GENDERED POLITICAL ECOLOGY OF COFFEE AND MAIZE AGRO-ECOSYSTEMS IN THE SOUTHERN ECUADORIAN ANDES


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Abstract:

This thesis is about how these small farmers in two socio-ecological systems in southern Ecuador accommodate their agro-ecologies and gender systems to national and international forces and networks, and how it relates to processes of ecological appropriation conflictive with their possibilities of wellbeing.
Loja, in the Southern Ecuadorian Andes, maize growers embrace industrial production, with a stricter gendered division of labor, which is offered as a solution to low income by state agents, meat-complex agribusiness, and banks at the cost of environmental degradation. Coffee farmers, adapt and increase their labor to join alliances with NGOs and farmer organizations in order to comply with fair trade and organic coffee market demands of high quality and moderate income improvements.

Cover illustrations: To the left an elderly couple of farmers harvesting papaya from their coffee poly-culture plot in San Antonio de las Aradas. To the right, monument to the maize in the main square of Pindal. Photographs by the author.

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1 Introduction

This thesis studies gendered socio-ecological relations of rural households in the Southern Ecuadorian Andes in the context of networks through which agricultural ecological appropriation occurs. Moreover, it seeks to understand diverse relations within peasant households, and between communities that produce two different cash crops in two different production systems. Seeking to clarify cultural and environmental differences and conflicts across and within these phenomena, the research and analysis of this study has been carried out using methods and theory from the field political ecology complemented with gender analysis.

This focus is justified by the critical stage of ruralities today . In absolute terms the world's rural population is larger than ever before, and has to feed an even larger and faster growing urban population. Moreover, demographic growth, and even more significantly, changes in lifestyle of economically emerging populations, are estimated to increase the demand for food in seventy percent by 2050 (IFAD. 2011, 14). Meanwhile, export-led cropping poses significant challenges for more mobile and diversified rural residents, who remain the global poorest and hungriest (Borras 2009, 7). Rural livelihoods since the last decades are incorporating new combinations of technologic, discursive, commercial and financial elements (Hecht 2010, 163) with fragmentation of labor classes and migration flows in multiple directions between the rural and urban, the national and international, and in permanent and cyclical modes (Borras ibid, 8).

Although socio-ecological changes occur intertwined with changes of biophysical and technological conditions, analysis of the environmental costs and impacts of productive forces in agriculture has been left out of much of the political economy of agriculture, a situation which calls for a refocus (Bernstein 2010, 303-4). As voiced by Via Campesina, the fact that industrial capitalism has transformed agriculture into "no longer a producer of energy but a consumer of energy" , pushes towards studies that address materially the biophysical contradictions of industrial agriculture (Martinez-Alier 2011, 145-6).

The two rural territories studied here, the Pindal maize growing canton, and the Quilanga and Espíndola coffee growing cantons, show environmental conflicts in different dimensions according to their culturally and materially differentiated agricultural activities.

Their two dominant agro-ecosystems were established several decades ago on maize and coffee as cash crops. Although sharing important historical, ethnic and geographic traits of the Loja region, each territory has developed complex, and distinct socio-ecological systems following important changes at regional, national and international scales.

The mono-cultural maize system is articulated to local commercial intermediaries, on-farm maize buyers, national agribusiness, the finance sector, and to a new producer association. The poly-culture coffee system is connected to fair trade commercial organizations, conventional coffee traders, farmer organizations, remittances, and fair-trade and organic coffee international brokers. Both systems interplay with the high outbound migration of the region, consequent remittances inflow, seasonal labor emigration and immigration from Peru.

Understanding how agricultural production evolves in connection to the world that it feeds is crucial to critical inquiries about the global environmental and cultural sustainability. This thesis intends to establish how rural labor and livelihoods, shaped by gender, have affected and been affected by recent socio-metabolic shifts related to connection of their production to markets. I analyze and identify the sources of different socio-ecological conflicts in each territory. Additionally, I seek to clarify how non-peasant social actors at multiple scales and technology are associated to the critical shifts in the commoditization of these systems. For this I integrate a synergistic theoretical and methodological framework combining political ecology with gender analysis, with additional attention to socio-metabolic processes. I am following principles of research informed by recent efforts of political ecology that take into account post-structural theories (Mackenzie 2005, 95), and challenge hegemonic epistemologies by incorporating participatory and collaborative methods (Paulson and Gezon 2005, 30-1)

1.1 Objective

The objective of this thesis is to characterize socio-ecological relations in changing agro-ecosystems demonstrating that cultural and environmental sustainability is built on complex and gendered interrelations. For this, the aim extends to establish relations of these changes with rural households' labor, gender systems, agro-ecosystems, and non-peasant social actors at different scales. The knowledge produced through this study may contribute to inform policies, strategies or assessments that look for improvement rural

livelihoods holistically considering this fundamental to ensure future global cultural and ecological wellbeing.

1.2 Research Questions

1.2.1 Central question.

What are the different relations between environments, gendered rural labor, local social metabolism, and non-farming actors in agricultural commodity networks in two rural territoeis? How these relations play-out in conflicts around efforts livelihoods with differentiated ecological appropriation in the two study areas?

1.2.2 Specific questions.

1. What is the historical background and geographical and socio-ecological characteristics of ruralities in Ecuador and Loja in relation to the world-system?
2. How is the gender organization of labor in two productive systems integrating different agricultural commercial networks (e.g. based on washed or cherry-dried coffee, fully industrialized and not fully industrialized maize)? What are the socio-metabolic differences?
3. How do the main non-peasant social actors, at local, national and global levels, constitute the two agricultural commodity networks and relate to peasant households in each study area?
4. How different commercial agriculture networks are shaped by and shape peasants' management of agro-ecosystems and their related labor and gender systems in each of the study areas?

2 Research Methodology

Three main theoretical and methodological approaches nurture this research: gendered political ecology, actor-network theory and social metabolism analysis. In this way research was concerned firstly on observing the power-differentiated relations of gendered rural labor with the agro-ecosystems they manage and exploit. Thereafter the research moves "upwards" in scale by looking at the relations between non-peasant actors that intermediate rural communities/territories and their agro-ecosystems to national and global socio-ecological networks, especially in relation to the commodities of interest: coffee and maize. Finally an additional emphasis of observation was put on social

metabolism via observation of material culture and the characteristics of the commodity network.

Methods used in the fieldwork were mostly qualitative with extensive systematic and non-systematic participant observation. Wide use of participatory tools was done in eight focus groups and nine on-farm and in-house participant observation routines. Quantitative data was drawn from the partial results of two surveys on production and commercialization of coffee and maize and secondary data, especially statistics from producer organizations. I participated in the design and data collection of the survey implemented in the coffee area, and my research colleagues implemented the survey in the maize area. The two areas of study are in the Loja province[1] of Ecuador (see Figure 1). The first one is formed by the Quilanga and Espíndola cantons characterized by coffee-growing households. The second area is found in the Pindal canton, characterized by maize growers.

I carried out the research for this thesis parallel to work as member of a research team carrying out a gender and environment study in the territory which report is named *Dinámicas económicas territoriales en Loja, Ecuador: ¿crecimiento sustentable o pasajero?* [Territorial economic dynamics in Loja, Ecuador: ¿sustainable or temporal growth] (Ospina et al. 2010) and as part of the collaboration gained authorized access to additional research results from work of other members of the whole group with whom I collaborated. For a detailed list of sites of the study with respective research activities see the Appendix.

2.1 Selection of Study Locations and Participants

The selection of Quilanga and Espíndola, and Pindal as study areas was according to economic indicators that these cantons have had important socio-economic changes and information that they had special environmental evolutions. Espindola and Quilanga had moderate economic growth, significant economic distribution, and the organic, fair-trade, washed coffee network was leading to improvements on ecological management. Pindal had significant economic growth, moderate reduction in distribution and perceived loss of soil fertility and public-health problems due to expansion of industrial maize monoculture.

[1] The political-administrative division of the Republic of Ecuador is given in provinces divided into cantons in turn divided into parishes. Rural communities are locally called *barrios*

San Antonio de las Aradas, in Quilanga, and El Airo-La Guaca in Espíndola, were selected as study sites following information from previous research and from a local expert and research team member, Eng. José Poma. These parishes were considered to include households representative in farm size and integration into the washed coffee networks. Ecologically, both parishes were considered good examples of the high altitude (ca. 1700 m. above sea level) sub-tropical forest where coffee is grown in the cantons. Industrial maiz is prevalent in the whole canton of Pindal and at different altitudes ranging from 600 to 1200 m. above the sea level. The urban center and its peripheral communities were selected because of its proximity to the non-peasant social actors and the variety of altitudes and humidity. La Esperancita was selected due to its distant location from the urban center and for being a good example of a lower altitude and dryer ecology not found in Pindal's center. In the Appendix 1 a larger list of study sites is presented.

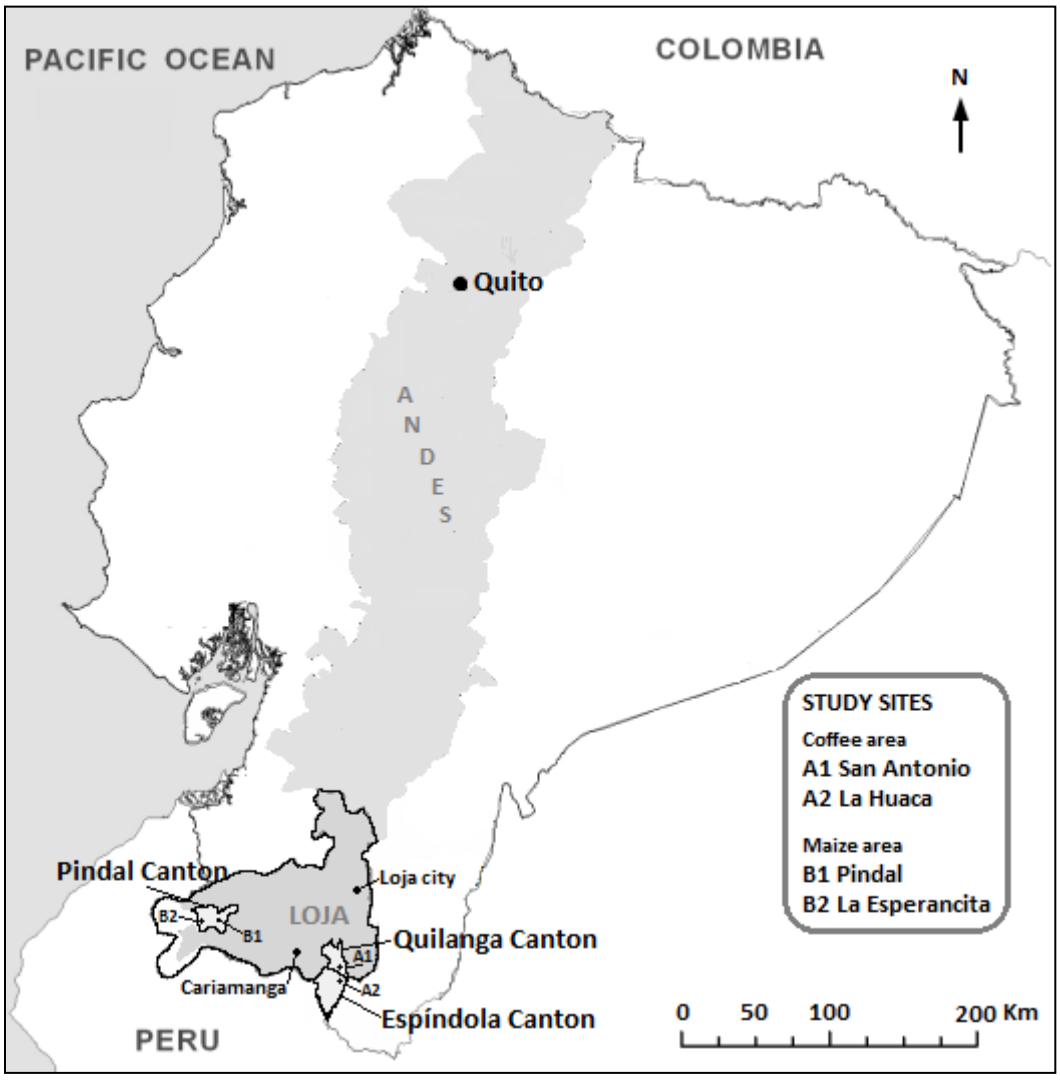

Figure 1. Map of Ecuador showing main cities, the Loja province, cantons and sites; prepared by the author.

The selection criteria of individuals and households in San Antonio de las Aradas and El-Airo-La Guaca for non-structured interviews, focus groups and on-farm in-house participative research considered several variables. I sought to study a set of households that would represent diversity in (1) different modes of production (dried cherry coffee and washed coffee), (2) farm size, (3) cash crop production output, (4) household composition, (5) age of participants and (6) membership to different organizations. In Pindal the selection criteria considered diversity of households (1) affiliated and not affiliated with the canton's peasant organization (CORPAP), (2) acquiring and not acquiring the credit and inputs package from the Bank of Loja, and acquiring other credit services, (3) attempting or not attempting productive diversification, and (4) age of participants. For a partial list of participants (participant observation routines) see the Appendix

2.2 Primary Data

Fieldwork to produce primary data was conducted mainly in four locations, two in each of the two study areas. In the coffee growing area these were the central rural communities in the parish of San Antonio de las Aradas in Quilanga, and in the parish of El Airo (La Guaca) in Espíndola. In the maize growing area I carried in-depth research in the rural town of Pindal and its outlying communities Cristo del Consuelo and Tabacales, and in community of the La Esperancita. Additional work on the El Cisne, San Juan, Quillusara, and Papalango communities is also included in this research. Between July and October of 2010 I spent twenty-one days in the coffee area and eighteen days in the maize area, with further time in Ecuador in Quito's Simon Bolivar Andean University preparing tools and systematizing the data produced. The methodological tools used ion the field work are the following:

Focus groups. One focus group for each gender group was carried out by other member of the research group I belonged to, Lorena Rodriguez, and I. Ths was done in each community: two per community, four per study area, and eight in total. The focus groups were defined as groups of 4 to 12 men and women who meet to discuss and/or exchange on a topic proposed by the researchers. Researchers keep the exchange focused on the issue through dialogue and participatory tools used (based on Longhurst 2003, 120) which were: (1) community map,(2) map of spatial connections, (3) participatory trend

graphs, (4) gendered labor matrix, and (5) gendered access and control matrix. The focus groups lasted between 3 to 4 hours. For a description of the participatory tools see the Appendix.

In-house and on-farm participatory research routines. I and Lorena Rodríguez, carried out short (one to two complete days) research routines with ethnographic elements (field notebook) and participatory tools. This included (1) participant observation [footnote with definition] of activities in the house and in the farm plots, (2) unstructured interviews, (3) resource map of house and plots, (4) seasonal calendar, (5) daily activity clock, and (6) monitoring of biodiversity and material culture. All routines were sought to be done, at least partially, with one man and one woman of the household (if possible) asking them to conduct themselves as in a normal day and offering help for any daily duty. For the coffee growing area six routines were conducted, in San Antonio de las Aradas three and in la Guaca other three. For the maize growing area five routines were done, three in the Pindal periphery (Cristo del Consuelo, Tabacales and Pindal center-Las Cochas) and two in the La Esperancita community. For a description of the participatory tools see also the Appendix

Interviews with social actors. I and Lorena Rodríguez, plus additional ones made by team members Patric Hollenstein and Pablo Ospina, did non-structured and semi-structured interviews with peasants, peasant community leaders, peasant organizations leaders, producer organization promoter-technicians, parishes and cantons political authorities, maize and coffee traders, and public health authorities.

Surveys. I also include partial results of a household survey on coffee production and commercialization of 2009, which design I collaborated for and participated in the data collection. The survey covered twenty-one communities in both cantons with 327 households surveyed. Moreover I also made use of results from a similar survey to maize growing households done previous to my participation in the research team and with less attention to entries on gender, labor and household composition. (396 households interviewed [20% of Pindal's population] and 23 buyers of Pindal's maize).

2.3 Secondary Data

Secondary data consists of literature on the history, geography and ecologies of the territories studied. Lists and statistics from the producer organizations and from credit providers were also accessed.

2.4 Shortcomings

One shortcoming of this methodological approach is representation, since the study only explores a small portion of the studied territories and only during a short period of the yearly socio-ecological cycle. Additionally, the number of participants was variable and limited in focus groups as well as access to household members during participant observation and interviews. Another issue is the imbalance in the realms of labor studied, with less work on non-farmer actors. More limitations include that gender identities were reduced to two dominant gender categories allowing enhanced comparability, but diminishing attention to diverse local categories and conceptions of gender. Further research might build a more complex approach to gender in relation to kinship and generation, and race/ethnicity (in a mainly *mestizo* population). In spite of some attempts at measurements, systematic quantifications of mass and energy flows were not produced due to time restrictions, and this is only covered by observations and gross estimations.

3 Theoretical Framework

3.1 Political Ecology

Political ecology is a field of study grounded on shared areas of inquiry approached with theoretical heterogeneity, though drawing heavily on Marxian dialectical materialism and more recently on post-structuralism. Political ecology responds to a theoretical need to integrate the political economy with the environment, addressing the politicization of the latter (Peet and Watts 1993, 238). Political ecology puts special emphasis in recognizing that "environmental problems are socially distributed" (Hornborg 2001, 35). This distributions include "social, spatial, and temporal asymmetries or inequalities in the use by people of environmental resources and services, i.e. in the depletion of natural resources (including the loss of biodiversity), and in the burdens of pollution" (Martinez-Alier 1995, 80). The field reflects a confluence of "ecologically rooted social science and the principles of political economy" (Peet & Watts 1996:6) and its heterogeneity spreads to communicate richly with neighbouring fields in many disciplines.

What studies of political ecology have in common is a focus on ecological distribution conflicts that rise from "social, spatial, and temporal asymmetries or inequalities in the use by people of environmental resources and services" (Martinez-Alier, 2002, 1995). These conflicts originate from growing social metabolism and show how

different actors and communities use different languages of valuation in contributing to and in confronting metabolic changes that involve emergy (embodied energy) accumulation by some at the expense of others (Martinez-Allier, 2001).

Enriched by influxes from post-structural feminist, practice and discourse theories important areas of political ecology scholarship are the relations between the logics of capitalist production and specific outcomes in the environment, the differentiated political action to control and access resources, differentiated knowledges, discourses, meaning frameworks, institutions related to power and the environment. Political ecologist approaches also locate studies in multiple scales of space and time not limited to singular historical moments or places of analysis but building connections between and/or across them (Peet & Watts 1996:5-13; Paulson et al. 2005:25-30).

3.1.1.1 Cultural distribution conflicts.

It is considered useful and innovative to analyze complex interactions of humans and the environment recognizing the hybrid and open quality of modernity, which Escobar (2008:168) and Mignolo (cited by ibid.) sustain can be understood in duality: Modernity and what it denies to exist. This conceptualization of modernity considers what reflects its failures, and what reproduces, renews or transcends it, "in sum there is no modernity without coloniality, modernity/coloniality encompassing modern colonialism and colonial modernities" (ibid.)

This clashes of modernity can be translated to an understanding of material (economic and ecological) conflicts always intertwined with cultural distribution conflicts. As Escobar presents (2006, 9) "if production under unequal distribution negates ecological processes, it also negates the cultural processes that are at the basis of people's evaluation and relationship to the natural World".

Moreover seemingly clearly identified conflicts are a product of a set of broad change processes inscribed in "specific historical contexts" (Turner, 2004:865). Therefore conflicts may not just be "manifest", but can be traced in other phases of their evolution such as "incipient" or "latent" (Moritz, 2010), and can be address along this processes.

3.1.1.2 Networks.

The importance of a detailed analysis of socio-ecological dynamics calls for the incorporation of a theory in dialogue with political ecology (eg. Castree 2002) that presents useful conceptual tools for this mission: Actor Network Theory (ANT, cf. Latour 1993; Law 1991; 1993). Conceptualizing the formation of networks that connect human and non-human actors through specific historical relations is useful to look closely at the interactions between organizations, communities, individuals and non-human beings.

Post-structural political ecology, especially in Urban Political Ecology (cf. Syngedouw, 2006; Heynen et al., 2005) has established fruitful dialogues with Actor-Network Theory (ANT) that conceptualizes nature-society relations as networks that connect human and non-human actors through specific historical relations and interactions between organizations, communities, individuals and non-human agents (actants) (cf. Castree, 2002; Escobar 2008; Nightingale, 2006). Political ecology with ANT can clarify how ontological dualities (structure/agency, natural/social) can not be defined a priori (Castree, 2002; Goodman, 2001). As Hollifield (2009, 655) explains, ANT can bring analytical capabilities that move beyond "describing or explaining environmental inequalities, traces the emergence and resolution of controversies and uncertainties surrounding environmental injustices". Moreover, Busch and Juska (200, p.701) argue that looking at political economies –in this case ecologies–, through networks is better suited to determine "[w]ho or what, by using policies, inventing new technologies, modifying or creating institutions, is able to position him/her/itself in a strategic position so as to provide for his/her/its best interests."

In rural studies and agro-food systems scholarship there is also a history of the incorporation of actor-network theory (Murdoch 2000)into analytical frameworks. For example, Whatmore (1991) demonstrates how the commodification of socio-environmental systems (such as family farming) is produced in very different forms and in multiple directions. Changing phenomena is seen as a networked and agency is given to households whose work, embedded in systems of gender, class and race, modifies the environment and interacts with other actors. This ends up giving a more complex and comprehensive view of relations with local socio-ecologies major structures (ie capitalism or the market Castree, 2002) and allows for an analysis on a continuous movement (and discontinuous) between the local and global.

Additionally, this variety of networks in rural areas gives a particular specificity that resists generalizations about policy and government. This may require refining the definition in terms of development strategies to cover more dimensions (Marsden, 1998).

3.1.1.3 Rural Metabolism

Social metabolism approaches also are serving to complement political ecology to incorporate the biophysical world into analysis. Social metabolism is the integration of flows of mass and energy that human societies need for their existence, in other words, a process by which "[h]uman beings organized in society appropriate, circulate, transform, consume and excrete materials and energies originated from" the non-human environment Toledo (2008, 3). Marx specifies that labour is (…) a process by which man [sic] mediates, regulates and controls the metabolism between him and nature. (…) It is the universal condition for the metabolic interaction [Stoffwechsel]" (cited in Forster 1999, 380).

This process is differentiated, in first instance by Georgescu-Roegen, as "endosomatic", to reproduce internally the body in pre-social conditions, and "exosomatic" , to reproduce the conditions outside the body of the members of a given society (Giampietro et al. 2009, 314). This is respectively understood by Toledo (ibid., 4) as "bio-metabolisms" (inside bodies) and socio-metabolisms (outside bodies).

Marx explains that through labour the human being "acts upon external nature and changes it, and in this way he simultanepusly changes his own nature…" (Forster, ibid.). Toledo (ibid, 3) puts it as metabolism "socializing" fractions of the non-human, and "naturalizing" society by producing and reproducing its linkages to nature, in a "reciprocal determination between society and nature." In better terms, the co-determination of the human and the non-human world.

Rural Metabolism can be distinguished within Social Metabolism on the basis of the process conceptualized as "appropriation of nature", the process which by the members of a society appropriate and transform ecosystems, that originally all humans had to carry out, and that some authors limit to the appropriation of the products of photosynthesis. The rural is defined here as the social space formed by the units thata carry out this appopiation (Toledo ibid., 5-6).

3.2 Gender as Socio-Ecological System

Gender is a socio-cultural system that norms, structures and gives meaning to the roles and relationships of men and women in the socio-natural environment. It influences the constitution of actors and networks, in the functioning and composition of the institutions, and in the development, distribution and use of tangible and intangible resources in the socio-natural environment (adapted from Paulson et al. 2010: 4).

The concept of social capital is of essential importance for understanding the gender systems and are key economic link with non-economic areas. In the words of Bourdieu and Wacquant (1992, 178:119), "[t] he social capital is the sum of resources, virtual or real resources, that are entitled to an individual or group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition "

Moreover rural masculinities present hegemonic and subordinate constitutions, that not necessarily make more powerful to those men (or women) that incorporate them. Moreover, masculinity are in constant change, especially in processes where socio-ecologic systems are shifting their relations with systems of class (and race) (Connel, 1997 [1995]).

3.2.1 Triple role and practical and strategic gender needs.

Based on the conceptualizations of Moser (1989), I conceive the triple role as a analytical categorization of three areas of work necessarily carried out in each family or community. This categorization reflects in various degrees the institutional and conceptual organization of work in the studied territories. Gender analysis explores the division of labor between women and men, and their respective roles within the following areas:

- Productive Labor. The work, the use and / or conversion of assets for obtaining agricultural products, handicrafts, art or money for subsistence, trade (commercial or otherwise) and / or accumulation.
- Reproductive Labor. Consists of the generational reproduction of the population through birth, upbringing and education of children, and the daily reproduction of the workforce through health care (physical and emotional), food, and maintaining housing, dress, and culture. A strict definition can be extended to the care and

husbandry, the production and application of manure for fertilization of the soil and everything that reproduces livelihoods.

- Community Labor. The interaction and / or shared work with individuals from other households, and leadership and political representation to ensure access to and control of the necessary assets for the community, and to maintain social and cultural organization necessary to handle them and give them meaning. It can range from party planning to environmental management that goes beyond the family property.

According to Moser, despite the fact that reproductive, is essential for the maintenance and reproduction of family labor for productive work. Reproductive labor is often considered secondary by institutions and policies. Community activities for women are generally related to access and provision of supplies for public consumption, and in the case of men they relate to leadership and political office. (Moser 1989, 1801).

This last consideration is completed by the main perspectives of political ecology also described by Mackenzie (ibid.): "[H]ow people relate to each other and the environment affects and is affected by their relationship to the means of production", and relations "are historically constituted and connected to other geographical scales of analysis". Complementing this, human economies, in Hornborg's (2001, 39) words, can only be understood in terms of "interfusion" of objective-material and subjective-cultural constructions.

4 Two Gendered Agro-Ecosystems and their Agro-Food Network

In this section I will present results from my research on two socio-ecological systems. I will start by addressing the context at larger scales with the historical position of the Loja province-territory as periphery of the world-system at national and global levels. Following this I will describe the gendered labor organization of the yearly socio-agroecological cycle. Subsequently I will describe the relations between farm households and the various non-rural actors that form and shape the networks by which they relate to the world-ecology. Finally I will present a socio-metabolic characterization of the networks.

4.1 Latin American Ruralities in the Neoliberal Era

Trade liberalization, commodification and financialization of agriculture has augmented since neoliberalism started to take after the oil crisis of the 1970s. In a context

of new and multiple relations between deregulation, new trade regimes, this has brought further inequalities as a higher proportion of people do not live dependent on agriculture and the absolute increment of rural households living in poverty. Moreover, the expansion of high value food, like organic coffee, posses new questions to the relation of inequality between producer and consumer. Additionally, changes in diet in developing countries within liberalized trade also poses threats to sustainability, for example rising poultry demands with imported maize and soja. However al this connection between rural households and the market is never fully "globalized" signaled by complete vertical integration, as there are always disruption between, producers, especially if they are from the south, and consumer and powerful intermediaries (Goodman and Watts 1997, 10-15)

After several decades of populist land reforms Latin America faces recent processes of land grabbing and extractive agriculture for consumption in industrial networks and international markets (Huitzer 1999). Together with other extractive enterprises, such as mining and illegal crops, this intensified commoditization of agriculture of recent decades frequently leads to socio-environmental conflicts in rural communities (Bebbington et al. 2008). Extractive economies in agriculture are characterized by unequal trade balances, local dis-empowerment, and rates of production beyond ecological replacement rates (Martínez-Alier 1991, 625-627)

4.2 Rural Ecuador in the World-Ecology

Ecuador is one of the most biodiverse places in the world. At the same time its position in world-system peripheral. Basically, it has passed through several stages of extractivist "booms". First was cinchona in the 19th century until it was exhasuted, next was cacao in the first third of the 20th century until plagues moved the offer to Africa.In the 1950s and 1960s Ecuador became the major producer of bananas in the world, a position that, after a crisis in the 70s still keeps. Import-substitution policies were implanted during1970s but due to the debt crises, even after massive oil exploitation major restructuration occurred. The effects of this neoliberal restructuration on the environment include increase in economic pressure on natural resources; push on crops of doubtful sustainability; policy exclusion of the rural poor related to intenfication of land pressure; erosion, desertification; overgrazing, and ecosystem destruction; weakening of the state with the strengthening of market laws as the main mechanism to assign investments and resources through prices that do not value the environmental support of production (Larrea 2001).

Moreover, since the sixties significant and unforeseeable changes occurred in rural Ecuador. This shifts respond to the extinction of the hacienda system after land reforms in 1964 and 1973, the intervention of many development projects in the decades of the eighties and nineties, and the expansion of export –led agribusiness to some areas of the nation. This phenemomena has been signaled by the appearance of new actors and differentiated power among them. Moreover, it has been accompanied by development strategies from pre-reform state controlled approaches, later top-down NGO business friendly approaches, to more recent partial bottom up, "empowering" strategies, and attempts of integral rural development that in its latest editions has seen the emergence of peasant, and indigenous associations and organizations (Breton 2008, 583-585).

4.2.1 The Loja region as periphery.

Loja is the Andean southern-most province of Ecuador. It has a particular historical development shaped by early colonial and neocolonial exploitation of its resources (gold mining XVI-II c., Quina bark extraction XVIII-XIX c., and *hacienda* cattle ranching XVII c.-1970s), remoteness, terrain abruptness, and geopolitical conflicts with neighboring Peru. The population is largely of *mestizo* ethnicity. They live in a part of a lower but more topographically convoluted section of the Andes shared with northern Peru. It includes unique, variate ecosystems and is one of the most rural areas of Ecuador. Its geography and location make the area prone to extreme wet and dry years given higher sensitivity to El Niño phenomena--exacerbated with climate change (Maldonado A., Vivar C., and Vélez Q. 2005, 31-34; Valarezo 2008, 116-118).

Important for the evolution of the agroecosystems of study is the processes of Land Reform and the disruption of the hacienda system. This was built on exploitative relation where the owner rented marginal lands in exchange for labor to the rural workers. Additionally there was open lands, communal *de facto,* where rural households accessed rrigated land for subsistence crops and graze lands for small scale husbandry shared with owner animals (Maldonado et al. 2005 241-245).

4.2.2 Socio-ecological relations and dynamics of two agroecosytems.

The two rural territories in Loja, in the Pindal canton and Quilanga and Espindola cantons, show environmental conflicts in different dimensions according to their differentiated social metabolism of agricultural resources. Their two dominant agro-ecosystems have been built several decades ago on maize, in Pindal, and on coffee in

Quilanga and Espindola. Although sharing important historical, ethnic and geographic traits of the Loja region, each territory has developed complex, and distinct socio-ecological systems. Peasants labor and livelihood, shaped by gender systems, have affected and been affected by recent metabolic shifts related to commodity and technology change in in their cash crops. This also interplays with the high outbound migration of the region, consequent remittances inflow, and entrance of migrant labor from Peru after the neoliberal dollarization (2000) and the bi-national peace treaty (1998).

In the next two sub sections I will present the differentiated gendered labor process of coffee producers, the way they connect to non-rural actors, and their social metabolism.

4.2.2.1 Conventional and alternative coffee in Quilanga and Espindola. Labor

The agro-food networks differ between conventional, cherry-dried coffee, and alternative washed coffee. Cherry dried coffee has a simpler postharvest and it's sold to local traders. The alternative coffee is "washed", this means that is pulped and soaked before drying. The process is explained in detail below product of the participant observation routines:

Preparation

The harvest ends between August and October. The latest coffee sales are realized, there is more money and people try to cancel debts and make significant expenditure (eg. sacks of rice and beans, clothing, materials for repairing houses and fences). The work in the fields focuses on pruning the coffee bushes the leguminous shade trees and fruit trees. Pruning bushes seems to be a common activity for both men and women, but men prune the trees. The promoters of washed coffee production recommend to prune with a saw to avoid broken branches to minimize the exposed surface and prevent plants from infection. In this time sporadic weedings are also done.

In late December and January the rainy season begins and extends until May. Weeding is usually carried out throughout this period, usually more intense towards the end. It allowshigher productivity and less danger during the harvest.. Bersavé C. and the men focus group in La Guaca participants said that women do not weed and instead bring the food and stay at home taking care of animals. Two women in the observation routines

weeded: Rosa U. and Selmira C, both in their fifties-sixties, their children grown and absent, with little access to labor through kinship. Men tend to weed but it is common to hire laborers a couple of times or at least once before the harvest. In households with limited access to household labor men continually weeded. In San Antonio men reported to weed daily. Following participant observation on the farm with Melesio C., weeding in a well mantained hectare could take three to five days for one man. Normally requires two main weedings during the year and households with access to hired labor, hire for this crews of four to six men at the beginning and end of the rainy season. As usual, women prepare and transport food to the farm for men, and the weeding crews.

The planting of fruits (especially bananas) and cassava is also performed during the rainy season. Men make the holes and women plant the shoots of banana or cassava. During the rainy season is when the households have less cash, especially in the months before the harvest when the money from the coffee sale was exhausted and provisions (i.e. rice, beans, etc.) bought have been consumed. In households with no other significant source of income, the subsistence economy , cared by women, becomes dominant. Food crops and small animals that are taken cared mostly by women, become more important than coffee. Bananas are harvested throughout the year and together with rice (always purchased) are the staple foods. Women in food crops tend to harvest or ask men to do so following needs for cooking, barter or gift. Additionally, women appear to be the ones that sell or trade this food-crops production, and buy food-stuffs that they do not produce

Many homes also have fenced small plots with grass for mules and horses used in transporting farm products. During the dry season after harvesting men also weeded periodically these plots and check the animals. It is not unusual, given the rugged terrain, that some animals fall by accident . Also at this time men take time to repair the fences that after some years require a complete renovation and often requires additional labor. Women that breed guinea pigs at home ask men to bring green pasture from this lots fresh grass for feed.

Management

The organizations that mediate the trading of washed coffee require to avoid the use of the shovel to weed and recommend the machete, in order to prevent the damage of the coffee bush superficial roots. The conventional small bladed shovel can reduce the

frequency of weeding. The machete can produce fast and tougher re-grown weeds. Besides this methods households who do not wash coffee, and thus do not have organic certification requirements occasionally use herbicides. Melesio said he rarely applies herbicides, every three to four years, especially when rainy years produce weedy orchards or when for some reason the orchard has been unattended to long.

Orchard management

The coffee bushes usually are kept for several years without renewal. The local cultivar of arabica coffee is the "criollo" (Spanish for creole) probably the only variety grown by cherry dried coffee producers. Washed coffee producers also grow mainly criollo, with seldom use of new varieties as caturra and amarillo. The productivity tends to be variable but sustained over time (15 years).

In orchards from cherry dried coffee producers, the renewal of coffee bushes is not usual (and to lesser extent leguminous and fruit trees). It's done replanting shoots found on the ground while weeding. The acquisition of plants is rare and the removal of old plants may encounter barriers due to their symbolic value as they have passed through generations. Households producers of cherry dried coffee tend to put more time in the renewal and maintenance of fruit trees, especially bananas, than those who wash coffee.

The management of washed coffee involves systematic renewal or expansion of the coffee crop, for which households prepare nurseries or buy seedlings. Seedling production in nurseries should begin from June to July so that they are ready five or six months later to sown at the beginning of the wet season. Seedling production is closely linked to the relationship of the households with the organizations promoting the new production system. From them, the farmers get the training, seeds, and some materials. Varieties introduced by the organizations have resulted in mixed experiences. The new varieties are more productive but some growers have reservations about their shorter life of seven to ten years, compared to the criollo that can last several decades. The caturra variety now is rejected due to its small cherry and higher cluster density which complicates the finger-picked harvest required in washed coffee.

The nurseries are mostly handled by men, but involves many laborious not heavy tasks and entire family helps including children and teenagers. In the same way, when the rains start the planting of seedlings involves all the members of washed coffee households.

Harvest

Starting in May, It's the most crucial and demanding activity of the production cycle, and the most differing stage between the two production systems washed and dry. The harvest for cherry-dried coffee is estimated by PROCAFEQ technicians to take 40 man-days per hectare. Both women and men participate in the harvest. In the conventional harvest used for dried cherry coffee the cherries are torn from the clusters considered ripe pulling all of them off with both hands. This results in significant amount of green or over-ripe cherries collected. Transport of the harvest is done in sacks and buckets and can take some hours to move to the house given that plots many times are dispersed and in abrupt hills.

Right after harvesting cherries are sun-dried in roads, patios or roofs. It takes about two weeks and the pulp undergoes partial fermentation conferring odors and flavors to the bean considered undesirable for high-quality coffee. The inclusion of cherries with ripeness makes bean sizes less homogeneous than in washed coffee. To dry cherry promptly and with higher quality the sun-drying has to be supervised to avoid drawbacks from sporadic rains. Women tend to do this by stowing the cherries when it rains, to spread it again when precipitation stops.

To produce washed coffee the ripe cherries are harvested finger-picking them from the cluster. The green ones are left so the same cluster is harvested more than once. In the late afternoon following the harvest, the cherries are pulped by a machine, a pulper (more often electric than manual), that produces pulp and beans. The beans are washed with water to remove the mucilage. Finally the beans are dried in the sun for about a week to obtain parchment coffee, (bean with a paper-like skin). Women are generally also responsible for this shorter drying. The washed coffee organizations require that washed coffee is not dried in the floor. Therefore, many households producers of washed coffee build concrete patios or a drying platforms sometimes with canopies to avoid the rain and the need to be alert to stow and cover the parchment coffee.

Waged Labor and Community

Men tend to go and stay at the plot(s) all day. Women tend to walk several times between the house and plots and between plots, as they pick fruit, prune, take food to

harvesters, carry fertilizers and prepared soil for planting, water to irrigate recent plantations, fruit plants or legume trees that do not tolerate dry conditions.

This movements and associations render women key actors in building relations to access quality and quantity of labor, specially important for washed coffee. Women also manage the income coming from occasional local micro-sales or barter of fruits and animals (chickens, guinea pigs).

Connections

Networks systems of washed coffee and bola coffee differ substantially in the networks of regional and extra-territorial actors involved and their relationships with households.

Washed coffee in the area has its origin after the international coffee crisis of the early 1990's. In 1993 there was a fall in the price of conventional coffee to less than 30 dolars the quintal. Local actors (farmers and farmer organizations) found an alternative of participation in the niche market of organic coffee, in partnership with NGOs and alter funding from remittance-fed financial cooperatives and international cooperation. Social movements of the land reform led to the formation of producer organizations (UCOCPE) which then formed coalitions with NGOs in the end of the 90's .1 The result has been a main new organization of coffee producers (PROCAFEQ) linked to a regional one (FAPECAFES), and other local competing ones. They provide technical support via promoter-technicians.

Household responsibilities with organizations are to meet the quotas and the time delivery of the agreed washed coffee production, for which they receive a performance bonus of five dollars on the price per quintal (going from 158 to 163 USD with PROCAFEQ). Households have to invest in capital that can produce washed coffee (pulping machine, electric motor, washing tank, drying canopy) and follow the practices that allow them certify the coffee as organic. The human capital transfer it through regular training workshops, and visits to promoters and technicians. There are meetings of members, usually one main meeting once a year and then secondary ones bimonthly. The group workshops are generally attended by men. PROCAFEQ sells coffee to middle or small size retailers in Europe and the US.

The evidence suggests that group workshops are generally attended by men, they are targeted and offered to them, but there is some space that allows also women participation. Workshops are seen as advantageous by men and justify their bias towards them because they are "for the field", " for the coffee". On the contrary, they consider that women have a greater say in the orchard or backyard garden, the equivalent of saying the food crops.

For cherry-dried the traditional retailers of the intermediate cities, basically Cariamanga, buy the bola coffee and give small credits and advances to farmers in client relations. Prices in the conventional network have increased due to the input of washed coffee and respondents reported that 2009 were between 99 to 136 dollars per quintal (48kg) of bola coffee.

4.2.2.2 Industrial maize in Pindal.

Labor

Post-Harvest

When the harvest is finishing maize cobs are selected for seeds to sow next year. Both men and women can do this selection looking for big homogenous cobs. The grain from both ends of the cobs is discarded and the un-tipped cobs safed in sacks or buckets. This practice however is done if the household will not use exclusively commercial seeds. In the observation routines in La Esperancita participants used mainly commercial hybrid seeds but given their involvement in alternative projects some were testing local seeds. In Pindal, there mixed practices: in Cristo Consuelo Miguel R. had quit buying seeds recently, reused seeds from past harvests and tested the alternative local seeds; in El Cisne Nora was testing local seeds; in Tabacales Santos R. used only commercial ones.

Most participants expressed that the income from the harvest is spent quickly whatever the productivity of the system. The payment of debts (bank loans must be paid between October and December), added to large investments or consumption in the post-harvest months quickly reduces finances. This is exacerbated if for any reason productivity is low, either because of debt accumulation, use of less inputs, or climatic variations. Therefore, in the dry season many men and women seek different strategies to sustain their livelihoods. Men search for a variety of scarce agricultural work options. For example Miguel R. from Cristo Consuelo, close to Pindal, points out that after working four

hectares with a low productivity based of 40 *quintales* (qq = 48kg) using after using a few inputs and reused seeds :

> It's only enough for paying a part [of expenses], for what is missing one has to win a day [work wage days]. The children stay with the grandparents and Rosa [wife] goes to sell cooked pulses that she prepares four times a week. I weed coffee orchards, repair fences. There is always something to do in the countryside. One lives like an ant.

Santos in Tabacales has specialized in repairing fences in his community. Tabacales has a communal organization since it came to be after a late land reform process that they won to a surviving hacienda in the late 1980s. This organization has made Santos responsible for fence maintenance. Moreover, He also works as labourer in coffee orchards later in the rainy season in the few neighbouring creek watersheds.

Ensuring Land is also crucial in the post-harvest dry season. Because of the expansion of maize growing and declining soil quality there is more competition for good land to rent. Very early in the final stage of the harvest, men have a responsibility to ensure the land lease. In the focus group with men of Pindal Miguel R. said that even since April a verbal agreement has to be sought. In both focus groups, in Pindal and La Esperancita, men said the contract has to be done between October and November. Women are not involved in this business, at least directly, However, in the workshop with women in Pindal, they reported precisely who were the tenants of land in the area, and how much each tenant was paid, with a detail not heard from the male participants.\

Preparation and Sowing

Between October and December the plots are prepared for sowing. Weeding with a machete, called "scraping" (*roce*), can be done gradually in a couple of weeks by one man, usually the owner or leaser. It is also common that two to three more laborers do it in a couple of days. Miguel and Santos commented that they continue using reciprocal work for this activity. In the case of Miguel R., reciprocal labor is common as his community is formed by eight houses of his close relatives. Since Tabacales is a organized commune, the costume of reciprocal work remains alive. In the focus group with women in Pindal, two out of eight women declared that they participate of the field preparation, Johana said she helped her husband, and Blanca it's a unique case of a single woman that does all agricultural work. After scraping the fields follows the burning that usually is done in a

few days in December leaving the land ready for sowing. Women tend not to bring food to the fields during the scraping and burning as there are not intensive tasks and men have time to go back to eat at home. These two activities are often done solo, during the morning in one place, and afternoon in another, and in the way men pass by home to eat. When there are groups of three to five men, either hired workers or reciprocal work women bring food.

Sowing is carried out in January when the rainy season begins. It's sought to be done as early as possible. This urgency is meant to maximize productivity from the whole wet season, and profitability of higher prices for early harvest. Participants reported that sowing three hectares can last about two days and seven hectares about five days with a crew of about eight to twelve men. It is also sought to complete the sowing fast, to reduce the time of hiring workers. Laborers are mostly Peruvians seasonal immigrants that have to be accommodated and fed. Hiring more workers for less time can enable women to do some economies of scale in cooking. Folowing this, Imelda, from Pindal, considers that during the sowing season she has less work than during the harvest, because its a shorter lapse of time. In contrast, due to the high number of workers, between eight and fifteen men, Flora (Pindal) and Lisbeth (La Esperancita) consider that it is harder work for them.

Moreover the transport of food is more difficult because of the muddy roads of the wet season many of them unusable for automobiles, with motorcycles as the only motorized option. Women and their daughters (as in the case of Teresa C. and her daughter Narcisa in La Esperancita) transport heavy pots of food on donkeys or on foot. In La Esperancita, Dumani and Wilder felt that without a motorcycle they could not grow where they have currently leased their plots in El Tambillo. They must ride home to pick up the pots with food. Women cannot come with them, then they bring the pots on the motorcycles. When sowing, men apply herbicides and nematicides to the seed. As these chemicals are more concentrated, they represent the greatest risk for poisoning suffered by men (Santos, Dr. Jorge Castillo).

Fumigation and Fertilization

In February herbicide spraying is done and in March fertilizer spreading. Both can be repeated up to April. Men prepare the solutions and apply the pesticides with backpack pumps. Women usually carry water to the field for the preparation. Fertilization consists in

spreading urea crystals on the base of the plants, and this activity is carried out by everyone including nine years old children, which sometimes are hired. One signal that soil fertility is diminishing is the increase of fertilization reported by partipants:

> Before we used to add an urea ince, now we have do it three times ... we have to burn twice (Miguel). It [the land] does not yield anymore (Sergio). There are people who do fallows of two of years, then it keeps up [fertiliy], but we can't, I would not have where to plant (Luis) (Focus group with men in Pindal).

Only one woman fumigated, who ran the production completely on her own, Blanca O., whose family was made up of her and her three young children. Men sprayed with backpack pumps that they give maintainance to. The adequate protection is not common and every year a handful of severe poisoning cases are reported in Pindal (Interview with Dr. J. Castillo, Pindal Health Center).

Seasonal migration

Only men migrate for seasonal work. Until just few years ago it was widespread to migrate to the coastal west to work in the shrimp or banana business. However, due to the increased flow of Peruvian workers to large agro-businesses on the coast, and also the increased productivity of hybrid maize, the temporary migration has declined.

> I have not migrated for years. We go sometimes just for needs, not to work. The work is quite cheap. Here we have12 dollars, 10 and the lunch, there is lower so the Peruvian with these peace treaties go everywhere, and Peruvians accept little less salary. Then why to go, if going one loses. At that time it used to go no [Peruvians were going]. We know because we have family ... in banana business we have worked more. It was a season in which there was no maize product [hybrid maize] , we used to go two, three times [per year] (Paul, 44, Guineo Chico.)

According to partipant Flor M. there are men who leave Pindal the soonest possible. They harvest before and store the product until the price improves, then go immediately to work in the West. The working conditions can be difficult.

To a lesser extent men find urban jobs such as security guarding, construction, as experienced by an unidentified interviewee in Papalango. However this appears to be more recent and not common.

Starting from April, the maize can be left to grow and savings are depleted before harvest, men seek more urgently other sources of income. Luis M. and Dumani C. continue to migrate to the coast. Luis sends money every 15 days or every month. Dumani told how

conditions in the banana plantations are stark. Laborers are given empty rooms to share with four others that often sleep on cardboards. They are paid by piecework.

Harvest

Harvest begins between May and June. It's considered an unpleasant task. The dust of the decaying dry maize plants, the spores of the molds that grow on them are irritant. Male harvesters cover their entire face to avoid breathing the particles and wear long leaved under heavy sunlight. In addition, snakes are quite common. Men and women considered harvest as a "heavier" activity in which women do not participate.

Once the cobs are collected, they are mechanically threshed. The machine used is rented out from neighbors or in urban Pindal and taken in a truck to the farm. Five people, including women, introduce the cobs in the machine to obtain bagged grains on one side and husks on the other. The operation with various parallel activities (feeding, bagging, sewing, pilling up bags, counting) requires considerable manpower, 6 to 8 days of work. The bags are then piled on the house porches to wait the sales. Counting and monitoring was reported by participants (Flor, Miguel y Rosa) as a female activity crucial at the moment of the sale.

Connections to non-rural actors

According to what has been expressed by the participants in the participatory trend graphs in the focus groups of men, the importance of grassroots organizations in Pindal started in 2002, motivated by political changes and the project of FECD (At that time Ecuadorian-Canadian Development Fund), and it grows until 2006[2]. With the organizations due to the meetings, events and visits for accompanying projects, community activities have increased.

The intensification of monoculture begins with the arrival of new commercial actors that introduced improved hybrid maize seed. Subsequently, in mid 2000, it creates a network between farmers, poultry agribusiness PRONACA and Bank of Loja. The coalition of powerful actors was born after the agreement of a regional deputy, a promoter of local development and between the two companies aforementioned, agribusiness and

[2] The participants of Pindal point out the beginning of the increased organization with the conflict between the counties government and the opposition groups with the important presence of the prist A. Astudillo. The participants of la Esperancita in 2006, with the beginning of Correa's government.

finance. In pararel, with the increases in productivity, maize buyers outside the region were attracted.

Almost at the same time, but with slower growth, other network appeared, catalysed by the intervention of the now called Ecuadorian Fund for Development Cooperation, FECD. 2 In addition to this change, as perceived by some of the participants (José Miguel Malla and Miguel, among others), was due to its socio-political movements that the local government, linked to the conventional networks and maize mercantilists loses legitimacy with the people and with important social actors of opposition (among them the church through a priest named Asdrubal Astudillo, promoter of the neighbourhood organizations). In this network, "neighborhood" or "base" organization multiply and through the FNAC, becomes important CORPAP (Corporation of Agricultural Producers of Pindal), which includes an important part of the neighbourhood organizations.

CORPAP groups producers for associative sales and negotiates agreements with buyers such as PRONACA. Furthermore, CORPAP participates annually in the national negotiation of hard maize prices, and takes part of the coalitions on projects in economic and ecological diversity, promoted by other organization[3].

Grassroots organizations are linked to intermediate organizations, basically CORPAP and CNC (Rural Business Center of CORPAP) - financial institutions, especially Co-development and National Development Bank (BNF) - and the Canton municipality. The cooperative Codesarrollo, linked to the CORPAP, and the BNF facilitate credit to applicants from any organization.

In contrast, relations of producing households with the network headed by the Banco de Loja are as clients. The contracts with the bank are managed individually by the coordinator, Dalton Valdivieso, key player, along with former deputy Rafael Davila, in creating the coalition of the PRONACA-Banco de Loja, which also includes agrochemical package providers[4].

[3] For example: Pre-Association for the Defense of Nature and Life of Pindal (DENAVIP), Italo Ecuadorian Fund (IEF), Association of Municipalities of Celica, Macara, Pinal, and Zapotillo Puyango.

[4] For example, currently offer Brasilia seeds via Ecuaquímica, and Pioneer (Dupont) via India, the home of agro-inputs PRONACA.

There are slightly more women membership in CORPAP (14.1% in 2010) than female clients of the credit-package of Bank of Loja (10.7%, 2010). Moreover, one should consider the fact that CORPAP has grown recently. Also in terms of policies and leadership positions there are signs that these occur more often among women in the network focused on CORPAP. For example, the current manager of CNC and his assistant are women. Most important grassroots membership have more than a quarter of women affiliates and there are three organizations headed by women.

Female participation in the recent, but still limited, productive efforts in agro-ecological and diversification projects is outstanding. The organizations that are leading these projects are the Italian-Ecuadorian Fund (IEF), the Spanish Red Cross and the Commonwealth of municipalities including Pindal. These projects involve the recovery of native seeds and associated crops, economic and cultural promotion (recovery of cloth / traditional culinary knowledge) of "women artisans, family orchards and breeding of small animals.

These alternatives are addressed by women as an opportunity for solution of practical needs of both men and women, and opening up space and time for the attention of women's strategic needs (increased of power equity and opportunities.) Here is visible the challenge to the strict division of labor:

> [In the Projects of the FIE] participation of women is bigger, they help us with the biological fertilizers, the companion [Nora], they made a demonstration plot [of sarandaja] and I saw her [working] more than the men (Interview to Kleber Vaca, President of CORPAP).

The technician and farmer Flor. M. considers that the involvement of women in agro-ecological activities and recovery of seeds is 50%, however formally FIE project and the Mancomunidad only lists 11% among their affiliates.

There is a strong virilocality in the maize area, which coincides with previous findings of Martínez (2002:31) on Pindal. She notes that the virilocality reduces the power that women could have, being excluded from their kinship groups and it also reduces their chances of accessing the land. In La Esperancita, from our talks with Angel. virilocality is extended. In all the couples met women were from other communities and had moved to La Esperancita.

The dynamics of improved/commercial maize in La Esperancita is widespread and is the neighbourhood with the largest grassroots organization. According to the registration list of CORPAP, there are 59 affiliates, and one is female. The use of hybrid seeds and agrochemicals is intensive, but it contrasts with that, given the high degree of community organization, is relatively well involved in recovery efforts of local seeds and orchard improvement projects. The division of roles was more strict compared to the peripheries of Pindal. In la Esperancita women left early focus group because they needed to go home to cook. Participation in turn was limited, few attendees expressed their opinions and they took their children they were taking care during the meeting.

4.2.2.3 Socio-Metabolic relations

Regarding shade tree species, washed coffee producers tend to use a greater variety of these and handle more the composition of the forests, increasing the amount and variety of legumes (predominance of *guabo* [ingá, pacae]: *Inga sp.*) and eliminating or changing species considered to be counterproductive. For example, the successful introduction of Leucaena species promoted by the washed coffee technicians; removal of eucalyptus known for his voracious appetite for nutrients, removal of Ochroma species ("balsos") presumed to relate to leaf diseases in the coffee; and replacement of guabos affected by a recent plague that attacks the leafs undermining their canopy and lifetime.

As an additional enquiry, in Bersave C. and in Melesio and Rosas' farm I made a agro-biodiversity transects counting for different species. Rougly walking 75 meters in each farm, identifying species to the right and left every three meters. Bersave who washes coffee had 21 especies, Melesio and Rosa, who don't wash, 14.Bersaves variety was mostly in leguminous trees and more variate but few small fruit plantas (pineapple, naranjilla, bitter orange, tomato). Melesio and Rosa had almost half of the plot with banana and a considerable amount of papaya. Yuca at the morder of the farm was important. The agrobiosdiversity depended on how important was the cash-crop or the subsistence species.

Construction technologies are noted to have changed with income raises from remmitances and from the better prices of the new commodity networks. The technologies observed are the following:

- Concrete masonry: Defined by the use of concrete, iron rods, bricks (locally baked mud bricks, commercial bricks or concrete blocks), and finishing such as stucco coating or ceramic tiling.
- Adobe: Adobe bricks (Dried molded pieces of mud, clay and fiber), and wood.
- Wattle-and-daub *(Bareque)*: Light wooden structured Woven cane or sticks daubed with a thick mix of mud and fiber (sometimes also manure).
- Roofs in concrete buildings were built either also concrete, metal (ondulated sheets and steel beams) or fiber cement. Roofing in adobe and wattle-and-daub uses wood and clay slates.

The most common technology used for new houses was concrete masonry. The materials used varied widely. The semi-artisanal "bloque" bricks appear to be more common. For this is require cement and gravel. Locally made baked clay bricks still are in used. All the mud and fiber technologies are bein let down, because of the cost their intense labor requirements. In La Esperancita was very common the concrete bricks with

Most households with older members had well constructed and large adobe houses, with newer rooms sometimes made of concrete. Only in one of the households visited, Melesio and Rosa's, they used rammed earth for a large portion of their adobe house.

Concerning diet, or endosomatic metabolism, this is also growing dependent on outbound flows. All men focus groups recognize more bought food since at least thirty years ago, ecceleratin, interestingly in the early 1990s, with the arrival of electricity. In Collingora, notoriously impoverished, with few coffee washers people did barter rental of small lots of land for part of the harvest (paid frequently with part of the harvest)of plots for cultivation of maize and for consumption was common. In Pindal, besides maize fed chcicken and sporadic garden fruit fresh sarandaja as the plague makes inconvenient to harvest dry. Green peas are a staple for widely eaten soup, but they are no longer produced to cover the demand and it comes from Argentina. In Quilanga and Espindola, green banana, mandioca, added importantly to the carbs. However the preferred and widely consumed green pea for the famous "Repe" soup, that includes green banana and cheese.

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5 Analysis

5.1 The Extent of Alternativity of a Fair-Trade Network

The fair trade network of coffee is alternative only in the sense that it is a new framework of a commodity network. It shortens the network and it does reduce the asymmetries of unequal exchange. Households in the fair-trade networks earn an average of around 1500 a year and takes a different shape. However the "positive externalities", there are limitations at different levels for this alternativeness.

As Whatmore and Thorne (1997) explored for the Peruvian fair trade coffee, it follows an *ordering* of *connection* between consumer and producer and viseversa. Another universal or composite of the ordering of the washed coffee network, is environmentalism. Washed coffee is certified organic, comes with the described practices of improved soil and watersheds. Sustainability somehow is also part of this language that provides meaning for the exchange and production of washed coffee. There is also "quality", coffee is passing to be partially a niche commodity with less elasticity than conventional coffee. Quality is central for the network to still be running, and the hope cart that pulls more people into the game. The commodity fetish is still central and this is the main limitation of the alternativeness of the network. The commodity is the center. The access to European consumers is limited, the logistics, quotas and fixation that the capitalist transactions need to be efficient and profitable run on top of the other discursive and practical elements related to the agroecological management

The integration to a fair-trade network has produced mainly to sets of relations to the environment on the producer side. One of conservation other as management. The former one is based on practices propagated by the producer organizations that also push for better water and soil management. does help towards multi-dimensional sustainability, at least in a transitional form. Within the washed coffee network

However of positive impact in the short to mid term, in both territories the innovative networks are solely based on income-oriented, production-centered strategies. These then fall into the masculine sphere, preserve gender inequity, and exclude reproductive activities and women needs. In both places diet and construction have increased its dependency of the market. Consumption crops have diminished and non-local construction technologies and materials are more accesible. Lost of knowledge in both consumption crops and cooking and in construction.

The apparent sustainability of coffee could be related to the gender system relatively more equitable and more open to the division of gender roles within the household: the more variety within the system that is supported by a network more complex. On the other hand, the industrial maize is based on a limited size of the gender system. The shortcomings of the dynamics in terms of economic and environmental vulnerability may be related in part to this specificity.

However, the difficulties of washed coffee system to expand, and the facilities of the maize should also be linked to different levels of complexity of the social fabric in which they are constructed. The coalitions that make the coffee dynamics are not as inclusive as the production system on which they act and could be blocking a potential expansion if you consider the variety in terms of gender and generation of producers.

While some households acquire the capital necessary to change its production system to washed coffee, a considerable number (estimated at 60% PROCAFEQ) remain as producers of coffee in ball sold through the network of intermediaries cities (Cariamanga, Amaluza, Catamayo). To explain this difference,Iobserve from a gender analysis the factors that condition, in other words, that ease or hinder changes with washed coffee.

The capabilities and social capital differentiated for both women and men has been seen as highly important to define the movement from conventional coffee networks into washed coffee. As described, the women in their movements more extended maintain social networks that ease the access to reliable labor. On the other hand, men are the major beneficiaries of the supply of human and social capital in workshops, meetings, field visits, on behalf of organizations. A combination of these conditions for access to assets may encourage movement toward the washed coffee. It was also noted that men who produce

washed coffee often tend to be involved in other business activities and off-farm, and in political office.

I found evidence of commercial relationship between economic diversity and production of washed coffee. In the household-farm research with Silvio and Orfa, involved for years in the washed coffee, it was observed that between the two undertook a variety of additional activities. As mentioned Silvio is promoter of PROCAFEQ, but also sells coffee plants that they grow in their greenhouse, and between the two prepare and sell ice cream. Previously they had a store that Orfa was managing, and they baked bread to sell.

In other case, Maria Delia O. when a public employee in the parish court is the one who received more income in the household, and is also a member of the cooperative PROCAFEQ. Her husband and son are who work in coffee harvesting and maintenance together with laborers. Everyone says they want something more (coffee is not enough), but there are not many options in the area. In short, most diverse roles of men and women connected to the commercial sphere are related to households that wash coffee.

The important process of migration, generator of remittances and recent returns have been of great significance for establishing the network of washed coffee. Remittances arising from international migration contribute to the net, making viable the connection between the unions that finance organizations and households that boost the washed coffee. The money managed by women can also catalyze the shift to washed coffee, competing with the micro-credit of the traditional retailers ("loan sharks").

On the other hand, the constitution of the home, the roles of men and women, and the division of labor within the household, condition the choices and decisions in the households about the system / crop production. A primary relationship between the gender system and washed coffee starts with the largest manpower requirement of the new system. Pre-existing power of women in the integral management, either as labor in the crop production processes, through monitoring or via management of networks of trust, providers of labor, economic capital through income of wage labor, could ease that the manpower requirement is resolved.

Women move between home and farm, between different fields in scattered farms, carrying lunch to workers or going to work alongside men, and in these transfers interact

with neighbours and relatives. They also interact during the time they are on their front and back yard orchards, while working in the house or drying coffee. Observations like this suggest that the relationship of women with a wider range of people, the fact that they handle more social networks, informal, often linked to kinship, provide access to quality workmanship and trust, a requirement for the viability of washed coffee. Also in isolated situations, such as Bersavé with his sister and uncle, exchanges of labor still occurs. However, it is noteworthy to point out that the loss of traditional mingas and "pay-arms" is a disadvantage for coffee households with little family labor, especially for those potential new network affiliates who remain outside of the dynamic due to lack of initial cash-flow.

In addition, the polyculture including washed coffee leads to the adoption of agroecological practices that involve physical capital and different material practices, with a likely reduction of assets and time linked to subsistence. The result is that washed coffee tends to an increased agro-biodiversity in polyculture due to the handling of more associated shade tree species. With that in some households a reduced number of plants and handling time for cultivars for consumption and micro-marketing (eg banana intercropping or cassava patch on the margins of the fields), and time spent for handling and use, may be perceived.

The risk or investment capacity of the necessary capital (eg. time formal training and socialization, acquisition of equipment) for the production of washed coffee can be calculated through the level of improvement of household livelihood. The knowledge of this inflection point is more feminine than masculine because women manage food expenditure (watch for household food security), also managed the farm so they know the limits of both.

Revenues from sales of bola coffee is seen by some women (focus groups) as insufficient to take the production of washed coffee, just as other agricultural activities which together do not leave enough surplus. The harvest season is the stage production that requires more labor, and washed coffee requires even further labor than bola coffee. The survey data show signs of a redistributive effect generated by the high labor requirements of washed coffee with greater participation of women in paid work. The effects of washed coffee on the local gender system are performed by increasing wage labor for women. It would also be related to the accumulation of greater social and human capital for women

business owners that increase their supervisory tasks on the farm and their participation in organizations.

The introduction of washed coffee in the sub-area is related to a substantial increase in the recruitment of paid work, both male and female. The survey results show an increase in the work force in the production of washed coffee compared to bola coffee. While this increase is not equitable, women have an important role as well. As seen in the survey, the increase in women's work would not be then due to a change in the proportion of female participation but resulted from a total greater requirement of workers. With washed coffee women may be more involved in the control of production compared with the traditional dynamic. With the increase of the general workforce women may have an even greater involvement in the organization and supervision of production. The only cases in which it was explicit that women performed supervision jobs (Bersave and Orfa), was in the production of washed coffee.

The new dynamic has resulted in increased access to training and agro-ecological management technology for both men and women, though not necessarily equitably. Male participants of focus groups indicate that technical assistance and training are linked in the first instance to themselves, due to their mastery of "farm work" and that the man is the partner of the organization because he is " the nucleus of the family. " This shows how the opportunities for human capital accumulation focus on men, who are assumed, by themselves and the organizations, to be in total control of the production. All technicians are men except for a promoter.

In the focus group Guaca, men identify that there is unequal access to technical assistance, but now they stress that technical assistance takes more into account women than before. In addition, the needs identified by men in both focus groups were directed to the market and infrastructure. In contrast, those identified by women aimed more at human capital and more job opportunities. There is a discourse of sustainable business enterprises, including tourism, in the majority of men who wash coffee and leaders like Efren. Instead where there is no attention to the work itself, the skills and knowledge of their own. Melesio C. espresso lava that the technicians were wrong or were not realistic with the method of weeding with machete and the receiver with saw and explained the differences seen above.

5.2 The Contradictions of Hybrid-Maize

The dynamics of the sub-area maize part of a gendered divisions of labor and builds on an activity closely linked to the historical masculine identity in the territory. Hence, it has spread and it largely established. The division of gender roles has been intensified to require external inputs of labor (temporary migrants) and inputs (chemicals and seeds). The already limited access to assets related to maize by women (income, marginal labor, capital support for reproductive roles of production) could have been exacerbated. This is reinforced by the decline in productivity due to depleted soils that could bring it into serious contradictions, taking into account the quality of commodity maize and uncertainty that means.

The fact that the momentum seems to have begun to sabotage itself, may encourage movement toward more equitable gender systems. The emergence of peasant organizations and new political actors, and NGOs to attract a greater or lesser degree of effort involved new (and emerging) and the diversification of production, has a relatively large depth in women. These may be seeing here the ability to access capital dynamics industrial maize denied even stronger than the former. Of these new coalitions and organizations are born women who take advantage of opportunities that may enhance resilience with variety and risky system for its specialty and dependence on foreign capital.

Another factor could also be contributing to these recent efforts are the same economic benefits and institutional dynamics. Financial capital and its distribution through coalitions could be on investing in human and social capital more distributed in gender systems that could affect positive change then to a more sustainable and inclusive dynamic. A kind of creative destruction that stems from social innovations within the production system.

The sharp division of gender roles established before the increment of yields in the territory is part of the scenario that determined the consolidation and spread of monoculture with hybrid seeds and intensive use of agrochemicals. The tasks linked to cash crop production appears almost entirely dominated by men. Martinez (2002, 36) argues that Pindal "producing maize and leave the food [in the fields] are opposing activities (...) related to masculinity and femininity. "

Overall this socio-ecological distribution may have eased that the extension of industrial maize has not encountered any resistance to replace more diverse agricultural production systems. The new system has been installed from the decisions of commercial and political actors under generalizations about how the territory is defined in terms of gender.

In contrast to some other regions,it has been granted a largely male character to hard maize producction in the territory, that even covers the management of germplasm produced on the few occasions when they do not buy seeds. The association of maize with Pindal rural masculinity seems to have been exploited by the marketing of seeds and other inputs, which includes advertising with violent and phallic text and images in brands such as "El Aventajado", "Trueno", "Tuco" (Loja slang for penis), "El reventador", "El Gallo" and the logo of Agripac corporation, provider since the seventies, including the mascot "Agripito" representing a man that extends and maximizes his pubis area. There are also brands "AtaKill", "Killer", "Fulminado" "Terminator" "Bala" that may relate to violent masculinity, control over nature, which hyped the physicality and masculine strength.

Another condition that affects production decisions in Pindal, is the virilocality in the household of maize farmers, which coincides with previous Martinez's findings in Pindal. She notes that the virilocality reduces the power that women could have, being excluded from their kinship groups and reduces the chances of access to land (2002, 31). As I saw in the case in Esperancita, the virilocality there seems to have impacted on the participation of women in the largest grassroots organization of CORPAP, where only there is one female member out of the total 59 members.

The expansion of the workforce, masculine and concentrated in the periods of planting and harvest, could mean that the associated work of women, with preparation and logistics of food may be overload in those periods. Changes of the production system with the dynamic have brought about a concentration of work during harvest time. According to the Gender analysis matrix conducted in focus groups, women tend not to intervene in the harvest work in the field. It can also see that there is a reduction of the work force in the weeding. Outside of the dynamic, weeding use to vary between hand weeding practices, polyculture and/or not weeding at all. Then step by step the application of herbicides through backpack pumps extended, and currently, it has intensified with the use of certified seed and technology packages.

Planting and spraying have also become more intense with the increased cultivated areas. In participatory research in La Esperancita, specifically the daily activity clock of Dumani and Lisbeth in the home and farm, both pointed out that time of year with more work was at the early stage of cultivation, from January to March. With these changes the work in the fields focuses even more in men. Although women work more, their work is reduced to some very intense weeks.

Additionally, after the decline of male temporary migration, space and time in which women can diversify and gain access to the benefits that would involve interaction with a greater variety of actors, may have been reduced with the presence of men throughout the year. Temporary migration during the summer rain (dry) to some extent still is attractive to young people who tend to migrate to diverse destinations and sectors such as urban construction.

Comparisons

The coffee already requires a permeability between productive and reproductive labor between both men and women, the latter provide important social capital to ensure the necessary labor to produce washed coffee, due to their access to diverse spaces. Moreover, the quality of mixed subsistence and cash-crop of the coffee poly-culture that multiplies the relation between humans and different species, the labor intensity that requires to appropriate ecological surplus from small holdings in soils of low agricultural productivity, pushes for

in parts of the agro-ecological cycle and in which there is a degree of flexibility between gender roles, eased the adoption of a production system that requires higher quality of work and intense socio-ecological collaboration among household members. In this context, organic poly-culture does not lead to specialization that prevents the cultivation of subsistence crops, that are essential domain of knowledge and decisions of women in the family agro-ecosystems.

However, the model of washed coffee is after all commoditization of agriculture that requires steady increases in production and expertise through the acquisition of social capital, physical and economic. Households whose members, either due to gender factors intertwined with generational, educational, kinship, cannot access these funds are excluded.

Additionally, the gender system would be causal for the changes linked to washed coffee due to the remittances sent mostly to women. Remittances are partially funding the productive change on two levels. First competing with credits of the traditional merchants. Second through the new credit cooperative that are part of the coalition of washed coffee network. Also, more spaces management by women in their ongoing administration of social and family networks could facilitate the labor contract of trust, a key concern of households coffee.

Finally, the largest labor requirement includes a significant wage labor and organizational work for women, and this possibly be encouraging the recognition and valuation of more diverse femininity in the households involved in the new system of washed coffee.

The intensification of industrial maize in this sub-territory departs from a strict gender division of labor and builds on an activity closely linked to the historical masculine identity in the territory. The division of gender roles has been intensified by the spread of a system characterized by increased external inputs of labor (temporary migrants) and inputs (chemicals and seeds). The already limited access of women to assets related to maize (income, marginal labor, social capital for reproductive roles supportive of the production) appears to have been reduced. This is reinforced by the decline in productivity due to soil depletion that is leading the production model to serious contradictions, taking into account the quality commodity of maize and vulnerability that this means. The decline of soil fertility in conjunction with the commodification of the whole household economy would increase the vulnerability of the conditions of reproduction and food security in the family farms. The vicious cycle of intensification and environmental degradation - less maize per hectare, more need to plant the land without rest - adds to the scarcity of land and lease prices on the rise.

This trend implies destabilizing impacts on the gender system. The responsibility for household cash economy remains entirely on men, and a significant drop in production would contribute to impact negatively on male subjectivities constructed based on the prevailing model. It reproduces the inequality of access and control of assets and accumulation of capital between men and women. The latter might be slightly tempered by a possible increase in formal education of women associated with the increase of income resulted form hard maize production.

Signs of hard maize monoculture has begun to sabotage itself coexists with an incipient movement toward production systems that are more diversified and more balanced in terms of environmental and gender. The emergence of peasant organizations and new political actors, and the attraction of NGOs that to a greater or lesser extent take part of new efforts for production diversification could bring opportunities for women, as I have described the enthusiastic participation in the CORPAP, and FIE projects and the "Mancomunidad". Women may be seeing here the possibility of access to capital, as well as men. These new coalitions and organizations provide opportunities that could enhance diversity and resiliency in a risky system that is specialized and dependent on foreign capital.

Another factor that could also be contributing to recent efforts to find alternatives to industrial maize are the same economic and institutional benefits derived from the hard maize industry. Financial capital and its distribution through coalitions could be invested on human and social capital of women and men, girls and boys, which could then affect positive changes towards a more sustainable and inclusive production. The importance that hybrid maize has given to Pindal in the national maize market has contributed to the formation of more representative coalitions with more diverse values and discourses. The CORPAP and grassroots organizations are the breeding ground where more sustainable proposals, recoveries of knowledge, could take shape in future.

Since the beginning women in Pindal have had a less direct involvement in commercial agricultural production, in other words, the division of the farm from home/orchard has been more strict, women's priorities and decisions have not been a major obstacle to the expansion of hard maize monoculture.

By contrast, in the polyculture coffee, women and men have shared time in less distinguished spaces between farm and home/orchard. First, subsistence farming is largely associated to the commercial farming. Second, women participation is significantly direct in the production, especially in the most symbolic of its operations, the harvest. Therefore, women in coffee-growing areas have more successfully resisted the loss of diversification and control of household food security. This priority coincides more easily with coffee, where specialization is not as radical as in maize, and its opposition to food diversification is lower.

The apparent sustainability of washed coffee could be related to the gender system relatively more equitable and more open to the division of gender roles within the household: the more variety within the system that is supported by a more complex network. On the other hand, industrial maize is based on a limited dimension of the gender system of their abrupt separation of productive and reproductive. The shortcomings of the system in terms of economic and environmental vulnerability may be related in part to this specificity.

The difficulties of the network of washed coffee to expand may relate to the failure of efforts to link with a variety of households in terms of human capital and others. Not all homes are young adult couples, with pre-built capabilities, not all have returned after migrating, with many adult sons and daughters. It is noticeable the number of household with mature adults (between 50 and 65 years old) who can work, but whose children left the field, who have knowledge but not the human capital (education) to articulate it, they want the subsistence production remains economically important. However, it is also likely that these households are already in the network as hired workers in farms that wash coffee.

A marked trend in the two sub-territories is the practice applied by a variety of organizations to guide the technical transfer, financial and organizational support almost exclusively to men. The choice to support the development of capital and skills in only half of the adult population is associated with the professional made up of the support organizations, which are mostly formed by male professionals, reflecting their ideological assumptions and expectations. In the case of coffee, where women are involved in many aspects of production and express their need of technical support, this trend of the organizations is simply not consistent with these empirical realities and demands of agricultural development. In the case of maize, where women are less involved in agricultural work, their exclusion from training partnerships coexists with the expansion of a system that bring along negative impacts in terms of socio-economic equity and environmental sustainability.

In both cases I see tensions between old and new representations of masculinity, but in a different direction with respect to changes in the socio-ecological and socio-economic system. In the coffee sub-territory a traditional masculinity, physical, set in the hard work in the field would have constituted an obstacle for membership of rural households in

market networks and more sophisticated and complex production that require new types of social and human capital. As pointed out by Coldwell (2010, 22), in general, farmers involved in "sustainable agriculture" less often constitute their subjectivities in terms of physical exercise and control discourses and practices. Instead there is a prevalence of entrepreneurship and business management discourses. Some new options, including aspects of washed coffee, are more accessible to men and women who recognize and incorporate the new rural masculinities. Coldwell (ibid.) says it is not clear whether these new masculinities will provide more equitable conditions for women. When I see both of the cases, this doubt rises. Households that do or do not wash coffee tended to be more or less equally "egalitarian" in terms of diversity of activities for both sexes. Only in some cases, such as Bersavé, where women had their own social and human capital related to commercial organic farming, is that significant increases in the performance of socio-economic power by women was perceived.

Coalitions between households and organizations, and the involvement of more work force, which make possible the washed coffee model, could benefit from a promotion that more openly acknowledges the diversity of masculinity and femininity associated with different material conditions. In other words, to position subsistence agriculture and local knowledge in the same scale as of fair trade, organic and gourmet coffee. This balance could even be positive, when renegotiating and agreeing the interests of the organizations with those of households with less capital and encourage them gradually expand the production of washed coffee for the benefit of both: some more income for households, some more supply and market for network administrators. Whatmore and Thorne (1997) argue that coffee in this form of commodity of fair and sustainable network uses a "system" that combines the discursive and materialities of efficiency and productivity with another of "connectivity" between consumer and producer. The interests that validate this connectivity is the exchange of a premium coffee for social welfare.

In the human ecology of hard maize there are similar contradictions. The market actors and hard maize policies of high-performance seem to have brought a masculinity that combines physical male identities and technical entrepreneurship that ends up to secure a production system that increases the undervaluation and exclusion of women in agricultural production. Cooperatives and NGOs, on the other hand, provide a discourse of market takeover and opening new economical opportunities (sustainable agriculture, feed

production, tourism). This is comparable to the new "green" entrepreneurial masculinity of washed coffee that also conditions women participation.

6 Conclusion

In both rural territories, further commodification of agricultural production are generating latent and perceived socio-ecological conflicts in different intensities. Social, cultural and environmental diversity is homogenized due to the single demands of the respective commodities of each territory. This raise sustainability problems evident in soil degradation in the Pindal maize growing canton, and loss of agro-biodiversity in both Pindal and the Quilanga and Espindola coffee growing cantons.

Each commodity network and its actors at local, territorial, national and global scales hold together through different material, economic and cultural relations to farmer households and their agro-ecosytems.

In first instance, the coffee area environmental management shifted according to access to labor and the relations with the specific non-rural actors at play. Less access to labor through kin or friendship, older generations, and subsistence farming, was linked to the conventional network of client relations with conventional coffee traders. Additionally, emigrants' remittances, the oligopolistic conventional traders, the pre-existence of rural grassroots organizations from the land reform, have played important parts in the dynamics between conventional and washed coffee.

The second case showed a more top-down relation. In the maize area, the rise of productivity from hybrid seeds and agro-chemical inputs packages has originated higher dependency and client relations with financiers, input suppliers and maize buyers. As land is degraded and legume intercropping has become impossible, yields drop and to maintain income levels land is over-used, fertilization augmented, perpetuating the production system. However the productivity improvements, attracted new actors, like agribusiness, extra-regional maize traders that have competed with local traders. This has provoked the origin of maize growers organization, less dependent on a few actors, and within this organizations they are looking for alternatives to a perceived unsustainable model.

Moreover, the incorporation of households to the different commodity networks in Quilanga and Espíndola , and in Pindal, depend importantly on the gendered labor division, and on gendered differentiated social capital and access to different agro-ecological spaces.

This was specially clear with the specific gender systems in the coffee sub-area, as it facilitated the development of washed coffee, and the process of monetization of the ecology. In the original productive system, conventional cherry-dried coffee, subsistence farming and barter, and micro sales of produced food-stuff, were found related to women. Continual motion between plots, houses and public spaces to ensure reproduction and access to food-stuff has lead to female social capital accumulation. At the same time, this social capital, raised through communal and kin relations, has served to cover the intense and high-quality labor necessary for producing the more monetarily profitable washed coffee.

In Pindal an strict division of labor has been strengthened and has facilitated the expansion of industrial maize monoculture with degrading effects on the environment and the withdrawal of legume-maize intercropping. Women's access and control of agro-ecological spaces is limited mainly to the household through reproduction, labor reproduction (cooking), and production of small animals. Men manage almost completely the agricultural production and the relations for commercialization in a variety of spaces. The expansion of industrial maize promoted by political actors and finance and agrochemical suppliers who promote and appeal to images of masculinities that exacerbate an identification with dominating control of the environment and with the monoculture itself. In the high-input maize monocrop system, women's spaces of control are limited to short and intense support of labor during periods.

These gender relations also are sustained by the discursive orders of the networks to masculinities and femininities: institutionalized masculine identity with the maize crop, male green entrepreneurialism in coffee incorporating women to some extent.

In historical perpective, the current socio-ecological relations in the studied communities have an important relation to the changes in land distribution since land reform processes starting from the late 1960s. In the case of Pindal communal and individual property has been the most common situation and today individual property is the most widespread. Division of communal land by inheritance puts pressure on

individual owners to extract the most economical profit of their productive units exacerbating the environmental problems of the industrial maize system. In Quilanga and Espíndola the highly uneven land accumulation and exploitative practices the haciendas were disrupted by the land reforms from the late 1960s to the early 1970s. However the land was unequally distributed again due to privatization division and there was a loss of access to varied agro-ecosytems via open lands now enclosed.

Another historically important characteristic is the emigrating culture of both territories, but more importantly in the coffee area. The destructive drought of 1968-69 initiated a massive regional emigration that set the basis of relations to facilitate further migration during economic crises in the later decades. Remittances originating from this contemporary process add importantly to the washed coffee network.

The agro-ecosystems' biophysical implications in both study areas are related to the raises of incomes and consumption brought by further connection to markets through the new commodity networks. In the coffee area remittances add up strongly to this processes.

Construction technologies have been switched from labor intensive inbound material buildings (i.e. adobe), to less labor intensive massive use of imported concrete and metals that requires monetary exchange. remittances on changes on construction technology. Consumption of imported food-stuffs and materials in diets and construction, and in the maize case . The diet seems to steadily be becoming more dependent on food-stuffs from extra-regional and international markets. Endosomatic and exosomatic metabolism is becoming locked to outbound sources.

In terms of ecological appropriation, in the coffee area the recent washed coffee agro-ecosystems are managed to move to a specialization of providing human labor and diverse leguminous species nutrient fixing that can increase coffee bushes material productivity, that later is value-exchanged. The conventional coffee growers managed their agroecosystems with more attention to a mix of the leguminous-coffee association, food-stuff, and small husbandry for human consumption. In the maize area, the pressure on land, the disruption by plague of the maize-legume intercropping, makes the system to draw heavily and in augment on imported nitrogen inputs. The maintenance of the level of income from industrial maize in declining soils degradation augments the pressure on land and has produced loss of agro-biodiversity (legumes and coffee) related to subsistence.

Finally, the exploration done through this research can serve to inform rural strategies for improving wellbeing. After many decades most of development strategies in rural territories are still based on income improvement. However necessary, this has to be symmetrically accompanied with the recognition of complex systems, non-monetary economies, and intense labor, through which human beings interact with ecologies to produce surplus. The subsistence economy can be synergistic at a same level with income earning strategies.

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8 Appendix

Participant household in "in-Home on-Farm" Research

Coffee area

Household (Pareja partici-pante)	Parish	Coffee type	Production (qqs 48kg)	Average age couple	Área Café (Ha)	Household membrs	Household workers	Main type of labor	Children / Teenagers
Bersavé y Tito	San Antonio	Washed	8	35	1	5	2	Waged	3
Joselina y Segundo	La Guaca	Cherry-dried	< 4	55	4	4	2	Household	1

Rosa Elena y Sixto	La Guaca	Washed	8 >	50	5	4	4	Waged	0
Rosa y Melesio	San Antonio	Cherry-dried	8 >	62	10	2	2	Even	0
Selmira y Crescencio	San Antonio	Cherry-dried	8	57	8	3	2	Household	1
Silvio y Orfa	La Guaca	Washed	< 4	38	1	8	2	Waged	6

Maize area

Household (Participant couple)	Community	Seed	Production (qqs 48kg)	Average age couple	Área maize (Ha)	Household members	Children / Teenagers
Miguel y Rosa	Pindal (Cristo Consuelo)	Resused	8	38	5	5	3
Imelda y Segundo	Pindal (Las Cochas)	Reused	< 4	50	3	2	0
Santos y Flor	Pindal (Tabacales)	Hybrid	8 >	42	7	7	5
Teresa y Antonio	La Esperancita	Hybrid	8 >	55	10	2	1
Dumani y Lisbeth	La Esperancita	Hybrid	8	25	5	3	1

Studied sites and methodological tools applied

Canton	Community	Survey	Gender Team	Interviews	Focus Group	House-Farm
Coffee						
Espíndola	Cangochara	**Yes**	No	No	No	No
	Collingora	**Yes**	**Yes**	**Yes**	No	No
	El Batan	**Yes**	No	No	No	No
	El Guarango	**Yes**	No	No	No	No
	El Laurel	**Yes**	No	No	No	No
	El Sango	**Yes**	No	No	No	No
	El Tambo	**Yes**	No	No	No	No
	La Guaca	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Santa Teresita	**Yes**	No	No	No	No
	Tundurama	**Yes**	No	No	No	No
Quilanga	Cariamanga*	**Yes**	**Yes**	**Yes**	No	No
	El Limon	**Yes**	No	No	No	No

	El Sauce	**Yes**	No	No	No	No
	Fundochamba	**Yes**	No	No	No	No
	Jacapo	**Yes**	No	No	No	No
	La Libertad	**Yes**	No	No	No	No
	Las Cuadras	**Yes**	No	No	No	No
	San Antonio de las Aradas	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	San José	**Yes**	No	No	No	No
	Santa Rosa	**Yes**	No	No	No	No
	Tuburo	**Yes**	No	No	No	No
	Valdivia	**Yes**	No	No	No	No
Maize						
Pindal	Pindal**	NA*****	**Yes**	**Yes**	**Yes**	No
	Cristo Consuelo	NA	**Yes**	**Yes**	No	**Yes**
	Tabacales	NA	**Yes**	**Yes**	No	**Yes**
	El Cisne	NA	**Yes**	**Yes**	No	**Yes**
	San Juan	NA	**Yes**	**Yes**	No	**Yes**
Pindal-Celica	El Limon Chico***	NA	**Yes**	**Yes**	No	No
Pindal-Zapotillo	La Esperancita****	NA*****	**Yes**	**Yes**	**Yes**	**S**

*Rural City, informants interviews, traders survey.
** Pindal is the urban center for the communities of the canton
***Limón Chico belongs to Celica but commercial and financial services are taken from Pindal.
****Belongs to Pindal but many of the fields are in Zapotillo.
***** Survey designed without the participation of the gender team

Participatory research in the neighbourhoods

Focus groups

In facilitation of focus groups by sex, we defined groups, as 6 to 12 men or women who meet to exchange views on a topic proposed by a research team. Facilitators keep the exchange focused on the issue through dialogue and knowledge tools used (adapted from Longhurst, in Clifford and Gill, 2003). It looks for each gender groups meet simultaneously.4 hours.

Tool 1: Community Map (60 min).

Description: In this map we intend to merge environmental and social aspects. In reference to a central location of the neighborhood, graphically locate resources, areas, organizations, neighbourhood infrastructure. Also rank how the social differences are distributed in space and on what resources.

Objective: To know perceptions about the resources and the actors differentiated by gender. To generate discussion about actors, assets, production, and environmental coalitions.

Guiding questions:

What is the most important place in the neighborhood? How is the neighborhood? Where does

water come from? What buildings are there? Where do people study, do shopping or sports? Where is coffee grown? Where are other things growing? Where do people live? Where are the oldest homes? What is the best place to live? Where are the people involved in decision making of the district? Where are the people who we do not see much? Who are they? Where the best soil is? Where is the coffee/maize is growing towards to?

Include information on:

- Infrastructure (roads, houses, buildings)
- Sites and sources of water supply
- Agricultural land (location and variety of crops)
- Agro-ecological zones (soils, slopes, elevations)
- Forest land
- Grazing areas
- Shops, markets
- Hospitals, health centers, schools and religious establishments
- Other places (bus stops, cemeteries, shrines, places)
- Socioeconomic differences, hierarchies

(ASEG, 2001)

Tool 2: Network Map

Description: In a flip chart represent the central point of the neighborhood. Through Arrows and circles, represent the spatial connections related to the household economy. Write travel cost, frequency, purpose and people tend to make the Transfer:

Consider: Organizations, collection centers, educational and health centers, retailers, shops, coffee lands, land use, grazing lands, political authorities.

Example (Exposito, 2003):

Tool 3: Participatory graph of trends

Description: On a flip chart delineate XY quadrants and respective legends with the variables. In Y score three sectors low, medium and high. Explain the proposed variables. Agree and discuss temporary references. Plot trend lines according to the dialogue.

Coffee:

Proposed variables (Y1): 1) Income from production

2) Membership organizations

3) Remittances

Proposed variables (Y2): 1) Type of Production

2) Food produced for consumption

3) Immigration - Family Integrity

4\) Renewal of coffee

Time references (X): To provide participants:

- Government of Duran
- Creating organizations (PROCAFEQ) 2002
- Migration 1995-2006
- Dollarization 2000
- Coffee prices fall 95-96

Maze:

Proposed variables (Y1): 1) Inputs use(seed + fertilizer)
2) Inputs cost
3) Maíze Price/ earnings
4) Rent Cost

Proposed variables (Y1): 1) Organization
2) Migration
3) Fertility/Productivity
4) Pest

Time references (X): To provide participants:

- Drought
- Strong Pests (Sarandaja moth)
- Governments
- Arrival financial organizations
- Creating organizations
- Dollarization
- Falling coffee prices
- Years of heavy rains

Objetive: to know in a participatory manner the temporal evolution of the socio-economic-environmental dynamic according to gender.

Questions: How many years ago (40, 30, 20, 10, 5, a few years ago) has it happened that changes has been brought in the neighborhood? When were there changes in the variables? How the variables have influenced each other?

Tool 4: Task Gender Matrix

Tool 5: Access y Control Gender Matrix

Description: In a flip chart, outline the matrix below and talk to the participants to fill it in.

Objective: To study the specific dynamics of assets and in detail respect to the gender system.

Guiding questions:

How things have changed since you have access to that asset?

Does that influence household decisions?

- Which activities of coffee production are caried out by women, men and children, and how hong do they take to carry them out?
- Who has access to assets? What easeas and hinders this?
- What does allow / did allow them the access?
- How have things changed since there is access to that asset?
- What Does/did influence household decisions?
- Has the asset A (eg remittances) influenced the access to and control of asset B (eg oraganization membership)?
- What is it needed to improve access and control of these assets?

Coffee:

Gender Task Matrix

	WOMEN				MEN			
TASK	Type of activity		Time		Type of activity		Time	
	Adults	children	Adults	children	Adults	children	Adults	
Weeding								
Harvest								
Re-harvest/Recepa								
Nursery								
Washing (If there is)								
Drying								
Selection								
Packing								
Transport								
Selling								
Money Sales for coffee								

Gender Access and Control matrix

Assets y Tasks	Access		Control		Obstacles	Advantages
	H	M	H	M		
Money Coffee						
Meney sales Others (Animals)						
Credit						
Another local job						
Another job (Temporal migraction)						
Help from relatives abroad, Remittances						
Small animals: pigs,						

chickens, guinea pigs						
Livestock						
Labor exchange						
Labor workers Cosecha Mantenimiento						
Technical Asistance						
Agricultural equiment: plants, machinery						
Organization membership						
Workshop-Training						
land (food consumption)						
Land (coffeee property)						
Water						
Wood, fuel						

Maize:

Task Matrix

TASK	WOMEN				MEN		
	Type of activity		Time		Type of activity		Time
	Adults	children	Adults	children	Adults	children	Adults
Scraping							
Burning							
Inputs Purchase							
Sowing							
Fumigation harvest							
Second Fumigation							
Water Transport							
Fertilization - Urea							
Harvest							
threshing							
Packaging							
Transport or load							
Bureaucratic procedure							
Nursery- seed production							
Kitchen production							

Access y Control matrix

Assets	Access		Control		Obstacles	advantages
	M	W	M	W		
Money Maize						
Money Sales Others (Animals, crops)						
Credit						
Another local job						
Another job (temporal Migration)						
Help from relatives abroad, Remittances						
Labor workers						
Labor exchange						
Inputs						
Equipment						
Organization membership						
Technical Asistance						
Workshop and training						
Land (Property)						
Land (Rented)						
Orchard, Land for consumption						
Small Animals: pigs, chickens, guinea pigs						
Livestock						
Water						
Transport maize						