Trifinio.

without shade has caused environmental degradation. The production process of coffee can lead to contaminated water sources, waste in the form of coffee pulp residues, and deforestation in order to plant coffee and annual crops (Ibid. 21). According to the reserves educational centre (CEN for its acronym in Spanish) the appearance of new inhabitants from the lower and dryer areas are endangering biodiversity because they do not have the knowledge to understand the importance of the reserve and through their unsustainable farming practices contribute to the degradation of the environment (Ibid. 22). The reserve is thus an important factor in the creation of the climate smart territory.

According to Bolt-Gonzáles, the president of CEN, deforestation is the most contributing factor to climate change in Nicaragua, making it the fourth most vulnerable country to climate change in the world[3]. The consequences of climate change in Nicaragua are predicted to be higher temperatures, changing rain patterns, an increase in long during droughts, and an increase in extreme weather events. According to MAPNoruega this has major impacts on the ecosystem services and agricultural production, which contributes 18% to Nicaragua's GDP and is of importance for the food security of the population (CATIE 2013, 3). Researchers of CATIE have identified Nicacentral as the most vulnerable region within Nicaragua. Based on IPCC's conceptualisation of vulnerability they have defined beans and coffee as the crops who's cultivation will be most impacted by climate change. As the population in Nicacentral and the agricultural sector are highly dependent on these crops the priority of agricultural adaptation in Nicaragua should be in this region (Bouroncle et al. 2014).

Climate smart territories are, so argues MAPNoruega, necessary to overcome the problems faced by the rural population in the context of climate change. This idea is based on the concept of 'climate smart agriculture' in which food production for a growing population is combined with an increase in resilience to climate change, the reduction of emissions of greenhouse gasses, and sequestration of carbon dioxide by agricultural and forestry practices, by that combining food security with adaptation and mitigation strategies. The strategy to stimulate sustainable rural development in the climate smart territory is based on the provision of technical assistance, education of farmers and rural families, and to communicate research results with the wider public (CATIE 2013, 6).

[3] Bolt-Gonzáles stated this during a visit of the team of MAPNoruega and me, to CEN. I have not been able to ask him for his source but it correspondents with the 'Global Climate Risk Index 2015' published by Germanwatch (Kreft et al. 2014).

The approach to create climate smart territories is holistic but remains mainly focused on changing farmers' practices. The strategy of MAPNoruega involves the inclusion of multiple actors from different sectors in order to reach the objective of sustainable rural development. For example the need to make improvements in the value chain requires the collaboration of various actors within the territory. However the focus is mainly on changes on the farm or family level. The logic is that by educating families in 'Farmer Field Schools' (FFS) people gain knowledge about food preparation and production, farming practices, gender equality, and climate change, and can change their actions. Better knowledge about food preparation and diversification of production will improve food security. Other farming practices will protect the environment, or ecosystem services, and lead to higher production, which will lead to higher revenues. Especially in combination with improvements in the value chain this will lead to higher food security. Capacity trainings will enable family members to diversify off-farm income. Together these practices are supposed not only to end poverty and increase food security, but as well to make people more adaptive to climate change.

The farmers' practices

In order to get a better idea of the situation of the rural families in Nicacentral and of their practices in relation to coffee production, the next part will be a description of their practices. These farms cannot be seen as representing all rural families in central Nicaragua. There are many different practices between different coffee producers and families, related to the situation of the farm, farm size, compilation of the household, and many more factors. But the description is used as an example in order to get a better understanding of rural life in central Nicaragua. These insights will be used in the next chapter to situate the families in the wider context of the global coffee market.

Family Rizo

The first family, family Rizo, is living in the rural fringe of the small village el Cuá, and within the borders of the nature reserve Peñas Blancas. The family bought the land fifteen years ago from a livestock farmer. This meant that the land was pasture land with some orange and peers trees to provide shade for the cattle, but not enough shade for coffee production. In order to create shade for the coffee plants the family planted banana, guava, and avocado. Not all trees however are equally suitable to manage. The most important one is the banana tree. The leaves of the banana tree are big, thus providing a lot of shade, and grow quickly, therefore it is easy to adapt the form of the shape when needed. As Norman, one of

the farmer's sons who lives in the community further down but works at the farm, told me, "the tree should look like a chicken leg, with three fingers" in order to regulate the amount of shade during the day. As the branches are not so thick, one can easily cut them off with a knife attached to a long stick. Other fruit trees, like the guava or the avocado have to be managed with a more long term vision because the branches grow slower. These trees also grow a little bit higher which makes it difficult to reach them. The biggest trees that grow in the area cannot be managed since they are too high.

The family found these trees on the other plot they bought, a little bit more up the hill and a five minute walk from the house. When the family arrived they took down these trees to build their house. As I was walking with Don Domingo, the owner of the farm, through the plantation he was naming the trees and mentioned how well suited they were for construction. That is why he replanted trees, so he could sell the wood when the trees where grown. The trees that are now growing within the plantation were partly given by a project a couple of years ago. They initially wanted to take them down when they are ready for it but Ismael, his son, told me that they might receive money if they leave the trees standing, and therefore they are waiting with it. Other big trees that are left to grow are the ones at the sides of the creek to which the plantation borders. They are not allowed to take those trees down since the trees prevent the stream from drying up in times of less rainfall.

Water is very important for the coffee process, especially when the coffee is being washed on the farm. After the coffee fruit has been picked the fruit and the bean are separated (depulped) and the bean is left to ferment. The residual pulp is one of the factors that have led to contamination of water sources but the family is now using it as fertilizer for the new plants. And as the pulp is far away from the creek it will not reach to the water. When the coffee has been left a day to ferment, before the mucilage is washed off the coffee beans. The family washes the coffee by hand in a concrete canal. The canal is long and narrow, forty centimetres wide, and a couple of meters long, and in the beginning of the process closed off with small wooden boards on top of each other to construct a bath. The water for washing the coffee comes through a tube and is taken from the creek, enters the canal, runs over the wooden boards, and goes via a small dug out canal back to the creek. The coffee beans are stirred with a long wooden board in order to get all the mucilage off. When the first water leaves the canal it is full of mucilage that contaminates the creek when going back. Therefore the family has constructed a pond of two by two meters wide, and one and a half deep. The first water leaving the canal is caught instead of going directly to the creek and is filtered by the soil,

leaving the mucilage behind. When the beans are washed the canal is used to separate the good beans from the bad ones. One of the wooden boards is taken off and the water in the canal runs towards the lower part, hereby taking leaves and beans that still have some fruit. The better quality beans are heavier and remain on the bottom. To get all the 'bad' ones out, one needs to stir, leave it to rest, move the boards, etc. Therefore there are at least two people doing this, one is lifting and downing the boards, the other ones stirs.

The coffee is dried at the side of the house (el patio) on a metal grid in wooden frames. On the short sides they have handles so you can move them with two persons. They are placed on knee high supporting balks so they are free from the ground. The coffee has to dry, depending on the amount of sun, for a day to several days. While it is drying someone has to stir it so the coffee dries equally. Don Domingo would do this during the day in between other tasks; while he was stirring it he was also picking up some beans of less quality or little leaves. There was always a large piece of plastic nearby to place on top of the coffee when it would start raining. Doña Dilma would take care of the coffee as well, covering it when it starts raining, or helping to place the frames on top of each other at night. Cacao is dried on the same grids, but with a plastic bag on top of the metal. The cacao beans do not dry well when they are directly on the grid, Don Domingo explained. "A technician told me, but I already knew", he said.

The cacao he has been producing for a couple of years now were given by a project. The cacao trees grow in between the coffee plants and produce more continuously than coffee whose harvest is only once a year. When the cacao is picked, the fruit is opened and the beans are left to ferment for a couple of days. After this the cacao is dried in the sun, but without having washed the beans. Therefore it takes longer to dry cacao but no water is needed. More farmers are starting to cultivate cacao and the father in law of Ismael told me he was thinking about it as well. "But I will have to take down some trees to make space for cacao" he said. "But that's ok, a tree is a tree so I will sacrifice one but replant one." Norman told me that a company was planting two thousand manzanas[4] of cacao in a region more towards the Atlantic part of Nicaragua. But he was not worried about falling prices because of this.

The family is aligned with the coffee cooperative in town. The origins of the cooperative lay in the time of the Sandinista revolution when it started as a farmers cooperative for basic grains. Via the cooperative the family is benefiting from many projects. There are not enough resources for all the members to be part of the projects so the ones that are most active within

[4] The unit of area used in Nicaragua, 1 manzana equals around 0,7 hectares

the cooperative are selected. The family for example constructed a toilet with biogas system for the kitchen. I have never seen Doña Dilma use it as she was always using the stove with wood. The stove was also provided by a project in order to use less wood as it is more efficient. In the house there was a water tank provided by another project to rinse water, however they do not need it because fresh water comes from one of the upstream creaks. The construction of the 'huerta' (vegetable garden) was stimulated by the project 'Save the children' with the objective to reach food security. Furthermore there are signs around the farm with sentences like 'throw your garbage here' and 'toilet'. When I asked Ismael about it he said it was a requirement from the fair trade initiative of which they are part. Another requirement is to have everything you do documented and have maps of your farm. He showed me the maps he had outside on the wall. It stated all the information of the farm, as how many coffee plants and other trees they had. Next to this map was a map drawn at a meeting at the farmers' field school of MAPNoruega. It indicated which problems they faced and what he planned on doing about it. Before they were involved in fair trade they tried organic farming. But Ismael told me it was not possible for them. The production was too low without the use of fertilizers and costs of clearing the grounds without any pesticides to high.

Family Robben

The second family I visited was situated on the other side of El Cuá, in an area where there is a mixture between coffee plantations and cattle farms. In the week I arrived they had started picking coffee. The farm was a lot bigger than the other one: family Rizo has a farm of five and a half manzanas, and this family has twenty five of which they have planted coffee on fifteen manzanas. The coffee was picked by people from the community. Some were family members, living next to the house, others young boys from the village. In the morning they would come to pick up tortillas and coffee for breakfast during work. This meant that Doña Juana and her daughter Maria would get up around three in the morning to start cooking. After having made the tortillas they would start with the lunch for the workers. On a Saturday, they made pasta with meat, which was exceptional. "On Saturdays you have to do something nice", Doña Juana said. According to her food is not like this on big plantations but you have to take care of the people.

Her daughter, Tania, also referred to taking care of people when we were discussing poverty in the community: "people are poor, but they do not suffer from hunger, we take care of each other". When the family asked me if there was poverty in the Netherlands, I asked, "What does it mean to be poor in Nicaragua?". They answered that you are poor if you have no

‘farm’, no land and are dependent on ‘obra de mano’ (labour wage); when you have difficulties buying food, clothes, and you do not have a good house nor a mattress to sleep on. Later that week Tania and I passed some houses of plastic, “these people are poor” she said. “In food we’re almost equal but not in luxury.” Doña Juana would tell me that when someone is poor, this person has to know how to cook with variation not to get bored by eating the same food every day. She could make all kinds of food in many different ways, often by frying or using sugar, and was eager to make me taste everything. When I responded enthusiastic on new food, Rubi, another daughter laughed “es rico ser pobre!”[5]

Don Pablo and his son, Hector, would pick up the coffee from the fields with their horses. In the evening when the pickers were done they started to depulp the coffee with a depulping machine driven by a motor. The next day we would wash it but not lay down to dry. Because they produce a lot, it would be more work to dry the coffee so they sell it wet. As the price a farmer receives goes per weight there is a reduction of the price for wet coffee. But it saves the farmer as well the work of not having to dry it, which requires space, material, attention and labour. So after the coffee has been washed it is collected in bags. The coffee can however not be stored too long wet because it will start reduce quality. And for the farmer it is best to bring the coffee as soon as possible to the buyer since waiting longer means drying coffee which still is considered wet coffee, but will weigh less. I realised this when on our way to the buyer, with the coffee in the bags in the back of the pick-up, we stopped in the middle of a water stream we had to cross. Hector got out, filled the bucked with water, and started throwing it over the bags of coffee. His nephew hit the bags so water would go through and reach all the coffee. The coffee had been washed in the morning but it was not until the evening that his nephew could bring the coffee to the buyer. So the coffee had already dried a little bit, thereby losing weight, and Hector would receive less money for it. Now he was trying to get it as wet as possible to make up for the loss.

Although the family is aligned with a coffee cooperative, this does not mean that they hand in all their coffee at the cooperative. Although the price is higher at a cooperative, there can be incentives to sell the coffee at a commercial buyer. The cooperative paid out exactly the amount of money that was needed to pay the labourers that had picked the coffee. It is only in May, when the coffee has been sold by the cooperative, that the coffee farmer receives the rest. Because the cooperative cannot pay out all the money at the moment that the farmer

[5]Translation - It is tasteful to be poor! - However in Spanish ‘rico’ is both rich as tasteful.

brings the coffee, it might be necessary for farmers to go to a commercial buyer who pays less but pays out immediately. On a Sunday morning Don Pablo had disappeared to go drinking with friends. The coffee that had been depulping the day before however had to be washed before going bad and the buyer was coming in the afternoon to pick it up. One of the workers had been sent back to wash the coffee and Tania and I helped him. When the buyer had come to pick up the coffee it was unclear however where the coffee had to go. No one in the house knew how much money was needed directly and how much had to be saved for later, thus how much to bring to the commercial buyer and how much to the cooperative. When Doña Juana could not decide, Tania sighted "my mother owns half the farm but doesn't know what is happening with the money". She had told me before as well that most of the money went to Don Pablo, and she never got something except food for shopping. It was only since last year that he had built this kitchen for her. I joined Tania to bring the coffee to the commercial buyer. Insight after having weighted the coffee and as he was paying her out he told her that her father had a big debt standing out with them and that he should be worried.

The commercial buyer is not the owner but works for one of the biggest coffee buyers in Nicaragua. The family seems to know him well and do not have a simple business relation. When Hector was looking for ways to transport the coffee to the cooperative he asked the buyer to come by the next day to pick up the coffee for him and to bring bags of fertilizer to his house further down. The fertilizers they take on credit he said. We don't have to pay them now but later with the revenues of the coffee. One of the days we went to fertilise the coffee plants. The grains were small and bright blue. Don Pablo walked along the plants and poured a cup of grains at the bottom of each plant. Hector showed me the difference, "see these plants have not had any, and these I already did before". The colour of the leaves of the plants he pointed out first were somewhere in between yellow and light green. The other part that had been fertilised before had leaves that were dark green. "Without the fertilises there is no production" he said.

3. Expending the view

The first part of this chapter gives an overview of the historical relations between coffee production, position of peasants and environmental degradation. I will use the term of peasants here to give an idea of the continuity through time. I refer to the position of the families thus as well as belonging to a peasant mode of production. This is based on the conceptualisation of Ellis (1993, 50) in which the peasant household produces for imperfect

markets in combination with production for self-consumption. This historical account does not give a lot of space for specifics, all the forms of resistance and collaboration of peasants themselves. However, it sketches the processes that are part of the history of the mountains region in Nicaragua.

Coffee production in historical perspective

According to CEN, the expansion of coffee towards the reserve has gone alongside deforestation and soil degradation. This is not something new; ever since the introduction of coffee to central America it has replaced forests with plantations and displaced people of higher and less fertile lands. Coffee as an export crop was stimulated by elite groups in Central America to replace Indigo and other natural dyes that had become less profitable because of synthetic chemical alternatives. The elite groups stimulated capitalist production in line with social modernisation with foreign investment of European immigrants and created the conditions for coffee production by commodifying the land, creating a cheap labour force, and stimulating investment in public infrastructure (Faber 1993, 21). The first lands to be cleared for coffee where the unclaimed lands but in search for more fertile lands the lands that where controlled by Indian villages, the Catholic Church and municipal governments were privatised by the agrarian reform law of 1877. Besides transforming the landscape in one suited for coffee production, the displacement of people also created the social conditions in the form of a large labour force. This was needed not only for seasonal labour on the bigger estates but as well for the construction of the infrastructure for the transportation and exportation of coffee (Ibid,. 21-28).

As coffee became the major export commodity of Nicaragua more and more forest areas in the highlands where turned into coffee plantations owned by urban merchants and German immigrants (Ibid,. 24). According to Faber (1993, 26) the rise in prices around 1890 caused more expansion of coffee production into the highlands which are more favourable for coffee production. However, the government stimulated the production of coffee actively. Encouraged by a decree of the government in 1887, the urban merchants from the lowlands and German immigrants introduced coffee production in the mountains of Jinotega. In the decree it was stated that every person who planted five hundred or more coffee trees would receive five cents for each planted coffee tree. Two years later this decree was modified and five hundred manzanas were donated to everyone who would plant twenty five thousand coffee trees in the Northern departments (Jarquin-Blandón 1991, 97). The expansion of coffee

production to the highlands transformed the landscape of oak-pine forests into landscapes of coffee production with a two story ecosystem, combining coffee bushes with higher growing shade trees like cacao. The Indians and peasants whose land was confiscated moved into even higher lands where coffee could not be cultivated, or to less favourable land, and transformed these landscapes by subsistence agriculture. But peasants and Indians resisted as well, and governments were used by the coffee elite to protect their haciendas from peasant and Indian attacks (Faber 1993, 26-27). This led to an increase in large haciendas where, with up to sixty permanent workers, one can imagine the amount of seasonal labourers needed in the picking season. But besides the large haciendas there were also small coffee producers and inequality in Nicaragua did not seem so severe as in other countries in Central America (with the exception of Costa Rica). Export and credit however were controlled by foreign investors (Faber 1993, 24). The haciendas in the North that were owned by German Immigrants, nineteen families in Jinotega, were confiscated by the by the US supported president Somoza in light of the second world war in 1939 (Jarquin-Blandón 1991, 99). But the Somoza regime transformed the highlands of Nicaragua by giving concessions to timber companies to clear the pine-wood forests in the North and by focusing on export of beef and cotton in the lowlands, confiscating many maize and bean cultivating peasants of their lands and chasing them into the less fertile lands in the mountains (Ryan 1995, 56). Hereby, the labour force needed for seasonal work in the picking season, such as urban-based landless workers and semi-proletarian peasants, was 'created' (Faber 1993, 60-61).

The lands acquired by Somoza and his allies would remain in their hands until the Sandinista revolution in 1979, but it was not until the contra war was on its height that land was distributed to landless families and cooperatives. The Sandinista movement promised to distribute the confiscated haciendas among the landless people but this conflicted with the ideal of socialist production. The socialist ideal was to have large scale farms instead of individual production that could not be planned as large scale production could. However the state farms would not be the continuation of the repressive hacienda but a form of collective agriculture. On the other side there was also the preoccupation to maintain export production and the fear that redistribution of land would mean a transformation into subsistence farming. The solution for the landless people initially was not the distribution of land but, in the words of the minister of agriculture and agrarian reform at the time, the “distribution of people and the adventure of colonization” (Wheelock quoted in Ryan 1995, 95). Although the efforts of the Sandinistas to reform were undermined by US interests and their impact cannot be

underestimated, the difficulty of the urbanist Sandinista movement to understand the peasantry from within contributed to the increase of support for the contras (Ryan 1995, 92-95).

These processes coincided with the liberalisation of the global coffee price due to the the collapse of the International Coffee Agreement (ICA) in 1989 (Bacon 2005, 497; Pichop and Kemegue 2005-2006, 26). The ICA was an agreement between consumer and producer countries and stabilised the price of coffee between 1962 and 1989. The price was controlled by the restriction of supplies in the form of export quotas (Bates and Lien 1985, 553-555). The ICA was possible because consumer and producer countries interests coincided during this period. The main consumer country supporting the agreement was the United States as it used the ICA as a foreign policy tool in the war on communism (Igami 2015, 228). Most producer countries could earn more money with high prices and quotas than with lower prices and increased production. However when in around 1989 the threat of the left for the USA had declined and big producer countries such as Indonesia and Brazil could benefit from a free market, the ICA became unattainable (Bacon 2005, 497; Igami 2015, 34; Pichop and Kemegue 2005-2006, 243).

The end of the agreement changed the global market for coffee in several ways. The most direct consequence was the decline of state occupation with coffee production and transnational companies that took over the role. The value captured by the state, according to Bacon (2005, 499) declined from 55% to 22% after the fall of the ICA until 2005. But as coffee plants need around three to four year to become productive, the real consequences of the liberation of the coffee price was felt around 1998-2000 when increased production of Brazil[6] and Vietnam made the prices drop drastically. While some countries had always been producing at their maximum, Brazil could increase production and meanwhile Vietnam had had pushed a big development programme to become a coffee exporting country in order to increase their export revenues. By the late 1990 they had become the second biggest coffee exporter behind Colombia (Igami 2015, 231).

The effects for Nicaraguan farmers where severe. Brazil doubled its production of Arabica beans, the main coffee variation production in Nicaragua. Besides increased production of Arabica beans, coffee roasting companies developed techniques to blend the use of high

[6] Coffee production in Brazil almost doubled between 1995 and 2000, from 16,850 to 32,200 tons (Castro and Neto 2009, 202)

quality Arabica beans with cheaper and lower quality Robusta beans. Robusta hereby became a competitor to the Arabica bean, dropping this price even more (Bacon 2005, 498). This led to a financial crisis in which coffee producers could not pay their labourers and banks went bankrupt. In Nicaragua the coffee crisis coincided with hurricane Mitch who hit Nicaragua in 1998, because of which harvests failed as the consequence of damaged infrastructure and lost production areas. Subsistence farmers lost their harvests because of the droughts that followed in between 1999-2001. The combination of the coffee crisis and the lack of food led to a situation of unrest and people demonstrated on the streets of Matagalpa, demanding action from the government. The government however responded slow and mainly helped out big coffee producers (Bacon 2005, 499).

So although the crisis had stopped a farmer from cultivating coffee coffee production continued with a new farmer taking over. Many farmers were in debt and had to sell their land to other more successful farmers who increased their land. Other farmers were moving to the cities or becoming wage labourer (Wilson 2010, 84). The transformation of small-scale farmers into capitalists or labourers has been called the social differentiation in which there is a disintegration into capitalist farmers or rural wage labourer (Ellis 1993, 51). A lot of farmers survived due to their affiliation with the fair trade initiatives from before, who provided credit and technological assistance (Bacon 2005, 504). Wilson (2010, 85) however argues that although Fair trade provided a safety net, it could not solve the problems of rising costs and decreasing revenues, hereby leading to an increasing amount of farmers with high debts.

The metabolic rift in relation to farmers' practices

In order to understand the effect of changing practices in relation to coffee production I will make use of the concept of the ecological rift. As described before this means taking ecological problems and relating them to the division of labour, or "the domination of human being by human being" (Foster, Clark, and York 2010). Although there are many environmental problems perceived differently by different groups in relation to coffee production the one which the families were facing directly is the problem of soil degradation. Talking with Ismael about the use of fertiliser, he said that it is necessary because the soil is exhausted by thirty to forty years of coffee production. On their plot there are plants that are at least twenty five years old, and the difference in production with their neighbour is significant. The neighbour's plot has only been in use for coffee production for three to four years, and before that it had been 'fresh' land.

The experiences of the coffee farmers are in line with research that shows a negative nutrient balance in shaded coffee production. The removal of nutrients by long distance trade, that is, the nutrients taken up by the green beans and transported to other places, is only one aspect of the negative balance. The coffee fruit also takes up nutrients that stay behind in the form of pulp. More nutrients are taken up by the tree itself and are eventually taken out by stumping or replanting. As described before, the first family used the pulp as fertiliser on the farm and leaves fallen leafs on the ground. However this cannot make up for the imbalance, and additional off-farm input in the form of fertiliser of nutrient-rich compost is needed (Van Der Vossen 2005, 457-459).

Coffee production with high output is thus not possible without a negative nutrient balance. The families have 'solved' the problem of the negative nutrient balance by the use of off-farm input in the form of inorganic fertilizers, hereby creating a relation with the market. According to Van der Ploeg (2008, 25) the self-controlled resource base is hereby exposed to external influences which can lead to the loss of freedom. In order to keep production going the family has to earn enough money to buy new input for the next harvest. This is no problem as long as prices are high enough, but when prices drop there might not be enough revenues for reproduction. The reproduction is not only dependent on off-farm inputs as fertilisers but as well on for example labour of the family, wage-labour from outside of the household, and availability of food for the family. The second family has two structural labourers and had seasonal labour in the form of coffee pickers. As became clear, the revenues from the coffee harvest where just enough to pay for the costs, thus not generating profit. In fact the family was getting in debts to pay for the fertilisers needed for the next harvest.

According to Ellis (1993, 50) the market is a mechanism through which the individual actions are coordinated and forced into increasing production. Markets hereby set the terms that have to be followed to survive, competition redefines these terms and ensures processes of adaptation to them. This means that coffee farmers in Nicaragua are in direct competition with for example coffee farmers in Brazil and Colombia, which is are the biggest Arabica coffee producing countries in the world and offer government support in the form of guaranteed prices in the case of Brazil, and subsidies in the case of Colombia (Agrimoney 2013). Therefore the coffee producers have to adjust their practices to be competitive in the global market.

The production of coffee without credit has become increasingly difficult. In an interview with the president of the coffee cooperative he stated that one of the challenges for the cooperative is to keep members aligned as more and more members are leaving the cooperative because they need credit which the cooperative cannot provide. As the farmers showed, they can however get fertilizers and other needs from the big commercial buyers in the village. Credit is often not sufficient to cover all costs, leading to credit for household consumption as well. Profits then go to pay off debts if years are good, or leading to more debt if revenues are low (Wilson 2010, 88). This seems to be the case in the second family as the coffee buyer told them they should be preoccupied about their debt.

Debt is another way of extracting surplus value from the farmer as a relation is created in which people use their labour to pay back loans. The relation is not the employer-labourer relation of direct employment but financing them. This has the benefit of the funder not needing to create surplus himself but the pressure is on the borrower to look for possibilities to make money. The important difference with the employer-labourer relation is that a debt means one has to sell labour in the future, which adds obligations and discipline (Mader 2015, 21-25). This phenomenon is described as a debt relation in value-chain agriculture by McMichael (2013). When smallholder farmers enter into a dependency relation with capital they lose control and autonomy over the land. This might for example explain why the father and son in the second family suddenly increased coffee production. The value that they generate is being appropriated by other actors higher up in the value chain. Debt is the key mechanism that transforms the independent peasant into a contract farmer by imposing capitals own order (McMichael 2013, 672-674).

It is this entanglement into debt relations and the need to produce coffee that makes it impossible to farm without the negative balance of nutrients. Complete organic production without environmental degradation will lead to low yields, thus a reduction in farm production and an increase in labour costs. Without sufficient prices it is not possible for the families to produce in this way with only coffee as income (Valkila 2009, 3025; Van Der Vossen 2005, 465-466). However the families have additional income with the production of cacao, maize, beans, bananas, and other fruits and vegetables, both for sale and for direct consumption. The diversification of the farmer is often seen as means to withdraw from exploitative relations and a form of resistance(van der Ploeg, Jingzhong, and Schneider 2012, 136). However in case of the families their entanglement with the international coffee market creates the extraction of value of the other activities of the farm. They are putting labour of

other activities in the service of coffee production, to be able to withstand low coffee prices (Wilson 2010, 91). The diversification of income hereby subsidises the low coffee prices.

4. Discussion

The previous section has indicated that it is difficult, if not impossible to make a living from coffee, and although a far more thorough and collaborative analysis is necessary, I wonder if it can be the case that the household is not gaining anything with coffee, but that they are actually paying for the reproduction of the global coffee chain by extracting value from other parts of the farm and household. In this case the diversification of income, and subsistence farming are not a means of survival when coffee prices are low but *a means of keeping coffee prices low* without causing another coffee crisis. The question that remains is thus, if farmers and communities *depend* upon coffee production for their livelihoods, or do they create a livelihood *despite* their entanglement in the international coffee market? Hereby the perceived problems of rural families are not the consequence of imperfections in the global coffee market, but these supposedly 'externalities' are actually part of the logic, and are essential to the operating of the global coffee market which operates *through* the degradation of the environment and the marginalisation of people. As Doña Juana told me, she does not see the point of producing coffee as they do not make any money with it. In line with her daughter who mentioned she would never want to work with coffee because it is not worth it, the costs are too high, the revenues too low. "Because of ideology" she answered me, when I asked why it is then that her father and brother had just planted coffee plants on two more fields.

That the benefits and costs of coffee production are unequally distributed within households, communities and non-local actors is nothing new. I wonder however who the ones are that are truly dependent on coffee production if not, as so many times stated as an introduction into coffee related articles, the ones producing it. Which processes maintain the existence of coffee production and for whose aims do the farmers' practices have to be changed? Changing implies an actor who is involved in shaping the behaviour of the farmers and the families. Thus in line with Kelly (2016), "anything that seeks to change the behaviour of others is political and is ultimately about power and authority" (Kelly 2016, 12).

Most coffee is exported to Western countries in North America and Europe, however to say that consumers in these countries are the drivers of coffee production is too simplistic. According to Tucker (2011, 44-45) coffee in these countries has coincided with the industrial

revolution and the changing working conditions as people moved to the cities. The work in factories did not combine well with the intake of beer, which was the most common drink as alternative to unsafe water. Coffee and the awakening effect of caffeine matched better with the working conditions in factories and according to Wild (Wild 2004 quoted in Tucker 2011, 44) coffee is even necessary for the functioning of modern capitalism. These claims can be contested of course, and consumers in these countries could now easily argue that they drink coffee because they choose to and enjoy drinking it. What is essential however is that the creation of consumers has always been the other side of production of coffee. As for example one of the objectives of the voluntary International Coffee Agreements of 2007 is "promoting the development of consumption and markets for all types and forms of coffee, including in coffee producing countries" (International Coffee Organization 2007, 2) Production of coffee thus goes hand in hand with expanding consumption in order to extract value on both sides of the coin. Even in the case of specialty coffees such as fair trade and organic, most value is captured by retailers and roasters. They can set the price almost as high as they want since the consumers act upon moral standards, making the price less relevant (Valkila, Haaparanta, and Niemi 2010, 264). Consumers are thus not the drivers of coffee production but a necessary part of the accumulation of capital in the global coffee system.

However, it is not only coffee production that is in the interest of powerful actors, also the landscape that has been created by coffee production. It is this specific form of coffee production in the shade that coincides with ideas about nature, biodiversity, and climate change of local and non-local actors. Shade coffee production has become an important ally in haltering loss of biodiversity and deforestation and more recently contributing to carbon capture. It is in the interest of climate change producing actors that coffee producers maintain their landscapes and thus maintain producing coffee. One of the preoccupations after the coffee crisis has been that the abandoned coffee plantations would lead to less forestation and less possibilities for carbon capture (Mora 2004). Without trivializing the consequences of climate change for the people in the area, the crisis of climate change is also used for other purposes as Norway finds in CATIE and the MAP projects the possibility to extend the REDD+ projects in Central America (Garcia et al. 2011, 58).

The diversification of farmers' production to cacao is also framed as an adaptation to climate change. Although it is not within reach to discuss the political economy of cacao, climate change is not the only reason that cacao production is stimulated. Prices have been increasing in the last years and chocolate producers are looking for new production areas (Timms 2016,

100-101). The cacao plantation Norman told me about is owned by Ritter and a response to high cacao prices (Nieburg 2014). The diversification of farmers is thus not only a way of securing income for small farmers but also a way of securing the supply chain of chocolate producers. It is however questionable how different the international market of cacao is from the one of coffee. Many problems attributed to coffee production are also part of cacao production. In light of the discussion on increased pressure on the environment and the extraction of nutrients, it seems that cacao will put an ever higher pressure on the environment which can lead to higher costs in off-farm input and thus to a need to generate more income. As long as cacao prices will remain high this could work out, but a cacao crisis seems prone to happen (Timms 2016, 100-101). The diversification of cacao production is thus just as much about adaptation of people's lives towards climate change, as it is about adaptation of the commodity production systems.

Coffee in Nicaragua has mainly been produced because of its value as an export commodity. Under Somoza for example cotton and coffee for export were given more importance then food production. And 'even' when the Sandinistas were in power, coffee was seen as a means for further development and modernisation (Ryan 1995, 56). Although these 'structural' processes have an influence, it cannot be denied that farmers and families actively participate in the process of coffee production as well. Norman for example told me proudly about his dedication towards coffee production and that he preferred to work with coffee than constructing the road they were building at the moment. There are ways how people seize opportunities and take control over their lives, and for many coffee is seen as a way to develop. As Doña Dilma told me about her son, "he has the strive to get ahead in life".

Conclusion

The claim of this thesis is that changing farmers' practices in relation to coffee production, within in the current global coffee production system, cannot halter environmental degradation and the marginalisation of rural peoples in the mountains of Nicaragua. The attempt to change the situation by changing farmers' practices does not take into account how these practices related to historical processes and processes in connection to other localities. The expansion of coffee landscapes into the highlands of Nicaragua, together with the creation of a large landless population are part of the logic of coffee production. The benefits and externalities of coffee production are unequally distributed among people whose lives are shaped by the presence of coffee production in their lives. The community is not a homogeneous group in which increasing revenues from coffee production will be distributed among, or trickle down to, all the people in the region. Though fair trade initiatives might increase prices for some coffee farmers, and benefit others in the form of side projects, it has shown not to be sufficient because of increasing consumption and production costs. The higher production costs relate to environmental degradation and to incentives to increase production by making use of external inputs, which are mutually reinforcing each other. Although organic production methods can halter environmental degradation, the yields and therefore revenues for farmers will be lower. As the price does not reflect the amount of work, this could lead to sacrificing other aspects of the farm income in order to keep producing. Families however are not passive and create ways of dealing with external influences. But there are other interests in the landscapes of shade-grown coffee that stabilise the production of coffee. It is in the interest of climate change producing actors that coffee producers maintain their landscapes and thus maintain producing coffee. Furthermore the land is being used by the chocolate industry to secure the supply of cacao. Adaptation of the people in the mountains is thus as much about adaptation of the systems of co2 emission, and the system of unequal exchange of export commodities. External concerns of adaptation are thus about *channelling adaptation* in the interest of the ones that perceive the problems in the first place.

'Global' concerns that do not take into consideration the particularities of the local are prone to reproduce situations of injustice. This is exemplified by the modernisation efforts and the failure of the Sandinista movement to understand rural life in the mountains. An analysis of global initiatives put forward by rural development and climate change adaptation programs, from the perspective of the coloniality/modernity could reveal how local perceptions on how to interact with one's place are being transformed in the interest of other localities.

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