GLOBALIZATION, UNEQUAL ECOLOGICAL EXCHANGE, AND CLIMATE JUSTICE: THE CASE OF TURKEY AND THE EUROPEAN UNION

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by

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ABSTRACT OF DISSERTATION

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ABSTRACT

Analyses of physical trade flows over the last decade reveal that the global South is running ever higher physical trade deficits. These deficits are being magnified by the increased export of both resource-intensive and pollution-intensive commodities onto the world market. A primary aim of this dissertation is to empirically demonstrate support for the theory of unequal ecological exchange in the case of Turkey and the European Union. This research undertakes three levels of analysis: cross-national, national, and local. The dissertation attempts to answer the following questions: To what extent have Turkey’s natural resources been appropriated at the global level through the process of unequal ecological exchange? What are the economic and political conditions that give rise to unequal ecological exchange? To what extent is unequal ecological exchange occurring between Turkey and the EU? What are the socio-ecological impacts of unequal ecological exchange in the Köprülü Canyon and its buffer zones?

Answers to these questions are derived from both quantitative (physical accounting and regression analyses) and qualitative methods (20 semi-structured interviews and previous research results from my unpublished MA thesis), relying heavily on long-time data series analysis. In contrast to the Netherlands Fallacy, the findings showed that Turkey increases its impacts on the environment within “her” borders through the exportation of resources and importation of wastes—a process which is conceptualized as the Turkish Fallacy—the over-consumption of resources in both primary and secondary sectors of the economy. The increase in physical flows of agricultural exports has resulted in deterioration of both “cropland” and “agroforestry” reserves over four decades. As articulated by the theory, resource consumption and ecological degradation paradox, and a decrease in biocapacity, are at least partly a function
of cores that utilize their advantageous positions in the global economy to externalize their consumption-based environmental costs to Turkey. These findings showed that not only the materials but also the consumption of fossil fuels embedded in agricultural trade has increased. This finding supports climate change for the Turkish case. Turkey had the largest increases in “energyland deficit”; whereas, the core has been able to outsource energy inefficient sources of income to Turkey, increasing the “entropy” of Turkey.

This study also reveals how environmental surpluses are extracted from Turkey through trade. Turkey has been a net-exporter of “dirty” manufacturing over forty years. As “dirty” physical net-exports created pollution havens—an indication of the second contradiction of capital— the amount of “energyland” embedded in “dirty” manufacturing production has also increased. The findings run counter to macroeconomic orientations that predict an environmental Kuznets curve. The results show that the energy embedded in Turkish manufacturing production, and the carbon intensity of Turkish trade is the dissipated energy and carbon dioxide produced by trade.

The deeper analysis of unequal ecological exchange showed that through the export of ‘dirty’ products, the EU is creating a ‘pollution haven’ in Turkey, contributing to cropland degradation while protecting the EU’s cropland through trade. The expansion of European capital accumulation is predicated on the consumption of growing quantities of natural resource flows from Turkey to the EU-15. This study reveals that the physical exports of Turkey are more pollution-intensive in comparison to the flows of the EU-15. Also, Turkey’s embodied crop/grazing land in exports is higher than that of the EU-15. The EU appropriates ecological space through trade without having to deal with its local ecological consequences.
The undervaluation of natural resource exports is a key mechanism of unequal ecological exchange and valuation fails to account for local negative externalities associated with natural resource extraction. Hence, these costs are encountered at local levels, such as in the destruction of the subsistence base and sustainable ecological and social system of the yayla-farmers at Köprülü Canyon who are subsidizing the profits of foreign capital. The yayla-peasants became exporters of various crops and became more dependent on external market conditions. They experienced the degradation of their cultivated land due to the pressure of production on resources rather than due to excessive population pressure on these resources. The forest ecosystem of the Köprülü Canyon shows an unsustainable growth path over several decades. As a result of social class transformation, the exporting corporations become the winners; whereas, the majority, including semi-yayla farmers, become victims of unequal ecological exchange.
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DEDICATION

To my mom and my sister,
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CHAPTER ONE
INTRODUCTION

Increasing global trade and facilitating the economic integration of multiple world regions is a central trait of globalization. In its current form, neo-liberal trade policy is one of the key driving forces of global economic growth, accelerating the extraction and use of natural resources. More importantly, pollution rates and CO₂ emissions related to these trends in global trade are steadily increasing and economic gains do not adequately compensate for the resulting environmental damage (Giljum and Eisemenger, 2004; SERI, 2007; Giljum et al., 2008). With annual growth rates of international trade constantly above the growth of production in the world economy, the natural resource requirements of traded products assumes ever greater importance. The geographical shift in CO₂ emissions from developed to developing and emerging countries is also occurring due to the geographic relocation of resource-extraction and industrial production through international trade.

In this dissertation, I investigate the complicated relationship between international trade and the growing pressure on the environment, especially the sociology of ecological flows. I argue that neoliberal globalization enhances the process of unequal ecological exchange, or what I call *unsustainable ecological exchange*, resulting in an unsustainable ecological trajectory. Specifically, I examine unequal and unsustainable ecological exchange at both national and European levels, and its socio-ecological impacts on local people in Turkey within the context of environmental and climate injustices. No environmental and climate justice discourses at the international and national level will be meaningful unless these discourses recognize the background conditions of neoliberal globalization (Agarwal and Narain, 1991). This means that
global free trade and foreign direct investment will increasingly be an important component of national economies. I argue that globalization, an *uneven process*, is greatly enhancing the process of unequal ecological exchange. I demonstrate how unequal ecological exchange promotes the disproportionate utilization of natural resources by the global North at the expense of the global South by focusing on the case of Turkey. This unilateral exchange results in the expansion of the ecological footprint of the global North. The global South subsidizes the global North with a constant flow of wealth, not only of energy and natural resources, but also of financial flows for the payment of interest on foreign debt. It is the drive to eliminate foreign debt that compels the countries of the global South (such as Turkey) to increase their exports, primarily through the adoption of export-oriented industrial (EOI) development policy.

Turkey is a good candidate for testing the tenets of unequal ecological exchange. A primary aim of this dissertation is to empirically demonstrate support for the theory of unequal ecological exchange, the results of which are environmental cost-shifting (or externalization of the negative consequences of material consumption), disproportionate and uncompensated utilization of environmental space, undervaluation of natural resource exports, and an unsustainable ecological trajectory, focusing on the case of Turkey. This research undertakes three levels of analysis: cross-national (the EU-15 and Turkey), national and local (Turkey's Köprülü Canyon National Park and its buffer area) to demonstrate both the processes and the impacts of unequal ecological exchange.

One of the purposes of this dissertation is to investigate Turkey's ecological trade flows with selected members of the European Union. To what extent is unequal ecological exchange at work in the case of Turkey? This inquiry challenges a number of theoretical arguments on this
point. First, I challenge scholarly arguments that Turkey is gaining from global free-trade especially from trade with the EU (Hilmi & Safa, 2007; Aydin, 1996; and records and authors of Export Promotion Centers in Turkey, 2001-2011). There are few scholars who explore whether Turkey is gaining environmentally from the global trade regime (Akbotanci et al., 2007).

The second purpose of this dissertation is to demonstrate how the free trade paradigm and especially trade liberalization policies at the national level are realized at the local level. What actors played a role as yayla-peasants became “producers of export crops” and environmental victims while supporting the national export-oriented economy? There are almost no studies of such socio-ecological impacts of trade on the ground level in Turkey. In this case, Köprülü Canyon provides some evidence of trade-led agriculture expansion, especially on protected lands.

Another purpose of this dissertation is to assess the free trade and sustainability debate from an ecological and biocapacity point of view. To what extent are Turkey’s natural resources being appropriated by the capitalist world system? How deep is the appropriation of Turkey's ecological space through free trade or unequal/unsustainable ecological exchange? These are the central questions of this dissertation.

This dissertation not only challenges neoliberal discourses on trade, but also the Ecological Modernization school that sees rationalization and competitive pressure typical of capitalist society as instigating more environmentally benign technological developments (Mol & Spaargaren, 2000). For instance, the Ecological Kuznet Curve (EKC)¹ argues that economic growth will change preferences toward environmental quality and will reduce pressure on the

¹ The research by many scholars does not uncover an EKC or inverted-U relationship between either GDP per capita or urbanization and footprint consumption (York et al., 2003; 2005).
exploitation of ecosystems (Muradian & Martinez-Alier, 2001). Mol, who supports the EKC, does not realize that “some environmental impacts by unit of GNP may indeed decrease in some countries but the environment does not care at all about GNP, it cares about absolute amounts of pollutants or extractions” (Martinez-Alier, 2003:138). Thus, Mol (2001) fails to offer facts on the human appropriation of biomass production while under-estimating the role of material and energy flow accounting. I agree with scholars (Shiva, 1989; Sachs, 1993; Martinez-Alier, 2003; Agarwal & Narain, 1991) who argue that the eco-modernization approach in the global North is only possible through the net withdrawal of natural resources from, and the net addition of pollution to, the global South. Furthermore, the analysis of global warming showed that the costs of major greenhouse gas emissions are unequally distributed between core and periphery (Roberts & Park, 2007). I argue that peripheral nations need an ecological space to choose their own ecologically sound development path.

**Background and Problem Statement**

**Distribution of Environmental Goods and Burdens in the Global North-South Trade**

The catastrophic ecological results of liberalized trade arrangements are generally ignored by proponents of economic globalization. Many core nations have enormous ecological footprints that vastly exceed their domestic bio-capacities (Wackernagel & Rees, 2003; GFN, 2006). Through global free trade and accompanying impositions on the global commons, these nations now live largely on bioproductivity imported from other nations. Thus, for every nation running an ecological deficit there has to be an equivalent surplus somewhere else (Andersson & Lindroth, 2001). Unfortunately, there are few surpluses; certainly the world is in an overall state
of ecological overshoot (Wackernagel, 2006; 2008). The recent North-to-South export of the most polluting industries and waste suggests an ecological imperialism where peripheries in the world system are converted into dumping grounds for entropy generated by affluent core areas. This constitutes a global environmental injustice: The periphery is exploited both as sources of negative entropy and as sinks for entropy.

Corporate-led globalization intensifies ecological unequal exchange, facilitating the colonization and capitalization of nature in the global South at the hands of global capital while magnifying the externalization of negative environmental costs. Neoliberal globalization presents challenges for many peripheral and semi-peripheral nations locked into ecologically unsustainable patterns. Cheap prices for primary commodities allow industrialized countries of the capitalist core to appropriate high amounts of biophysical resources from the peripheral economies in the South at a low monetary cost. Uneven development tends to be accompanied by an unequal distribution of the ecological burden of raw materials extraction, industrial emissions and toxic wastes generated to the disadvantage of extractive economies (Bunker, 1998). The extractive economies are not only draining their energy and matter, but more importantly, damaging their local ecologies and social institutions as can be evidenced in Turkey.

The neoliberal trade paradigm does not assume the emergence of unequal distribution patterns of environmental costs and benefits from global trade. The principles of trade theory

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2 A process called overshoot occurs when a country exceeds ecological limits by using natural resources more quickly than they can be renewed, and this means less resources will be available for future generations since the country is in an ecological deficit—an indicator of unsustainability (Andersson & Lindroth, 2001)
were established by Ricardo in his theory of *comparative advantage*, which assumes that two countries engaging in international trade both have mutual welfare gains when specializing in the production of goods they produce with relatively lower costs (Sen, 2005). Ricardian free trade theory was updated by Heckscher-Ohlin, who focused on factor proportions to explain relative efficiencies in production. According to this theory, a country will export those goods that use the country’s most abundant factor (e.g. labor, capital) of production intensively (Ibid.). Because of the resurrection of neoliberalism during the late 1970s and early 1980s, the free trade argument became mainstream economic policy. Allies of trade liberalization stressed that global free trade would promote environmental sustainability as economic growth would increase tax revenues and, therefore, enable governments to provide more financial resources for environmental protection (Bhagwati, 1993). The World Bank (2002) emphasized that a win-win situation for all trade partners would result from global free trade (market liberalization); economic growth would be stimulated through an increased division of labor and intensified export production in all countries. The problem is that the neoliberal trade paradigm is still based on this standard framework of neoclassical trade theory. Positive links between free trade, economic development and poverty eradication in Southern countries are currently being re-emphasized by the WB and the WTO, which call for a “trade-for development” agenda to be centered in a new round of talks on global trade liberalization (World Bank, 2001; see Wise & Gallagher, 2008).

However, *physical accounting* studies suggest that increased global trade tends to exacerbate the regressive distribution between North and South with respect to the consumption of natural resources on the one hand, and the negative environmental impacts of resource
extraction and production processes, on the other hand (Behrens & Giljum, 2007). While North-South trade might only account for a small fraction of world trade from a monetary perspective, the physical perspective reveals that the global North (such as the EU) is a substantial and (at least for some material groups) increasing net-importer of natural resources from the global South (Giljum, 2007; Biengezu, 2007). For the global South, specialization patterns with economic activities concentrating on resource-intensive primary sectors (such as agriculture, forestry) cause severe environmental problems and a substantial loss of natural capital (Biengezu, 2007). Unequal distribution of natural resources between different world regions in the direct sense occurs when some regions are characterized by a physical import surplus, while others face a physical trade deficit (Andersson & Lindroth, 2001; Giljum & Eisenmenger, 2004). Even if direct physical imports and exports are balanced between trading partners, distribution can still be unequal with regard to indirect flows “embodied” in traded goods or “hidden flows” (Giljum, 2003; Martinez-Alier, 2005; 2007; Muradian et al, 2002). Analyses of physical trade flows for the global South reveal that physical trade deficits due to increased exports of resource-intensive products have been growing in the last few decades (Giljum, 2008). In contrast to the situation in industrialized countries, resource extraction is growing faster than GDP in many developing countries (Fischer-Kowalski & Amann, 2001). The global North’s net-imports are increasing as the global South becomes the sole provider of biophysical resources. These findings seem to support the hypothesis of world systems theory that economies of the capitalist core ensure access to natural resources from the

3 Physical accounting studies of international trade can clarify whether relative dematerialization in the North is going along with a de-intensification of trade flows or is linked to increased physical inputs of natural resources from the South (Eisenmenger and Giljum, 2003)
global periphery through international trade (Giljum & Eisenmenger, 2003). However, many more empirical studies supporting the process of unequal ecological exchange, especially from the global South, are needed in order to document general trends. Thus, this dissertation makes a contribution to the theoretical and empirical debates on conceptualization of unequal and unsustainable ecological exchange. This dissertation also critiques the orthodox view that is held by mainstream scholars who support liberalized trade regimes. For example, some scholars contend that global free trade is good for economic growth (Safa & Hilmi, 2007; Aydin, 1996) and that economic growth is good for the environment (EKC hypothesis supported by Bhagwati; levels of income vs. ecological degradation supported by Grossman & Krueger) (Gallagher, 2004). Therefore, this dissertation also describes the trade and environment debate from a political ecology/economy perspective using theoretical paradigms from ecological economics, environmental sociology, and economic globalization.

Unequal ecological exchange theory provides a framework for conceptualizing how the socioeconomic metabolism of the core's productive economy negatively impacts the marginalized periphery through extraction-based production in the world system. The core-periphery division has not only monetary implications for the terms of trade, but also has physical implications: The global South typically provides “excess” materials and energy so that the global North can sustain and develop its socioeconomic metabolism (Behrens & Giljim, 2007). Whatever the historically changing positions of different countries and regions, the metabolic processes that maintain the centers of the world system are guaranteed by deteriorating terms of trade for natural resources (Ibid.). Simply put the deterioration of terms of trade means increasing quantities of primary exports (Martinez-Alier, 2007). Therefore, the main purpose of
this dissertation is to empirically demonstrate support for the theory of unequal ecological exchange in the case of Turkey.

Trade Liberalization and Environmental Burdens in Turkey

Trade Liberalization and Pollution-Intensive Industries

After the oil crisis in early 1974, the Turkish economy experienced very hard times, which were magnified by unstable political conditions and a large domestic debt (Tunc et al., 2007). In order to reduce debt, major structural changes were introduced in the early 1980s as solutions to long-lasting economic problems: financial institutions were strengthened, new exchange rate policies were adopted, new monetary and fiscal policies were introduced, and export-based open economic policies (or Export-oriented Industrialization, EOI) were implemented. Since that time, Turkey has implemented export-led growth strategies and has gradually become deeply integrated into global markets (Akbostanci et al., 2007). Turkish’s geographical position is also crucial with respect to trade relations; the majority of manufacturing industry exports are destined for EU countries (50 percent) and the United States (10 percent) (Ibid.). Because industrial development is the priority of public authorities, the environment has not been given enough importance in Turkey (Tunc et al., 2007). Even though there are attempts to comply with international standards, the actual implementation of environmental regulations is weak (Ibid. 5). Thus, Turkish's economy is often compared to the developing economies of countries within Latin America and Asia, which are prone to financial crises due to weak “national” economies and global indebtedness (Ibid. 9). The liberalization process of the 1980s was further stimulated with the Customs Union in 1996 (Bekmez & Gokalp, 2005). Since then, Turkey has put additional efforts into trade liberalization policies.
Some argue that economic liberalization may have drawbacks for developing countries (such as Turkey) in regard to environmental concerns (AkboStanci et al., 2007). In the age of economic globalization, scholars agree that Turkey is a good candidate for testing unequal ecological exchange, especially for those (AkboStanci et al., 2007), who have explored the impact of industrial “dirtiness” on manufacturing exports. Larson et al. (2002) studied the impact of environmental regulations on exports of the leather industry in Turkey. He showed that the leather industry—one of the traditional sectors of the Turkish economy—is highly pollution-intensive. Later, a study by other researchers (Tunc et al., 2007) found that “exports increase as the dirtiness of the industries increases” providing some evidence for the pollution haven hypothesis. In term of CO₂ emissions in the world, Turkey’s place is gradually ascending.⁴ Recently, Ipek Tunc et al. (2007), an economist team, estimated the amount of CO₂ emissions for the Turkish economy by utilizing an input-output methodology for 1996 and concluded that the manufacturing sector ranks first place for both CO₂ emissions and CO₂ responsibilities,⁵ while agriculture and husbandry rank last place. Further, these scholars indicated that the pollution content of exports was greater than the pollution content of imports and argued that “to achieve more convincing conclusions it is apparent that data covering a wider time span is necessary” (Ibid. 862). Following this stream of investigation, this dissertation utilizes physical accounting

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⁴ While Turkey was in the 31st place in 1960, it became 25th in 1996 and 23rd in 2000 (Ibid.: 855). In the same period, the U.S which has the highest CO₂ emissions decreased its share from 32 percent in 1960 to 24.4 percent in 2000. In the meantime, the share of Turkey increased from 0.2 percent in 1960 to 1 percent in 2000 (Tunc et al., 2007).

⁵ They define the CO₂ responsibilities as “CO₂ emitted during the production of imported goods and their components” and CO₂ emissions as “a result of production to satisfy both domestic final demand together with export demand” (Tunc et al., 2007:856)
methods while conducting a time-series analysis that covers longer periods to test the pollution
haven hypothesis.

*Trade Liberalization and Agro-export Trajectory: Primary Resource-extraction in Turkey*

The model of economic development established by developing countries such as Turkey
tends to follow the neo-liberal agro-export trajectory; wherein, economic development requires a
shift from family crop subsistence to the growing of cash crops for export on the global market.
In my M.A. thesis, completed in early 1990s, one of the research questions and related
hypotheses that I investigated was how traditional *yayla* peasants, who occupy a national park
area, managed to protect and maintain an ecological balance for centuries.6 The agroforesters,
who had (some still do) a traditional social control system, retained this ecological balance
through their sustainable agriculture, forestry and livestock practices. But, during that time, I did
not inquire as to why traditional *yayla* peasants, who occupy a *raw-material supplying region* in
southern Turkey, had to become “cotton producers.” I did not know that “cotton farmers” were
living just a few hours away from one of the oldest free trade zones of Turkey, established in
1989. This free trade zone, like others in Turkey, facilitates access to global markets (EU, U.S.,
etc.) by collaborating with both domestic and foreign corporations.

Large scale extraction of natural resources for “globalized” raw material markets, such as
export crops, tends to increase damage to Southern local systems (Bunker, 2006). For Bunker
(2006: 30),

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6 Karaoglu, 1994: 10 “…the specific hypothesis of this study is that an attempt to maintain the
ecological balance and/or to conserve forestry resources by local people living within national
parks (i.e., Köprülli-Kanyon National Park) and in surrounding areas (in Turkey) depends on the
extent to which traditional social control systems are retained on traditional lands…”
new economies of scale imposed on hitherto unincorporated zones of the world-system disrupt established local ecosystems, increase the scale and concentration of capital, and lessen the authority and autonomy of the local political system. These effects leave both local society and local state with less competence and fewer resources to control the numerous problems of social welfare, social order, and environmental destruction that globally scaled projects with vast claims on locally produced matter bring with them.

During the early 1990s, I made very similar observations in the Köprülü Canyon and its buffer areas as did Bunker (2006) described above. Investigation of extractive economies in the Amazon by Bunker (2006: 73) showed “how local materio-spatial relations and processes in the Amazon intersects with, and partially constitute, the world system as it transforms and is transformed by systemic changes in the cycle of accumulation.” Analysis of local ecological and socioeconomic systems in the Köprülü Canyon, in light of global processes and consequences of material intensification and spatial expansion, will help us track historical changes between society, economy and nature.

As Bunker (2006) details, in the expanding world system, each growing national economy transformed world markets for the most used raw material of the time (wood, cotton, iron, etc.). These internal dynamics are exacerbated by extractive economies’ absolute dependence on external trade, and this dependence increases their vulnerability to external market shocks and price drops (Ibid.). These processes lead to internal ecological destruction and economic instability while global capital and international politics weaken the bargaining position of the global periphery in the age of neoliberal globalization. International flows of cheap primary products or environment-intensive products create ecological flows that result in environmental and social cost-shifting. This cost-shifting is then imposed on local ecologies from the importing to the exporting country In a free trade system, capital migration to poor countries will not convert affluent countries in ‘absolute losers,’ instead Southern nations
become real losers by suffering the environmental loads of ‘affluent’ consumption” (Muradian & Alier, 2001: 286).

The systematic undervaluation of ecological flows (in monetary terms) displaces the ecological costs of this uneven consumption onto peripheral nations; whereas, core nations can inequitably appropriate limited global ecological space (carrying/sink capacity of the ecosystem) well beyond their political territories. The questions remain: How does this ecologically unequal process affect local socioecological systems and promote the environmental victimization of yayla peasants in Turkey? How do a particular series of processes—that is, the extraction and export of specific raw materials from a specific place at a specific time (or over a long period of time)—affect the Köprüülü Canyon, increasing the scale of production to make a contribution to the national economy and trade, and also change the socio-ecological metabolism of the area? The extraction and export of natural resources from the global South not only constitutes a transfer of value embodied in matter and energy (Bunker, 2006), but also constitutes extractive activities (at one point in time) that shape the ecological, demographic, organizational (break down of the traditional social control system of yayla peasants)7 system that I observed in the 1990s at Köprüülü Canyon National Park. In addition, such processes shape infrastructural context and outside factors. The purpose of this dissertation is to test the theory of unequal ecological exchange while demonstrating its impact on the Köprüülü Canyon and its buffer zones.

**Research Questions, Hypotheses and Methods**

**Research Questions**

The macro-structural empirical consequences of unequal ecological exchange are

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manifested in three interrelated processes as discussed in the literature. First, environmental cost-shifting or the externalization of the social and ecological costs of extraction and distribution of natural resource exports (as in the case of Turkey’s agricultural sector) from the global South serve to enhance environmental degradation and depletion at the local level. Secondly, the disproportionate and under compensated utilization of global environmental space or trends (available sink capacity and biologically productive area) limits the growth and development capacities of the global South. Third, environmental cost-shifting and appropriation of environmental space contribute to processes of underdevelopment —that is, as a consequence of the loss of value associated with the export of undervalued natural resources—within the global South. The question is: How can we demonstrate that these processes might be happening in Turkey (especially the physical value of ecological trade flows)?

As nations both import and export biophysical resources, and with many ecosystems throughout the world under mounting stress, countries may be increasingly aware of the extent and origin of their ecological imports/exports and dependencies. The central questions are:

National level: To what extent has Turkey’s natural resources been appropriated at the global level through the process of unequal ecological exchange? What are the economic and political contexts (export oriented growth strategy, trade liberalization, external debt, etc.) that give rise to unsustainable and/or unequal ecological exchange in Turkey? What is the trend in ecological flows of Turkey? Regional level (or with EU): To what extent is unequal exchange occurring between Turkey and the EU? More specifically, to what extent has Turkey been feeding the EU (with its agricultural products) and/or manufacturing its (dirty) goods?

Regarding micro-structural interpretations, the questions are: What are the actual
consequences of ecologically unequal trade for regions (which are net-exporters of natural resources) providing natural resources in terms of both economic development potential and actual environmental impacts? What kind of social and ecological impact/s can be detected at the local level? Investigation of a local case study at Köprülü Canyon and its buffer areas can provide potential answers to these questions. The analysis of the local case can be guided by a set of research questions: What are the socioecological effects of the “free trade zone” in the area that frames the Köprülü Canyon as one of the “raw-materials supplying regions,” which has been occupied by yayla peasants for centuries? What are the external influences, especially in regards to access to market and trade-led agricultural expansion, on this protected land and its buffers?

Pilot Study: I used the COMTRADE database to check a few years of the Physical Trade Balance (PTB), as well as some calculations related to PTB balance, in Turkey. The preliminary analysis showed that the Physical Trade Balance is hardly positive. In other words, two important sectors—primary agriculture and secondary manufacturing—were negative (physical deficit). This motivated me to do a time-series analysis to see if this had been the case for Turkey and for how long (see below sections for details). Weisz (2007) and Bunker (2006) argue that there are times when economies, or particular sectors of economies, are "being extractive" or "being productive," even though the PTB is positive. I used their approach, especially Bunker’s (2006), to examine the extractive economic sector/s of Turkey in long time-series. As an oil importing, semi-peripheral country, Turkey has a long history of monetary trade deficits (Dis Ticaret, 2007; EUROSTAT). Understanding to what extent Turkey’s ecological space has been appropriated and how much Turkey is gaining through trade from an ecological/ biophysical point of view becomes the central focus.
Research Hypotheses

Hypothesis 1: Consistent with the unequal ecological exchange theory and its macrostructural empirical results, externalization of the social and ecological costs of extraction and distribution of natural resource exports (such as primary agriculture) from the global South enhances environmental degradation and depletion of local ecologies, while displacing externalities onto marginalized communities. As many scholars theorize (namely Muradian & Giljum, 2007; Martinez-Alier, 2002; Faber, 2008; O’Connor, 1998), nations in the global South specialize in resource-intensive products.8

I hypothesize that the increase in flows of agricultural exports has an inverse relationship with both “cropland remainder” and “agroforestry remainder” over the years 1961-2003 in Turkey. Specifically, increases in agricultural exports result in a deterioration of both cropland and agroforestry reserves in Turkey.

Both a long time-series PTB approach (agricultural sector analysis in weights of imports minus weights of exports) and regression models using over forty years of observations are used to test the hypothesis stated above (See Chapter Four for detailed research methodology).

Hypothesis 2: This hypothesis is focused on pollution-intensive manufacturing that moves from the global North to the global South as well as on the export trends of polluting sectors. More specifically, it explores historical trends in the trade flows of pollution-intensive manufacturing, supporting the claim for climate injustice in Turkey. Similar to hypothesis 1, if one conceives of international flows of environment-intensive products in general as “ecological flows,” that is, ecological cost-shifting from the importing to the exporting country, then free

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8 Also, in a free trade system, capital migration to poor countries will not convert affluent nations to “absolute losers” (as Daly (1993) fears), but instead the poorest nations may become the real losers by suffering the environmental load of “affluent” consumption (Muradian & Martinez-Alier, 2001: 286). It can be added that the global South specializing in resource-intensive or environment-intensive products may generate a “specialization trap” (Ibid.: 287)
trade can promote increased environmental-load displacement from the importing to the exporting country. This is consistent with the increased internalization of the productive circuit of global capital or the movement of polluting and environmentally hazardous production processes (Faber, 2002; 2008). This is also consistent with the trade effects of the pollution haven hypothesis (PHH). First, it can be argued that through the process of economic globalization (under an export-led growth strategy or through production-oriented growth), exports increase in the manufacturing sector. Then,

I state that as the polluting industries, especially CO₂-intensive manufacturing, move from the global North to the global South, as may be evidenced in Turkey, the amount of CO₂ produced in Turkish manufacturing (including metal, iron and steel production, etc.) increases over the years. ⁹ Greater export flows of “dirty” industries are positively correlated with pollution-intensive manufacturing activities over the years in Turkey.

Following the line of argument by Neumayer (2001), Giljum (2004), and Muradian and Giljum (2007), this hypothesis tackles the issue of the physical scale of exports, and more specifically, production in and exports from developing countries, exemplifying Turkey as a case that may become increasingly pollution-intensive. The results from this empirical work will contribute to discussion of the international distribution of environment-intensive exports (more weight-intensive) associated with the process of economic globalization.

In PHH the scale effects have not been observed, and there have not been enough studies done for specific regions/countries. Thus, the main task of this hypothesis is to assess the long-term trends in the trade of goods from polluting sectors in time-series, which indirectly contributes to the debate on the PHH. The scale effects have been ignored in PHH. However, physical inputs (resources) must comprehend the physical outputs (products and wastes), and

⁹ Related literature emphasizes the importance of CO₂ as the strongest indicator in such studies.
physical flows are a better proxy than monetary flows for estimating the environmental transformations associated with the scale of economic activity (Muradian & Giljum, 2007: 309 and personal contact). To test these specific hypotheses, a long time-series of the PTB (over forty years) approach (weights of imports minus weights of exports) is utilized. In addition, regression analyses are run using several variables (see Chapter Four for details).

_Hypothesis 3:_ This hypothesis is related to trends in the pollution terms of unequal ecological exchange and trends in agricultural exchange between the EU-15 and Turkey. The European economy has been increasingly dependent on material inputs from outside its territory since the 1990s. The socioeconomic system of the EU is indeed to some extent draining off ecological capacity from other world regions (including non-EU countries) and is heavily dependent on resource inputs provided by other countries (Bringezu and Schütz, 2001a). Following this line of argument and in considering Free Trade Agreements (FTAs) with Turkey, that is, the European Free Trade Agreement (see also Kumar & Gallagher, 2007), I argue that the impact of unequal exchange can be observed at regional levels, especially between the EU and non-EU, such as Turkey. More specifically, some EU nations may have appropriated the ecological space as well as the political space (through FTAs) of Turkey (mainly in two sectors—primary agriculture and secondary manufacturing). The _deeper_ unequal ecological exchange

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10 As Giljum and Hubacek (2001) argue, through international trade, the EU appropriates material resources from all over the world without reciprocally re-exporting physical resources. At the end of the 1990s, the European Union had a net import of almost 1 billion tons of materials per year from outside its territory (Giljum & Hubacek, 2001: 34). According to Muradian & Giljum (2007:5) the “EU is importing most of the pollution-intensive products from other world regions (including other industrialized countries), processing them in order to add value, and then re-exporting them.”
analysis at the regional level is more focused on products that have a large ecological impact, what Turkish trade looks like with the EU.

I hypothesize that the “pollution haven” created in Turkey by the EU, which is marked by increasing “pollution-intensive” activity, is associated with the increased CO₂ embedded in exports of Turkey’s non-agricultural products through trade with the EU.

Similarly, I also hypothesize that both the creation of a “pollution haven” and the appropriation of Turkey’s cropland (increased utilization of cropland in ha.) is associated with the increased CO₂ embodied in exports of Turkey’s agricultural products through trade with the EU.

The Product Land Use Matrix (PLUM) for 2002 is utilized (See Chapter Six for details of PLUM, and see Moran et al., 2008).

Qualitative Case Study: I conducted semi-structured interviews to investigate the consequences of unequal agricultural exchange in Köprülü Canyon National Park and its buffer areas. I attempt to answer the following questions: What are the socio-ecological impacts of unequal ecological exchange in the Köprülü Canyon? More specifically, how do we define and explain the marketing channels for exporting agricultural products? Who are the actors involved in the marketing and trading of agricultural products? The semi-structured interviews were conducted from August – September 2010 and followed up in June 2011 with various stakeholders in order to answer these questions. The results of my previous fieldwork (an unpublished MA thesis) in the area are used for comparison purposes for this socio-ecological case study.

Research Methods and Data Collection

This study uses both quantitative and qualitative methods. Two different quantitative methods are utilized to test the proposed hypotheses stated above. First, several physical
accounting concepts and indicators like ecological footprints and energy-related concepts (Odum, 1984) have been applied to analyze environmental distribution issues related to international trade. In 2007, Dr. Wackernagel and his organization (Global Footprint Network=GFN) gave me access to Turkey’s Ecological Footprints Accounts in time-series. In 2008, GFN also granted me access to their recently developed model/data called PLUM (Product Land Use Matrix), which is an updated version of the ecological footprint analysis’ trade section for 2002. With relation to trade, Physical Trade Balance (PTB) is the most important indicator (Giljum et al., 2007; Martinez-Alier, 2005; Weisz, 2005; Ditrich, 2010). In each empirical chapter, I provided detailed methodology (see Chapter Four, Five and Six).

Second, the regression analyses are run by utilizing an SPSS statistical software package. The different variables, such as Agricultural Exports (in tons), Pollution-Intensive Manufacturing, Foreign Direct Investment (FDI), GDP, energy embedded in manufacturing production, energy embedded in agricultural production, energyland deficit vs. reserve, some of which are calculated through the PTB analysis, are included in regression models. Such variable combinations have not been used by scholars who have conducted similar analyses. Each empirical chapter (especially Chapter Four, Five, and Six) has a detailed research methods section.

The qualitative section of this study is guided by semi-structured, long-distance interviews, which were administered to various actors in the study area. In general, the LTSER (long-term socio-ecological research) technique that Haberl, Fisher-Kowalski; Freudenburg, and Krausmann et al. (2006) described was somewhat adopted in my socio-ecological study at Köprülü Canyon. The “snowball technique” was employed to increase the number of
participants. Also, some secondary data was obtained through online database sites as well as through communication with scholars at local universities. In addition, archival data was used, consisting of records, articles, and newspaper sources.

**Generalizability and Replicability**

Mainly, there are two types of generalization in the social sciences, statistical or enumerative generalization and analytic or theoretical generalization. One of the goals of this study is theoretical generalization (or empirical generalization)—that is, testing the theory in general (Shutt, 2002). More specifically, the study will test the hypotheses deduced from the general theory. The generalizability of the results can be applicable to some semi-peripheral nations in the world system. The quantitative part of this study, especially PTB and EF data/methods (social relevance of physical indicators) are common at a macro level of analysis and can be replicable to another country. The data-bases used, such as COMTRADE, EUROSTAT, FAO, and especially GFN’s Ecological Footprint's methods and data, have become universally accepted for this type of research.

**Rationale and Importance of the Study**

More detailed information on the links between environmental pressures (expressed as material flow data and physical accounting work) and actual local or regional environmental impacts (expressed as local ecological/socioeconomic data) is needed in the literature. The following are some of the gaps in the literature that this dissertation aims to fill. First, most studies take an economic (monetary) approach, focusing on specific environmental problems related to international trade activities (such as air and water pollution or soil degradation). Very few studies take a systemic, biophysical approach to economy-environment relationships to
explain environmental results as a consequence of the biophysical metabolism of societies. There is a need to analyze the distribution of environmental goods and burdens in North-South trade relations, especially focusing on certain regions, such as those in the semi-periphery. Thus, this dissertation focuses on a specific country (Turkey) and its relations with certain nations, such as the EU-15, and then explores ‘outcomes’ at the local level. Second, monitoring the environmental impacts of export sectors and the environmental implications of sectoral shifts marks more detailed information on the links between environmental pressures (expressed as material flow data) and actual local or regional environmental impacts. This dissertation fills this gap since previous research has not fully addressed this issue. Third, there are several physical accounting methods, and it is crucial to combine and utilize them to identify general patterns and trends. This dissertation utilizes physical accounting methods such as Physical Trade Balance (PTB), Product Land Use Matrix (PLUM) and ecological footprint (EF) analysis as well as regression analysis. Regarding the last physical method, EF analysis, this method does not directly use the EF data as seen in previous quantitative studies. Instead, it delves more into the analysis of physical trade balances, which include the biophysical capacity of a nation to analyze unequal ecological exchange. Forth, this dissertation shows how unequal ecological exchange impacts local socio-economic ecologies, social control systems, and social class structure. Lastly, this dissertation conducts a country-level data analysis on the ecological footprint in time series while investigating un/sustainability trends in a semi-periphery.

**Ethical Considerations: Consent and Confidentiality**

In order to protect the study participants' privacy while making them comfortable in answering the questions, a number of procedures were undertaken during semi-structured
interviews. According to Northeastern University’s IRB Office guidelines, I prepared forms including an unsigned consent form, which was used at the initial contact verbally over the phone, and recruitment phone scripts for various stakeholders. At initial contact, I explained the nature of the study, the purpose of the interview, the time commitment expected, and I answered any questions the potential participant had. If the individual agreed to the interview, a time for the interview was set. When I called the participant, I read the unsigned consent form and asked once again if they wished to participate (see Appendix A: Unsigned Consent Document). I obtained the phone numbers of the potential participants through written sources, mostly in online form. Therefore, I located many participants’ phone numbers online in their village catalogue and/or county-based business directories. In addition, my key informants voluntarily provided their friends' and/or relatives' phone numbers to assist me in locating other participants, making a contribution to my research. I verbally explained the purpose of the study to all participants in Turkish.

The objectives of my research were written, and I read them to each of my informants before starting to ask the interview questions. The themes for discussion revolved around production for market free trade zone access, their general agro-forestry experiences, transportation as well as their social and economic status/class, etc. (see Appendix B: Phone Interview Questions). The interviews were not digitally recorded (see Appendix A: Recruiting Phone Script). I also reiterated the section about confidentiality (of their name along with the nature of their business and village residency) to the participants. In other words, the participants of the interview were assured that their names would not be identified with the comments they made. Also, they were assured that their names would not be revealed in the final
report of this study, that they could stop the interview process any time, and that they did not have to answer any questions with which they felt uncomfortable. The personal information that the subjects provided were identified with a code system (see Chapter 7). Participants were interviewed at a time of their convenience. The final report of this study is a social construction of the informants’ skills, knowledge and experiences as well as the meanings that they attached to them, in addition to my own interpretations. This approach allows readers to understand these local communities’ specific conditions and the various aspects of their lives.

**Outlines of the Study**

Chapter Two, “Theoretical Framework to Analyze Unequal Ecological Exchange within the Context of Environmental and Climatic Injustices,” reviews and critiques theories and debates related to unequal ecological exchange within the context of environmental and climate (in)justices. First, it focuses on distribution issues in global North-South trade in the age of globalization and ecological imperialism. Secondly, it details a theoretical framework to analyze unequal ecological exchange that discusses extractive vs. productive economies, capital accumulation and appropriation of energy and resources, *dematerialization*, the production-consumption treadmill, appropriation of environmental space and uneven ecological footprints. Accordingly, it conceptualizes ecological debt, including carbon debt. Third, it addresses environmental (in)justice vs. post-material environmentalism as well as climate (in) justice as an unequal cost of climate change. To this end, it emphasizes the relationships among unequal ecological exchange, ecological debt, and climate and environmental injustices.

Chapter Three, “Political Economy of Turkish Agricultural Trade in the Age of Neoliberal Globalization,” analyzes agricultural trade policies in Turkey from a broader political
economy perspective. It focuses on economic liberalization, including debt crisis, and
agricultural trade policies under neo-liberal restructuring. This chapter also addresses
transformation of the agricultural sector, foreign direct investment in agriculture, as well as
transnational corporations in the agricultural sector. To this end, it stresses the difficulties in the
Turkish agricultural sector under economic globalization.

Chapter Four, “Unequal Agricultural Exchange and Turkish Fallacy in the Age of
Climate Change,” empirically examines unequal agricultural exchange in the case of Turkey.
First, it discusses processes of unequal agricultural exchange, including the peripheralization of
agroecological burden, environmental cost-shifting, and the “Netherlands Fallacy.” This chapter
also conceptualizes the “Turkish Fallacy.” Secondly, it presents the specific hypothesis as well
as two different methods: “physical accounting” and regression modeling. The research findings
and results are discussed further with special attention afforded to energy embedded in
agricultural trade and climate change in the concluding section.

Chapter Five, “Pollution Havens and Unequal Ecological Exchange: Trade Flows of Anti-
wealth,” empirically investigates the trade impacts of pollution havens in the case of Turkey.
First, I argue that unequal “pollution” exchange is one of the underlying mechanisms enhancing
the “transnational” treadmill of production in the age of corporate-led globalization. After
presenting a literature review on the trade effects of pollution havens, pollution havens are
located within the context of the internationalization of the second contradiction of capital. The
chapter also draws on new research on the “flow of pollution through international trade flows”
to provide support for the pollution haven hypothesis. Second, I highlight trade liberalization
and previous studies on pollution havens of Turkey while discussing “dirty” exports, foreign
investments, and free trade zones. Third, I present my research hypotheses, a description of two different research methods (physical trade balance approach and regression analysis) and the findings, and provide further discussion. The appropriation of energy and environmental cost-shifting to trade as a form of thermodynamic imperialism is discussed in the concluding remarks.

Chapter Six, “Unequal Ecological Exchange: Turkey and the EU: Environmental and Climate Injustices,” examines unequal ecological exchange between Turkey and the EU-15 by using a special input-output matrix called Product Land Use Matrix (PLUM). First, the chapter provides an overview of the EU’s environmental policy, free trade agreements, the EU’s cost-shifting successes and evidence of pollution havens. Secondly, the chapter focuses on the political economy of Turkey-EU trade and overviews the EU-Turkey Custom Union agreement with special attention to Turkey’s agricultural and manufacturing industry trade agreements with the EU. Third, I re-state the research hypotheses and research methods and then document the empirical findings. To this end, the chapter argues for acknowledging Europe’s eco-debt and the overuse of environmental space within the context of environmental and climate (in)justice perspective.

Chapter Seven, “Köprülü Canyon National Park and Its Buffer Zones: A Local Case Study of Unequal Ecological Exchange,” explores the socio-ecological impacts of unequal ecological exchange in Köprülü Canyon National Park and its buffer areas through posing specific research questions. This last empirical chapter utilizes qualitative methods to analyze data collected through semi-structured interviews. The author’s previous research from the 1990s provides a comparative analysis. This chapter starts defining the social ecology of the yayla-peasantry at Köprülü Canyon and explains the colonization of the local ecosystem and the yayla-
peasantry through intensified agriculture. By focusing on the flows of material and energy in an extractive economy, the chapter details the capitalization of the ecosystem. It also argues for recognizing commodity chains in the study area, such as commodification of "yaylacilik" and the ecological costs of export crops. In the concluding section, this chapter discusses the winners and losers of unequal ecological exchange from a political economy perspective.

Chapter Eight, “Concluding Remarks,” discusses the empirical results of the study in relation to unequal agricultural exchange and the *Turkish Fallacy*, pollution havens and trade flows of *antiwealth*, unequal ecological exchange between the EU-15 and Turkey, as well as the consequences of unequal ecological exchange at Köprülü Canyon from an environmental and climatic injustices perspective. The concluding remarks of this chapter highlight the unsustainable path of Turkey by using GFN’s long time-series (1961-2003) of ecological footprints. The chapter also addresses climate justice as an emerging global ecological and social movement to halt the unequal cost of climate change and Turkey’s efforts to achieve ecologically sustainable development.

**Titles of Empirical Chapters**

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CHAPTER TWO  
THEORETICAL FRAMEWORK TO ANALYZE  
UNEQUAL ECOLOGICAL EXCHANGE WITHIN THE CONTEXT OF  
ENVIRONMENTAL AND CLIMATIC INJUSTICES

Introduction

This chapter reviews and critiques theories and debates related to unequal ecological exchange within the context of environmental and climate (in)justices. The first part of the chapter focuses on identifying distribution issues in global North-South trade in the age of globalization and ecological imperialism. The second part details a theoretical framework through which to analyze ecologically unequal exchange. This theoretical framework addresses: extractive vs. productive economies, capital accumulation and appropriation of energy and resources, dematerialization, the treadmill of production-consumption, appropriation of environmental space and uneven ecological footprints. It also reviews arguments about “pollution havens” as well as the “Netherlands Fallacy.” To this end, it conceptualizes ecological debt, including carbon debt. The third section addresses environmental (in)justice vs. post-material environmentalism, as well as climate in(justice), as an unequal cost of climate change. The last section stresses the significance of the relationships among unequal ecological exchange, ecological debt, and climate/environmental injustices.

Ecological Imperialism in the age of Globalization

Globalization increases both environmental and climate injustices as well as ecological imperialism, advancing the interests of the global North. Environmental commodification has been accomplished (Shiva, 2000: 129) through the intensive exploitation of natural resources, not
by the *environmentalism of the poor*, but by the invasion of transnationals for profits and for promoting the interests of wealthy local elites. This has left a legacy of social inequality and ecological transformation—one form of ecological imperialism (O’Connor, 1998:24). Today, an unprecedented form of ecological imperialism is taking place with extensive research on genetically modified organisms and activities of corporations in developing nations that are rich in biological diversity. This has lead to a new trade involving *biopiracy*\(^{11}\) (Martinez-Alier 2002).

For Shiva (2003), *biopiracy*—another form of ecological imperialism—is one of the greatest excesses of corporate-led globalization.

*ecological imperialism cut across national boundaries and [it] implies wanton natural resource exploitation and inequitable distribution of environmental hazards (or externalization of costs of production) by MNCs or other powerful foreign interests, remains a serious threat to the ‘global commons.’* (Adeola, 2000:689)

Since the global North is afraid of losing its high standards through ecological dumping from the South, their strategy is to construct trade barriers based on environmental considerations. This strategy is certainly another form of ecological imperialism (Muradian & Martinez-Alier 2002) as detailed below. Accordingly, ecological imperialism offers an inclusive picture of the biological implications of international industrialization that underscores the linkage between structures of social inequality and ecological transformation (Byrne et al., 2002:12). Foster & Clark (2004:5) argue that “ecological imperialism—the growth of the centre of the system at unsustainable rates through the more thoroughgoing ecological degradation of the periphery—is now generating a planetary-scale set of ecological contradictions, imperiling the entire biosphere.” I agree with Clark and Foster (2009) that ecological imperialism, which is itself a

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\(^{11}\) The Rural Advancement Foundation International defines *biopiracy* as "the use of intellectual property laws (patents, plant breeders’ rights) to gain exclusive monopoly control over genetic resources that are based on the knowledge and innovation of farmers and indigenous peoples." (RAFI 1996:1)
mechanism to search for profit, plays a pivotal role in terms of creating asymmetries in the
exploitation of natural resources, unequal exchange and “global metabolic rift.” The social
metabolic order of capitalism needs to be analyzed within the context of ecological imperialism.
Thus, the management of material flows is fundamental for capitalist competition.

Neo-liberal globalization has been wielded to enshrine wealthy elite privilege at the
expense of people and the ecosystem (Harvey, 2005), and its universalization has dismantled
most major institutions and policies designed to stabilize the world capitalist system (Faber,
2002). As many agree (Faber, 2002; 2008; Sachs, 2002, Adeola, 2000; Shiva, 1997; Berberoglu,
2003; 2005), under the new ecological imperialism which was fueled by globalization, the core
nations are becoming increasingly dependent on the appropriation of surplus *environmental space* from the peripheral nations. By expanding its ecological footprints, the core’s economic
growth is predicated upon further subtraction of biomass production from the periphery.

The globalization of capital has accelerated the deterioration of natural resources and has
led to a global ecological crisis (O’Connor, 1998; Foster, 2002; 2005; Faber 2008). The
commodification and capitalization of nature resulting from primitive accumulation, then,
competitive capital accumulation, removed traditional economic and cultural constraints on land
use, hence created the potential for ecologically destructive production methods (O’Connor,
1998:23). The well known “first” contradiction of capitalism arises from the fact that capitalist
production is not only production of commodities but also production of surplus value, that is,
capitalist exploitation of labor, which means class struggle and economic crises are inherent in
capitalism. The crisis takes the form of a “realization crisis” (or the “overproduction of capital”).
In eco-Marxism, economic crisis assumes the form of a “liquidity crisis” or “underproduction of
capital.” (Ibid. 161) O’Connor’s (1998) infamous “second” or “cost-side contradiction of capitalism” is recognizable within the context of global free trade. As capital undermines or destroys its own production conditions and accumulation, it also undermines its own profits, and it creates social and political opposition. In particular, “the advent of global free trade is subverting nationalist economic development models, compelling nations in both the North and South to focus primarily on expanding foreign investments and export markets (over domestic markets) as a means of achieving growth” (Faber 2002: 372).

Furthermore, as Berberoglu (2003:108) argues, “the neocolonial capitalist states have played a key role in the globalization of capital and its predominance in much of the Third World, promoting further penetration of their economies and societies by the transnational monopolies.” Faber (2008) analyzes how the American power structure is impacted by the polluter industrial complex that “engages in a series of maneuvers designed to colonize and restructure the state in its favor.” (9) Once in control of the state, “Neoliberals strive to reduce the costs of environmental regulations to industry and to increase the flexibility of capital to appropriate labor power and natural resources in the most profitable manner possible by transferring power from the state to private institutions under the control and domination of capital” (Ibid. 126). The endless cycle of capital accumulation implies that the neoliberal regime of private property rights must be geographically expanded across the globe (Harvey, 2005b:181-182). Thus, new areas of the global South are being transformed into a dumping ground for transnational capital (Karliner, 1997).

Ecological crises under capitalism are complex, requiring analysis both at the local and the global level. I argue that the concepts of ecological debt, unequal ecological exchange,
especially the disproportionate use of the environmental space of the periphery and ecological
cost shifting are at the root of most ecological distribution conflicts in the global South. All refer
to ecologically unsustainable practices, indicating the current logic of ecological imperialism and
dependency, and almost all refer to global environmental and climatic injustices. I agree with
scholars (Faber, 1998; 2002; 2008; Adeola, 2000; Guha, 1997; Martinez-Alier, 1998; 2002;
O’Connor, 1998; Shiva, 1989; 2003) who locate the root causes of these environmental injustices
(both in the North & South) in the expansionary dynamics of global capitalist accumulation,
which contributes not only to global environmental change but also the continuing
underdevelopment of the global South.

The trade-induced world division of labor will, in turn, give rise to an international
structure of unequally powerful nation states: a structure which, though maintaining and
consolidating the world division of labor, determines an accelerated process of
accumulation in certain regions (the core), while enforcing a cycle of backwardness in
others (periphery) (Wallerstein in Brenner 1977: 30)

Economic inequalities caused by unbalanced trade structures can be traced as far back as to
Adam Smith and the possibility of exploitation through trade representing trade relations
between towns and countryside characterized by different levels of wages and profits (Raffer,
1987). In the late 1940s, members of the structuralist school presented a theory on deteriorating
terms of trade for primary commodities exporters. On the one hand, this deterioration is
supposed to result from different income elasticities for Southern vs. Northern export products.
On the other hand, in the South, the products are characterized as ‘using natural resources’ and
are produced by mostly non-unionized labor; whereas, those from the North are characterized as
‘capital’ and knowledge intensive, and produced by well-paid labor under the influence of trade
unions. The deterioration of terms of trade for exports means that an ever increasing quantity of
primary export products from the periphery is needed to obtain the same amount of imported goods—leading to *economically unequal exchange* (Muradian, 2001). Thus, the assumption of stable prices for different product groups does not hold (Giljum and Eisenmenger, 2003).

With respect to the productive circuit of capital, the theory of non-existing international capital mobility no longer holds in today’s global financial markets (Constanze et al., 1995; Daly, 1993). When capital flows to countries with absolute profit advantages, then comparative advantage becomes of no importance. Then, regions of the world might be excluded from global investment flows and are in a state of inaction as absolute losers in the international economic system (see Altvater and Mahnkopf, 1996). The key point is that the standard trade theory of comparative advantage assumes constant benefits from specialization (Ropke, 1994) Hence, it fails to consider strong disadvantages due to specialization in economic activities with declining marginal returns, marginalized human potential and short run-over effects from the export sectors to the rest of the economy (Ibid. 1994).

World systems scholars, such as Bunker & Ciccantell (1999), emphasize that safe and steady access to inexpensive raw materials, either within or outside the territory, was one imperative requirement for the rise of hegemonic powers since the very beginning of capitalist development. Due to the dynamics of a liberalized global trade regime, much of the global South fails to proceed with industrial development (Altvater and Mahnkopf, 1996). Accumulation processes have always been closely connected to “the *appropriation* of natural resources from regions outside the accumulation center” and “in the modern trade system, market prices provide the key to understand how market institutions organize the net transfer of natural resources to
world centers, as they are to a large extent the outcome of power and distribution conflicts” (Hornborg, 1998: 170).

**Ecological Terms of Trade**

The terms-of-trade distortion effect produced by world capitalism that has been explained from a Marxist perspective by Patnaik (1997: 120), who improved on earlier theories of dependency and unequal exchange, claimed that

…falling terms-of-trade for the poor countries can be seen as a distortion of the global relative prices from an ecological point of view. Despite a deterioration of the global natural capital, this need not manifest itself in rising prices for biocapacity intensive products. Instead, it may show up as worsening standards of living in the periphery and as falling prices due to the growing reserve army of labour. The poorer the producers of primary commodities, the more easily can they be forced to give precedence to short-run income over long-run ecological considerations…

According to Andersson and Lindroth (2001:121), asymmetric power relations, which increase the intra-generational income differences between core and periphery, also distort the prices of biocapacity intensive goods. Since these products are exported from countries with such weak bargaining positions that their global terms-of-trade are worsening, the results are greater negative ecological externalities (Muradian and Martinez-Alier 2001). The countries and/or their corporations with greater wealth and power can decide how to use global biocapacity.

Ecological economists consider the ecosystems, species, and other biophysical entities that produce required resource flows as forms of *natural capital* and the flows themselves as types of essential *natural income* (Costanza and Daly 1992; Rees 2000). Commodity flows and the trade are monitored in monetary, not in ecological units. In this case, the deteriorating terms of trade actually hasten the depletion of essential natural capital while undermining global carrying

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While the speed and scale of the transformation of ecosystems is unprecedented, the disparities in environmental damages are uneven among nations. Rich nations place more stress on the global environment, while poorer nations disproportionately contend with the effects and consequences of degraded and/or stressed ecosystems (Roberts and Parks 2007; see also: Srinivasan et al., 2008). The South subsidizes the North with a constant flow of wealth, not only of energy, and natural goods, but also of financial flows for the payment of interest on the foreign debt. It is because of their foreign debt obligations that the countries of the South are pressed to adopt export-led growth policy. The Third World Debt (especially in the 1980s), which made ecological conditions worse in the global South, can be explained by the close connection between capital accumulation, economic, and ecological crisis. For O’Connor (1998:128),

World capitalism entered a period of slow growth and sectoral crisis in the early 1970s. Since then, the three circuits of capital have been downsized, outsourced… restructured …streamlined. Cost-cutting and efficiency has been the order of the day…. associated with the radical changes in the international division of labor. The costs of the crisis have been exported to the South and to oppressed minorities and the poor in the North. Capital has accumulated its way through this crisis in part by neglecting, impairing, or destroying its own conditions of production and reproduction, that is, by acquiring an “ecological debt” to the South and world’s poor generally. It has done this by externalizing more cost…by ruining resources… which survival economies …of the South depend on (emphasis is mine)

A Framework to Analyze Unequal Ecological Exchange

The theory of unequal exchange had considerable influence on the development vs. dependency debate in the 1970s. It is based on Marx’ theory of labour value and focuses on differences in wage levels between the North and the South. These differences in wage levels
then cause net-losses of surplus value for peripheral countries and wage disparities between different countries, which generates an “imperialism of trade” (Attewell, 1984) and, thus, an unequal distribution of economic benefits in international trade relations. The central idea of unequal exchange, from Emmanuel’s point of view, is that one hour’s work embodied in a commodity produced by an underdeveloped nation exchanges for less than one hour’s ‘work embodied’ in the product of an industrialized nation. For Emmanuel, the periphery’s work is consistently devalued; whereas, the core’s work is overvalued. Emmanuel also emphasizes how peripheral nations are exploited by the center through free competition on a world market, and he attacks the Ricardian theory of comparative advantage—a belief that both countries of the North and the South gain from producing different kinds of products (Martinez-Alier 2002a & b). Paul Baran stresses that utilization of underdeveloped nations’ resources by developed nations is exploitation of the South’s future potential surplus (Attewell 1984). Baran, following Rosa Luxemburg, argued that capitalist economies must suffer from a chronic deficit in demand and concomitant ‘under-consumption’ because the purchasing power of the workers is always bound to be less than the value of the produce that has to be sold in the market (de Janvry 1981). This is the incentive toward capturing new, external markets in areas that, as a result, become structurally incapable of “development.” This zero-sum perspective was a marked difference in dependency theory.

Scholars, such as O’Brien and Williams (2004), define unequal exchange broadly as the declaration of asymmetrical power relationships between the global North and global South; whereas, the former gain disproportionate advantages at the expense of the latter through international trade. Marxist scholars, in particular, point to the influence of international trade as
a mechanism stabilizing the international division of labor, thereby making development problematic within the periphery and concentrating economic power in the core nations (O’Brien and Williams 2004).

Ecologically oriented Unequal Exchange

a sociometabolic perspective shows that capital accumulation does not take place on its own, and is not only based on the exploitation of labor and technical change. Industrial capitalism advances into commodity frontiers because it uses more and more materials and energy produces more and more waste, and thus undermines not only its own conditions of production but the conditions of existence of peripheral peoples, who complain accordingly. Such ecological conflicts are becoming increasingly visible (Martinez-Alier, 2007: 234)

Wide-ranging research is focused upon such ecological distributional conflicts and unequal ecological exchange (Andersson and Lindroth, 2001; Bunker, 1985; Giljum et al., 2008; Hornborg, 1998a, 1998b, 2001; Jorgenson, 2004; Faber, 2008; Muradian and Martinez-Alier, 2001; Martinez-Alier 2003; Rice 2007). The starting point of this diverse view is that global capital accumulation is fundamentally rooted in the alteration of ecological systems and the exploitation of labor (Faber, 2002; 2008; Bunker, 2006; Hornborg, 2001; Martinez-Alier, 2006). Thus, it shapes not only social relations of production but also the integrity and structure of ecosystems. Unequal ecological exchange provides a framework for conceptualizing how socioeconomic metabolism or material throughput of core nations may negatively impact marginalized nations in the global economy by highlighting the uneven flow of energy and natural resources underlining disparities in production and material consumption (Rice 2007; 2009; Jorgenson 2009; Weisz 2007).

An ecologically-oriented focus upon the uneven processes underlying capital accumulation enhances but does not replace the traditional Marxist concern with labor
exploitation (Bunker 1998; 2006, Hornborg 2003, Martinez Alier 2002; 2007). In addition to the
transformative dynamics of labor, human societies require the continual appropriation of energy
and raw materials (Hornborg 1998) and the externalization of waste products or pollution within
the ecological systems. Socioecologic metabolism, which refers to cycling of biophysical flows
between human societies and ecological systems (Fisher-Kowalski & Haberl, 1998; Weisz,
2005), consists of interdependent flows of energy, natural resources, and waste products between
countries as it shapes the differential process of production-consumption -accumulation at
different positions in the world economy (Rice 2007). The global economy is based on an
increasingly internalized environment where economic and political interests far from the
physical location of specific resources influence their form and utilization; thus, environmental
outcomes are increasingly the consequence of transnational processes (Redcliff, 1987).

As Bunker (1998) emphasizes, the value is appropriated not only through labor but
through the acquisition of energy and natural resources. This transfer of value, which cannot be
calculated fully in terms of wages, prices, and profit, is recognizable in biophysical terms.
Instead of using monetary indicators, ecological economists utilize “physical accounting”
methods (see Chapters 4-6 in the case of Turkey) to illustrate the transfer of energy and materials
between core and peripheral nations. In contrast to the theory of comparative advantage, unequal
ecological exchange focuses on the potential zero-sum relationships resulting from international
trade of natural resources (Rice 2009). Furthermore, it stresses that core nations externalize the
environmental costs to the peripheral nations while they preserve their natural resource base and
succeed in disproportionate rates of material consumption. To this end, the core consumes a
disproportionate amount of environmental space at the expense of the periphery. Muradian et al.
Andersson and Lindroth (2001:117) refer to unequal ecological exchange as “an imbalance, calculated in ecological footprints, between imports and exports and as unsustainable if such trade promotes a progressive reduction in natural capital in at least one trade partner…” They indicate that unequal ecological exchange is the general rule in the global economy. As the core enlarges its domestic carrying capacity, it destroys the natural capital of the periphery using it as either “sink” or for “waste dumping.” For Rice (2009:14), unequal ecological exchange is about “…the environmentally damaging withdrawal of energy and other natural resources and addition or externalization of environmentally damaging production and the disposal activities within the periphery of the world system as a result of exchange relations with core nations…”

Extractive vs. productive economies

World system scholars such as Bunker (1985, 1998) locate the origin of unequal ecological exchange in the internal dynamics and logic of accumulation between extractive and productive economies. Bunker emphasizes that development theories undermined the fact that extraction and export of natural resources from the global South are composed of two processes. The first is the transfer of value embodied in matter and energy, and the second is the extractive activities (both at local and global levels) that at one point in time shape the ecological, demographic, organizational, and infrastructural context in which successive development efforts are situated (Bunker, 2006). As argued previously, Bunker (2005, 2006) claimed that export crops tend to increase the damage to the global South’s established local ecologies while weakening their local authority and political systems. As such, this situation presents challenges
for many local states with fewer resources to control both social and environmental issues. The ecological consequences of unequal international exchange are manifested for nations that rely heavily on exporting mainly raw materials with limited processed resources (Clark and Foster 2009; Roberts and Parks 2007).13

Extractive economies, which are the most environmentally destructive, generate enormous amounts of pollution and degrade ecosystems. Ciccantell and Smith (2009: 362) discuss the extractive and generative ‘drivers’ of economic sectors within the context of global commodity chains. By emphasizing Bunker’s (1984:1017) critical view — “commodities can emerge only from locally based extractive and productive systems,” they propose to lengthen the global chains by starting from the “beginning” of the chain or specific ‘natural geographies’— that is, ‘enclave economies.’ These ‘enclave economies’ are often globally integrated but they are locally disarticulated (Bunker 1998: 362). Similarly, Hornborg (2001) locates the origin of unequal ecological exchange within the asymmetric transfer of energy and materials while productive potential mainly holds within importing centers of global economic power.

*Undervaluation of Natural Resource Flows and Externalities*

The systemic undervaluation of natural resource exports, which is a key mechanism of unequal ecological exchange, is a result of cross-national power and advantage in international exchange relations (Martinez-Alier 2002; 2003). As part of the theory of underdevelopment, unequal exchange occurs in terms of not only the undervaluation of labor and health conditions of the poor, but also the conditions of trade expressed in “prices”—a socially negotiated

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13 As Jorgenson (2006: 692) states, theory of unequal exchange focuses on the structure of exports and attributes of receiving countries, rather than the intensity of overall exports or the diversity in goods and trading partners.
exchange relationship (Hornborg 1998). Those “prices,” however, may not reflect real material flows, including the energy and productive potential embodied in these flows and the environmental and human health costs incurred, as Hornborg (1998) argues. According to Martinez-Alier and O’Connor (1999: 380), environmental cost-shifting essentially entails the absence of prices in markets and a redistribution of social and environmental burdens and benefits. Andersson and Lindroth (2001) argue that there may nonetheless be an inequitable exchange of energy, productive potential and sink-capacity demand among trading partners. As Martinez-Alier (2002: 214) details,

> By ecologically unequal exchange we mean, then, the fact of exporting products from poor regions and countries, at prices which do not take into account the local externalities caused by these exports or the exhaustion of natural resources, in exchange for goods and services from richer regions.

Unequal can also refer to ‘ecological dumping’, which means "selling at prices that do not include compensation for the exhaustion of resources"—a practice central to unequal ecological exchange (Martinez-Alier, 2003: 19). This occurs when negative environmental externalities, i.e. ecosystemic costs that are attributable to production, are not factored into prices.

In the age of capital accumulation, not only capital and technology are transferred from global North to global South, but a cluster of social and environmental costs are transferred as well. Externality theory regards environmental degradation and use of unpriced natural resources as a negative effect outside the market by one economic agent on another without any form of compensation taking place (Kapp, 1950). More importantly, the valuation fails to account for local negative externalities linked to natural resource extraction and transport, suggesting these

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14 Some examples are a mining process that pollutes a river system with its waste product but is not held accountable for it or the effects of subsidized industrial agricultural water consumption on aquifers (Martinez-Alier, 2003: 23).
environmental costs are encountered at the local level within the periphery. In the current
economic framework for the environment, the guidelines for factoring in externalities into prices
could be brought about by classifying them as a social marginal cost of production or extraction
(Ibid. 15). When “dumping” occurs from global South to global North, poor and powerless
nations are not able to slow down the rate of resource exploitation or charge ‘natural capital
depletion taxes’ to the North (Martinez-Alier 2002). Thus, *undervaluation* is about the
successful appropriation of natural resources by more powerful trading partners without
internalization of the full social and ecological costs (Muradian and Martinez-Alier 2001). The
combination of power and market relations presents daunting challenges for governments of the
global South that do not have the choice of socio-cultural and environmental costs of natural
resource extraction in the price. Thus, they are unable to internalize the externalities— negative
ecological impacts. The global South has to export their ecological resources at prices dictated
by the market.

As argued in the literature, *conditionality* refers to financial *external debt*, an
internalization of the global North doctrine of an export-led economy based on factor
endowments, structural adjustment policies, Northern import protectionism, and *ecological
imperialism* (Martinez-Alier, 2002; Guha 2000; Arden-Clarke, 1992). The servicing of debt
repayments forces the global South to produce desperately while complicating efforts to
internalize environmental and social costs. This feeds over-consumption of resources in the
global North (Arden-Clarke, 1992:126). However, developing nations need to diversify their
greater value-added exports while preserving their natural resource base. The infamous trade
barriers make this process very challenging for developing nations. As a result of ‘northern
protectionism’, they fail to reconcile the need for export-oriented growth with protection of domestic resources (Andersson and Lindroth, 2001). All these contribute not only to resource degradation but also to the oversupply of primary products on the world market and declining “terms of trade” (Muradian and Martinez-Alier, 2001), which promotes disproportionate and under-compensated access to global natural resources and sink capacity services of ecological systems.

Ecological terms-of-trade characterizes the ecological burdens of a country’s exports relative to its imports (Giljum & Eisenmenger, 2004; Muradian et al., 2002). As this dissertation attests, measuring ecological flows, and consequent ecological terms of trade, attempts to make the environmental loads displacement more evident. This unequal access facilitates the externalization of many negative environmental costs, domestic production, consumption, and waste activities. Ultimately, this view promotes the environmental contradictions of capital accumulation as well as the ecological-distributional conflicts that support the natural resource consumption of core countries (Martinez-Alier, 2002).

Since the most value-added processing of traded natural resources takes place in the global North, only low rates of revenue are observed in the global South (Arden-Clarke, 1992). Thus, developing countries are in fact locked-in to a path of ecological destruction to supply the insatiable consumption of the richer segments of the capitalist world economy (McLaren, 2003; Rees & Westra, 2003). As such, unequal ecological exchange represents a “cost shifting success” for the more powerful elites of global society. In the South, environmental awareness should not be underestimated, however it is the lack of economic and social power that causes a failure to defend the environment and incorporate negative local externalities derived from the
prices of export products (Guha, 2000). Hence, the “dependent state” sells its resources cheaply in the market. This is one of the causes of unequal ecological exchange. Accordingly, this concept—unequal ecological exchange—focuses on the lack of political power and the poverty of exporting countries that have almost no alternatives in terms of “internalizing the externalities” in the price of exports, or of exporting renewable goods with less local, social and environmental impacts, or of practicing a precautionary principle for harmful, untested technologies (Martinez-Alier 2002: 214). Sachs (2002:28) emphasizes that the creation of economic value, which is “the art of internalizing benefits and externalizing costs and [more importantly] power has always been an essential ingredient of value creation...”

**Pollution Havens and Ecological Flows**

The Pollution Haven Hypothesis (PHH) is closely related to the discussion about the international distribution of environmental burdens and risks arising from the current process of globalization (Muradian & Giljum, 2007). The PHH claims that some highly pollutant multinational corporations (MNCs) choose developing countries as a base in order to produce their goods (Ibid.). In other words, these MNCs intensify their pollution-oriented components of production in developing and/or underdeveloped nations (Clapp, 2002; 2005). This is because these nations have more pollution absorbing capacity due to their lack of industrial waste, less ‘political sensitivity’ towards the environment, lower per capita income, imperfectly defined property rights (London et al., 2006, Clapp, 2005), and weaker government regulations (Faber, 2008). The commodities and surplus profits produced by the factories are then exported back into the EU and other advanced capitalist countries while leaving the pollution behind. Even worse, the toxic waste, industrial pollution, discarded consumer goods, and other forms of
“antiwealth” produced in the U.S and EU (Faber, 2008) are becoming increasingly mobile and end up in the pollution havens of the global South. The extensive literature on PHH\(^\text{15}\) (Neumayer, 2001a; Muradian, 2004) assumes that the migration of pollution intensive industries from North to South is in large part due to more stringent environmental regulations in the industrialized countries (Mani and Wheeler, 1998). In short, what has been called the PHH is the proposition that polluting industries tend to migrate towards (poorer) countries with weaker (or not well enforced) environmental standards. Hence, disparities in national environmental standards should lead to an unequal distribution of environmental burdens between different world regions, concentrating the most environment-intensive activities in the global South.

Even though some analyses support or find mixed results on the above-stated hypothesis (Low and Yeats, 1992; Cole, 2004), most empirical works do not hold up the statement that environmental standards are a variable conditioning the international location of polluting industries (Eskeland and Harrison, 2003; Mani and Wheeler, 1998; Neumayer, 2001b; Wheeler 2001; 2002). It is often alleged that environmental costs, pollution abatement, compliance and prevention costs are negligible in comparison with other costs involved in location decisions, and thus low environmental standards are not an effective source of global competitiveness. Although true labour costs, political stability and the size of the internal market seem to be the key factors driving the present global movement of industries, this does not necessarily prevent the concentration of disproportionate (under-compensated) environmental burdens in the South in comparison with their trade partners in the North (Rice, 2007). Some scholars contend that even though a Southern nation may not constitute a haven for polluting industries, the

\(^{15}\) See also Chapter Five for more details on PHH.
environmental performance of trading national or translational industries may be considerably higher than it would be in an industrialized country due to weaker institutions and lower investment in environmental control (Muradian 2004). Secondly, for some researchers, environmental impacts (which may vary from industrialized to developing nations) depend not only on standards, but also on the scale and composition of economic activities (Ibid.; Rice 2007).

Following thermodynamic considerations, integration into the world economy through material-intensive and low-value-added products might entail significant environmental burdens linked to a rising ‘scale of the physical outflows of the economy’ (Giljum, 2004). One of the contributions of ecological economics has been the analysis of the physical dimension of the economic system (as opposed to monetary value), and this perspective may shed new light on the relationship between globalization and the environment (Giljum & Eisenmenger, 2004; Muradian & Martinez -Alier, 2002; see Schuetz et al., 2004). Investigations related to PHH based on physical trade flows (or PTB) are very few since most studies on PHH focus on the composition of economic activities. Thus this dissertation will use a time-series PTB (Physical Trade Balance) approach in combination with others to trace PHH empirically in Turkey (see also Chapter Five).

Race to the bottom?

Ecological economists tend to be particularly critical of neo-liberalism arguing that free trade provides incentives for increasing environmental externalities in order to become more competitive in world markets (Martinez-Alier 2002; 2006). Such social and environmental costs are not reflected in the price of the commodities. Thus, the exporting country suffers as a
consequence in a global *race to the bottom* of environmental (and social) standards (Ibid.; Daly, 1993). However, other authors suggest rather that free trade would lead to a polarization of environmental standards between North and South, as the North would increasingly shift pollution-intensive production stages to the South, while maintaining high environmental quality within its own borders (Muradian & Martinez-Alier, 2001b). In addition, there is general criticism concerning the assumption of free trade supporters that welfare gains from trade could pay for all necessary abatement costs to compensate environmental destruction. This view is seen to neglect the fact of possibly irreversible environmental destruction through economic activities (Ibid.). Unequal ecological exchange also refers to a polarization of environmental standards between North and South or a “stuck at the bottom” scenario. In this case, as the North would increasingly shift pollution-intensive production stages to the South, while maintaining high environmental quality within its own borders (Muradian & Martinez-Alier, 2001b).

Following this line of discussion, undervaluation of natural resource exports is a key mechanism of unequal ecological exchange within the context of cross-national power and advantage in global exchange relations. Valuation fails to account for local negative externalities associated with natural resource extraction and transport (Bunker, 2006), suggesting that these counts are encountered at the local level within the periphery/semi-periphery—destruction of the subsistence based, sustainable ecological and social system (as can be exemplified at the Köprülü Canyon National Park region of *yayla*-peasants), subsidizing the profits of foreign capital (see Chapter Seven).
Capital Accumulation and Appropriation of Energy & Materials: Trade as Thermodynamic Imperialism?

Exactly how is this environmental surplus extracted from the periphery? Odum’s (1988) work deals with an embodied energy (or emergy) similar to Marx’s concept of labor value which indicates the amount of energy that has been invested in a product (Martinez-Alier, 2002). Hornborg (2001) locates the origin of unequal ecological exchange within the asymmetric transfer of energy and materials while productive potential mainly holds within core importing centers of global economic power. Hornborg’s (1998) exergy (available energy) presents a different view of unequal exchange. Hornborg argues that market prices are the specific mechanism by which the world system extracts exergy from, and exports entropy to, their peripheries, and it is not easy to understand accumulation, development, or modern technology itself without referring to how exchange value relates to thermodynamics, which is the way in which market institutions organize the net transfer of energy and materials to world centers (Ibid. 132). With modern technology, the productive input that is being underpaid is resources rather than labor, and the reasonable market price conceals the fact that what is being exchanged are intact resources for products representing resources already spent (Ibid. 127). As both Bunker (1998) and Hornborg (2001) agree, productive economies become increasingly adaptable; whereas, extractive economies become more and more vulnerable to the shifting demands of global capital accumulation.

Similarly, for Lawrence (2009:336), energy flows are “the capture and transformation of energy, and the output of pollution generated during that process — is essential to increases in

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16 Ecological economist, Hornborg (2001) suggested, for Marx’s labor-focused concept of exploitation to be supplemented by a biophysical one [i.e. focused on material and energy flows].
complexity, but with the cost of growing disorder, or entropy.” The analysis of energy flows provides support for the existence of unequal ecological exchange — the core countries are using more energy, emitting more CO₂, and attaining more GDP per capita relative to the semi-periphery, with the periphery lagging well behind both (Lawrence 2009: 338). This relationship between core and periphery holds for net importers of energy as compared to net energy exporters. Furthermore, Lawrence (2009) argues that the CO₂ emissions were not equally shared, with the core emitting more than the semi-periphery, which emitted more than the periphery. According to the convention on climate change, core is ‘winning’ the zero-sum energy game (Hornborg, 2001) by receiving a transfer of energy resources from the semi-periphery and periphery, and not having restrictions on emissions (see Roberts and Parks 2007; Lawrence 2009). Most notably, the semiperipheral nations’ increased energy consumption did not translate into efficient and profitable economic growth—a reflection of the industrialization of many semiperipherals—whereas, the periphery continued to suffer a combination of low GDP and energy consumption and is the only group that increased the percentage of the workforce in agriculture (Lawrence 2009: 338).

The findings of Roberts and Parks (2007) also correlate with Jorgenson et al. (2007) and Kentor & Grimes (2007) that less developed nations dependent on FDI in manufacturing have been found to emit higher levels of emissions. More importantly, carbon intensity of countries CO₂ emission/unit of GDP were found to vary across the world system, with semi-periphery and upper periphery countries operating least efficiently (cited in Lawrence 2009: 338-339). The studies also showed that increases in CO₂ emissions are positively correlated with trade for peripheral nations but negatively correlated with core nations, which is an indication of unequal
exchange (Roberts and Park 2007). As many argue, the core nations experienced relatively low growth in energy use and CO₂ emissions/capita, but larger gains in GDP (Lawrence 2009; Roberts & Parks 2007). It is imperative to note that the semi-periphery had the largest increases in energy use, including Turkey; whereas, the core is able to outsource energy inefficient sources of income to semi-peripheral and peripheral nations, increasing the order of the core and the disorder, or entropy, of the semi-periphery and periphery (Lawrence 2009: 352-53; see also Jorgenson 2009).

**Dematerialization and Ecological Modernization**

As related literature attests, 20 percent of the world population (mainly in the North) is appropriating 80 percent of the world’s natural resources (see von Weizsäcker et al., 1995; Giljum 2003). On the other hand, scholars (Adriaanse et al.1997; Giljum & Eisenmenger, 2004) argue that a process of *relative dematerialization* can be observed for many Northern countries. Daly (2000) contends that not all nations can be net-importers of natural resources at the same time. In his analysis, free trade supporters are completely neglected. However, rising net-imports of the North are only possible if the global South increasingly serves as a supplier of biophysical resources. Rothman (1998) and others discuss the possibility that this *dematerialization* (or “gospel of eco-efficiency”), which is pushed by the ecological modernization school, is facilitated by a re-location of resource-intensive production from the global North to global South. Physical accounting studies of international trade can clarify whether *relative dematerialization* in the North is going along with a de-intensification of trade flows or is linked to increased physical inputs of natural resources from the South. Concerning the distribution of negative environmental consequences through specialization in the world economy, physical
accounting studies can investigate whether negative environmental consequences are disproportionately concentrated in particular world regions. According to Ciccantell and Smith (2009: 365), *dematerialization* is simply an illusion as more iron ore and coal are being mined than ever before and consumed than ever before, and the extraction and processing of raw materials continues to increase at an accelerated rate.

There are some differences across theorists; however, the key assumption of the Ecological Modernization (EM) perspective is that global environmental problems can be solved through existing and/or slightly modified social, economic, and political institutions without abandoning economic growth, capitalism and globalization. The fundamental premise of EM theory “is the centripetal movement of ecological interests, ideas, considerations involved in social practices and institutional developments, which results in the constant ecological restructuring of modern societies.” (Mol 2001:59) In fact, EM scholars suggest that further development and modernization may alleviate environmental problems rather than adding to them (Ehrhardt-Martinez 1998). Economic development, urbanization, a service sector economy, the expansion of political rights and civil liberties, and state environmentalism, are all expected to help curb environmental degradation (Ibid.). By focusing on restructuring institutions, EM supporters explain the dynamics and effects of modernization on the environment, and in contrast to neo-Marxist scholars and many environmentalists, they argue that advanced capitalism and institutions are not fundamentally in conflict with the environment (Mol and Spaargaen 2000). EM scholars agree that modern societies caused environmental degradation; however, they claim that further modernization can solve environmental problems when nation-states and industries recognize the importance of long-term ecological sustainability.
Ecological modernization scholars stress the “ecological rationality” that modernization would bring to the industry, which will weigh the costs/benefits of ecological disruption and take steps to minimize environmental *externalities* by designing cleaner products/goods which meet environmental standards. For Mol (2001), “ecological rationality” has been “emancipated” and is starting to globalize; yet, this process needs political modernization. On the other hand, neo-Marxist scholars question this “win-win” situation and the cost of environmental protection and insist that EM does not address the underlying causes of environmental disruption. For EM scholars, radical, aggressive, uncompromising environmental movements and “command-and-control” regulations encourage corporations to move to “pollution havens” or engage in litigation rather than complying with regulations. Ecological Modernization supports *dematerialization* and deregulation, similar to Kuznets curve theory (Mol et al. 2000).

Gallagher (2008:6) pointed out that Simon Kuznets found a relationship between income inequality and GDP per capita in a cross-section of countries in the 1950s. It is argued that in the developed countries as income has grown the composition of industry has shifted toward relatively less pollution-intensive economic activity; while, at the same time, improvements in technology and environmental regulation have occurred. Gallagher (2004; 2008) emphasizes that these findings have been used to make the claim (see Bhagwhati and Daly, 1993) that nations should grow now through trade liberation and worry about the environment later. Hence, Kuznets curve theory explains, empirically, whether social change and development across the world tends, on balance, to have environmentally positive, *dematerializing* effects (Mol et al. 2000). This is the opposite of neo-Marxist scholars, who look for reasons why modern industrial societies are inherently environmentally destructive. Opschoor (1997) noted that the process of
*delinking* economic and income growth from the demand on the biosphere for materials and services in the industrial countries is currently too slow to yield a Kuznets curve-type response. Buttel (1997), on the other hand, argues that the relationships between growth, income, and environmental parameters are not well captured by such notions as *limits to growth* and environmental Kuznets curves. By using eco-footprints data tested against EM/human ecology/political economy, York et al. (2003) showed that

the expectations of the modernization perspective are clearly contradicted—*no environmental Kuznets curve exists* [294]. *Kuznets curve, increases in GDP per capita consistently lead to increases in impacts, but the increases are not proportional. Furthermore, urbanization also increases impacts, contrary to the expectation of the modernization perspective. Factors identified by ecological modernization theorists as potentially mitigating human impacts on the environment...this finding is fully consistent with the work of Foster (1999; 2000), who, drawing on Marx ([1867] 1967), argues that modernization, because of the separation it generates between country and city, creates a metabolic rift between ecological processes and economic processes... political economy receives support for one of its key premises—the conflict between the economy and the environment* (York et al, 2003:294, emphasis added)

EM scholars do not challenge the logic of international capital and it is assumed that industrial societies can shift their technology and patterns of production while leaving the structures of private capital accumulation fundamentally intact (Redcliff and Woodgard 1997). Today, many environmental problems are ‘externality’ problems, which arise due to exploitation of resources, rather than their shortage. The real challenge, however, as Herman Daly pointed out “is to reduce energy consumption throughout the economy, rather than in the production of a limited range of ‘greener’ goods and services” (cited in Redcliff 1987:66).

Is ecological modernization suitable for developing countries? Mol, Spaargaren and others Mol (2001) argued that this model may not be appropriate for some countries in the South, such as Africa, and some Latin American countries. Other scholars, such as Shiva (1989), Guha...
(2000), Sachs (1993), Martinez-Alier (2002; 2003) and world-system theorists argue that EM strategy in the North is only possible because of net withdrawal of natural resources from, and net addition of pollution to, the South, and Agarwal and Narain (1991; 1999) have called EM \textit{environmental colonialism}. Because of the dominance of the North and their TNCs (Clapp, 2001; Hough & White, 2003), these scholars are skeptical of the South's ability to display their own strategies and models in dealing with their own environmental crisis. Also, due to intensified global economic and political interaction, worldwide standardization, and technological production, there is hardly any space left for the South to grow and choose its own ecologically sound development path. Since it is within the capitalist logic to maximize profit, any “development” action or project that limits profit making would not appeal to capitalists (Schnaiberg & Gould 1994; O’Connor 1998). How can EM alleviate environmental pressure by proposing new production techniques and shifts to economic growth separated from natural resource use? What about issues relating to environmental justice? Despite the exaggerated claims of believers in \textit{dematerialization} and eco-efficiency, the research agenda advanced by EM’s doctrine (Martinez-Alier, 2003:137) fails to offer an analysis of eco-footprints and human appropriation of biomass production and Mol’s eco-Kuznets curve is too simple:

\begin{quote}
environmental impacts by unit of GNP may indeed decrease in some countries but environment does not care at all about GNP, it cares about absolute amounts of pollutants or extractions. The world reality is anyway of increasing use of fossil fuels, even of oil wars… (Martinez-Alier, 2003: 138 emphasize added)
\end{quote}

According to World System schools of thought, an environmental Kuznets curve showing reduced environmental impacts in core nations via ecological modernization theory is spurious (York et al., 2003). As Roberts and Grimes (1997) have shown, in the case of CO$_2$ emissions, the overall pattern of the Kuznets curve can be explained by nations at different positions in the
world-system being locked into different trajectories of fossil fuel use. Evidence of an environmental Kuznets curve typically has been found only for local impacts, which calls into question whether development ultimately reduces impacts or simply shifts them elsewhere (York et al., 2003).

_Treadmill of Production and Consumption_

The treadmill of production school argues that the economy is driven by an “insatiable appetite” to expand profit due to “the inherent nature of competition and concentration of capital” (Schnaiberg, 1980:230). The unequal ecological exchange perspective crosses over both treadmill orientations – production and consumption: It is the global economy that drives the treadmill of production toward constant expansion while demanding more and more resources to meet its “insatiable appetite” of core nations’ consumer markets (Gould et al., 2008; see also Foster, 1999, 2002). Unequal ecological exchange has become _increasingly_ visible between the global North and the global South as the treadmill of both production and consumption magnifies. Schnaiberg (1980) identifies a fundamental conflict: the dialectic between society and the environment—between economic production and ecosystems. In theory, reconciling disparities between “the treadmill” and the needs of society is the state’s responsibility. In practice, it has often acted to accelerate the treadmill in the hope of avoiding political conflict (Ibid. 418). As new technologies motivate to expand production, they also reduce labor costs; thus, such growth requires raw materials and energy to function. During this process, nature is used to boost industry and to produce commodities for the market (Gould et al., 2008) As a result, economic growth and the environment are caught in an “enduring conflict” (Schnaiberg & Gould, 1994).
According to Schnaiberg and Gould (1994) the *treadmill of production*, as a complex, self-reinforcing social institution, is the driving force behind modern economies—and ultimately environmental impacts. The tendency toward growth is due to the competitive character of capitalism. Through the continual expansion of production, the treadmill increases environmental impacts by placing greater demands on resources and by producing a greater volume of waste. Capitalist production is at odds with efforts to clean up or improve the environment. In contrast to the eco-modernization school, treadmill of production scholars argue that producers will not willingly internalize the environmental costs of production because doing so would reduce profits. Further, because of the political power of the economic elite, reform-oriented social and political action is unlikely to substantially alter the power of producers or to reduce environmental externalities. The ecological result is that the use of natural resources continues to increase despite the cost for ecosystem sustainability (Schnaiberg, 1980; Schnaiberg & Gould, 1994).

The treadmill of production school suggests that economic development leads to higher consumption-based environmental demands. O’Connor (1998), after Marx and reflecting the work of Schnaiberg (1980), argues that production economies, particularly capitalist ones, are growth dependent. The export of pollution and the export of dangerous products—both the means of production and the means of consumption—occur within the context of *uneven development* (O’Connor, 1998). Thus, through global capital accumulation, “the natural wealth of the world is depleted and turned into…dangerous garbage…the greater the profit and accumulation rates, the greater the direct pollution, and the greater the indirect depletion and exhaustion of nature” (Ibid. 198). At the age of globalization, the acceleration of the production
treadmill and its destruction is more pronounced in the global South. The recent expansion of more liberalized global trade has contributed to an increase in social and environmental inequalities between global North and global South (Jorgenson & Kick, 2003; Lofdahl, 2002).

**Appropriation of Environmental Space & Uneven Ecological Footprints**

**Placing Environmental Space in Context**

The concept of environmental space was first proposed by J. B. Opshoor who defines it as the geographical space occupied by an economy, taking into account imports of natural resources and disposal of emissions (cited in Martinez-Alier, 2002:40; McLaren 2003). In the early 1990s, this concept was further developed by Friends of the Earth—Netherlands, to measure global environmental capacity or environmental space (Martinez-Alier, 2002: 4). According to Hille (1998), environmental space is a term that stands for “environmental utilization space,” which shows that countries were using environmental resources as well as services much beyond their own territory (cited in Martinez-Alier 2002; see also Chambers et al., 2000). Similar to the ecological footprint concept, environmental space is built on the notion that there are limits to the amount of ecological pressure that global ecosystems can handle without suffering irreversible damage (Hille, 1998).

For McLaren (2003), environmental space provides an equity-based approach to transnational environmental justice. The method of environmental space calculates each individual’s maximum consumption rate of environmental resources, “aimed at a fair share of a maximum available within global limits and recognize the existence of a minimum need and dignified behavior” (McLaren, 2003:27). It is a *rights-based approach*, which conceptualizes sustainable development in terms of *fair share* for all global environmental resources (Ibid. 28).
More importantly, an environmental space approach understands international inequalities with regard to resource consumption as both international and intra-generational inequities. This concept presents challenges to the interests of transnational corporations as well as export-led growth and neoliberal policies all of which lead to an increase in resource exploitation in the global South.

As detailed below, the ecological footprint provides one strategy for operationalizing the concept of environmental space. It is the environmental space concept that assists us in understanding and meeting the enormous challenge of achieving ecological and social sustainable development (Carley and Spapens, 1998) within the context of environmental and climatic justices. The reasoning is as follows: When the carrying capacity appropriated by one economy is not available to another, then nations compete for ecological space. The global North’s enormous purchasing power makes it possible for them to finance massive eco-debts by appropriating trade or natural flows of the unused productive capacity of other nations and the global commons (Rees & Westra,, 2003:110).

Conceptualization of Ecological Footprints

The notion of an ecological footprint can be found in H. Odum’s (1988) work during the 1960s and 1970s; later this concept was studied by other scholars, such as Opschoor and Rees. The central question is:

how large an area of productive land is needed (as source and sink) in order to sustain a given population indefinitely, at its current standard of living and with current technologies? Calculations for whole countries, regions, or cities or metropolitan areas show that some densely populated European countries… or Japan or Korea… occupy eco-spaces 10 or 15 times larger than their own territories. This is ‘appropriated carrying capacity’, from which an ‘ecological debt’ arises. (Martinez-Alier 2002a: 41)
The Ecological Footprint answers one particular research question: How much of the planet’s regenerative capacity is demanded by human activities, such as eating, moving, the provision of shelter, and use of goods and services (Wackernagel et al., 1999). It measures the biologically productive land and water required to produce all the resources a population consumes, and to sequester its CO₂ emissions, using prevailing technology (Wackernagel et al., 2002). While the Ecological Footprint quantifies human demand, biocapacity acts as an ecological benchmark and quantifies nature’s supply: resource production and waste disposal services (GFN, 2010:2). A population’s footprint can be compared to the biocapacity that is available to support that population, as expenditures are compared against income in financial terms (Monfreda et al., 2004).

The amount of biocapacity that a person has access to also depends on that population’s purchasing power. If a population has high purchasing power, it can access biocapacity from other regions through trade. For instance, they can import biocapacity in the form of food or goods. Alternatively, in the absence of international carbon emissions trading schemes, they can use the biocapacity of other nations freely by emitting carbon dioxide into the global commons (GFN, 2010:3). If the residents of a country use more biocapacity in net terms than is available within the country, they run an ecological deficit (conversely, if residents use less, then they run an ecological remainder). An ecological deficit indicates that a country must rely on biocapacity from outside its own borders (through imports or emissions of CO₂ to the global atmosphere), or must be drawing down its own stock of natural capital (GFN, 2010: 4 see also Wackernagel et al., 2004). The Ecological Footprint monitors the combined demand of anthropogenic pressures that are usually evaluated independently (climate change, fisheries collapse, land degradation /
land-use change, etc.) and compresses this large amount of information into a single number. However, it does not assign arbitrary weights to individual components, but weighs them in proportion to their demand on biocapacity (Monfreda et al., 2004).

As Wackernagel et al. (2004) detail, if some sectors of a country have surpluses then this “ecological remainder” may still be used for providing services that are consumed in other countries (see Chapter Four and Chapter Six for EU vs. Turkey). As argued in the coming chapters, Turkey still has “cropland footprint remainder”, more or less “grazing land footprint remainder” as well as “timber land footprint remainder.” However, Turkey’s major ecological deficit originates from its “energyland footprint”—that is “energyland deficit” over the years (detailed in Chapter Four, regression analysis). As scholars emphasize, if these services were sold to a second country, then the corresponding demand on the first country’s Biocapacity would be part of this first country’s “Production Footprint”, as well as part of the second country’s Ecological Footprint of consumption (Wackernagel et al., 2004:240)

‘Ecological footprint deficit’ and its relation to ‘externalities’

Templet (2000) details this question and argues that the global North has high energy use per capita. Thus, the global North has the largest eco-footprint deficits. The global South needs ‘ecological room’ to expand while the global North is already out of room and is exporting and externalizing its excess impacts and footprints to other countries through trade and to the global commons. For instance, the demand in the North is outstripping domestic supplies. Even so, the United States remains one of the biggest oil producers in the world. As the “deficits” are externalized to other countries through trade, this result in a net import of another country’s biocapacity as embodied energy and, thus, embodied capacity. Furthermore, the export of
deficits deteriorates the gap in income and prosperity between the global South and global North, and the externalities most likely lead to subsidies for whomever is appropriating more of the global commons. As Templet (2000:383) stresses:

> Both consumption of energy and disposal of its waste are being subsidized… a state or the industrial sector within the state, can receive a subsidy in the form of lower energy prices by externalizing its energy cost through political action which leads to lower prices for itself but higher prices for other sectors. Low industrial energy prices, in turn, lead to higher, more inefficient energy use and a larger ecological footprint. The energy ecological footprint deficit is then externalized to the global commons.

Eco-footprint underscores the fact that over consumption by the global North is the principal driver of ecosystem degradation, frequently even in the South. This view contrasts with the popular notion that subsistence activities by the poor are the most important cause of ecological decay in the South (Rees & Westra, 2003). In short, the ecological footprint is a measure of the biologically productive area required to satisfy the consumption of renewable natural resources and absorption of carbon dioxide waste of a given population, based on prevailing technology and management practices (Chambers et al., 2002). The ecological footprint is composed of six subcomponents: cropland, forest, grazing land, fisheries, “energy land”, and built-up land. Ecological footprint calculations include domestic resource production plus imports from abroad minus exports to other countries. It is important to note that exports do not constitute part of a country’s footprint demand but are added to the calculation of importing countries. Thus, the eco-footprint is based upon a “trade balance approach” and is sensitive to a nation’s demand regardless of the origin of the natural resources consumed. Consumption within each subcomponent is summed and divided by world average productivity to produce an adjusted figure comparable across countries (Chambers et al., 2002). The overall footprint figure
consists of the sum of the adjusted calculations of each of the subcomponent areas, expressed as global hectares of consumption per capita. Because it measures demand relative to both domestic and global biocapacity, it is a reasonable approximation of the cross-national flow of hectares of productive area (Andersson & Lindroth, 2001).

As Jorgenson (2006, 2008, 2009) details, the ecological footprint is calculated by adding imports to, and subtracting exports from, domestic production. In mathematical terms, 
\[
\text{consumption} = (\text{production} + \text{imports}) - \text{exports}
\]
(see Chapter Four for a detailed formula). This balance is calculated for more than 600 products, including both primary resources and manufactured products that are derived from them (GFN report, 2006). The per capita footprints of nations can be compared to global biocapacity per capita, which is calculated by dividing all the biologically productive land and sea on earth by the total world population, which provides a general estimate of human sustainable levels of consumption. Examining unequal ecological exchange within the international political economy framework illuminates the environmental consequences of the contemporary world’s interstate system, with a particular focus on the consumption-based environmental impacts of nations, measured as a per capita ecological footprint (Jorgenson & Clark, 2009). Ecologically unequal exchange theories for identifying and explaining particular society/nature relationships are related to the consumption-based environmental demands of nations.

Ecological Overshoot

The ecological footprint concept emphasizes that if we can take more than nature can renew, the consequence is ecological overshoot. Overshoot of biological capacity is maintained in the short-term by drawing down or degrading natural capital faster than natural replacement
rates (GFN; see also Rice 2007). Furthermore, progressive depletion of groundwater, fisheries, agricultural land, forests, and other large-scale ecological sources creates instability which, in some measure, is an end result of ecological overshoot (Wackernagel, 2004). Global overshoot began in the 1980s and has been increasing steadily (Loh and Wackernagel, 2004). Global biocapacity changes with the amount of productive area available and its average yield (Loh and Wackernagel 2004). However, for nearly 20 years the average yield has not increased as fast as consumption demand, in spite of dematerialization in many industrialized nations (Rice 2007). York et al. (2003) use both a human ecology perspective, focused upon population dynamics, and a neo-Marxist or treadmill of production perspective, focused upon economic production. Their research shows no relationship between an Environmental Kuznets Curve (EKC) or inverted-U relationship between either GDP per capita or footprint consumption. That means it is hard to argue that there is a “decoupling” in absolute terms (York et al., 2003; York, Rosa, and Dietz, 2005). However, Jorgenson’s cross-national analyses, which utilize a per capita ecological footprint demand, shows a strong causal link between core nations and higher ecological footprint demands (Jorgenson, 2003, 2006, 2009).

When nations/regions are running eco-deficits this means their populations are appropriating carrying capacity from elsewhere and/or from future generations (Rees & Wackernagel, 1994; Chambers et al., 2000). As Rees explains, the total land requirements for specific categories of land represents a community’s ecological footprint—the total area appropriated from nature to support its particular consumption pattern (Ibid. 372). Ecological footprint calculations are based on: tracking of the resources consumed and wastes generated. Most of these resource and waste flows can be converted to a biologically productive area
necessary to provide these functions, then an ecological footprint shows how much nature the
nenations use (Wackernagel et al., 1999). The global North already exceeds its domestic
bioproductivity by 100 percent or more and their ecological footprint is several times larger than
their political territories. This leads to their *appropriation* of global carrying capacity.

The ecological footprint measures almost all types of environmental impacts, but some
impacts are not included, such as pollution from hazardous substances and waste from nuclear
energy generation (York et al., 2003). The ecological footprint is an indicator of human pressure
on the environment, but not the consequences of the impacts (Ibid.). As York et al., (2003)
argue, environmental impact theories fall into three categories: human ecology, modernization,
and political economy. They have tested these theories in an analytical framework in terms of the
eco-footprint as dependent variable. In their model, the position of the nations in the world
capitalist system was one of the independent variables used to measure the political economy
perspective. GDP per capita and political and civil rights are used as ecological modernization
variables, and population size and percentage of the population are used as human ecology
variables to control for basic climate and biogeography. Ecological modernization theory, which
makes predictions close to neo-classical economists, emphasizes that environmental global
problems can be solved through “existing and/or modified social, political, and economic
institutions, without renouncing economic growth, capitalism, and globalization” (Ibid. 285). It
suggests that environmental problems decrease as the country develops (Ibid.). From the political
economy perspective, as York et al. explain, “…environmental exploitation is driven by the
market structure economies, the institutions of modernity, and the severe commitment to growth
originated in modern, particularly capitalist production systems” (Ibid. 286, Schnaiberg 1994,
O’Connor, 1998). Researchers, York et al., (2003) emphasize that “the producers will not willingly internalize the environmental costs of production” and economic production is in conflict with ecological limits (Ibid. 286-267). One of their major findings is that the high level of consumption in rich nations is a great threat to the environment, even though the rate of population growth is slow in these nations (relative to the nations of the South that have a rapid rate of population growth).\footnote{For instance, the US’s footprint is nearly 25 times greater than that of Bangladesh and their finding suggest that societies cannot be optimistic about achieving sustainability through continuation of current trends in economic growth and institutional change (York et al., 2003: 295).} As York et al. (2003: 287) state:

…economic production as the primary driving force behind environmental impacts that is similar to the view of political economy… core nations are the predominant producers and consumer in the global economy, while they extract the need for production from, and export waste to semi-peripheral and/or peripheral nations…

The literature questions how global trade affects the ecological footprints/ ecological space of nations and sustainable use of biocapacity. In other words, preservation of natural capital through trade is critical for nations. As Wackernagel et al. (2004: 240) detail, nations with low per capita biocapacities do not have the capacity to meet their resource demand by importing food and timber from countries with agricultural, fishery, or timber “remainders.” Subtracting a “footprint of production” yields the ecological trade deficit or the net import or net export of biological capacity. Ecological deficits not balanced through trade are met through the overuse of domestic or, in the case of fossil fuels, global resources, resulting in overgrazed pastures, depleted fisheries, degraded forests, and the accumulation of carbon emissions in the global atmosphere (Ibid. 204). As mentioned previously, this phenomenon termed “ecological overshoot,” is a state in which resources are used more rapidly than the biosphere can replenish.
them or assimilate their waste, breaching the principle of strong sustainability at the global level. They contend that it is possible for a country to run a negative ecological trade deficit (remainder) while in a state of ecological overshoot. In such a situation, the country would literally be liquidating *natural capital* to service exports (Ibid. 241). Is this what’s happening in Turkey, since the country has “cropland, grazing, timber remainders” even though there is an ‘ecological overshoot,’ which is primarily the result of “energy land” (or “energy deficit”)? (see Chapter Four for empirical results).

On the other hand, the relevant literature claims that more affluent nations reduce their impacts on the environment within their borders through the importation of resources and exportation of wastes—a process commonly referred to as *Netherlands Fallacy* (Jorgenson, 2005; Muradian & Martinez-Alier, 2001). For instance, Netherlands can protect their own resources—*natural capital*—by importing biocapacity (see Chapter Four). The more countries become dependent on ‘net-imports of biomass’ and ‘sink-capacity’, the more intense will become the efforts to increase the relative position of each nation (Andersson & Lindroth, 2001). In absolute terms, the *natural capital* of a country can still be eroded if the ecological deficit of the country is smaller than the sum of its net-imports of biomass and of net-sink-capacity. Ecological preservation in some countries is partly achieved by means of importing biomass and sink-capacity from other countries, where the *natural capital* is instead gradually depleted. Moreover, trade between economically non-equivalent partners is arguably one mechanism shaping cross-national disparities over access to environmental space (Anderson & Lindroth, 2001). In Chapter Four, I conceptualize the *Turkish Fallacy* as the “over-consumption” of resources by the Turkish people, who are responsible for Turkey’s ecological crisis.
Conceptualization of Ecological Debt

The ecological debt is the obligation and responsibility that the global North has with the countries of the global South for the looting and use of its natural goods, for the cost of the human energy of their people and of the destruction, and contamination of their natural heritage and sources of livelihood (Martinez-Alier, 1997; 1998). The literature raises the question of what is the relationship between external debt and ecological debt. As Dimbleby (2001:127; 130) states, the growing burden of external debt:

owned by developing countries to global institutions, governments and individual banks in the industrialized countries is a key factor undermining the ability of the debtor countries to engage more fully and fairly in global trade and improve economic and social conditions within their boundaries …new dimension in the search for solutions to the problem of debt and deep poverty provided by the idea that the North should repay the ecological debt owned by the industrialized world to the South …this ecological debt is based on assessments of the damage to the environment of the South as a result of past exploitation by the North…

Dimbleby (2001:131) further argues that ecological debt not only covers damage to the Southern environment but also the effects on the whole planet’s absorption capacity. As Martinez-Alier (1998) details, the relationship between external economic and ecological debt has two principal aspects. First, economic debt is the claim for the ecological debt, “on account of both export undervalued (as their price does not include the various local and global social and environmental costs) and environmental services provided free” (Ibid. 1). Secondly, “the obligation to pay the external [or economic] debt and its interest lead to a degradation of the environment (and an increase in the ecological debt)” because it is necessary to produce surplus (i.e. production has to be greater than consumption) to be able to pay external debt (Ibid. 2). This surplus “might partly come from an actual increase in productivity (more production per hour worked) and also comes from the impoverishment of people in the debtor countries and the
abuse of nature” (Ibid.3). In order to pay the economic debt, more and more resources are exported in an ecologically unsustainable manner.

The arguments in support of eco-debt include the following claims, as Martinez-Alier (1998) listed. First, Martinez-Alier (1998) brings in the historical claim that the global North has with the global South by going back to the colonial period while stressing the “neo-colonies” of the global North and of the TNCs which created more dependence. Secondly, he argues that eco-debt involves the claim for debt that the North has with the South for extraction and export of natural resources through the ecologically unequal terms of trade. As such, the global South, in the past and present, has been the main supplier of these goods to the North. This process is unequal because the price of the resources does not take into account the social or environmental damages that are caused on both a local and global level. Accordingly, the global South subsidizes the global North with a constant flow, not only of energy, natural goods, and a cheap army of labor, but also of financial flows for the payment of interest on its foreign debt. It is their foreign debt obligations and this debt’s interest that compels the countries of the South to increase their exports. However, they receive less as they export more. In addition to oil, mining, timber, and fishing extraction, mega-projects such as hydroelectric dams (as in Turkey), involve the destruction of biodiversity, the contamination of the environment, damage to the health of local populations, while displacing local people and destroying their cultures and sources of livelihood.

Thirdly, Martinez-Alier (1998) argues that eco-debt involves the intellectual appropriation and use of traditional, local knowledge and biodiversity related to such as seeds, medicinal plants, and sources of bio-tech and sources of natural capital for international agro-
industries. Fourth, he points out that the eco-debt involves claims for degradation of the best lands, of water and air, and of human energy, for the development of export crops, while the rest of the community is marginalized. Such claims certainly highlight the key aspects of the current development model (or export-oriented growth), which is characterized by waste and consumerism. Martinez-Alier’s other important point is related to the main causes of climate change. He argues that the eco-debt claims contamination of the atmosphere by the North through their disproportionate emission of gases. Finally, eco-debt claims for the production of chemical and nuclear weapons, carrying out nuclear tests, substances and toxic residuals that are deposited in the countries of the South (Ibid.2002). As Peet (2004: 10-11) stresses, “free trade is painted as beneficial to everyone, but its actually always beneficial to the most powerful country…the process of privatization, deregulation and export orientation benefits the elite and is bad for the poor.. big capitalists behind global governance. ..That’s where the controversy is, and that’s why people protest…”

The global South stresses that the eco-debt owed by the global North is one of the most damaging manifestation of new global commodity chains (Ciccantell and Smith, 2009). Some scholars (Inglehart, 1990; Adriaanse 1997; Ruth, 1998) argue that wealthy nations are dematerializing their economies. In addition, the Environmental Kuznets Curve school of thought emphasizes how capitalist firms incorporate environmental standards into their decision-making process (Mol, 1995; Mol and Spaargaren, 2002). Both of these arguments lead many scholars to argue that economic growth is decoupling from resource consumption. Furthermore, this claim is tied to a second and related claim made by World Bank and World Trade Organization analysts that exports from the global South are continually being upgraded and are
increasing poor nations’ prospects for positive economic growth and development (Bhagwati, 2004; World Bank, 1992; 1999). In contrast, both of these arguments come under attack by scholars who support tenets of unequal ecological exchange (Andersson & Lindroth, 2001; Cebeza-Gutes and Martinez Alier, 2001; Giljum 2003; 2004; Giljum & Eisenmenger, 2004; Hubacek & Giljum 2003; Giljum & Hubacek, 2001; Hornborg, 1998; 2001; Matinez-Alier, 2002; 2003; Muradian & O’Connor 2001; Muradian et al., 2002).

Recent empirical work demonstrates that while exports are indeed shifting, trade relations remain extremely unbalanced; the global South continues to export large quantities of under-priced products whose value does not include the environmental and social costs of extraction, processing or shipping (Jorgenson, 2009, Rice, 2007). Material Flows Analysis (MFA) has led to an important finding: Many developing nations traditionally seen as successful export-oriented economies are now facing ecological and economical distress. The EU-15 region, as Briengezu and Schutz (2002) documented, balanced external trade in monetary terms, but enormous trade deficit in physical terms. The EU imports – in physical terms- more than four times its exports. Thus, MFA analysis appears to debunk notion that we have entered an era of dematerialization. The ecological footprint data and geographical location of environmental degradation unequivocally demonstrate that the global North’s development path (although unsustainable ecologically) relies on the South's exporting of its bio-capacity to the global North (Moran et al., 2008). Thus, the global North’s development path is dialectically responsible for environmental degradation in the South (Guha, 2000, Adeola, 2000, Martinez-Alier, 2003).
Quantification of the ecological debt

The core quantification components of ecological debt are as follows: ecologically unequal exchange is the basis for an ecological debt and disproportionate use of environmental space (Martinez-Alier, 2002:227-8). Stabilization programs and conditionality—whether financial, environmental or in the field of human rights, is imposed by hegemonic states upon the peripheral nations (Martinez-Alier, 1998). For instance, international flows of cheap primary products or environment-intensive products are a manifestation of externalizing environmental and social costs onto marginalized local communities. Then:

In a free trade system, capital migration to poor countries will not convert affluent countries in ‘absolute losers,’ instead Southern nations become real losers by suffering the environmental loads of ‘affluent’ consumption (Muradian & Martinez-Alier, 2001: 286)

As such, the global North specializes in relatively cleaner forms of material extensive production whereas the global South increasingly specializes in both the exploitation of resources and environment-intensive products, which generates a “specialization trap” (Ibid.) In addition, the increasing pressure from the international trade agreements leads them to maintain their “specialized trap” in the least dynamic comparative advantage. Accordingly, “free trade” becomes “forced trade” for the global South (Ropke, 1994: 15)

The major threat to the environment is “over-consumption” in the global North, which is encouraged by ecologically unequal trade and free use of unilaterally appropriated environmental services that gave rise to an eco-debt (Martinez-Alier, 2002b). The wealth is being concentrated in the hands of a few local elites, resulting in serious social and environmental problems in the global South. Small elites often consume more than their fair share of resources in comparison with the majority of the population. However, this trend in the global North is not visible because
of the *distancing of consumers* from the negative impacts of their consumption, which increases the capacity for international capital and transnational corporations to benefit from the expanding commodity trade (Rees, 1994:379). The global South, on the other hand, has become increasingly dependent on export earnings, much of which must go to pay off the original “development” loans (Ibid.). All of this points to two forms of power issues.

First one is the ability to impose a decision on others, like to steal resources, to locate an environmentally damaging plant, to destroy a forest, or to occupy *environmental space* and dispose of residues. *Externalities* are understood as cost shifting. Second, as the *procedural power* which in the face of complexity, is able nevertheless to impose a language of valuation determining which is the bottom-line in an ecological distribution conflict (Martinez-Alier, 2002:271, *emphasized*).

In brief, there is a legitimate claim for the ecological debt that the global North owes to the South. The response of the global South to the economic debt crisis has been to adopt a strategy of export-oriented industrialization. It is obligated to service the external economic debt resulting in the oversupply of primary commodities, which leads to falling prices of the South’s commodities in the global market. The ecological debt not only covers damages to the South’s ecology, but it also affects the atmosphere and entire planet’s absorption capacity because of continuing emissions by the global North. Hence, the global North’s contribution to environmental and climatic problems is an issue of environmental and climate injustices.

*Carbon-debt*

Climate change is a particularly important area in which unequal ecological exchange appears to be in effect (Roberts & Parks, 2009:392). The scholars’ quantitative research suggests and testifies ecological unequal exchange: “poorer nations that participate more in international trade emit more carbon dioxide, while wealthier nations that trade more emit less than those who traded less.” (Ibid. 161) Thus, the effect of international trade and globalization, as they claimed,
“is to shunt off the greatest ecological impacts of production onto poorer nations.” (Ibid: 162) From a policy perspective, wealthy nations should be held accountable for excessive use of “environmental space.” Poor peripheral nations export their resources and supply their cheap labor directly to manufacturers; whereas, middle-income semi-peripheral nations lie somewhere in the middle, with some industry and partially diversified export structures. However, many peripheral and semi-peripheral nations are locked into ecologically unsustainable patterns (Ibid. 166)

The greater proportions of sink-capacity of the global commons are mainly utilized by the core nations. As many scholars argue, global warming, for example, is largely a result of the carbon emissions of core nations, and their use of fossil fuels threatens the assimilative capacity of the global environment (Robets & Parks, 2007; 2009; Schneider et al., 2010). Martinez-Alier (2002:229) argues that the “carbon debt” indicates that the North has made use of a disproportionate amount of environmental services without monetary payment or compensation. As Lohl & Wackernagel (2004) detail, aside from high income nations, all other nations, including low, lower middle, and upper middle (including Turkey) have an ecological surplus. Furthermore, high-income countries, on average, consume 1.4 hectares per capita more than are available domestically, running an ecological deficit; whereas, low income countries are characterized by an average ecological surplus of .8 hectares per capita, consuming much less than the biologically productive area originally located within their borders (Ibid., 2004; GFN, 2006). In their research, lower and upper middle-income countries are also characterized by ecological surpluses, including Turkey. All this research suggests that high income countries utilize the global South as a resource to subsidize their own rates of material consumption,
arguably constraining resource consumption elsewhere (Rice, 2007). Jorgenson and Rice (2005) emphasize that structured trade relations among countries shape differential appropriation of environmental space.

The concept of uneven appropriation of “environmental space” (including ecological footprints) brings the climate injustice discourses to the center. The global North’s fossil fuels threaten the assimilative capacity of the global environment and perhaps prevent the global South’s from following a similar trajectory within the limits of the global environment (Rice, 2007). The cross national disparities in access to “environmental space” is relevant to broader discussions concerning global environmental change, the continuing development of obstacles facing the global South, considerations of environmental/climate injustice, and the challenges inherent in addressing broad-based sustainable development (Robert & Parks, 2007).

**Conceptualization of Environmental (in)Justice vs. Post-material Environmentalism**

Environmental injustice refers to the experience of those who are excluded from benefits of development and/or who carry the burden of its costs and externalities (Mutz et al., 2002). I found that the most relevant theorizing comes from the neo-Marxist /ecological perspective18 (O’Connor, 1998; Faber, 1998; Martinez-Alier, 2002; Kovel, 2002). Scholars, (Faber 1998, 2005, Gould & Schnaiberg, 1994; O’Connor, 1998; Foster, 2005) argue that the systemic logic of capital accumulation, production, and consumption is responsible for problems of ecological/injustice. Faber (1998), who incorporated an analysis of the American capitalist

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18 For eco-Marxists, the creation of wealth (exchange value) under capitalism is achieved via the exploitation of labor, the extraction of surplus-labor from human nature. For political ecologists, the creation of wealth (use value) under capitalism has been achieved via the exploitation of nature. For Marxists, the result is an immiseration of the working class (poverty, extinction of cultural systems, etc), and the advent of economic crisis (Faber & Grossman, 2000:73)
system into the environmental justice (EJ) literature, raises the crucial question that had been ignored by the EJ literature: What are the root causes of ecological injustice? Faber (1998) locates the root causes of ecological injustices into the expansionary dynamics of the global capitalist system.

To sustain the process of capital accumulation and higher profits in the new global economy, American capital is increasingly relying on ecologically and socially unsustainable forms of production (Faber, 1998:3). Environmental inequalities in all form, whether they be class, race, or geographically based, are socially constructed features grounded in the systemic logic of capitalist accumulation (Faber 1998: 5).

The claims to the rights to natural resources of poor communities and their complaints about pollution are an integral part of the environmental justice movement (EJM). The demands of the EJM against toxic contamination in poorer communities are a demand for a state to regulate corporations (Epstein, 2000). Examples of ecological resistance movements or environmentalism of the poor (Martinez-Alier, 2002; Guha, 2000), all of which have radical orientations, include marginal livelihood and struggles in the global South, but also transnational EJ movements, EJ networks in the global North working to compel capital to “internalize” negative externalities brought by neoliberal globalization (Pellow and Brulle, 2005; Faber, 2008; Agyeman et al., 2005).

In contrast, the post-materialist perspective does not question the root causes of environmental injustices in explaining the origin of environmental movements in developed countries. For Inglehart (1990), a change in “cultural values” away from material consumption towards “quality of life” issues means that economic distribution conflicts are no longer so sharp. This leads to a generational shift towards new values, which include an increasing appreciation of environmental amenities because of the declining marginal utility of abundant, easily obtained
material commodities (Ibid. 65-67; 373). For him, environmentalism is central to this shift ‘from
giving top priority to physical sustenance and safety toward heavier emphasis on belonging, self-
expression, and the quality of life’ (Ibid. 66; 392). By the shift from Fordism to a post-Fordist
mode of production in advanced capitalist states, the growing ‘new middle-class’ of
professionals/white/pink collar workers experience more material wealth, declining traditional
trade-union occupation in favor of more service-oriented economies. Therefore, issues relating to
economic security decrease; whereas, the salience of life-style and political issues increase
(Faber and Grossman, 2000:75).

For Inglehart, political groups form on the basis of post-material interests rather than
economic or class interests, and support for national institutions decrease while demands for
political participation increase. The main question/problem with Inglehart’s thesis is: How can
we explain grassroots environmental movements in the U.S. and the South? In contrast, the
more materialistic environmental perspective argues that material conditions play a salient role in
giving rise to the environmentalism of the poor (Ruchi, 2004; Mutz et al., 2002), including the
rise of revolutionary ecology (Faber, 1993) and liberation ecologies (Peet & Watts, 2004) around
issues of livelihood.

Environmental justice scholarship suffers from the lack of a consistent theoretical
framework (Bryner, 2002:34-35). The five theoretical frameworks (listed below), which aren’t
mutually exclusive, overlap considerably and can be used to understand alternative ways of
conceptualizing environmental injustices. These frameworks are: environmental racism/civil

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19 New Social Movements (NSM), very close to Inglehart thesis, are profoundly different from
the Marxist perception of ideology as a unifying and totalizing element for collective action
(Buechler, 1995)
rights & identity politics, distributive justice, public participation /procedural justice, social justice, and productive justice /ecological sustainability framework. Since these frameworks are related, emphasis will be given to the “productive justice and ecological sustainability framework.”

**Productive Justice and Ecological Sustainability Framework**

The question of how to eliminate toxics, as opposed to merely keeping them out of particular communities, raises large inquiries of analysis (Epstein, 1997:66). What should be the ultimate goal of EJM in the U.S.?

the struggle for EJ is not just about distributing environmental risks equally about but preventing them from being produced in the first place so that no one is harmed at all (Faber, 1998:14 emphasis added).

The movement’s transition into its third stage of development, therefore, represents its evolution from a focus on the inequitable distribution of hazards (distributive justice) to the production itself of those toxins (productive justice). Addressing productive justice means getting at the systemic causes of environmental injustices…This, in turn, means that the movement will have to have a national and even international level impact (Faber and McCarthy, 2001:417)

Although some scholars concern about a range of broad issues that EJ has to deal with, EJM has not extended its reach broadly enough to confront the root political economic causes of the environmental injustices (Faber, 1998), nor has it taken the role of natural resource exploitation seriously in the production of environmental inequalities (Mutz et al., 2002). The U.S. environmental justice movement is limited by its focus on distributive justice; thus, productive justice should be pushed as a powerful tool to achieve ecological sustainability. How the dominant economic system creates inequalities is not thoroughly answered or integrated into
explanations of environmental racism and injustices in the literature. The literature does not ask why and how toxic waste was produced in the first place. That means, producing toxic waste is inevitable. The environmental justice framework can rest on precautionary principles (Bullard, 2005:28) for protecting workers, communities, and ecosystems, but not many scholars integrate this approach into their studies (Morello-Frosch et al., 2002). By the same token, ecological sustainability and its connection with environmental justice, especially productive justice, is only explained by a few EJ scholars (Faber & McCarthy, 2003).

The U.S. environmental justice research calls for widening its approach towards environmental issues, including natural resource exploitation, which encompasses both ecological and social justice (in the South natural resource/use, management issues are in the process of integrating into its sustainability approach). Then, EJ can perform its task to ‘push’ ecological sustainability further. However, structural, political, and economic changes that would produce EJ and sustainability have not yet materialized (Pellow & Brulle, 2005). Productive justice related studies are still not enough. EJM diagnoses have radical implications. The need is to reframe environmental justice while linking radical analyses with the root causes of environmental injustice and its action-oriented strategies. U.S. environmental justice scholars need to work more on global environmental injustices since the local-global connection has always been important (historically) due to ecologically unequal exchange and the externalities caused by TNCs inside and outside of the United States.

*Climate in(justice)—An Unequal Cost of Climate Change?*

This notion of “climate justice” is typically ignored by many rich nations and their mainstream media, making it easy to blame China, India and other developing countries, or gain
credence in the “false balancing” argument that if they must be subject to emission reductions then so must China and India (Shah, 2009). There may be a case for emerging nations to be subject to some reduction targets, but the burden of reductions must lie with industrialized countries (Ibid.). In regards to COP8-Delhi Conference, Shah (2002) explains that

Southern leaders miserably and continuously fail their people. We watch amazed and horrified as the victims of climate change keep pleading for funds from the culprits in the climate negotiations, as if they were beggars. As developing countries fight each other to sell off the rights of their future generations for peanuts under the CDM [Clean Development Mechanism], vying to provide the industrialized world with the cheapest way to buy their way out of emission cuts! One can only marvel at the ingenuity of Northern leadership when it comes to protecting their national economic interests by drawing on somebody else's expense account, and … Southern leaders… allow the situation to degrade. Again and again and again and again, in negotiation after negotiation (Shah, 2002: http://www.globalissues.org/article/382/cop8-delhi-climate-conference; with emphasis)

I agree with scholars who locate the root causes of climate change (and climate (in)justice) within the framework of capital accumulation and “negative externalities”, ecological unequal exchange, and eco-imperialism. Many scholars agree that capitalism’s institutions need to be drastically reformed and made fundamentally more equitable, which means a broader agenda for the climate movement—going beyond carbon trading and technocratic discussion of mitigation options— is needed (Storm, 2009:1011; see also Li 2009; Lohmann, 2009; Foster et al., 2009; Martinez-Alier, 2009). Environmental justice (and climate justice) scholars working on issues of sustainability are now using indicators such as ecological footprints, ecological space, and ecological debt, which all show the accumulating ecological deficit. These indicators can be used as a force to achieve ecologically sustainable development within the context of environmental and climatic injustices.

To explore the root causes of climate injustices (now the environmentalism of the poor is
asking for *justice*), perhaps we need to inquire who is responsible for unequal ecological exchange, appropriated ecological space, and ecological debt. I agree that discourses on unequal ecological exchange and ecological debt have greatly influenced current climate change negotiations (Roberts & Parks, 2009). However, North-South climate negotiations\(^{20}\) are not serving the needs of the global South due to treaty *conditionalities*, protectionism, “deep integration” agreements, and weak voting power in international forums (Roberts & Parks, 2007). The climate negotiations,\(^{21}\)

…take place in the context of an ongoing development crisis and what the global South perceives as a pattern of Northern callousness and opportunism in matters of international political economy [instead of] providing greater “policy space” and “environmental space” to late developers. (Roberts & Parks, 2007: 23-24)

**Concluding Remarks**

As detailed earlier, I developed a theoretical framework to analyze a relatively new theory “ecologically unequal exchange” by including relevant discourses and theories of environmental sociology as well as ecological (and political) economics. The theory of unequal ecological exchange takes the forms of *environmental cost-shifting* (or externalization of the negative consequences of material consumption), disproportionate and *uncompensated* utilization of *environmental space*, undervaluation of natural resource exports, as well as uneven ecological footprints, all resulting in an *unsustainable* ecological path. As (Faber, 2008:210) affirmed,


\(^{21}\) The G-77 and China which have seized on these ideas and a movement for “climate justice,” is now gaining strength and exerting influence in international negotiations (Roberts & Parks, 2007)
Free trade and neoliberal economic policy is giving international capital or any other agent who is rich enough to decide the power to decide how global biocapacity is to be used. And so far, the decision is clear. The world’s ruling classes are depleting the earth’s resources at the expense of the poorest segments of society as well as future generations.

In other words, neoliberal globalization intensifies ecological unequal exchange, facilitates the colonization and capitalization of nature in the global South at the hands of international capital while highlighting the serious environmental and climate justice issues that remain global and intergenerational in scope. Thus, neo-liberal globalization presents challenges for many peripheral and semi-peripheral nations, including Turkey, and accordingly those nations are locked into ecologically unsustainable patterns. As argued in the literature, low prices for primary commodities (such as agricultural crops) allow industrialized countries of the capitalist core to appropriate high amounts of biophysical resources from the peripheral economies in the South, while maintaining external trade relations balanced in monetary terms. Hence, uneven development tends to be accompanied by an unequal distribution of the burden of raw materials extraction and emissions and wastes generated to the disadvantage of extractive economies. The extractive economies, such as Turkey’s agricultural sector, are not only draining their energy and matter, but more importantly damaging their local ecology (such as agroforestry systems) and social organization (see Chapter Seven). I argue that capital accumulation is essentially rooted in the transformation of ecological systems and the exploitation of labor and that it shapes the social relations of production, structure and integrity of ecological systems.

Accordingly, a relatively new literature about “ecologically unequal exchange” documents that energy and materials disproportionately flow from the global South to the global North. These findings have begun to influence efforts to negotiate a “post-Kyoto” global climate regime. As a result of globalized economic production and liberalized trade, a number of
industrializing nations’ primary earning originates from carbon-intensive export products (which also require energy-intensive transport and processing). Since the extraction of resources and energy is one of the most damaging stages of the chain of commodity production, a logical next step is the mounting cry from developing countries that they are owed an “ecological debt” by the North (Martinez-Alier, 2002; 2009; Roberts & Parks, 2007). Unequal ecological exchange, as argued earlier, is the core of the eco-debt. Thus, ecological debt arises from two different ecological distribution conflicts. The first set of conflicts arises when the export of raw materials and other products from the poor nations of the South are sold at “ecologically incorrect prices”, which do not include compensation for local or global externalities. Another set of conflicts arises when the global North makes disproportionate use of the environmental space of the global South without making adequate payment. Consequently, the concept of ecological debt brings power and justice to the center stage of the analysis. The ecological debt is accumulated by Northern, industrial countries toward the periphery on account of resource plundering, environmental damages, and especially free occupation of environmental space to deposit wastes, such as greenhouse gases, from the industrial countries (AEE, 2000:2). Thus, subsistence economies of the South broken by the Northern consumers’ insatiable demands for energy…The ecological debt is risen when one country’s own territory is exceeded or becoming larger then its occupied environmental space…. South needs this environmental space to grow which has been already colonized by the North (Agarwal and Narain, 1998; also cited in McLaren, 2003:30, with emphasis)

Recently, scholars examining the relationships between unequal ecological exchange, ecological debt, and climate justice argue that each concept is related to the other and have the potential to reshape the discussion of “burden sharing” in the post-Kyoto world (Roberts & Parks, 2007; 2009; Martinez-Alier, 2002; 2007). As Chapter Four of this dissertation details, the findings of this study make connections between climate change and unequal agricultural
exchange. Similarly, Chapter Five focuses on “pollution havens” in Turkey, while utilizing the theoretical discussions in this chapter.

The next chapter, Chapter Three, overviews the political economy of agricultural trade in Turkey.
CHAPTER THREE

POLITICAL ECONOMY OF TURKISH AGRICULTURAL TRADE
IN THE AGE OF NEOLIBERAL GLOBALIZATION

Introduction

The purpose of this chapter is to provide a background for the upcoming chapter, Chapter Four, Unequal Agricultural Exchange and *Turkish Fallacy* in the age of Climate Change. This chapter analyzes agricultural trade policies in Turkey from a broader political economy perspective. The first part of the chapter addresses economic liberalization, including Turkey’s debt crisis, and agricultural trade policies under neoliberal restructuring. In this chapter, I discuss the adoption of agricultural trade policies in response to these changes within the context of a market-oriented capitalist economy recommended for Turkey by international financial and trade institutions. This section also details the transformation of the agricultural sector, foreign direct investment in agriculture, as well as the influence of transnational corporations in agricultural sector. The concluding section highlights difficulties in the agricultural sector that are not unique to Turkey under economic globalization, including agricultural trade protection.

Political Economy of Agricultural Trade in Turkey: Overview

“Globalization has become a corporate tool to exploit labor and natural resources in developing countries in the name of economic process.” (Odekon, 2005:17)

Neoliberal globalization represents the emergence of a truly integrated international system of capital production and distribution (the internationalization of money, commodity, productive, and waste circuits of capital) under the hegemony of developed nations (Faber, 2002). As a result, world labor, natural resources and energy, biosystems and other productive inputs are becoming more integrated into the circuits of global capital and the structures of transnational
corporations (TNCs) and financial institutions (Faber, 2002; Faber and McCarthy, 2003). Thus, a deep restructuring of the economy has occurred during the process of economic globalization. The transition to Export Oriented Industrialization (EOI) and the adoption of neoliberal projects (privatization, deregulation, and free trade) have been undertaken in many countries, including Turkey. Accordingly, in the global South, many nations (including Turkey), have had to shift from import-substitution industrialization (ISI) to export-led industrialization (EOI) as they become suppliers of cheap natural capital for global markets through international trade.

The neoliberal project has succeeded in creating a form of class war which involves a massive transfer of wealth from the global South to the global North (Harvey, 2005b). In the global South, EOI has resulted in competition amongst countries to attract foreign direct investment (FDI) —a major force for driving economic globalization. This need to attract FDI encourages nations to work with the *unholy trinity* of the World Bank, International Monetary Fund, and Word Trade Organization (Peet and Watts 2004). As a result of worsening terms of trade and debt service obligations, countries must agree to the IMF’s structural adjustment conditions (SAPs) to stay in the “playing field” of the new global economy, which requires privatization and large-scale financial investment (Cavanagh and Mander 2004). Furthermore, the main international agreements from the Uruguay Round—TRIPS, TRIMs and GATS —systematically tip the “playing field” against developing nations while shrinking their “development space” (Wade, 2005). For instance, the TRIPs, one of the products of the Uruguay Round alters trade rules based on the principle of “avoiding discrimination between

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22 Note: TRIPs (the agreement on Trade-Related Aspects of Intellectual Property Rights), TRIMs (the Agreement on Trade-Related Investment Measures), and GATS (the General Agreement on Trade in Services).
countries (the “most favored nation” principle of the old General Agreement on Tariffs and Trade) as well as the goal of “avoid trade and investment distortions.” (Wade 2005:86) More importantly, the TRIMs agreement bans performance requirements related to local content, trade balancing, export requirements, and requirements that public agencies procure goods from local suppliers. As Wade (2005:86) emphasizes,

…a country that tries to impose such requirements can be taken to the Dispute Settlement Mechanism [DSM], and will surely lose the case. In theory the complainant (normally the United States or the European Union) has to provide evidence that the specific requirement is distorting, but in practice the United States and the European Union do not; they simply assert that such requirements are distorting by definition, and –being dominant actors—their assertions generally prevail.

Moreover, the United States and the European Union want to modify the current TRIMs agreement so as to ban all performance requirements. However, the language in the relevant part of TRIMs is not legally clear. Therefore, many developing nations, including Turkey, fear that if they do use such non-banned performance requirements, the U.S. or the EU will threaten to take them to the DSM whose rulings are almost always in favor of the most restrictive interpretation of allowable performance requirements. Threat of the DSM may well be reinforced by other threats, such as cutting foreign aid (Wade, 2005; Gallagher 2005). This represents just one of the products of the Uruguay Round agreements which have an impact on shrinking the “development space” of the global South.

**Economic Liberalization and Debt Crisis during Neoliberal restructuring**

According to Hilmi and Safa (2007), Turkey’s economic success in the age of neoliberal globalization revolves around a growth model centered on exports. Agriculture is an important sector in Turkey despite the fact that its share within Turkey’s GDP has diminished over time as a result of the transformation into a manufacturing and service-based economy. In the early
2000s, the contribution of agriculture to GDP was still considerable (14.1 percent in 2000). Over 40 percent of the population is still employed in the agricultural sector (Ozmerzi and Ozkan 2003). Furthermore, in 2002, 36 percent of the population that was dependent upon agriculture for employment was below the poverty line. This is about double the rate of poverty amongst the population employed in manufacturing and distribution sectors. Nearly 20 percent of the rural population had consumption levels below half the national average (Burrell and Kurzweil, 2007). The productivity and income gaps between richer and poorer regions have also been increasing in the agricultural sector (Odekon, 2005). Turkish agriculture is in transition from a latent sector acting as a labor sinking for the rural population to a dynamic sector responding to global market signals (Cakmak, 2007). As detailed below, the ongoing structural adjustment and stabilization programs continue to be the driving forces behind the transformation of the primary agricultural production sector.

The changes in Turkish agricultural sector are related to the macro-economic and political changes in the country. The key turning points in Turkish economic development can be divided into four major phases. As Onis and Senses (2007) identify, the first phase occurred in the 1950s during the transition from etatism (public services) to agriculture-based integration in the world economy. The dominant development discourses during this phase emphasized the benefits of integration into the capitalist world economy and the advantages of market-based development as opposed to the inefficiency of central planning. Domestic policy coalitions between major land owners and peasants favored this agriculture-based integration strategy, and an emerging new industrial bourgeoisie and ruling party emerged which favored this new coalition of interests (Ibid.).
The second phase of development in Turkey represents the transition from a broadly liberal policy regime to a protectionist import-substituting industrialization strategy in the 1960s and the 1970s. The dominant development discourse can be identified as “national developmentalism” in a mixed economy context. In other words, the existence of pervasive market failures necessitated the need for systematic state intervention and planning for rapid industrialization (Ozis & Senses, 2007). The domestic policy coalitions of this phase included “emerging industrialists” and state bureaucratic agencies responsible for implementing the national development model. Organized labor also formed the backbone of the new import-substituted industrialization (ISI) coalition.

The third phase marks the collapse of ISI and the rise of the neoliberal model, with an emphasis on liberalization and government deregulation that occurred between the post-1980 era until the outbreak of the 2000-2001 political-economic crises (Ozis & Senses, 2007: 31). The dominant development discourse during this phase is the emergence of “Washington Consensus” which emphasized market remedies to government failures. In the post-2001 period, the fourth phase also emphasizes neoliberalism but with a regulatory state component during the post-2001 period. The dominant development discourse of this phase emphasizes a return to the need for an effective regulatory state as the basic ingredient of market based reforms. The domestic policy coalitions of this phase include export-oriented domestic capital, which is becoming increasingly transnational in its operations and forming an alliance with a growing group of transnational investors. In addition to export-oriented small and medium-sized businessmen with financial

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interests, growing segments of the new regulatory bureaucratic institutions are also occupying prestigious positions on the bureaucratic arm of the neoliberal state apparatus (Ibid. 40).

The 1990s were a lost decade for the Turkish economy (Keyder, 1993). Whereas growth had averaged 5.3 percent during the 1980s, the economy shrank by 6 percent in the crisis years of 1994 and 1999, and by 9 percent in 2001 (Keyder, 2004: 28). In general, investment fell, bankruptcy and unemployment skyrocketed, and the average rate of inflation was around 80 percent. Starting at manageable levels in the early 1990s, national debt reached the alarming level of 150 percent of GNP by 2001 (Ibid. 32). With debt accumulation mounting each year, Turkey’s entire tax revenue was required to service the debt and the government had to obtain to new loans in order to function beyond debt. The level of debt accumulation was largely due to the excessively high interest rates paid to domestic lenders, which averaged over 20 percent in real terms for much of the 1990s (Keyder, 1993; 2004). With lending to the government bringing such returns, investment in the real sector suffered. Banks bought the bonds issued by the Treasury and offered attractive rates to depositors (Ibid.). The bulk of the debt was held by a small group of wealthy investors who owned the high-interest deposits in the banks. Rosa Luxemburg detailed how the Ottoman state was employed as a tax-collecting conduit for the appropriation of surplus by international financiers; the present-day beneficiaries are a small group of “local rentiers” (Keyder, 2004). The state’s systematic transfer of tax revenues to a “rentier class” was bound to create resentment among the “active and working elements” within the real economy (Yeldan, 2002).

The 2000s witnessed EU pressure to reform the highly authoritarian state system, electoral breakthrough by the populist Islamist (AKP) and most importantly, an intensified IMF-
led restructuring of the Turkish economy. As neoliberal globalization became further embedded, the political class was unable to offer protection from the ravages of market forces to the general population (Keyder, 2004). Instead of engaging in politically unpopular tax reform, the government restricted all expenditures in line with IMF prescriptions; thus, public education and health services were left to deteriorate. By 2000, social expenditures on health and education had decreased to 3.5 and 2.2 percent of GNP respectively (Ibid. 14). Nationally owned companies were privatized, consumer subsidies were discontinued, and agricultural support was reduced. On the present fiscal front, the debt burden continues to increase and, even if the Erdogan Government (AKP) succeeds in gradually lowering interest rates, the current pattern seems unsustainable (Keyder, 2005).

In early 2001, Turkey’s three-year exchange-rate based stabilization program backed by the IMF collapsed (Keyder, 2004). In 2002, Turkey experienced its deepest recession since the Second World War (Demir, 2004; Akyüz and Boratav, 2003). The pre-condition for coherent agricultural policies is macroeconomic stability, which has not been consistently met in recent decades. Thus, according to Odekon (2005) and Yeldan (2007), longer-term strategies for investment and development are thwarted. With a new stand-by upon which the existing AKP government reached a consensus with the IMF in 2004, the IFIs, and Turkish businesses were assured that the “reform” process would continue up to 2008 along the course set by the IMF’s structural adjustment program since 1998 (Yeldan, 2007). The program was officially declared as a bundle of policies aimed at increasing in both domestic and external debt and “promising” to put the country back on the path of “stable” growth (Yeldan, 2005). However, the program

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24 According to one report, about 80 percent of the Turkish population is against the IMF program (Morgan Stanley Economic Reform on Turkey, March 4, 2003)
envisages more radical arrangements in restructuring political and social life as a whole, such as the commodification of all public services through privatization. Privatization emerged as a key element of the Turkish neoliberal experiment in the 1980s and was designed to achieve integration into the world economy. The privatization component, which was a key neoliberal strategy, focused on increasing efficiency and reducing the burden of the state economic enterprises (SEEs) on the government budget (Ercan and Oni, 2000). Importantly, all the Turkish governments of the recent period have displayed their “most determined” political stance (Yeldan, 2009) and fully adopted neo-liberal policies (Cizre and Yeldan, 2005).

**Agricultural Policies and Sectoral Transformation**

The trends in Turkish agricultural policy are closely linked to the evolution of the economy as a whole, and cannot be assessed in isolation from the macroeconomic and political contexts. The main policy instruments have traditionally been output price supports and input subsidies against a backdrop of high *border protection*. The 1960 military coup terminated the Democratic Party rule and a new era of Five-Year plans began as import substitution became the official development strategy (Onis & Senses, 2007). Most agricultural products and inputs could only be imported by the State Economic Enterprises (SEE) under the import substitution regime (Burrell and Oskam, 2005). Starting in the early 1970s, an intensification of crop production was the result of a reduction of fallow areas and the increased use of fertilizer, fuel, and pesticides. Due to a severe economic crisis in the late 1970s, there was a switch to export-led growth policies and progressive trade liberalization, and the new export-oriented development strategy led to the adoption of different agricultural policies in 1980s.

The post-1980s era [in Turkey] has been characterized by the triumph of the free market-based economic system. Politicians… business leaders, and ordinary people alike have
come to accept that a free-market economy is indisputably the more efficient, the most humane, the most socially and economically just, and hence most desirable system (Odekon, 2005:15)

The 1980s started with a period of post-crisis rehabilitation under a military coup from 1980-1983. In this new era, the government switched from promoting food self-sufficiency to maximizing agriculture's net contribution to the balance of trade (Odekon, 2005). The incentive system was partially dismantled, fertilizer and pesticide subsidies were curtailed, and the remaining price supports were gradually converted to floor prices (Ibid.). Turkey’s tight monetary policy limited agricultural credit, but real interest rates on loans to farmers remained negative. The elimination of export licenses and minimum export prices, along with currency devaluation, an export-incentive system, and flat domestic demand encouraged agricultural exports (Burrell & Kurzweil, 2007). In addition, a wider range of food imports was permitted, providing competition for domestic products. However, the government's hope of rapidly increasing agricultural exports was slow to materialize, and total values of exports fell sharply in the mid-1980s (Ibid.). This decline reflected both softer demands abroad for Turkey’s exports (especially in the Arab oil-producing countries) and attempts to increase the share of agricultural products processed prior to export (Ibid.). Thus, the 1980 stabilization package included a large devaluation, together with stringent measures to curb inflation and to reduce the public sector borrowing requirement of 10 percent of GDP (Ibid.) As a result, the period from the late 1980s until 2001 was marked by more unstable macroeconomic cycles, characterized by deep recessions and two major currency collapses.

The neoliberal state subordinates the interests of the public interests in favor of the interest of the elites (Harvey, 2005b). Privatization, finance, and market processes are
emphasized while state interventions in the economy are minimized, especially with regards to state obligations to provide for the welfare of its citizens. Yeldan (2009:2) emphasizes that,

in a market economy under capitalist competition, the profit rate (or, more generally, the rate of return to capital) is heralded as the supreme objective and the state apparatus is to be re-organized to ensure highest profitability of capital. This re-organization aims at reducing the role of the public sector in regulation of the economy, and is dressed with the rhetoric of terms such as “governance” and “market-friendly, credible governments.”

Under neoliberalism, openness to FDI combined with austerity measures and an export orientated industrialization forced by the IMF has facilitated capital’s intensified exploitation of both labor and the environment through transnational production and commodity chains (Rupert & Solomon, 2005) Turkish agricultural policy choices dictated by the infamous structural adjustment programs of the IMF were prominent causes of the agricultural transformation (Odekon, 2005; Yeldan, 2007). The main responsibility of peripheral nations is to open their economies to international capital and to implement the necessary reforms warranted by the TNCs and the IFIs.

After the 1980s, Turkey developed an ongoing series of agricultural policy reforms to integrate itself into the global economy. The international institutions’ (IMF, WB, OECD) policy recommendations regarding Turkish agriculture are remarkably similar. They all suggest that Turkey should eliminate the support for price schemes, privatize the agricultural SEEs, and

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25 Formal authority for the formulation of annual programs involving specific agricultural policy measures resides with the Council of Ministers, in consultation with the ministries concerned, the State Planning Office and the Treasury. The prime responsibility for implementation of these programs belongs to the Ministry for Agriculture and Rural Affairs (MARA), with some responsibilities allocated to the Ministry for Industry and Trade (MIT) and the Ministry of Finance. Agricultural Credit Cooperatives and the state-owned Agricultural Bank also played a role in policy implementation, providing credit to the industry (Burrell & Kurzweil, 2007).
integrate the agricultural sector into the world trading system.\textsuperscript{26} In 1990, the government reintroduced economic stabilization and structural adjustment programs as suggested by the IMF. During this era, the authorities continued to support agricultural prices to stabilize agricultural incomes. Today, support prices provide the bulk of farm assistance in Turkey. The downside of this policy is that the three main SEEs\textsuperscript{27} in the agricultural sector that set the relevant price supports compose about half of the total SEE deficit (Odekon 2005: 85). The price support schemes are inefficient, wasteful, costly, and potentially inflationary (Odekon 2005). The “stop-and-go” approach regarding agricultural credits and the price support system has failed to provide farmers with a consistent signal regarding agricultural markets, and government policies are partially to blame for the poor performance of agriculture (Odekon, 2005). Furthermore, with the inception of the 1980 stabilization program, financial resources have shifted from bank to “nonbank” agricultural finance institutions enabling the authorities to increase the total credit steadily, especially after 1988 (Ibid. 25).

In 2000, the Agricultural Bank was restructured as ‘a joint-stock company’ whose structural and operational characteristics are of private sector concern but whose capital happens to be state-owned (Ziraat Bank, 2003). The rapid privatization of the SEEs resulted in granting autonomy to the agricultural sales cooperatives and the cooperative unions in order to facilitate

\textsuperscript{26} The OECD was convinced that “these reforms should bring significant benefits relatively quickly to the Turkish consumers and taxpayers” (OECD, 1999:119). But, the adjustment costs include unemployment, poverty, and increased urban-rural income gap (Odekon, 2005).

\textsuperscript{27} A key group of institutional players in the agricultural policy arena have been the SEEs. Beginning in the early 1980s, some SEEs lost their monopoly powers, and there was a move to allow SEEs more autonomy in fixing prices. However, as government retained its right to set prices, SEEs were not managed fully in line with commercial principles (Demir, 2002). The government began writing off the debt of agricultural SEEs in the mid-1990s (Ibid.)
the liberalization of the agricultural sector, contain the cost of this transitional arrangement, and to encourage efficient market-driven restructuring (Odekon, 2005:91). Therefore, farmers are increasingly left to the mercy of the markets without the safety net the state provides for dealing with the uncertainties of the agricultural sector (Ibid.) According to Odekon (2005:75), the dramatic drop in the share of agriculture as part of GNP is the most telling evidence of de-agriculturalization in Turkey.  

However, this decrease slowed in the 1990s and by the end of the decade the share of agriculture was only 12.7 percent (Ibid. 78). Small farm size, land fragmentation, and the large farmer population are major obstacles to agricultural progress and efficiency (Ozmeri & Ozkan, 2003). Despite this poor structure, the Turkish agricultural sector still produces enough food for the domestic population and a surplus to export (Ibid. 20).

The present agricultural support policies are not the most cost effective way of providing support to poor farmers. They distort resource allocation by distorting market price signals and tend to benefit rich farmers more than the poor farmers (Odekon, 2005 cited in Letter of Intent 9/29, 1999:10). A direct income support system targeting poor farmers is less effective in reducing welfare than the price support system because the direct income scheme which began in 2001, targets the individual farmer. Additionally, the incomplete and unreliable farmer registration system in Turkey posed an obstacle in reaching the needy farmers (Odekon, 2005).  

The 2001 Agricultural Reform Implementation Program (ARIP) is aimed at organizing the restructuring process, reducing artificial incentives and government subsidies dramatically, and

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28 Odekon (2005:72) compares the agricultural sector with manufacturing, and reported that “the OECD data in 1990s estimated that labor productivity in agriculture in the early 1990s was 20 to 25 percent lower than that in manufacturing.

29 For Oztuksavul (2000:7), the purpose of direct income support is to provide some financial help temporarily, not for the long-term. The effectiveness of the proposed agricultural reforms, even including their 2-3 percent contribution to GNP is in serious doubt (Odekon 2005: 90).
substituting a support system that will give agricultural producers and the agro-industry incentives to increase productivity in response to real competitive advantage (ARIP, 2002). Thus, the main focus of ARIP has been on approximating agricultural prices in Turkey with world prices, eliminating agricultural subsidies, eliminating or reducing credit channels, and privatizing the SEEs and Agriculture Sale Cooperatives (Eder, 2003). Recent reforms also attempt to include the restructuring of the agricultural credit markets, a transition to alternative crops, the design and implementation of a direct agricultural income support system, the privatization of state-owned agricultural enterprises, and additional reforms to manage agriculture more efficiently (Odekon 2005: 93). All of these reforms, however, have one common goal: to open up the agricultural sector to market forces.

*Foreign Direct Investments (FDIs)*

There is a broad and deep body of literature surrounding Foreign Direct Investment (FDI). In general, the theory of FDI dependence contends that the accumulated stocks of foreign investment make a less developed country more vulnerable to differences in global political and economic conditions. This often leads to negative consequences for domestic populations within investment-dependent nations (Chase-Dunn 1998; Jorgenson, 2007). Berberoglu (2008:275), who analyzed Romanian agriculture, emphasized that,

the privatization of capital and an open door policy toward foreign investment leads to greater economic dependence on the transnational corporations, the dependency theorists

---

30 As Baffe and Gorter (2005), detailed, total agricultural support in Turkey reached an annual average of $9.7 billion during 1999–2001, $6.5 billion of it in direct producer support, according to the OECD. Of that amount, $5.1 billion was transferred through border measures, the dominant component of agricultural support in Turkey.

31 As Gallagher (2010) argues, trade policy is needed to reduce the government role as well as cutting protective tariffs and quotas and price supports, following the theory of comparative advantage.
criticized the transnationals for dominating local markets and draining off profits, thereby causing the underdevelopment of peripheral countries.

There is also growing body of scholars that have begun to investigate the extent to which different forms of environmental degradation within less developed nations are functions of the transnational organization of production within the context of foreign investment dependence (Grimes and Kentor, 2003; Jorgenson 2006, 2007; Kentor and Grimes, 2006). Because of the dual influence of global governance institutions (McMichael, 2004) and the perceived threat of capital flight (Wallerstein, 2005), less developed nations such as Turkey often focus on creating attractive business conditions for foreign investors and TNCs. These attractive business conditions often include lower domestic environmental regulations than core nations (see also Clapp, 1998). Similarly, Bunker (2005) hypothesized that the results of increased TNC penetration may be more ecological degradation, which occurs for a number of reasons. FDI to corporations is expanded in export-oriented operations, and these corporations receive exemptions from environmental laws and regulations. Multilateral financial institutions pressure on governments to promote free trade and to limit state intervention continues, and this abets a generalized policy predilection that favors expanded production at the cost of peripheral suppliers (Bunker, 2005: 52).

*Foreign Direct Investment Networks in Turkey*

Since the early 1960s, Turkey has developed a network of bilateral agreements with eighty nations in order to promote investment flows between parties while ensuring a more stable investment environment. However, annual FDI flows to Turkey amount to less than US$1 billion, which is due to certain institutional, legal and judicial obstacles faced by foreign
investors in Turkey (Togan, 2010:43). According to the UNCTAD WRI report in 2001, Turkey’s level of inward FDI stocks remain behind the global average. However, Turkey appears to be among the most promising host countries for FDI, as stated by UNCTAD 2004 WIR Report (www.unctad.org).

The “Decree on Improving the Investment Environment” in Turkey was enacted at the end of 2001 as part of the national strategy to increase domestic and foreign investments by improving the national business environment. Later, the 2003 FDI Law went into effect. Its goal is to: (1) encourage FDI in the country (2) protect foreign investor’s rights (3) bring investors and investments in line with international standards (4) establish a notification-based system rather than the current approval-based system for FDI and (5) increase the volume of FDI through establishing policies (Togan, 2010: 44). This new law removed the screening and pre-approval procedures for FDI projects. With the new FDI law, foreigners can acquire land in accordance with the mutuality principle, but acquisitions of land between 2.5 and 30 hectares are subject to the approval of the Council of Ministers. Additionally, in June 2006, the Turkish Investment Support and Promotion Agency was established. This newly formed agency provides information to interested investors and incentives such as the provision and development of investment sites for specific projects. In recent years, FDI inflows into Turkey increased significantly with $20.2 billion of FDI in 2006, $22.1 billion in 2007 and $18.2 in 2008 (Togan, 2010: 45). Table 1 shows the FDI inflows in Turkey from 1970 to 2006 based on the data obtained from the WB. As depicted by the Table 3.1, there was a slight increase that started in the 1990s. However, the rate increased much more sharply in the early 2000s, and this pattern

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32 Between 1996–2000 the average growth of FDI was 10-20 percent (Demircan, 2003).
Table 3.1: FDI inflows in Turkey

Foreign Direct Investment (Inflows) 1970-2006

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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Units: Millions $</td>
<td>0</td>
<td>5000</td>
<td>10000</td>
<td>15000</td>
<td>20000</td>
<td>25000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data source: World Development Indicators, 2008.

has continued especially in the years after 2004. The sectoral breakdown of FDI provides more detail, especially within the agricultural sector (composed of agriculture, hunting, forestry, and fishing) in Turkey. In comparison to other sectors, the level of FDI in the Turkish agricultural sector is not small. As seen in Table 3.2, FDI investment in agriculture was $1 million in 2003, $6 million in 2004 and $42 million in 2007. Since the early 2000s, there has been an increase in agricultural FDIs as well as in other sectors such as manufacturing. Table 3.3 attests to the amount of FDI in the agricultural sector of Turkey. According to the report and data provided by the Treasury, in recent years, there were sixty FDI projects in the agricultural sector. In general,
FDI is taken as an important source of financing given the current account deficit, especially after 2005. It is true that the data reveals a sudden increase in the flow of FDI monies totaling $22.4 billion in the last two years (Yeldan, 2007:8). However, looking at

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of FDIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>60</td>
</tr>
<tr>
<td>1954 – 2009/January</td>
<td>334</td>
</tr>
</tbody>
</table>

Data source: Republic of Turkey, Undersecretariat of Treasury

The FDI data more closely reveals that the bulk of the aforementioned flow has been the result of privatization receipts plus real estate and land purchased by foreigners. Neither of these items are sustainable sources of foreign exchange, and they are driven by speculative arbitrage opportunities as opposed to enhancing the real physical capital stock of the domestic economy (Yeldan, 2007:9).

Agriculture and Transnational Corporations (TNCs)

It is not the state that drives economic globalization, but rather the transnational capitalist class both in the First and Third Worlds (Sklair and Robbins: 2002). Thus, TNCs are the leading forces of corporate-led globalization (Petras and Veltmeyer 2005; Held & McGrew 2007; Sklair 2002). The relationship between the owners of the TNCs—the monopoly capitalist class—and the imperialist state and the role and functions of this state (including the use of military force to advance the interests of the monopoly capitalist class) reveals the class logic of corporate-led globalization (Berberoglu, 2005). The chain of changes in global agriculture can be linked to multinational agrochemical corporations’ penetration into developing nations. The number of
agro-food processing TNCs operating in Mediterranean countries has increased recently, especially in Turkey (see Figure 3.1).

Figure 3.1: The number of affiliates of the top 100 food processing MNCs enterprises in the southern & eastern Mediterranean countries in 2002, including Turkey (USA MNEs [16] & European MNEs [18])

Data source: Cakmak et al., (2006) s’ work based on the data from Agrodata databank, CIHEAM-IAMM, UMR-MOISA, 2004

Agrobusinesses are generally engaged in the provision of relatively inexpensive chemical fertilizers and pesticides, hybrid seeds, and genetically modified crops (Odekon, 2005). The new world agricultural trade helps agrobusinesses enter the markets of developing nations because vegetable and fruit production require higher yields, increasing the need for fertilizers and insecticides. Agrobusinesses claim that the changes they introduce lead to cheaper and safer food supplies. The World Trade Organization and United Nations joined the international agencies that echo the voice of the agrobusinesses. Critics of agrobusiness’s involvement in agriculture (e.g. Shiva, 2000) argue that it favors large farmers, and further raise questions concerning public health, the environment, and the desirability of a homogenous food supply (McMichael, 2004; Magdoff et al., 2000; Shiva, 1990).
The global changes that have impacted the Turkish agricultural sector can be traced back to the early 1990s. Firstly, Turkey has shifted from grain production to vegetable and fruit production (see Chapter Seven). Secondly, EU and US-based companies such as Conagra, Inc, Pharmacia and Up-John, Procter & Gambel Co., and Novartis are now actively engaged in Turkish agriculture, producing and/or importing fertilizers, herbicides, and insecticides (Odekon 2005). Between 1990-1999 and through the 2000s, both fertilizer and pesticide use in Turkey increased over 80 percent (SIS 1997: 14-115; see Table 3.4). More importantly, not only did domestic fertilizer production double in the 1980-99 period (about 14 percent of total imports), but the imports of fertilizers increased more than six fold (see Isikli and Yercan 2005). This benefits mainly large farm holders who can afford to purchase these commodities (Odekon, 2005:79).

As Tunali (1993: 68) emphasized, the most striking feature of Turkish agriculture is the predominance of small, commercial farms that use family labor. Keyder (1983:130) refers to this structure as the “parcellary mode of production.” The agricultural census data from 1980 and
1991 supports these scholars’ observations (ISI 1992 and 1999). According to the 2001 census there were a total of 3,075,516 agricultural households in Turkey (Cakmak et al., 2006:17). As seen Figure 3.2, the average farm size is about 6 hectares, and about 65 percent of families own less than 5 hectares of land with 83 percent owning less than 10 hectares (EU 2003:5). Only 15 percent of the total holdings are in the 10-50 hectare range. From 1991-2001, the total number of Turkish holdings decreased by 25 percent. However, there has been a remarkable shift towards medium-sized farms in recent years (Isikli & Yercan, 2005:13). Even though the agricultural sector is characterized by small-scale holdings (92.57 percent family owned), the Export Center of Turkey has been encouraging large-scale farming, facilitated by mechanization and use of a wide variety of yield-increasing pesticides and fertilizers (Ozkan et al., 2005:40). Thus, the use of modern agricultural equipment rose between 1990 and 19999 (Odekon 2005). Likewise, the

<table>
<thead>
<tr>
<th>Size classes</th>
<th>1991 number</th>
<th>% of total</th>
<th>2001 number</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>4,060</td>
<td>100.0%</td>
<td>3,022</td>
<td>100.0%</td>
</tr>
<tr>
<td>0 - 2 ha</td>
<td>1,454</td>
<td>35.8%</td>
<td>1,008</td>
<td>33.4%</td>
</tr>
<tr>
<td>2 - 5 ha</td>
<td>1,260</td>
<td>31.0%</td>
<td>951</td>
<td>31.5%</td>
</tr>
<tr>
<td>5 - 10 ha</td>
<td>722</td>
<td>17.8%</td>
<td>560</td>
<td>18.5%</td>
</tr>
<tr>
<td>10 - 20 ha</td>
<td>399</td>
<td>9.8%</td>
<td>327</td>
<td>10.8%</td>
</tr>
<tr>
<td>20 - 50 ha</td>
<td>185</td>
<td>4.6%</td>
<td>154</td>
<td>5.1%</td>
</tr>
<tr>
<td>50 ha and more</td>
<td>38</td>
<td>0.9%</td>
<td>22</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Data source: EU, 2003: 5 (cited in Isikli and Yercan, 2005: Table 9)

For instance, while the average farm size was 7.73 hectares in 1950, it decreased to 5.69 hectares in 1991 (Yilmaz & Ozkan, 2004:1023). In view of the scarcity of land and land fragmentation emphasis was given on land tenure system in addition to intensifying input use. Due to poor agricultural structure, the issues associated with land tenure system in Turkish agriculture has grown over the years (ibid.)
utilization of tractors in the agricultural sector, for example, has doubled in the past decade (WRI, 2007). However, the data suggest that Genetically Modified Organisms (GMO), on the other hand, have experienced limited penetration into the agricultural sector thus far (Odekon, 2005).

Overall, the pro-industrialization bias in the liberalization program significantly decreased the share of agriculture in the economy and reshaped the agricultural sector in line with the international division of labor in agriculture as dictated by the core nations (Odekon, 2005) and their financial institutions. Whereas industrial countries specialize in capital- and technology-intensive agricultural production, peripheral nations such as Turkey specialize in labor-intensive agricultural production, such as vegetable and fruit production (see Chapter Seven). Macroeconomic and political stability is necessary to improve the performance of the agricultural sector, and to assuage the effects of frequent economic crises and the mismanagement of agricultural policies. The sector still dominates the rural economy, providing about 65-70 percent of total employment (Cakmak, 2007:23). The dualistic structure of production has all the basic traits of a developing economy with a dominant share of production concentrated in small holdings, co-existing with commercial and mostly export-oriented producers (Yeldan & Voyvoda, 2006). Despite the overvalued domestic currency, agricultural

---

34 To increase outputs, largely to export to core nations, foreign-controlled agriculture operations in less developed nations enhance their use of chemicals and machinery in production, harvesting, land clearing, and the transportation of inputs and outputs (Jorgenson, 2007b). The machinery used for production, transportation, and land clearing requires the burning of fossil fuels, which leads to the emission of carbon dioxide and other noxious gases (WRI, 2004). Due to lower environmental regulations and higher economic benefits, this machinery is often outdated and less efficient at burning fuels and minimizing emissions (see Grimes & Kenton, 2003). Also, tractors and other forms of outdated machinery are used for the distribution and application of pesticides and fertilizers (Jorgenson, 2007b).
exports doubled from 2002 to 2005 (Ibid.). Recently, agro-food products gained importance in agricultural trade. Agro-exports are also increasing at a higher rate than agro-imports since 2002. Thus, Turkey remains a net exporter in agro-food products (Cakmak, 2007). The ratio of exports to imports of agro-foods reached a peak in 2005, not considering the crisis year of 2004 (Yeldan, 2009).

**Agricultural Trade Policy Measures**

*Import policy measures*

The basic aims of Turkish import policy since the early 1980s as summarized by the official government site are a reduction of protectionist measures in conformity with the new GATT rules, a reduction of bureaucratic procedures, and to secure a supply of raw materials and intermediary goods at suitable prices with certain quality standards. 35 Before 1980, under the ISI regime, both agricultural products and inputs could only be imported by a SEE. At the beginning of 1980, the first steps towards liberalizing this regime were taken. The “liberalization lists” that could be imported were designated and products that did not appear on these lists were still controlled by quotas (Burrell, 2005). Three lists then replaced the liberalization lists, designating: (1) prohibited imports (2) goods requiring an import permit (3) and goods that could be imported without restriction (Burrell and Kurzweil, 2007). It should be noted that agricultural products could be found on each of the three lists. Later, a system of product-specific customs duties was set up, complementing several umbrella levies (Togan, 2010). Quotas were abolished in 1984, although by the early 1990s, agricultural imports were generally subject to stamp duties, custom duties, internal taxes, and other levies (Togan, 2010).

At the start of the implementation period of the Uruguay Round Agreement on
Agriculture (URAA) in 1995, all border levies were converted to tariff equivalents and bound
(Togan 2010). Import licenses such as these were no longer required for most products although
import approval procedures and inspection controls still applied (Burrell, 2007). Turkey took
measures to reduce duties on agricultural goods which were bound under the URAA, ultimately
reducing them by an average of 24 percent over the period of 1995-2004 (Ibid. 40) However,
various aspects of the tariff structure remain complicated (Burrell, 2005). Additionally, there is a
strong tendency towards positive tariff escalation in the agriculture and food tariff structure
(Burrell & Kurzweil, 2007). In 2005, final bindings ranged from zero to 225 percent on
agricultural products and from zero to 102 percent on non-agricultural goods (Togan, 2010: 25).
The simple average bound tariff rate amounts to 33.9 percent (Ibid. 29).36 Based on the analysis
of Burrell and Kurzweil (2007), many applied tariffs are currently well below bound levels. For
industrial goods and industrial component of processed agricultural goods, Turkey applies the
EU common external tariff under the EU-Turkey customs union agreement, and agriculture
remains outside the customs union.37 According to the Turkish government, average weighted
tariffs on non-agricultural goods imported from third party countries fell in 1996 following the
introduction of the customs union from about 15 to 5.6 percent, and fell even further to 4.4
percent in 2003 (WTO, 2003).

36 Turkey's tariff comprises *ad valorem* rates and non-*ad valorem* rates (specific, mixed,
compound, and variable duties), applied to 378 items at the HS twelve-digit level (284 in 2003)
(WTO, 2007:1). As of 2009, Turkey’s tariff comprises 16,800 lines at the Harmonized
Commodity Description and Coding System (HS) 12-digit level (Togan, 2010:19). As a result of
the URAA, 46.3 percent of tariff lines in Turkey are now bound including all tariff lines for
agricultural products and some 36 percent of the lines for non-agricultural products (ibid. 28).

37 See Chapter Six for details.
The complex structure of tariff policy, together with frequent changes in rates and coverage, characterized Turkish border protection policy up until 1995 (Burrell, 2005). It is unclear if the main purpose was to manage domestic markets, to help producers cope with fluctuating adverse circumstances, or to raise revenue (Burrell and Kurzweil, 2007). The lack of transparency in such a system makes the net extent of border protection hard to evaluate (Ibid. 9). According to Burrell and Kurzweil’s (2007) analyses of numerous agricultural products in 1992, 1994, 1997, and 2003/04, the applied Most-Favored-Nation (MFN)\(^{38}\) tariff provided only a small part of total border protection. In 1990, the list of goods requiring permission to import was abolished and, in theory all but six agricultural products could be freely imported (Ibid. 11). In practice, however, non-automatic, time-delimited import licenses were still required for a wide range of certain agricultural products.

*Export policy measures*

Under Turkey’s import substitution program of the 1960s and 1970s, exports were strictly controlled. During the 1980s, regulations pertaining to agricultural exports were gradually simplified (Burrell, 2007). Export levies on high-value products like angora wool and dried fruit and nuts, for which Turkey had a large world market share, had been implemented during the 1960s with the aim of raising revenue. These levies were gradually abolished or allowed to erode in value, and had completely evaporated by 1995 (Burrell, 2007). During the 1980s, exports of a few products (namely cotton and selected cereals including wheat) were alternately taxed or subsidized, apparently according to domestic supply management criteria.

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\(^{38}\) Turkey’s average applied MFN (Most-Favored-Nation) tariff is substantially higher in agriculture than in other sectors (using the WTO definition, the coverage is 47.6 percent on agricultural products) (cited in WTO, 2007; See also *International Trade and Climate Change: Economic, Legal, and Institutional Perspectives*, The World Bank, 2008)
Commodities traded by SEEs regularly received implicit subsidies as the Treasury covered their duty losses (including losses on external trade operations). Furthermore, exporters of either processed or unprocessed agricultural products were able to receive export credits of up to 50 percent of the \textit{fob} value of the consignment at interest rates often well below the rate of inflation (Burrell and Kurtzweil, 2007).

Turkey’s URAA schedules list 44 products on which export subsidies may be given, albeit subject to volume and expenditure bindings (Burrell 2005). In recent years, subsidies have been paid on only sixteen products, with the aim of developing export potential (Burrell and Kurzweil, 2007). It should be noted that as a result of the customs union between the EU and Turkey as well as Turkey’s commitments vis-à-vis the WTO, Turkey has progressively restored the incentives provided to exporters (Togan, 2010:38-39). As of 2010, export subsidies are provided through the following programs: cash subsidies, the Investment Encouragement Program (IEP), the Inward-Processing (IP) scheme, state aid programs under the Ministerial Council Resolution on State Aids Related to Exports of 1994, Export Credit Bank of Turkey, and free trade zones. Free trade zone of which there are about 20, are located in many major cities throughout the country. Among those, the free trade zone of the Antalya province is of particular importance in relation to the local case (see Chapter Seven).

According to Cakmak’s (2007) economic analysis, the trade performance of the agricultural sector is encouraging, despite the fact that the sector was deprived of taking part in the export-oriented development strategy which started in the mid-1980s. The ratio of exports to imports in the agro-food sector has increased steadily since the economic crisis of 2001 reaching 1.7 in 2005 (Cakmak, 2007). Historically, Turkey is a net exporter of agricultural products (see
Figure 3.3). Net exports with both the EU and the rest of the world remained positive from 1999 to 2005, while the level dwindled temporarily following the adjustment program.

**Figure 3.3: Trade in Agricultural Products, 1999-2005**

Data source: Cakmak 2007 (original source, TurkStat 2006)

**Further WTO/EU Commitments and Protection Measures**

Turkey has been a signatory to the GATT since 1951 and a WTO member since 1995. Within the WTO, Turkey holds developing country status. This means that—compared with developed countries—it is qualified for a more gradual and less stringent program of liberalization measures for agricultural trade (Burrell 2005). However, the position of Turkey in the new round of the WTO negotiations is rather contradictory. The pressure from the new phase of WTO-Agreement on Agriculture has been postponed. Some of the WTO rules regarding “permissible” types and levels of agricultural support are still under discussion within the Doha Development Round negotiations (Burrell 2005). It is also difficult to predict what rules will
apply in 2015 and beyond (Ibid.). The shrinking gains from trade through the Doha Round projections were evaluated by Ackerman (2005). In his analysis, Ackerman (2005:1) claims

…the estimated benefits are not only small in the aggregate, but also skewed toward developed nations; the expected contribution of trade liberalization to economic development and poverty alleviation is extremely limited… long-term productivity gains from trade liberalization, remain problematic.

In the Turkish case, there are also technical issues regarding domestic support that must be clarified during membership negotiations and within the WTO (Burrell and Kuzweich, 2007).

The EU is Turkey’s largest trade partner for all merchandise trade and for trade in agricultural products although for agricultural imports the EU and the US are of similar importance. Turkey’s membership negotiations with the EU will eventually require more liberalized trade in the agro-food market with a major trading partner (Cakmak, 2007). Turkey has been adjusting its domestic legislation to reflect both its EU and WTO commitments for about 15 years. Both border measures and behind-the-border regulations have been brought into compliance not only with the WTO agreements but also with those of the EU (Togan, 2005:29). The EU, in particular has called for a much deeper and wider liberalization of foreign trade than envisaged under the WTO agreements (Burrell, 2005). Since over half of Turkey’s agricultural exports are destined for the EU and about one third of its agricultural imports come from the EU, the arrangements for agricultural trade with the EU need to be taken into account when assessing border protection policy for Turkey’s agriculture. Processed and unprocessed agricultural products, as well as fishery products, remain outside the EU-Turkey customs union.

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Under the EU-Turkey customs union, Turkey applies the same rules of origin as the EU regarding third country trade. These rules of origin differ between countries with and without preferential trade arrangements (Burrell & Kurzweil, 2005: 157).

Overall, Turkish agriculture can be characterized as receiving substantial support, and the continuing existence of a number of high tariffs indicates a large degree of “border protection” (or trade distortions) for the products in question. Scholars identify trade distortions and domestic subsidies as major factors affecting world markets and thus developing-country consumers and producers (Aksoy, 2005). In their analysis Aksoy and Beghin (2005) found that developing countries have higher agricultural tariffs than industrial countries. Morocco, with a tariff of 64 percent, and Turkey, with a tariff of 49.5 percent have the highest average tariff rates in the world. It is also argued that border protection (measured by average tariff rate) contributes to making commodity markets artificially thin, with small trade volumes and a small number of agents. This in turn leads to high variability in prices and trade flows (Aksoy, 2005).

In addition, average tariffs underestimate the real degree of protection given to local producers in industrial countries and overestimate protection in the OECD developing countries (Aksoy, 2005). Therefore, the low average tariffs in industrial countries, which are compared with higher average tariffs in developing countries, are very misleading. Industrial countries protect commodities produced domestically much more than commodities that are not produced locally. Developing countries, in contrast, seem to protect commodities that are not produced locally more than commodities that are. Figure 3.4 shows the average tariff rates for both agriculture and processed foods in 2005. Turkey has among the highest average tariffs.

The scholars, who conducted cross-national agricultural trade research among OECD
Figure 3.4: Average Tariff Rates for Agriculture and Processed Foods, 2005


Figure 3.5: Market Price Support and Average Tariffs for Selected OECD Countries including Turkey

Data source: Aksoy (2005: Fig 3.1) originally from OECD and WTO Integrated Database. Note: Market price support figures are calculated using the 2000 and 2001 average except for the Slovak Republic, which uses just the 2000 average.
nations, argue that “actual protection” for local producers is much higher than the average tariffs in industrial countries and much lower than the average tariffs in selected developing countries, including Turkey. As Figure 3.5 depicts, the market price support measures show only the protection rate for locally produced commodities. Consequently, average tariffs fail to give a clear picture of real protection for domestic producers when the variances in tariff rates are large (Aksoy and Beghin 2005). In the case of market access, tariffs are the only instruments to sustain agricultural production in Turkey. Turkey, much like Mexico, started with a low level of protection that increased over the years (1986-2002) through higher border protection (Aksoy, 2005). The overall support given to agricultural producers through higher domestic prices and direct production-related subsidies are also investigated among OECD developed and developing countries. Aggregate support levels, as Table 3.5 shows, in OECD nations vary significantly. Some nations, especially the core OECD nations, have very high levels of support, primarily through high border protection and high direct payments. The agricultural support in Turkey analyzed as “emerging supporters,” presents a different scenario. In the EU, direct payment to producers is $39.95 billion, which is much higher than in Turkey. Whereas Turkey (as well as Mexico and South Korea) has relatively high border protection, ‘domestic measures’ – direct payment to producers— is only $4.89 billion. Another source depicted in Figure 3.6, shows the average annual rates of reported domestic support from 1998 to 2005. In this case, Turkey reported the lowest total support. Further, there is a significant difference observed between the EU and Turkey.

From the 1960s to the 1980s, despite high tariffs on agricultural products, most developing countries had negative total protection rates on agriculture. This was a result of both
Table 3.5: Agricultural Support in OECD Countries, 2000–2002 (billions of US$)

<table>
<thead>
<tr>
<th>Support</th>
<th>United States</th>
<th>European Union</th>
<th>Japan</th>
<th>Emerging Supporters (a)</th>
<th>Eastern European Countries (b)</th>
<th>Total OECD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who receives support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Producers</td>
<td>46.97</td>
<td>92.19</td>
<td>47.50</td>
<td>30.49</td>
<td>4.41</td>
<td>227.54</td>
</tr>
<tr>
<td>General services</td>
<td>24.29</td>
<td>8.02</td>
<td>12.25</td>
<td>5.98</td>
<td>0.57</td>
<td>53.8</td>
</tr>
<tr>
<td>Consumers</td>
<td>22.24</td>
<td>3.64</td>
<td>0.42</td>
<td>0.97</td>
<td>0.06</td>
<td>34.26</td>
</tr>
<tr>
<td>Total</td>
<td>93.50</td>
<td>103.85</td>
<td>60.17</td>
<td>37.44</td>
<td>5.05</td>
<td>314.88</td>
</tr>
<tr>
<td>Products that receive support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>11.25</td>
<td>16.11</td>
<td>4.63</td>
<td>2.53</td>
<td>1.03</td>
<td>40.14</td>
</tr>
<tr>
<td>Beef and pork</td>
<td>1.99</td>
<td>25.05</td>
<td>3.50</td>
<td>2.63</td>
<td>0.73</td>
<td>36.65</td>
</tr>
<tr>
<td>Rice</td>
<td>0.92</td>
<td>0.25</td>
<td>16.47</td>
<td>7.21</td>
<td>na</td>
<td>25.00</td>
</tr>
<tr>
<td>Wheat</td>
<td>3.99</td>
<td>8.97</td>
<td>0.89</td>
<td>0.36</td>
<td>0.31</td>
<td>15.31</td>
</tr>
<tr>
<td>Corn</td>
<td>6.80</td>
<td>2.41</td>
<td>na</td>
<td>1.32</td>
<td>-0.10</td>
<td>10.64</td>
</tr>
<tr>
<td>Other</td>
<td>22.02</td>
<td>39.40</td>
<td>22.00</td>
<td>16.46</td>
<td>2.45</td>
<td>99.81</td>
</tr>
<tr>
<td>Source of producer support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Border measures (c)</td>
<td>16.63</td>
<td>52.24</td>
<td>42.80</td>
<td>25.60</td>
<td>2.81</td>
<td>142.66</td>
</tr>
<tr>
<td>Domestic measures (d)</td>
<td>30.34</td>
<td>39.95</td>
<td>4.70</td>
<td>4.89</td>
<td>1.60</td>
<td>84.89</td>
</tr>
</tbody>
</table>

na – not applicable.

a. Republic of Korea, Mexico, and Turkey.
b. Czech Republic, Hungary, Poland, and Slovak Republic.
c. Tariffs and tariff equivalents of other border measures.
d. Direct payments to producers.

Data source: Aksoy (2005: Table 3.3, based on OECD 2003 and Aksoy’s calculations).

direct protection, including tariffs and taxes on agricultural products, and indirect protection caused by the protection of industry and exchange rate overvaluation. In a sample of 15 developing countries studied by Schiff and Valdes (1992), all but the three OECD middle-income countries had negative direct protection rates and negative total protection rates of agriculture. Of the three OECD middle-income countries, the total protection rate was positive
for South Korea and Portugal, but was negative for Turkey. Also, the tax due to industrial protection rate was negative for all three selected OECD nations, including Turkey. As previously noted, there is a strong tendency towards positive tariff escalation in the agriculture and food tariff structure. Table 3.6 shows the agricultural protection rates in selected developing countries.

**Table 3.6: Agricultural Protection Rates in Selected Developing Countries**

<table>
<thead>
<tr>
<th>Group</th>
<th>Direct Protection</th>
<th>Tax Due to Industrial Protection</th>
<th>Total Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries (a)</td>
<td>-13.0</td>
<td>-27.8</td>
<td>-35.7</td>
</tr>
<tr>
<td>OECD middle-income countries (b)</td>
<td>17.8</td>
<td>-28.4</td>
<td>-3.6</td>
</tr>
</tbody>
</table>

a. Argentina, Brazil, Chile, Colombia, Côte d’Ivoire, Dominican Republic, Egypt, Ghana, Malaysia, Morocco, Pakistan, Philippines, Sri Lanka, Thailand, and Zambia.

b. Republic of Korea, Portugal, and Turkey (Note: negative total protection is attributed to Turkey). Data source: Aksoy (2005: Table 3.2), and, original source and calculations by Schiff and Valdes 1992, table 2-1.
vs. OECD middle-income countries. The negative total protection among the middle-income nations is attributed to Turkey. Aksoy (2005) argues that the share of tariff lines with *non-ad-valorem* duties increases with the degree of processing and is highest in final products, which are generally classified under food-processing industries. For example, in the EU the share of *non-ad-valorem* tariff lines is 22 percent for raw materials but 45.3 percent for intermediate products and 57.5 percent for final products (as seen in Table 3.7). In Turkey, however, the share of *non-ad-valorem* duties in tariff lines for raw materials is zero, whereas it is 5.2 percent for intermediate products and 12.7 percent for final products, all of which are relatively low rates.

In general, tariffs are extremely low on the raw stages of traditional products, whereas the final products processed products have extremely high tariffs. Tariff escalation is similarly apparent in fruits and vegetables, which are supposed to be less protected (Aksoy, 2005). Yet, developing countries, including Turkey, have to expand their exports in accordance with EOI policies.

<table>
<thead>
<tr>
<th>Country or Group</th>
<th>Raw</th>
<th>Intermediate</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>41.39</td>
<td>58.84</td>
<td>68.53</td>
</tr>
<tr>
<td>European Union</td>
<td>22.05</td>
<td>45.27</td>
<td>57.54</td>
</tr>
<tr>
<td>United States</td>
<td>37.91</td>
<td>43.05</td>
<td>41.34</td>
</tr>
<tr>
<td>Canada</td>
<td>17.14</td>
<td>23.01</td>
<td>30.20</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>11.79</td>
<td>9.74</td>
<td>53.06</td>
</tr>
<tr>
<td>Turkey</td>
<td>0</td>
<td>5.22</td>
<td>12.70</td>
</tr>
</tbody>
</table>

Note: Tariff lines containing specific, compound, or mixed duties, as a percentage of all lines. Data source: Aksoy (2005: Table 3.5 and original source: WTO Integrated Database (most-favored-nation applied duties).

Under the Uruguay Round Agreement, Turkey has no bound allowance for domestic support to agriculture, since all domestic support has been declared as *de minimis* support (Burrell, 2005). Export subsidies are used for a number of products. In the Doha Development Round, Turkey follows the EU’s negotiating position regarding non-agricultural products, and
supports full trade liberalization of these products (see Chapter Five for details) However, Turkey does not want the change to be explicit for the agricultural products, and sides with developing nations on this matter (Odekon 2005). Turkey has acknowledged the ambivalence of its position, and has defended it as keeping with its current situation with respect to trade of agricultural products not being harmonized with the EU (WTO, 2004; Burrell 2005). Grethe (2004:83) identifies a number of highly protected commodities for which Turkey has no export subsidy bindings and which have no official export subsidies with the WTO. Implicit export subsidies, however, have been regularly paid via the commercial losses of state-owned companies. It should be noted that the underwriting of trading losses is no longer permitted under the Doha Round Agreement (Burrell, 2005). On the other hand, Turkey has no WTO export subsidy allowances for certain agricultural products such as sugar tea, tobacco, and barley. Thus, this situation would be problematic for an enlarged EU if the EU is already using its full subsidy binding to deal with current surpluses (Burrell, 2005: 161) (see Chapter Five).

As mentioned previously, tight budgetary conditions and compliance with the commitments of WTO Agreement on Agriculture do not allow high levels of subsidies for exports. Export subsidies are offered for a limited number of agro-food products. The trade flows of Turkey, especially the import figures, reflect the impact of relatively high levels of protection on agro-food products. The level of protection is bound to decrease if the WTO Agreement on Agriculture is renewed and with the advancement in Turkey’s EU membership negotiations (Odekon, 2005; Burrell, 2005; Burrell and Kurzweil, 2007).

During the International Conference of 2007 in Istanbul, scholars from various disciplines reported that developing nations are increasingly being marginalized in global
agricultural markets (Istanbul Conf., 2007). Participation of the peripheral nations in international agricultural trade is insignificant and has been declining (Ibid.) According to Burrell and Kurzweil’s (2005:166) analysis, due to significant trade-distorting policy measures for agricultural products, “it cannot be called an ‘open economy’ insofar.”

**Conclusion**

It is clear that economic liberalization has taken its toll on Turkish agriculture (Odekon, 2005). Many factors, such as low world food prices, the reduction of subsidies and price supports, aggressive U.S. and EU policies to restructure the world agricultural system, and anti-agricultural bias in the stabilization programs have all contributed to the transformation of the agricultural sector, leading to worsening conditions for those whose livelihood depends on agriculture (Odekon, 2005). It is predicted that the recent push by the WTO to implement the URA on Agriculture to reduce “trade distortions” could aggravate the short-term and medium-term problems of the agricultural sector not only in Turkey, but also in other developing nations (Ibid.). Furthermore, this scenario is likely if core nations maintain their agricultural protections while denying peripheral nations’ access to export markets (Hoekman and Anderson, 2000: 179). The negotiators of the global North and the 500-strong WTO staff are being driven by a mixture of ideological conviction and intense corporate lobbying (Wade, 2005). A former WTO negotiator commented that, “without the enormous pressure generated by the American financial sector… there would have been no [GATS] service agreement.” (Wade, 2008: 98). On the other hand, the governments of the global South are not cooperating closely enough to push for the changes within the WTO. For the most part, their trade negotiators accept the legitimacy of the idea that “market access” is the key to development. However, global North’s agenda for
“market access” emphasizes it as being in its own best interests. Accordingly, the “negotiation” for better market access for Southern exports (such as agricultural products) is an end in itself, instead of a “development space” for the global South.

In the case of Turkish agriculture, the one-size-fits all model and push to “getting the prices right” was insisted by the IMF and WB not only constrains the modernization of agriculture but also limits farmers’ access to information and to domestic and foreign markets. Small farmers, in particular, lack the necessary economies of scale and the financial resources to take advantage of all agrochemical inputs, mechanization, and the ability to utilize hydroelectric dams.\(^{40}\) These agricultural difficulties are not unique to Turkey under economic globalization. Many scholars have written extensively on the agricultural problems in Latin America, Africa, and Thailand (see Reynolds et al., 1993, Bryceson, 1997, Rigg and Nattapolwat, 2001) In Turkey, as in Latin America, the deliberate policy of transferring income from rural to urban-industrial sectors to promote manufactured good exports seem to have reached its limit (Odekon, 2005:94). In addition, the deflationary policies in Turkey have had significant adverse effects on investment and lowered the output growth (Ibid. 98). Agriculture still would likely be an important sector both in social and economic terms due to its multi-functionality; however, Turkish agriculture, as Isikli and Yercan (2005:55) affirmed, would be affected by the following different factors and their interaction among themselves in the future: (1) the future rural development and agricultural policy of EU and more particularly Turkey-EU agricultural

\(^{40}\) For instance, the Southeastern Anatolia Project (GAP)—an integrated socioeconomic development project that is one of the largest of its kind in the world—located a region which is rich in water for irrigation and hydroelectric power (see Yuksel, 2009) Social and environmental issues related to the GAP project have been documented (see OECD, 2008 and also see Yesilnacar and Gulluoglu, 2007)
relations (2) the new WTO Agreement and its requirements (3) the trade trend with third countries and their behavior in the near future (4) Turkish macroeconomic and resource distribution measures, especially Turkish agricultural and rural development policy implementation.

For instance, Oztuksavul (2000), who analyzed Turkish agricultural reforms, stated that some other general regional agreements with GATT, WTO are aimed at removing “real” agricultural support and “protective” tariffs, which is quite similar to NAFTA. As discussed earlier, border protection is not the “real protection” and some tariffs are also not “protective tariffs” as comparative trade analyses (Turkey vs. core and other nations) attested. It is also argued that free trade, foreign investment in agriculture and food production with the assistance of high-speed corporations that do not recognize ‘borders,’ would play a major role in the further transformation of agricultural sector (Oztuksavul, 2000). However, there is a large proportion of the labor force in agriculture, and authorities have little choice but to take extensive, integrated measures to raise overall agricultural productivity, which would eventually increase general demand in the Turkish economy (Odekon, 2005).

As previously argued, the macroeconomic structural adjustment program following the economic crisis in 2001 has changed the structure of agricultural sector subsidization. Despite a few backlashes in domestic policy, the financial discipline is bound to stay for the foreseeable future (Burrell, 2007). Attempts to shift from commodity-based subsidies towards more space-based supports are encouraging (Ibid.). Nevertheless, “real” protection for the agricultural sector has been declining only through the requirements of the WTO-Agreement on Agriculture. The production statistics are not able to point out the changes although the drastic decline in the
agricultural employment and slow but changing structure of foreign trade in agricultural products imply that further changes in allocation of resources are inescapable (Cakmak et al, 2006). Even without any decrease in protection levels, the new policy environment necessitates upgrading the adjustment ability of the sector. This, in turn, requires further support for the reform of agricultural subsidization in the removal of market and government failures. Unless effective measures are taken in the areas of rural credit, land, insurance markets, and infrastructure development, even small trade liberalization will have negative effects on the contributions of the sector and may lead to social turmoil (Cakmak, 2007). It is also predicted that the perceived threat to agriculture may turn into a nightmare in the future, even with a slight decline in protection against the EU (Cakmak et al., 2006).

In short, agriculture in Turkey is transitioning from a latent sector acting as a labor sink for the rural population towards a more dynamic sector that responds to global market signals (Cakmak, 2007). Several internal and international factors are still in play to enforce the structural change within the agricultural sector. The ongoing structural adjustment and stabilization programs continue to drive the transformation of the primary agricultural production sector. Agricultural policies have led to increased non-productive financial speculation, and transformed the agricultural sector in such a way that Turkey just recently imported few foods (Togan, 2010). Odekon (2005:19) argues that “limited industrialization in Turkey has taken place at the expense of the agricultural sector. The author emphasizes that Turkey’s agricultural sector has been reshaped according to the dictates of the international division of labor, whereby labor-intensive fruit and vegetable cultivation has replaced crop production in which the West. The United States has had an advantage thanks to their technological
superiority. However, Turkey is still a major exporter of food which contributed to environmental degradation as more high-pollutant goods were exported from Turkey to Western Europe and the core OECD countries (Odekon, 2005). Also, the findings of the present study document the degradation of cropland and agroforestry resources over forty years as a result of export-oriented development models (see Chapter Four). However, agriculture contributes between 8-10 percent to Turkey’s total exports, serving as one of the pillars of the economy (Agri-outlook, 2007).

The next chapter documents a quantitative investigation of unequal agricultural exchange in the case of Turkey as well as theorization of Turkish Fallacy.
CHAPTER FOUR
UNEQUAL AGRICULTURAL EXCHANGE and TURKISH FALLACY
IN THE AGE OF CLIMATE CHANGE

Introduction

The relationship between international trade and the environment has been central to the agendas of both academicians and policy makers in recent years. Theoretical and empirical studies on unequal ecological exchange are becoming vital components of transnational and environmental sociological inquiry. This chapter offers a quantitative investigation of unequal agricultural exchange using Turkey as a case study. In the first section, I detail processes of unequal agricultural exchange, including the peripheralization of agroecological burden, environmental cost-shifting, the “Netherlands Fallacy”, and the “Turkish Fallacy.” This section also addresses the links between agriculture and climate change. In the second section, I present the central hypothesis of this chapter and describe my research methodology, namely “physical accounting” methods as well as regression modeling. In the concluding section of this chapter, research findings and results are discussed with special attention afforded to energy embedded in agricultural trade and climate change.

Unequal Agricultural Exchange

The Peripheralization of Agroecological Burden

Turkey’s political and economic processes in both agriculture and manufacturing sectors, coupled with resultant environmental and health impacts, are characteristic of the externalizing of consumption-based and production-based environmental costs by transnational firms headquartered in affluent societies. When the global North imports environmentally intensive
primary products at declining terms of trade, local environments and human well-being within exporting peripheral nations is impacted. Ecological conflicts arise as the exporting of “specialized” raw materials from the global South are sold at “ecologically incorrect prices,” which ignores negative consequences, the exhaustion of the resources, and compensation for local externalities (Martinez-Alier 1998; 2004; 2008)41. As such, core nations exploit the periphery for natural resources, even as elite classes within peripheral countries exploit domestic environmental assets in search of economic growth through export-oriented exchange (Bunker & Ciccantel 2005). In the colonial era, processes of environmental cost-shifting were overt and explicit. However, in the contemporary global economy, mechanisms of market exchange complicate the conceptualization of cross-national ecological-distributional conflicts.

The extension of the agricultural frontier in many cases implies degradation of invaluable ecological diversity. A peripheralization of the environmental burdens of material consumption may occur when developing nations integrate themselves into the world economy through primary sector (agricultural/raw material) expansion (Martinez-Alier & Muradian, 2001). Moreover, the deterioration of commodity prices due to oversupply may force developing countries to export ever-increasing quantities of resources in order to maintain foreign exchange revenues. Such practices likely entail increased environmental impacts and cost-cutting effects to make resources more price-competitive due to disproportionate environmental space occupation by the global North. Industrialized countries maintain barriers to agricultural exports, and deep liberalization by developing countries in Free Trade Agreements (FTAs) is not reciprocated

41 For W. Kapp (1950), capitalism must be seen as an economy of unpaid costs. Following Kapp, M. O’Connor and Martinez-Alier have written that “externalities are not so much market failures as cost-shifting successes.” (Martinez-Aler, 2007)
(Oxfam International, 2007). Both the US and the EU give minimal tariff concessions in FTA negotiations, only liberalizing in the few agricultural sectors that do not compete directly with their own producers (and deep liberalization threatens a manufacturing future). Many FTAs, including FTAs proposed by the EU, require developing countries to reduce the majority of their industrial tariffs to zero and to freeze all other tariffs (see Kumar and Gallagher 2007). As Vitalis (2004) details, agricultural tariffs in developed countries still disproportionately affect exports from less-developed countries.

The specialization of some regions in primary goods, such that some regions produce agricultural products with lower energy, material or land input than others, makes sense from the environmental sustainability perspective regions (Giljum, 2004). However, economic activities in the primary sector are often characterized by higher “environmental-loads”42 (see Mani & Wheeler, 1998; UNEP, 1999). An international division of labor, in which primary activities are increasingly concentrated in the global South, leads to an unequal distribution of the environmental burden: The accumulation of hazardous waste and/or increased emissions output is apparent in countries specializing in metal mining and processing (Clapp & Dauvergne, 2005).

Furthermore, many primary commodities are traded on the world market at prices that do not fully reflect the level of local environmental and social costs (Martinez-Alier, 2002). If production prices do not reflect the actual costs, less restricted trade may lead to a more inefficient allocation of resources when countries or whole global regions specialize in activities

42 For instance, if one conceives of international flows of cheap primary products (or environmental-intensive products in general) as ‘ecological flows’, that is, as environmental cost shifting from the importing to the exporting country, then freer trade can promote increasing environmental-load displacement from the importing to the exporting country (Muradian & Martinez-Alier, 2001:286). Also, the notion of dematerialization, in fact, represents a displacement of environmental loads to ‘extractive economic sectors’ (Hornborg, 2006)
that decrease welfare, especially when the total costs of production exceed export revenues (Costanza et al., 1995; Neumayer, 2001b). The exchange of goods between different world regions can be “unequal” not only considering the direct and indirect physical flows, but also with respect to the considered environmental and social costs (Martinez-Alier, 2001). International trade opens the possibility for industrialized countries to maintain or even increase regional or national environmental quality without changes in the resource intensity of consumption patterns in the population (Muradian, 2004).

**Environmental Cost-shifting and Appropriation of Environmental Space**

*Netherlands Fallacy vs. Turkish Fallacy*

From a neo-Marxist perspective, the assertion of unequal exchange is implicitly based upon an underlying “undervaluation” within international trade; whereby, the interests of some countries are constrained while other countries are disproportionately rewarded. There exists, moreover, a suspicion that monetary exchange values and utility are not always synonymous (Hornborg 2003). In turn, unequal exchange suggests the objectively asymmetric transfer of real value that cannot be identified simply through reference to prices, which more often obscures rather than illuminates the substantive flows from the global South to the global North (Hornborg, 2003). Moreover, trade between economically non-equivalent partners is arguably one mechanism shaping cross-national disparities over access to environmental space (Anderson & Lindroth 2001). The globalization and mobilization of capital often intensifies, rather than diminishes, socio-economic disparities within and across societies. Cross-national disparities in access to environmental space are relevant to broader discussions concerning global environmental change, the continuing obstacle to development facing the global South,
considerations of environmental/ climate injustice, and the challenges inherent in addressing genuinely comprehensive sustainable development (Robert & Parks 2007; Rice 2007).

How does global trade affect the ecological footprints and/or ecological space of nations and sustainable use of biocapacity? How do nations preserve natural capital through trade? Scholars argue that more affluent nations reduce impacts on the environment within their borders through the importation of resources and exportation of wastes—a process commonly referred to as the Netherlands Fallacy (Muradian & Martinez-Alier, 2001). The Netherlands Fallacy is based upon the observation that the average standard of living of the Dutch population is only made possible through significant reliance upon imported resources (Ehrlich & Ehrlich 1990). Therefore, the Dutch population is not self-sufficient. One must appreciate the fact that the Netherlands must draw upon the resources of other countries to support their aggregate population and its associated consumption patterns (Ibid. 1990). The Netherlands can also protect its domestic resources by importing resources from abroad, preserving the Dutch people’s natural capital. Thus, the circumstances are not necessarily an accurate reflection of the environmental burdens created by domestic living standards and rates of material consumption. Global trade, as Clapp & Dauvergne (2005:129) argue, allows countries to import and export carrying capacity, so the rich live beyond their carrying capacity, while the poor live well beneath it. The Netherlands Fallacy is an example of environmental costs shifting between the core and the periphery. With respect to the function of neoliberal globalization, if a country is politically and economically strong enough, it can claim biocapacity outside its own territory. In absolute terms, the natural capital of a country can be eroded if the ecological deficit of the country is smaller than the sum of its net-imports of biomass and of net-sink-capacity. As argued
earlier, ecological preservation in some nations is partly achieved by means of importing biomass and sink-capacity from other nations where natural capital is gradually depleted.

It can be difficult to recognize the ecological implications of global trade as the global export-import of natural resources obscures responsibility for the environmental effects of production and consumption. According to Andersson & Lindroth (2001:120), this lengthening or globalization of the links between consumption and its consequences tends to promote the “rich-country illusion-effect.” In other words, by importing natural resources and exporting sink capacity demand, inhabitants of industrialized countries mistakenly perceive their lifestyles as “sustainable” as their consumption rates are not tightly linked to domestic environmental conditions. Contrastingly, this rich-country illusion effect implies that the global South is to blame for its failure to sustain its domestic natural capital. The Netherlands Fallacy is a reminder of the necessity to conceptualize ecological dynamics relative to a continually globalizing world. It is increasingly important to examine zero-sum relations among countries and the socio-economic and environmental costs and benefits that are differentially incurred.

Because the global North displaces the significant environmental consequences of their consumption and production oriented activities to the global South, supporters of ecological unequal exchange disagree with the optimism of many neoclassical economists. As Chase-Dunn (1975) details, when examining foreign capital and trade between countries, neoclassical economists observe resource flows between largely unconnected societies. Marxist oriented, dependency/world-system scholars, in contrast, examine control structures shaping power-dependency relations between nonequivalent partners acting within an interactive system (Chase-Dunn, 1975). In turn, the theory of comparative advantage and the assertion of unequal exchange
lead to very different predictions regarding the cross-national consequences of trade relations (Rice, 2007). It also challenges the Ecological Modernization School’s suggestion that many industrialized countries symbolize “environmental states” (Mol and Buttel, 2002).

**Conceptualization of Turkish Fallacy**

In contrast to the *Netherlands Fallacy*, I argue that Turkey, similarly to other peripheral and semiperipheral nations, increases “her” impacts on the environment within “her” borders through the exportation of resources and importation of wastes—a process which can be called the *Turkish Fallacy*. More specifically, the *Turkish Fallacy* establishes that the over-consumption of resources by the Turkish people is responsible for Turkey’s ecological crisis. The *Turkish Fallacy* can be observed not only in the nation's primary sector economy, agriculture, but also in the secondary sector, manufacturing. This process—the uneven appropriation of environmental space or uneven ecological footprints—has been increasing over time as core nations have increased their ecological footprint (Wackernagel et al. 2008). In this study, I use cropland and agroforestry reserves (or deficit) to analyze ecological withdrawal. This can be measured as Biocapacity (gha/cap) minus Consumption of ecological footprints (gha/cap) = cropland/agroforestry reserve.

The growing population pressure on land has been suggested as the main cause of the present land degradation in Turkey (Tekinel & Doorenbos, 2000). Kaya and Raynal (2001) also argue that rapid human population growth in Turkey and the associated demands on natural resources threaten the biodiversity of the nation’s natural ecosystems.43 Agricultural economists Evrendik and Ertekin (2002) emphasize that the unsustainable agricultural pattern in Turkey has

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43 For instance, the transformation of “ecosystem people” by external forces played a major role in changing ecological balance in the Mediterranean region of Turkey (Karaoglu, 1994)
been caused by rapid population growth. Tanrivermis (2003) has specifically identified rapid rural population growth as a cause of land degradation, following significant changes in the Mediterranean Region of Turkey since the 1950s. These scholars suggest stabilizing the population growth in order to maintain ecological balance.

I challenge the popular view that the “over-consumption” of resources by the Turkish population is at the origin of the nation’s environmental crisis. This misconception assumes that “over-population” is overcoming efforts by the State to protect the environment. Instead, I agree with scholars that see more affluent countries protecting their ecosystem through the importation of resources and exportation of wastes from periphery such as Turkey. This misconception that core nations are strong protectors of their ecosystem is commonly referred to the Netherlands Fallacy. In contrast to the Netherlands Fallacy, I argue that the lack of ability of the Turkish state to protect the environment is not due to “over-population” but rather conditioned by the exportation of resources and importation of wastes. I term this misconception the Turkish Fallacy. The over-consumption of resources occurs not only in agricultural sector, but also in the manufacturing sector. Turkey is a successful semiperipheral nation serving the core as an agent of neoliberal globalization. As detailed below, the agricultural exports sent to Turkey’s trading partners are strongly associated with the worsening conditions of agro-forestry resources. Turkey’s “hidden” overconsumption originates from the export of her natural capital. The enormous purchasing power of the world’s richest countries enables them to finance massive ecological deficits by appropriating unused productive capacity of other nations and the global commons through natural resource flows (Rees & Westra 2003:326).
Agricultural Trade and Climate Change

The era of economic globalization and exploding world trade has combined with climate change, the widespread plunder of natural resources and the expansion of large-scale agriculture to imperil global biodiversity as never before (New Internationalist, 2009). Even though climate change and its impacts on agriculture have been discussed for decades, interestingly enough, the trade-environment debate has not addressed climate change and its relation to agricultural trade policy (IBRD/WB, 2008). The climate change dilemma, which requires international cooperative action, can potentially lead to trade tensions if some countries get a “free ride” on the environmental preservation efforts of others (Ibid. 8). Certain agreements, such as the Kyoto Protocol, respond to global environmental issues. However, none of the agreements have universal membership, especially the U.S.’s spotty membership. This imbalance, as World Bank scholars argue, could lead to potential global conflicts as treaty-member countries continue to adopt measures regarding the agreements (Ibid.). Furthermore, these scholars contend that multilateral liberalization of renewable energy sources, or an agreement to remove fossil fuel subsidies, would equally serve climate change objectives (Ibid. 8; 40).

In addition, World Bank scholars emphasize that the provisions from the Doha Round could promote Kyoto objectives. However, virtually no countries in the developed world are on track to meet even their modest Kyoto goals (Roberts and Parks 2007:140). A preliminary assessment of CO₂ emissions between rich and poor nations since 1950 suggests that the carbon debt heavily outweighs the current financial Third World debt (McLaren 2003: 30) Giljum

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44 Recently, a research program of Tufts’ Global Development and Environment Institute launched a project to identify the relationships between trade, export-led agricultural expansion, and climate change in the Amazon Basin (GDAE working papers accessed May 2010; http://www.ase.tufts.edu/gdae/policy_research/amazon_project.html)
(2009) emphasizes that under the Kyoto Protocol the responsibility for meeting GHG emission reduction targets lies entirely with the countries in which they are produced. This principle of territorial responsibility contrasts with the reality of neo-liberal globalization, where the greenhouse gas emissions that are related to domestic consumption are produced in foreign countries. These emissions, which occur along international value chains, are known as embodied emissions of traded goods and services (Giljum 2009). Ecological imperialism has resulted in the appropriation of the global commons and the carbon absorption capacity of the biosphere, primarily to the benefit of a relatively small number of countries at the center of the capitalist world economy (Foster & Clark, 2004). Moreover, agro-ecosystems (including both labor and nature) are “rationally and systematically reshaped in order to intensify, not merely the production of food and fiber, but the accumulation of personal wealth” by comprador bourgeoisies and monopoly capital (Ibid. 9).

Recently, scholars at the Peterson Institute for International Economics evaluated the consistency of climate policy options using core principles of the world trading system as set forth in the decisions of the GATT and the WTO. Hufbauer et al., (2009) concluded that both import restrictive measures and measures that appear to subsidize exports stand a fair chance of being challenged in the WTO. They also argue that unilateral import bans, border taxes, and comparability mechanisms could cause a drawn-out period of severe trade friction. Furthermore, given the uncertainties of the effectiveness of trade steps, their potential to interrupt trade, and their possible conflict with WTO rules, Hufbauer et al., (2009) suggest that WTO members should attempt to negotiate a code that defines the “policy space” for climate control measures in
ways consistent with core WTO principles, and suggest the idea of “food miles.” The concept of “food miles” focuses on internalizing the externalities of international transport by incorporating such costs into the product (Kejun et al., 2008 cited in Hufbauer et al., 2009). This might mean adding a charge at the border for the greenhouse gas emissions entailed in the transportation of that product to the importing country (Hufbauer et al., 2009: 73).

Lastly, the strong relationship between climate change and ecological (or agricultural) debt has been addressed in the literature (see also Chapters Two, Seven, and Eight). The Jubilee Debt Campaign argues that climate change is making more poor countries vulnerable to various “natural” disasters. Similarly, the group of Global Action vs. Debt & IFIs Debts (2008) emphasized that “illegitimate debt” has been a major factor in the escalation of the climate crisis. International Financial Institutions (IFIs), such as the WB and the IMF, bear a significant part of the responsibility for illegitimate debt and harmful debt-related projects and policies. For Accion Ecologica, there is a connection between climate change and its impacts, the use of energy, and thus, increases in trade. For instance, large-scale export of agricultural monocultures uses large quantities of energy; “improved” seeds and agrochemicals contaminate the soil, the water and the air, and also affect the health of employees and local communities. A clear example is the cultivation of flowers for export, which now occupy the most fertile lands of many regions of the world (see Chapter Seven). Even today, the pattern has not really changed:

… increasing production and trade … [requires] greater energy and the use of more natural resources. Simultaneously, it means greater external debt since rapid progress can only be achieved through external financing, which is usually available through the agencies of rich countries of the North (Acción Ecologia, March 2000 online)

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**Research Hypothesis, Data and Methods**

Ecological conflicts arise due to the increased use of materials and energy in the economy and the increased production of waste (Martinez-Alier 2008). Explained by unequal ecological theory, the externalization of the social and ecological costs of extraction and distribution of natural resources exported from the global South enhances environmental degradation and depletion of local ecologies. Accordingly, negative externalities are displaced onto marginalized communities. As many scholars theorize (Muradian, Giljum, Martinez-Alier, Faber, M. O’Connor, and other scholars), nations in the global South specialize in resource-intensive products. In a free trade system, capital migration to poor countries will not convert affluent nations into ‘absolute losers’ (see also Daly 1993); instead, the poorest nations may become the real losers by suffering the environmental load of ‘affluent’ consumption (Muradian & Martinez-Alier, 2001: 286). If the global South is specialized in resource-intensive or environment-intensive products, a ‘specialization trap’ may result (Ibid. 287).

The discrepancies between the core and periphery in unequal ecological exchange have been studied by few quantitative researchers, and those who have used quantitative approaches mainly conduct cross-national analyses without analyzing specific economic sectors (such as agriculture and/or manufacturing). This section of the current study applies to the semi-peripheral nation of Turkey. My hypotheses are summarized as follows:

A preliminary hypothesis (or statement) is that Turkey has been the net physical exporter of agricultural commodities over a number of decades, which provides evidence of agriculturally unequal exchange. Thus, as Turkey moves towards EOI, increased pressure on the environment (such as “cropland”) means greater appropriation of Turkey’s biospace.

Furthermore, I hypothesize that the increase in flows of agricultural exports is negatively correlated (or has an inverse relationship) with both the “cropland remainder/reserve” and
the “agroforestry remainder/reserve” over the years 1961-2003 in Turkey. Specifically, increases in agricultural exports result in a deterioration of both cropland and agroforestry reserves in Turkey.

I utilized two different methods to test the hypothesis stated above: the Physical Trade Balance (PTB) approach in long time-series, one of the methods in “physical accounting” (Giljum, 2004; 2008; Muradian and Giljum, 2007; Weisz, 2007), and regression analysis using SPSS statistical software.

**Physical Trade Balance (PTB) Approach**

The PTB approach, a sub-category of Material Flow Analysis (MFA), has been widely used to test unequal ecological exchange\(^{46}\) or unbalanced international trade, especially by the scholars at Wuppertal Institute (Weisz, 2007; Giljum et al., 2007; 2008). As Weisz (2007) detailed, PTB is widely used to analyze unequal trade in terms of physical material flows in units of weight. The PTB is defined as physical imports minus physical exports, which is a common formula to measure physical trade balance. Thus, a positive PTB indicates a trade surplus or net imports and a negative PTB indicates a physical trade deficit or net exports. A number of scholars agree that the PTB approach, which uses trade data in units of weight, shedding new light on unequal ecological exchange (Giljum & Hubacek, 2001; Giljum, 2005; Giljum et al., 2007; Schutz, Moll, Bringezu, 2004). For these scholars, it is less difficult to predict the relationship between physical flows (i.e. compared monetary flows) and environmental burdens or risks because physical flows give a clearer picture of the overall scale of economic activity (Giljum & Hubacek, 2001). The actual environmental implications of an economic activity in a

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\(^{46}\) Note: The ratio of agriculture exports to domestic use in agriculture production (monetary value) is calculated for 1961-2006. During those years, ratio came up as 0.001-0.0004, which has no significant variations.
given geographical context also depend on the overall scale of economic activities at the macro-level. In the case of extractive economies, studies focusing on monetary trade flows did yield misleading results, as declining prices may lessen export flows in monetary terms, while physical exports actually increase (Ibid.), as expected under ecological imperialism. This is an important point when drawing conclusions about the environmental implications of trade patterns (Muradian & Martinez-Alier, 2001; Weisz, 2005). PTB expresses whether economies of countries or regions are dependent on resource inputs from other countries/regions and to what extent domestic material consumption is based on domestic resource extraction and on the imports of resources from abroad, respectively.

According to Andersson and Lindroth (2001), unequal ecological exchange denotes inequality between imports and exports (see Figures below demonstrate this for Turkey). Thus, physical trade balances; total resource requirements of an economic area (imports minus exports) are indicators of unequal ecological exchange (Schutz et al., 2004). Muradian and Giljum (2007) stress that physical flows give a clear picture of the overall scale of the economy. For Roberts and Park (2007), the PTB approach provides a general understanding of the nature and size of unequal ecological exchange. Recently, Dittrich (2010) has written her dissertation on unequal trade relations and utilized the PTB approach for a cross-national analysis.

**Findings and Results:** By using two databases, COMTRADE as well as FAO (2009), PTB in the agricultural sector is calculated. Also, Global Footprint Network’s (GFN) database on Turkey is utilized to obtain the percent of physical agricultural imports and exports flows. By using the world price (GFN used) for conversions, I calculated the PTB = imports minus exports in tons. The long-time, historical data from 1961 to 2004 (annual 43 observations) is obtained by
utilizing a PTB approach for Turkey’s agricultural sector. Results are shown in Figures 4.1 through 4.3. As a first "snapshot, Figure 4.1 clearly shows a strong indication of unequal agricultural exchange based on 43 years of annual observations. The percent of physical exports (calculated in tons as weight) and physical imports (calculated in tons as weight) of agricultural mass flows are captured by modifying GFN’s trade section calculations. It specifically reveals that there is a solid trend in “higher” physical flows of exports as opposed to “lower” physical flows of imports. When Turkey supported the export-oriented growth model starting in the late 1970-80s, the result was a higher volume of exports, and a lower volume of imports.

**Figure 4.1: Physical Flows of Agricultural Imports and Exports (1961-2003)**

![Agricultural Flows: Imports and Exports](image)

Data source: Disaggregated and calculated by the author, using GFN database

Consistent with the GFN calculations (in percentages), Figure 5 also shows unequal agricultural trade based on exports by weight (in tons) exceeding imports over 42 years of observation. This trend continues until the 1990s as seen in Figure 4.2. After the 1990s, both the percent of exports and tons of exports began to fluctuate. Nevertheless, discrepancy between imports and exports is maintained. The mid-1990s were a tumultuous time for Turkey, and
Figure 4.2: Agricultural Sector: Physical Flows of Agricultural Imports & Exports

Data source: Author’s calculation based on 2007 FAO database

Figure 4.2 clearly shows this. As Odekon (2005: 84) details, in 1993 a new stabilization program was launched and consequently “Turkish agriculture fell short of providing sufficient food… to almost 64 million people in 1997….” In 2001, exports were 6.593 million tones; whereas, imports were only 2.176 million tons. However, in later years we observe a different trend in the physical flows of exports and imports (see Figure 4.2). This may be, as Odekon (2005) argues, the beginning of a de-agriculturalization based on a relatively small agricultural share (compared to manufacturing) in Turkey’s GNP. On the other hand, Weisz (2007) argues that certain sectors of the economy (such as agriculture) are close to being either a generative and/or extractive sector of the economy for certain years. By using extractive vs. generative economies arguments, over the last 43 years, weight of exports has approached weight of imports. In 2004, exports weighted 5.3 million tons and imports weighted 5.2 million tons. However, the trend in increased levels of exports is still evident from 1961-2003/4, the span that this study investigates. Yet, Turkey maintains its “historical” status and its “dedication” to serve as a net exporter of agricultural products in the global trade (Cakmak, 2007; Togan, 2010).
Extractive economies are the most environmentally destructive and generate enormous amounts of pollution and ecosystem degradation (Bunker 1998). In the case of Turkey, this can be seen with agroforestry and the degradation of cropland. Figure 4.2 demonstrates the physical trade balance (weights of imports minus weights of exports) of Turkey’s annual net agricultural exports from 1961-2003. These findings provide strong evidence of unequal agricultural trade relations. More importantly, at the end of 2003, physical net exports were still increasing, and the strong trend towards increasing exports in physical terms is evident. For a few decades, Turkey had an agricultural surplus. After “feeding her people,” Turkey continued to supply agricultural goods to other nations. The regression analysis presented below attests to the ecological and, to some extent, social impacts on Turkey as a result of this unequal ecological exchange.

Figure 4.3 shows the embodied footprint (global hectares per capita) by land type, including cropland, grazing land, and forest. This annual data is obtained directly from GFN’s unpublished trade section on Turkey. The analysis of this data after disaggregation clearly shows that the cropland category, in particular, displays a very deep recession or deficit (as opposed to grazing land and forest). This is another way of analyzing the net trade balance in physical terms by sectors or land type. Figure 4.1 can be compared to Figure 4.2 in terms of net balance of agricultural trade (or net exports of agricultural trade). However, Figure 4.3 provides more detailed information on what types of land footprints are in demand (i.e. cropland vs. forest). In the Turkish case, in contrast to perhaps Brazil’s infamous forests, cropland shows a ‘deficit’ in physical terms since Turkey is still considered an agricultural country.

In both physical terms and monetary terms, Turkey’s agricultural trade has not been consistent (see Table 4.1). In some years, agricultural monetary flows are positive. However, in
2000, 2003, and 2004, there was a negative monetary balance (in USD). Prior to the 2000s, a positive trade balance originated from agro-food products, which had grown in size 3.4 times between 1992 and 2001 (Isikli & Yercan, 2005:39). In addition, Isikli and Yercan (2005) report that the monetary trade balance for raw agricultural products was negative for some years, especially between 1995 -1996, (although it recovered in 2001). For instance, the value of net exports was negative ($-398,000) for fresh food in 2003 (Ibid. 44). As argued in the literature, both peripheral and semi-peripheral nations are not winners in either monetary or physical terms. Wise (2008), who conducted research in Latin America, affirms that core countries are the main

Table 4.1: Trade Balance in Agriculture

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<tr>
<td>1999</td>
<td>2,094</td>
<td>1,655</td>
<td>439</td>
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<td>2000</td>
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<td>2,129</td>
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<td>1,707</td>
<td>98</td>
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<td>2003</td>
<td>2,200</td>
<td>2,537</td>
<td>-337</td>
</tr>
<tr>
<td>2004</td>
<td>2,644</td>
<td>2,765</td>
<td>-121</td>
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</tbody>
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Data source: TurkStat, 2006

Figure 4.3: Embodied Footprint by Land type in Trade (1961-2003)
beneficiaries of agricultural trade liberalization, gaining markets in both the global North and global South. While trade theorists continue to reference developing countries’ comparative advantage in agriculture, rich countries dominate global agricultural trade (Wise, 2008; Vallejo et al., 2010).

**Regression Analysis**

**Dependent Variables**

Two types of dependent variables are selected for regression analysis: (1) cropland remainder or cropland reserve only (2) agroforestry reserve or agroforestry remainder (which includes cropland, grazingland, and timberland). The original data is obtained from the Global Footprint Network (GFN) in a long-term time series (1961-2003). In general, ecological footprint per capita is a comprehensive measure of natural resource consumption. It is measured and reported in global hectares and is calculated by adding imports to domestic production, and then subtracting. In mathematical terms, consumption = (production + imports) – exports. This balance is calculated for the products of relevance for cropland, grazing land, and timber land categories. It is based upon six components as listed below.

1. **Cropland**--for the cultivation of food, animal feed, fiber, oil crops, and rubber.
2. **Grazing land**--for producing meat, hides, wool, and milk.
3. **Forest**--for harvesting timber, fuel-wood, and wood fiber for paper.
4. **Fishing/“Marine land”**--for consumption of fish and other marine products.
5. **Built-up land**--for accommodating infrastructure for housing, transportation, and industrial production.
6. **“Energy land”**--a calculation for the area required to sequester carbon emissions produced primarily from fossil fuel use (coal, oil, and natural gas); includes an additional calculation for nuclear power and hydroelectric use (Wackernagel et al., 1999; 2004)
In theory, the ecological footprint is utilized as one of the potential zero-sum properties related to international trade and environmental space.\textsuperscript{47} The \textit{Ecological Footprint of Nations} provides one strategy for operationalizing the concept of environmental space. This involves measuring the biologically productive area required to satisfy the consumption of renewable natural resources and absorption of carbon dioxide waste of a given population, based on prevailing technology and management practices (Chambers et al., 2002). The calculated ecological footprint (by the GFN) is thus based upon a \textit{trade balance approach} and is sensitive to a nation’s demand regardless of the origin of the natural resources consumed. Previous studies examining the driving forces of ecological footprint demand utilized ecological footprints (only the consumption footprint) directly in their cross-national analyses (Jorgenson 2003; 2009; 2010; York et al. 2003; Rice 2007). In this study, however, biocapacity (global ha/capita) minus consumption footprint (global ha per capita) = the cropland and/or agroforestry (gha/capita) reserve or deficit is obtained for Turkey using the GFN’s annually reported database (see Table 4.2). The biocapacity and consumption calculations, as well as the sectoral analysis, provided more details at the national level.

\textbf{Table 4.2: Ecological Supply vs. Ecological Demand}

| Ecological Supply \(–\) Ecological Demand = Ecological Reserve /Deficit |
| Biocapacity \(–\) Ecological Footprint of Final Consumption = Ecological Reserve/Deficit |
| Details: Ecological Footprint of Final Consumption = (production + imports) – exports |

For sectoral analysis:
Cropland/agroforestry Biocapacity \(–\) Final Consumption of Cropland/Agroforestry = Cropland/agroforestry reserve

\textit{Note: All these key formulas is based on the GFN terminology and calculation (Units based on global ha/capita)}

\textsuperscript{47} Further details and conceptualization, see Chapter Two.
A preliminary analysis of the long-time data series of GFN did not show a ‘cropland
deficit’ and/or a continuous agroforestry deficit over the 42 year span. Although there has been a
gradual decrease over the years, this decrease has not yet become a deficit. In contrast,
examining Turkey’s ecological footprints of “energyland” (mainly fossil fuels) reveals a deficit
for a few decades. This discrepancy provides a rationale to include the amount of energy
embedded in agricultural trade and ‘energyland’ deficits in the regression analysis as an
additional independent variable. Recent cross-national studies claimed that Turkey’s general
physical trade is in balance (Dittrich, 2010) without undertaking sectoral analyses at the national
level. However, this physical balance originated from Turkey’s ‘energyland’ deficit, which is
relatively high, and increasing. As seen in PTB analyses above, Turkey exports great amounts of
agricultural products in physical terms. Nevertheless, the energy component should be
integrated into the analyses to see its relation to various land types and exports (see regression
models).

Key Independent Variable

Agricultural Exports (tons): The key independent variable in this analysis is agricultural
exports flows which are calculated in tons (the unit in dollar value is obtained from
COMTRADE and FAO databases). As seen in Figure 4 above, the major impact on the
ecological footprint originates from cropland; whereas, grazing land and timberland have
minimal impacts. Because of this result, exports of agricultural commodities are utilized in
physical terms.

Additional Independent Variables

Foreign Direct Investment (FDI): Foreign Direct Investments and international finance
are the major drivers of economic globalization. As Faber (2002) details, exports of hazards from the core to the periphery are also included in the *money circuit of global capital*—the increased internationalization of production fueled by FDI. A critical component in the rise of transnational capital is the dramatic increase in FDI (Robertson 2004). Under the neo-liberal agenda and global capital accumulation, TNCs (those industries that require more *energy*) appropriate *carrying capacity* for the core by transferring the core’s hazardous products, production processes, and wastes to the peripheral nations. This is accomplished through a *dependence* on FDI.\(^{48}\) TURKSTAT and WDI databases are utilized to obtain time-series data on FDI inward stocks.

"*Energyland*" (or energy area) reserve/deficit: As mentioned earlier, *energyland* is a calculation of the area required to sequester carbon emissions produced primarily from fossil fuel use (coal, oil, and natural gas) and includes an additional calculation for nuclear power and hydroelectric use. It is reported as global hectares per capita in GFN’s database. GFN scholars have calculated energy (from non-renewable sources) while assuming that all embodied energy in imports and exports comes from fossil fuels. They also point out that ‘energy’ is a “carbon responsibility from embodied energy in exports and imports.” (GFN, Turkey 1961-2003). The database includes several energy-related calculations such as the percent of national energy production originating from fossil fuels, embodied energy in exports and imports (unit: Gj/y), and energy consumption (CO\(_2\) sequestration footprint) in global ha/capita. The energyland

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\(^{48}\) In previous studies, FDI is widely used as an independent variable to measure “investment dependency.” London and Ross (1995) use “flows of FDI” in their analysis of capital mobility, while others use FDI as percent of GDP (Shandra et al., 2003; Jorgenson 2006), to test FDI dependency related hypotheses.
reserve/deficit in global ha/capita is brought together by examining each year’s reserve and/or deficit [global hectare per capita]. 49 50

Evrendilek and Ertekin (2002) contend that agricultural intensification has been responsible for concomitant increases in energy- and water-intensive management practices and monoculture in Turkey. In 1997, Turkey had the 10th highest amount of irrigated area (4.2 million ha) in the world, comprising 14.4 percent of total cropland (FAO 2001); whereas, “rainfed croplands” covered 350000 ha (1.2 percent) (Istatistik Inst., 1998). Between 1970 and 1997, changes in the consumption of fertilizer and irrigated areas showed a 3.37-fold and 1.33-fold increase, respectively. Furthermore, the number of tractors increased from 104,640 in 1970 to 942,000 in the year 2000, representing a four-fold rate increase (Ozkan et al., 2004: 40).

Energyland (Fossil Fuels) Embodied in Agricultural Trade (both imported and exported goods): Energy consumption (from non-renewable sources) is calculated as the CO₂ sequestration footprint (gha/cap) in GFN’s original data. GFN’s research group has calculated an energy area or energyland embodied in trade by following a standardized category in the COMTRADE database. After examining their calculations in time-series, only “food and live animals” was selected (which corresponds to the “food and live animals” section in COMTRADE) at the 1-digit SITC level (Standard Industrial Trade Classification, referring to the detail in the composition of commodity classification groups). The annual agricultural section totals from 1961-2003 are then disaggregated and calculated.

49 Energy deficit/reserve= energy consumption [ecological demand] gha/cap = (production + imports) – exports.
50 Please note that there was no ‘ecological supply’ calculation in the case of ‘energy’ in the GFN data since energyland/ energy area is from non-renewable resources.
Energy use in Turkish agricultural production has become more intensive due to the use of fossil fuel chemical fertilizers, pesticides, machinery and electricity. However, more intensive energy use has caused important human health and environmental problems (Yilmaz et al., 2004a). Site and agricultural product specific studies have been conducted by agricultural economists to document the relationship between agriculture and some specific crops, such as cotton. For instance, Yilmaz et al., (2004a) investigated at Antalya province (where Köprülü Canyon is located) and interviewed 65 farmers in order to determine direct input energy and indirect energy required for per hectare cotton production.\(^{51}\) In addition, the research of Yilmaz et al., (2004b) confirmed that there is an excess of fertilizer use in Turkey. Farmers in Antalya were applying nitrogen beyond World Health Organization recommendations, causing negative effects on the environment and human health. However, the recent removal of fertilizer subsidy policies will most likely reduce fertilizer use (Ibid.). Yilmaz et al., (2004b) show that farms in Antalya province have a higher input of pesticide use than the national average. Overall, energy use in cotton production is not efficient and is detrimental to the environment mainly due to excess input use. The “energyland” footprint embedded in agricultural trade has not been studied previously in Turkey. Earlier studies, mainly undertaken by agricultural economists, calculated energy use in agricultural production, including particular crop production. In this study, forty-two years of the ‘energyland’ footprint embedded in agricultural trade are included in the regression models.

\(^{51}\) Turkey has the 6\(^{th}\) largest cotton cultivation area and is 6\(^{th}\) in terms of seed cotton production after China, US, Pakistan and Uzbekistan, respectively (Yilmaz et al., 2004:2). Among the major 10 cotton producer countries, cotton is harvested by hand only in Turkey and India; however, there was a shift from hand harvesting to machinery because of the difficulties of finding enough workers in early 2000s (Yilmaz et al., 2004) (See Chapter Seven).
Fertilizer consumption (100 grams per hectare of arable land): This variable is calculated by dividing total fertilizer consumption by the total area of both arable and permanent cropland (data source: WRI, 2005). Measures are given in kilograms per hectare. Total fertilizer consumption is measured in metric tons of plant nutrients consumed in agriculture. It is an aggregate of nitrogenous fertilizers, phosphate fertilizers, and potash fertilizers (WRI, 2005). Prior cross-national quantitative investigations showed that primary sector FDI contributes to growth in the use of both pesticides and fertilizers, and fertilizer use also contributes to increases in the intensity of pesticide use (Jorgenson & Kuykendall 2008). On the other hand, the use of synthetic fertilizers is also known to contribute to emissions of nitrous oxide, which is a greenhouse gas that contributes to global warming and climate change (WRI, 2005).

Furthermore, the use of both pesticides and fertilizers in large-scale agricultural production indirectly contributes to carbon dioxide emissions through the use of energy-intensive tractors.

GDP: Nominal GDP is also included as one of the independent variables. Prior studies utilized GDP as additional independent variables for similar research (Jorgenson 2008). This controls for the base level of economic development, in general. The GDP data is obtained from the World Bank’s World Development Indicators.

Net Agricultural Exports (in tons): This independent variable is included as another independent variable. The original data is gathered through calculation of PTB (physical trade balance= imports minus exports) from GFN data on Turkey (see also Figure 4.3 for description).

Rural Population Growth (annual %): This independent variable is included to refine the hypothesis further. Since the 1970s rural population growth has been cited as one of the major causes of land degradation in Turkey. Previous studied found that rural population growth
increases the likelihood that forested regions will be transformed, cut, or burned for use in industrial activities, extractive processes, or for various purposes in agricultural production (Burns et al., 1994; Rudel, 1989). The original data is gathered from the World Development Indicators’ database.

*Findings and Discussion:* Results from the regression diagnostics and related models are reported in Table 4.3 below. Due to the small sample size of data (N=number of years, annually observed) that are used in the regression models, not more than four variables are tested.

*Model 1* includes net agricultural exports (physical trade balance=imports minus exports in tons). In this regression parameter, both agricultural exports and net agricultural exports are inversely associated with the cropland remainder, one of the dependent variables. This regression model shows a statistically significant correlation coefficient. The key independent variable’s beta is -.785, and this finding is very statistically significant at the .01 level. The additional independent variable’s beta (-.462) is also significant at p=.057 and has a negative unstandardized coefficient. This regression coefficient (and, respectively, our conclusion) is statistically significant at the .10 level and is very close to being significant at the .05 level based on a sample of 42 annual observations.

*Model 2* introduces FDI inflows during the thirty-four years of annual observations as another independent variable. In previous studies, FDI is utilized to measure foreign capital integration. The regression output results point to both agricultural exports and FDI causing the amount of cropland available to decrease. The finding on the effect of agricultural exports is statistically significant at the 5 percent level, while the impact of FDI is statistically significant at the .01 level. In this model, the beta of independent variable (-.509) is very significant at the
p=.001 level, and the unstandardized coefficient is negative.

**Model 3** This model includes an additional independent variable—GDP. In this regression model, we note that agricultural exports appear to have a small, negative effect on the remainder of agroforestry. This finding is very statistically significant—even at the 1 percent level. The nominal GDP also appears to have a small, positive, statistically significant (at the .05 level) impact on the amount of agroforestry land available, if we consider the unstandardized coefficient. This GDP measures a country’s level of development. Previously, similar studies used this variable in regression analyses and found a positive relationship when the dependent variable was ecological footprint (final consumption) (Jorgenson 2006; 2009). In this regression model, the dependent variable is technically different (biocapacity minus final consumption).

**Model 4** illustrates the general energyland (fossil fuels) deficit over four decades. We observe that agricultural exports have a negative effect on the amount of agroforestry land available, and this result is very close to being statistically significant even at the .01 level. The energyland deficit is positively associated with the amount of agroforestry land available, and this finding is very statistically significant—even at the .01 level. In this regression model, beta (.757) is very significant at p=.000, and the unstandardized coefficient is positive (.007). In other words, as the exports of agricultural commodities increase, energy or fossil fuels deficits increase as well. An increase in the amount of agroforestry land used is positively associated with in a higher energyland. The more agroforestry land used, the greater the energyland (fossil fuels) deficit. Hence, the CO₂ sequestration footprint (energy consumption) is critical for Turkey. All traded energy, or embodied energy in imports and exports, as GFN scholars indicated, comes

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52 Due to lack of data on Turkey’s GDP in agriculture, Turkey’s GDP is utilized.
from fossil fuels. The calculated carbon responsibility from embodied energy in exports (as reported in the GFN database) calls for special attention. Turkey has to import fossil fuels in order to keep up with “her” agroforestry and export related activities.

**Model 5** includes both net agricultural exports and energyland (fossil fuels) embedded in agricultural trade. We find that the energyland (fossil fuels) embodied in agriculture trade has a small, positive impact on the remainder of agroforestry land. This result is statistically significant at the .05 level. In this regression model, beta = .608 significant at p = .032, and the unstandardized coefficient is positive. On the other hand, we note that our key independent variable, agricultural exports, appears to have a negative impact, all else equal, on our dependent variable. Specifically, increases in agricultural exports result in a deteriorating remainder of agroforestry land, as in the case of other models. This result is very statistically significant, even at the .01 level of significance. In this regression model, beta = -.778 very significant at p = .000, and the unstandardized coefficient is negative. Accordingly, both agricultural exports and net agricultural exports have a negative impact on the available agroforestry land. In this case, more fossil fuels are embedded in agricultural trade. This finding lends support to the further argument that agricultural practices in the age of neoliberal globalization can be linked to climate change in the case of semiperipheral nations such as Turkey.

**Model 6** presents another independent variable that is fertilizer consumption. We again observe that increased agricultural exports are inversely associated with the agroforestry land available, as seen in previous models. This conclusion is very statically significant at the .01 level. Fertilizer consumption appears to have a negative impact on the amount of agroforestry land available, as we note the negative regression parameter in front of this independent variable.
in the regression output above. This regression coefficient (and, respectively, our conclusion) is statistically significant at the .10 level and is very close to being significant at the .05 level.

Table 4.3: Regression Models Predicting Cropland and Agroforestry Reserves (or Reminders)

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
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<tr>
<td>Cropland Reserve</td>
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<tr>
<td>(or Reminder)</td>
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<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
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<tr>
<td>Agroforestry Reserve</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>(or Remainder)</td>
<td>-.785***</td>
<td>-.336**</td>
<td>-.542***</td>
<td>-.217**</td>
<td>-.778***</td>
<td>-.291**</td>
<td>-.641***</td>
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<td>[.019]</td>
<td>[.000]</td>
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<tr>
<td>GDP</td>
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<td>-.463**</td>
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<tr>
<td>FDI inflows</td>
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<td></td>
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<td>(.016)</td>
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<tr>
<td>Energy-land deficit</td>
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<td></td>
<td></td>
<td>.757***</td>
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<td></td>
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<tr>
<td>deficit or remainder</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Energy-land (fossil</td>
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<td>.608*</td>
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<td>(fossil fuels) in</td>
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<tr>
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<td></td>
<td></td>
<td>(.016)</td>
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<tr>
<td>Net</td>
<td>-.462*</td>
<td></td>
<td>-.469***</td>
<td></td>
<td></td>
<td></td>
<td>-.584***</td>
</tr>
<tr>
<td>Agricultural</td>
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<td>[.000]</td>
<td></td>
<td></td>
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<td>[.000]</td>
</tr>
<tr>
<td>Exports</td>
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<td>(.001)</td>
<td></td>
<td></td>
<td></td>
<td>(.000)</td>
</tr>
<tr>
<td>Fertilizer</td>
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<td></td>
<td></td>
<td></td>
<td>.146*</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[.031]</td>
</tr>
<tr>
<td>Rural</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-.550</td>
</tr>
<tr>
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<td>38</td>
<td>42</td>
<td>42</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>Adjusted R’</td>
<td>.204</td>
<td>.496</td>
<td>.622</td>
<td>.844</td>
<td>.620</td>
<td>.788</td>
<td>.550</td>
</tr>
</tbody>
</table>

Note: First number reported is standardized coefficient, unstandardized coefficients in brackets, standard errors in brackets/in italics and in parentheses is significance level: *p<.05 **p<.01 ***p<0.001 (2-tailed tests)
additional independent variable, which is fertilizer consumption, is negatively correlated with the remainder of agroforestry land. We can conclude that rising fertilizer use deteriorates agroforestry land, all else equal. In Chapter Three, Table 3.4, we also observed a significant increase in consuming fertilizer in Turkey, especially after the 1980s.

The problems of multicollinearity have been reported in the majority of quantitative cross-national research studies, testing similar theoretical approaches (Jorgenson, 2009, Jorgenson and Kuykendal, 2008, Rice, 2007; Shandra et al., 2005; Ehrhardt-Martinez 1998). The strong correlations between independent variables indicate the greater multicollinearity.53 As Melroy (online source)54 argued, autocorrelation poses a problem for regression analysis. If there is an autocorrelation in the data set, the OLS estimates will still be unbiased, but the standard errors will be wrong. Since the long-time series data is utilized in our small regression models, high correlation is observed. Accordingly, few unreported tests were run such as the Durbin-Watson statistic by utilizing STATA statistical software. Through the Durbin-Watson test, it is found that the Variance Inflation Factor (VIF) is relatively small. For instance, the VIF value for agricultural exports and energyland is 1.98, which is well below the commonly accepted VIF values. Usually, the VIF values of 7-9 or higher are considered as evidence of problematic multicollinearity. It is determined that the reported findings are not biased due to multicollinearity.

Model 7 includes one of the independent variables— annual rural population growth for 43 years. As the regression table attests, statistically, it is not significantly different from zero,

53 See Applied Statistics for Political Scientists (Week 8: Time Series luke.keele@politics.ox.ac.uk)
54 http://malroy.econ.ox.ac.uk/disher/stats.htm and luke.keele@politics.ox.ac.uk
unstandardized coefficient of rural population growth. This implies that the explanatory variable is not an important determinant of remainder of agroforestry reserves (the dependent variable). However, as we observed in previous models, increases in agricultural exports result in a worsening agroforestry reserve. By including this independent variable, our goal is not to shed light on a Malthusian discourse. To a certain extent, it is critical to acknowledge once again that traditional agroforestry communities (and their socially and ecologically well-established systems) should not be blamed for the destruction of ‘agroforestry reserves’ in Turkey (see also Karaoglu, 1994). Yet, export-oriented development growth through the neo-liberal restructuring agenda deserves more attention.

As I previously theorized Turkish Fallacy, the Turkish people are over-consuming their natural resources (such as agricultural land), and they are responsible for Turkey’s ecological crisis. However, it is a mistake to assume that increasing “overpopulation” is the primary source of the environmental impact in Turkey. The Turkish Fallacy is an example of environmental costs shifting between the core and the periphery. Conversely, Turkey, with elevated levels of exports sent to core nations, exhibits worsening biocapacity and ecological reserves (cropland and agroforestry reserve). Due to the core nations’ unsustainable consumption levels and the misappropriation of wealth to higher-income nations, resource consumption in Turkey is suppressed. Not only the materials, but also the consumption of energy (fossil fuels) embedded in agricultural trade has increased in Turkey.

With respect to the functioning of neoliberal globalization, if Turkey was politically and economically strong enough, it could claim biocapacity outside its own territory in a fashion similar to core nations. This would prevent the natural capital of Turkey from being eroded and
would promote ecological sustainability for Turkey by importing biomass and sink-capacity from other nations. Instead, the “extractive mode” of the agricultural sector, specifically Turkey’s role as a net exporter of agricultural products, increases negative environmental impacts within the country. Turkey increases its impacts on the environment through the exportation of agricultural and agroforestry resources, depleting the country’s ecological reserves over the years; whereas, “her” trading “core nations” in the global North protect their own natural capital. If the core nations displace significant environmental consequences of their consumption-production activities to Turkey, a semiperipheral nation, then supporters of ecological unequal exchange are in ideological conflict with the optimistic notions of many neoclassical economists. Examining the control structures shaping power-dependency relations between unequal partners becomes critical. The theory of comparative advantage and the assertion of unequal exchange lead to very different predictions regarding the cross-national consequences of trade relations.

**Further Discussion and Conclusion**

*Energy embedded in agricultural trade and climate change*

The empirical evidence supports the specific hypothesis of this chapter, which proposes that the increase in flows of agricultural exports is negatively correlated with the “remainder of cropland” as well as “remainder of agroforestry land” over a number of decades in Turkey. As Turkey moves towards EOI, increased pressure on the cropland, grazingland, and timberland translates into greater appropriation of Turkey’s biospace. This unequal ecological exchange in the agricultural sector becomes more visible between Turkey and the EU-14 (See Chapter Five for details). As articulated by the theory of unequal ecological exchange, the resource
consumption and environmental degradation paradox as well as the decrease in “biocapacity” is at least partly a function of core nations that utilize their advantageous positions in the world economy to externalize their consumption-based environmental costs to Turkey. The result is the destruction of Turkey’s biocapacity or more specifically ‘ecological reserve.’ In other words, more developed and higher consuming countries largely externalize their consumption-based environmental costs to Turkey, as we observe increased forms of environmental degradation within Turkey’s territory.

Wackernagel et al. (2004: 240) details that nations with low per capita biocapacities—typically resulting from high population densities (Bangladesh, the Netherlands) or inhospitable climates (Ethiopia, Saudi Arabia)—do not have the capacity to meet their resource demand and import food and timber from countries with agricultural, fishery, or timber remainders, such as Canada or Brazil. Subtracting the Footprint of Production yields the ecological trade deficit, or the net import or net export of biological capacity. Ecological deficits not balanced through trade are met through the overuse of domestic or, in the case of fossil fuels, global resources, resulting in overgrazed pastures, depleted fisheries, degraded forests, and the accumulation of carbon emissions in the global atmosphere (Ibid. 204). The phenomenon termed “ecological overshoot” is a state in which resources are used more rapidly than the biosphere can replenish them or assimilate their waste, breaching the principle of strong sustainability at the global level. It is possible for a country to run a negative ecological trade deficit (or a remainder/reserve) while in a state of ecological overshoot (Wackernagel et al., 2004). In such a situation, the country, such as Turkey, would literally be liquidating its own natural capital to service exports.

The GFN’s time-series data on Turkey indicates that most of the ecological deficit of
Turkey originated from her “energy deficit” (fossil fuels)\textsuperscript{55}; whereas the cropland, grazing land, and timberland possess surplus “ecological remainders.” If the agricultural sector (including grazing and timberland) of Turkey has surpluses, this means their “ecological remainder” has been used for providing services that are consumed in other countries. Furthermore, if these services are sold to a second country, then the corresponding demand on Turkey’s biocapacity is part of Turkey’s \textit{production footprint}, as well as part of the second country’s \textit{ecological footprint} of \textit{consumption}.

As McMichael (2007:171) affirms, “states now acted as the servants of trade, cross-border investment, deepening agro-exporting and the construction of an ecologically-invasive ‘world agriculture.’” Moreover, under the constraints of trade and foreign exchange needs, states encourage a pattern of indirect consumption of cereals by relatively affluent global consumers (Ibid. 180). \textsuperscript{56} More importantly, the expanded reproduction of corporate agriculture depends on either eliminating or incorporating pre-existing agroecologies, thus giving rise to land reclamation and food sovereignty movements (Ibid. 184). In Turkey, for instance, a few scholars are now exploring how to maintain or to restore traditional agroforestry systems (Tolunay et al., 2007).

Considering additional independent variables, for instance, fertilizers are usually produced and sold by chemical corporations in developed countries (Frey, 1995). TNCs investing in or directly operating capital intensive agriculture within peripheral nations are

\textsuperscript{55} See Altvater, 2007: The Social and Natural Environment of Fossil Capitalism, in \textit{Socialist Register: Coming to Terms with Nature}.

principal customers for pesticides and fertilizers, some of which are banned in core nations, but provide potential markets for their producers in locales with less environmental protection barriers (Magdoff et al., 2000; Clapp, 2002). Regarding the cycle of fertilizer use leading to higher pesticide use (see Wright, 2005), combined with the economic interests of agricultural firms and operations to retain or increase yields per hectare, it is likely that the effect of primary sector investment dependence on both pesticide and fertilizer use intensity increases over time, as seen in the Turkish case. For Sayin et al. (2002:5), producing organic vegetables in the greenhouse (mostly for exports) requires intensive pesticide and chemical usage. Although it is beyond the aim of this chapter, it is important to note that laborers and farmers that work in transnationally organized agriculture in Turkey are more likely to be directly exposed to potentially harmful pesticides, fertilizers and other agrochemicals (Sayin et al., 2002).

As regression models showed, energy embedded in agricultural trade, especially agroforestry, resulted an energyland (fossil fuel) deficit. The energy in agriculture is important in terms of crop production and agro-processing for value adding (Cakmak 2007). Agricultural economists conducted a study to determine the energy use in the Turkish agricultural sector for the period 1975-2000 (Ozkan et al., 2004a). In their study, the inputs in the calculation of agricultural energy use include both human and animal labor, machinery, electricity, diesel, fertilizers, seeds, and thirty-six crops (including cotton). During the last 25 years, the increase in physical input, fertilizer and seed energy input values calculated as 2.3-, 3.1 and 2.7 – fold (Ibid. 49). This means that the use of inputs is increasing and energy-related problems associated with agricultural production are still occurring (Ibid.; Ozkan et al., 2005). Ozkan et al. (2005:41) predicted that if the increase in energy use in the agricultural industry continues, the only chance
for producers to increase total output will be to use more inputs. There is no chance to expand the size of arable lands.\textsuperscript{57} It has been proposed that some specific policies need to be enacted to reduce the negative effects of energy use, such as pollution and nutrient loading, if the goal is to establish sustainable production systems (Ibid.)

In addition, agricultural economists examined the energy equivalents of inputs and outputs in greenhouse production, which is also increasing in Turkey, especially in the Antalya province (includes Köprülü Canyon).\textsuperscript{58} The data collected from eighty-eight greenhouse farms in Antalya province showed that an intensive use of inputs in green-house vegetable production was not accompanied by increases in the final product.\textsuperscript{59} Again, as indicated by the researchers, this situation can lead to issues related to these inputs, such as global warming and pesticide pollution. Similarly, Hatirli et al., (2006) examined energy use patterns and the relationship between energy inputs and yield for greenhouse tomato production in Antalya province. Their results also showed that all variables—diesel, fertilizer, electricity, chemicals, human power, consumed energy, except for seed energy—were found to be statistically significant. The Turkish greenhouse industry heavily depends on fossil fuels which, in turn, lead to many environmental issues. The findings of the researchers imply that fossil fuels are consumed in significant quantities by Turkish agriculture.

\textsuperscript{57} From 1975 to 2000, the share of human and animal power went from 60.4 to 14.6%, whereas mechanical and electrical power increased from 39.6 to 85.5% (Ozkan et al., 2000:48).

\textsuperscript{58} Ozkan et al. 2000:4b: 90, Greenhouse production in Turkey began in 1940s in glasshouses built in Antalya province, which is still the centre of such production due to very favorable climatic conditions for protected cultivation. According to 1999 statistics, 81.8% of the glasshouses and 48.5% of the plastic houses of the country were located in Antalya.

\textsuperscript{59} Turkish export and free trade centers are now encouraging vegetable exports, and Turkey is competing with others in exporting vegetables and fruits (Turkish Export Promotion Center.org)
The agricultural sector in Turkey made up 6.1 percent of the total greenhouse gas (GHG) emissions of 271.2 million tons in 1997 (Environmental Statistic, 1999). For instance, fossil fuel energy consumption in Turkey increased from $806 \times 10^{15}$ joules in 1997. “Imports” of fossil fuels have risen about ten-fold since 1970 and now supply $1821 \times 10^{15}$ J (6.1%) of Turkey’s fossil fuel consumption in 1997 (Istatistik Institute, 1998). Turkey’s reserves of fossil fuels in 1993 were 98 billion tons for oil and coal and 10 billion m$^3$ (cubic meters) for natural gas (Istatistik Institute, 1998). A historical time-series dataset of CO$_2$ emission estimates from fossil-fuel-burning, cement manufacture and gas flaring shows an exponential growth between 1965 and 1996 from 41,000 tons of carbon in 1965 to 48.7 million tons of carbon (Marland et al., 1999). Also, national per capita emission of CO$_2$ increased from 0.12 tons carbon in 1950 to 0.79 tons carbon in 1996 (Marland et al., 1999). The strong coupling of GDP and fossil-fuel consumption between 1970 and 1997 points to the need for the development of renewable energy technologies and more efficient use of energy resources (Cakmak, 2007). For instance, the total fossil fuel energy input into agriculture also rose between 1970-97 from 2.63 percent to 3.98 percent of total national fossil fuel consumption (Evrendilek and Ertekin, 2002). The application of irrigation and fertilizer requires huge amount of energy and is associated with large CO$_2$ emissions. Utilization of renewable energy could result in less dependence on foreign oil and less environmental degradation in Turkey (Ibid.). For Ozkan et al (2005:65), labor-intensive technologies in countries such as Turkey, where food production is the main source of the income of the poor, can reduce unemployment, poverty, rural-to-urban migration, dependency on foreign energy, and emissions of GHGs from fossil fuel consumption.

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Agricultural activities around the world are responsible for almost 15 percent of annual GHG emissions (Flynn & Smith, 2010). They could be an important sink for emissions from other sectors and are likely to be altered dramatically by climate change (Nelson, 2009). Agriculture also provides a living for more than half of the world’s poorest people. The ongoing negotiations to address climate change should provide an opportunity to combine low-cost mitigation and essential adaptation outcomes with poverty reduction. Interestingly, based on the World Bank’s 2009 report, Turkey’s Mediterranean region in particular, including Antalya province and its coastline, will be one of the regions in the world that will be negatively impacted by global warming in the future. Recently, studies on the economic evaluation of sectoral emission reduction policies for climate change has been conducted in Turkey (see Kaygusuz 2003; Telli et al., 2007). It should be noted that to embrace a transformative environmentalism, which is based on the idea of sustainable development, it is necessary to build upon the inter-connection of environmental and socio-economic justice (See also Chapter Eight).

As exemplified by the Turkish case,

physical indicators show that the economy is certainly not dematerializing in absolute terms. Hence, the raw materials and the fossil fuels are taken from the “commodity frontiers”, while the waste is dumped there or somewhere else. Therefore, an international movement of Environmental Justice or Environmentalism of the Poor is growing. This could become the strongest force for sustainability (Martinez-Alíer, 2008:30).

The International Food Policy Research Institute (FPRI) claims that agriculture and climate change are inextricably linked (Von Braun & Pandya-Lorch, 2009). According to the

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62 See also: Mestre-Sanchís and Feijóo-Bello, Climate change and its marginalizing effect on agriculture, *Ecological Economics*, (pp. 896-904), 2009.
FPRI’s report, agriculture is part of the climate change problem, contributing about 13.5 percent of annual GHG emissions (with forestry contributing an additional 19 percent), compared with 13.1 percent from transportation. Climate change threatens agricultural production through higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme events such as droughts and floods. If agriculture is not included, or not well included, in the international climate change negotiations leading up to the 15th Conference of Parties (COP15) of the UN Framework Convention on Climate Change in Copenhagen in December 2009, resulting climate change policies could threaten poor farming communities and smallholders in many developing countries. The policies could also impede the ability of smallholders to partake in new economic opportunities that might arise from the negotiations.

The findings of this chapter are relevant to the section on *Capital Accumulation and Appropriation of Energy: Trade as Thermodynamic Imperialism* in Chapter Two. World system scholars locate the origin of unequal ecological exchange in the internal dynamics and logic of accumulation between extractive and productive economies (Bunker, 1985; 1998). The extraction and export of natural resources from the global South is composed of two processes: the transfer of value embodied in matter and energy as well as the extractive activities (both at local and global levels) at one point in time (Bunker, 2006). The ecological consequences of unequal exchange are manifest for nations that rely heavily on raw materials exports (Clark and Foster 2009; Roberts and Parks 2007). Extractive economies, discussed earlier, which are the most environmentally destructive, generate enormous amounts of pollution and ecosystem degradation. As observed in the energy embedded in agricultural trade analysis (see regression models), Hornborg (2001) locates the origin of unequal ecological exchange within the
asymmetric transfer of energy and materials. Both Bunker (1998) and Hornborg (2001) agree that productive economic sectors become increasingly adaptable; whereas, extractive economic sector become more and more vulnerable to the shifting demands of global capital accumulation. As discussed in Chapter Two, the convention on climate change reports that core is ‘winning’ the zero-sum energy game (Hornborg, 2001) by receiving a transfer of energy resources from the semi-periphery and periphery, and not having restrictions on emissions (see Roberts and Parks 2007; Lawrence 2009). The results of this chapter also support Lawrence’s (2009) findings which show that increased energy consumption of the semi-periphery does not translate into efficient and profitable economic growth—a reflection of the industrialization of many semiperipheral countries. Again, as this chapter’s findings showed, the semi-periphery had the largest increases in energy use, including Turkey; whereas, the core is able to outsource energy inefficient sources of income to semi-peripheral and peripheral nations, increasing the order of core and the disorder, or entropy, of the semi-periphery and periphery. More importantly, the analysis of global warming showed that the costs of major greenhouse gas emissions are unequally distributed between core and periphery (Roberts and Park, 2007; 2009). Yet, semiperipheral nations, such as Turkey, need ecological space to choose their own ecologically sound development path.
CHAPTER FIVE

POLLUTION HAVENS and UNEQUAL ECOLOGICAL EXCHANGE: TRADE FLOWS OF “ANTI-WEALTH”

Introduction

This chapter empirically examines the trade impacts of pollution havens in the case of Turkey by analyzing physical trade flows and “imbalances” by utilizing regression analysis approaches in long-time series. In this chapter, I will argue that unequal “pollution” exchange is one of the underlying mechanisms enhancing the “transnational” treadmill of production in the age of corporate-led globalization. In the first section, I present a literature overview relevant to the trade effects of pollution havens. The second section places pollution havens within the context of the internationalization of the second contradiction of capital. The third section addresses new research on the flow of pollution through international trade flows to provide support for the pollution haven hypothesis while also analyzing physical trade flows to assess the unequal distribution of environmental burdens.

The second part of this chapter contains sections four and five, and addresses trade liberalization and previous studies on pollution havens in Turkey. In section four, I focus on “dirty” exports, foreign investments, and free trade zones as related to the implementation of trade liberalization. The fifth section provides an overview of previous econometric studies that investigates whether or not Turkey is a pollution haven. The third part of the chapter contains my research hypotheses, description of two different research methods, findings, and further discussion. In the conclusion of this chapter, the appropriation of energy and the role of pollution havens are discussed, from environmental cost-shifting to trade as a form of thermodynamic imperialism.
Transnational Treadmill of Production and Unequal “Pollution” Exchange

The unequal ecological exchange or the “pollution” terms of unequal exchange has become increasingly visible between the global North and the global South. Globalization magnifies both the transnational treadmills of production and consumption. As detailed in Chapter Two, unequal ecological exchange mainly takes the form of environmental cost-shifting, the disproportionate and uncompensated utilization of environmental space, and the undervaluation of natural resource exports. In other words, unequal ecological exchange describes the environmentally damaging withdrawal of energy and other natural resources from the periphery as well as the externalization of environmentally damaging production costs onto them by the core nations in the capitalist world system. As the core countries enlarge their domestic carrying capacity, they capitalize on peripheral and semi-peripheral nations as either “sink” or “waste dumping” grounds, and therefore magnify existing environmental and climate-based injustices. I argue that the unequal ecological (or “pollution”) exchange is one of the underlying mechanisms that enhance the “treadmill” logic of reckless capital accumulation—the transnational treadmill of neoliberal production within the global economy.

A neoliberal regime, which is sustained by the World Trade Organization and “free trade” agreements, typically includes monetarist policies to lower inflation and to maintain fiscal balances, “flexible” labor markets, trade and financial liberalization, and privatization of state resources and institutions (Li, 2010). Under neoliberal capitalism, decades of social progress and developmental efforts have been reversed. However, neoliberalism is able to provide an institutional framework for sustained global capital accumulation since it undermines and dismantles the institutions that are set up to stabilize the capitalist economy and alleviate social
and economic contradictions (Ibid.). The global economy is therefore left exposed to increasingly frequent and violent financial crises and stagnation tendencies. As argued in previous chapters, many nations (like Turkey) in the global South had to shift from import-substitution industrialization (ISI) to export-led industrialization (EOI) as they became a supplier of cheap natural resources for the global market. With the transition to EOI and the adoption of the neoliberal project, economic liberalization processes began in many countries, including Turkey. Since the FDIs of core nations expanded their business in the global South neither producers nor domestic corporations of the peripheral nations have much control over the world pricing mechanisms in the global market. As Faber (2008:206) details further,

Under ecological unequal exchange, the concrete and potential natural wealth found in energy and raw materials flow into the United States in much greater proportion to the monetary (abstract) wealth that is returned (via international trade) to the global South. This occurs because physical wealth imported into the United States is “undervalued” in the world economy. With the dramatic expansion of U.S. FDI in export-oriented industries in the global South, most raw material producers (with the exception of oil-producing nations that are OPEC members) are engaged in fierce price competition with one another in the world market.

The new geography of production is the growing spatial mismatch between the locations of production and the locations of consumption and capital accumulation (Mehretu et al., 2002). The driving force behind the process of internationalization of capital in both productive forms (investment to extend trade and expand production) and unproductive or speculative forms was a policy of liberalization and deregulation that was dominated by transnational capital (Petras & Veltmeyer, 2005:54). The global production and mobility of capital are united in the operations of TNCs, usually taken to be at the vanguard of corporate-led globalization, in which the company’s production is not limited to the country in which it is based, but involves multiple
sites of production in different countries based on FDI by the company itself (Nash, 2000:49). In this era, capital moves very quickly and freely, although the Ricardian “theory of comparative advantage” presumes capital immobility (Held and McGrew, 2007). The commodity markets are not freely competitive because of dominant TNCs (Korten, 2001). In such cases, greater liberalization, including trade liberalization risks, put export-oriented, democratic governments of developing countries in an unfair environment (Bruno & Karliner, 2002).

The creation of a new world order — a new system of global governance — found expression in the IMF, WB, which established an institutional framework for a process of capitalist development and free international trade (Petras & Veltmeyer, 2005). Thus, the new system of global governance’s goal is to enforce structural adjustment while forming a global free trade regime, along with “multilateral agreement on investment” (MAI), to govern the free flow of investment capital (Ibid.; Hoedeman et al., 1998). Under the neoliberal agenda, the class bias of the WTO’s governance promotes the notion of uneven development linked to global production organized by TNCs (Rupert & Solomon, 2005). The WTO not only refuses to link human or labor rights protections to participation in the system of global trade, but the rules of the WTO forbid discrimination against traded goods based on how they were produced as well (Sklair, 2002). Furthermore, the WTO's trade-related investment, which measures performance requirements placed on foreign investment, protects TNCs from a potentially important host government regulation. The WTO's laws restrict the ability of nations and the global community to establish effective environmental policy, and the periphery perceives such laws as unfair trade barriers. Yet, the WTO's rulings indicate that it does not object to environmental policy per se, but rather to environmental policies that are trade restrictive (Charnovitz, 2008).
The treadmill of production, as argued in Chapter Two, is a self-reinforcing process of capital accumulation in which the state often responds to demands for environmental withdrawals (like fossil fuels) or additions (like pollution) by mandating policies that encourage further economic expansion as a national and transnational goal (Schnaiberg, 1980; Schnaiberg & Gould, 1995; Schnaiberg, 1997). The state, which operates without regard to the ecological consequences of its actions, is the only social institution capable of redirecting the course of economic growth. However, the dynamics of two institutions — the state and the market — are systematically unable to take into account the effect of reckless capital accumulation on the environment while maximizing profit. The tendency towards economic expansion is due to the competitive character of capitalism, and through the continual expansion of production, the treadmill increases environmental impacts by placing greater demands on natural resources and by producing greater volumes of waste (Schnaiberg & Gould, 1994). Treadmill production uses fiscal capital to substitute more controllable physical technologies which have required the increased use of ecosystems as reliable “feedstocks for production” and as available “sinks for industrial wastes” (Schnaiberg, 1997:72). On the other hand, the producers will not willingly internalize the environmental costs of production because doing so would reduce profits (Schnaiberg, 1980). Because of the political power of the economic elite, reform-oriented social and political action is unlikely to substantially alter the power of producers or to reduce environmental externalities. Thus, the ecological result is that the use of natural resources continues to increase in spite of the cost to ecosystem sustainability (Schnaiberg, 2008).

Today, the expansion of profit has led to an enormous expansion of production resulting in more withdrawals and more additions (Schnaiberg & Gould, 1995). For instance, the Material
Flow Analysis (MFA) documents the overall peripheral regions' withdrawal of natural resources (see Chapter Four) while providing evidence of limited *dematerialization* of the core nations in absolute terms. This chapter illustrates the “additions” to the environment — that is, “pollution” — terms of unequal exchange. Scholars using the treadmill of production theory emphasize that economic production has become transnational in many aspects (Gould et al., 1995; 2008; Bunker, 2005). For Bunker (2005), the treadmill of production has become increasingly transnational, which magnifies the demand on the environment in terms of *new* additions and *new* withdrawals. In other words, the transnational organization of production is driven by the treadmill logic, but predicated upon the unequal process of using the natural resources and the waste-assimilation properties of ecosystems (Rice, 2009). For instance, energy is the largest category of trade in natural resources and a central dynamic of peripheral nations' withdrawals to the core nations (Goldstein et al., 1997; see regression model below). More importantly, the structure of the transnational treadmill integrates global trade institutions and accelerates the speed of production, consumption, and capital accumulation while degrading more ecosystems (Gould et al., 1995).

The transnational movement of hazardous products, waste, and manufacturing production processes from the core nations to periphery is often cited in the literature (Faber, 1993; 1998; 2002; 2008; Frey, 2003; Grime & Kentor, 2003; Clapp, 2001; 1998).

The commodities and surplus profits produced by the factories are then exported back into the United States and other advanced capitalist countries. The pollution, however, remains behind. Even worse, the toxic waste, industrial pollution, discarded consumer goods, and other forms of “antiwealth” produced in the United States are becoming increasingly mobile and end up in the “pollution havens” of the Third World… it is the *internationalization of the productive and waste circuits of capital* that distinguishes the current period of
corporate-led globalization from previous historical epochs. (Faber, 2008:172; emphasis added)

The export of ecological hazards from the global North to the global South takes place in various forms and systemic logic. First, as Faber (2002; 2008:179-180) details, it takes place in the *money circuit of global capital*, in the form of FDI in domestically owned hazardous industries as well as destructive investment schemes to gain access to new oil fields, forests, agricultural lands, mining deposits, and other natural resources. Second, hazardous industries are exported in the form of *productive circuit of global capital* or the relocation to the South of polluting and environmentally hazardous production processes and polluting facilities owned by transnational capital (Ibid. 179, 246). Third, it occurs in the *commodity circuit of global capital*, as witnessed in the marketing of more profitable, but also more dangerous, foods, drugs, pesticides (see also Pellow, 2007 for pesticide poison), technologies, and other goods (consumer/capital) (Faber, 2008:180). Fourth, it takes place in the *waste circuit of global capital* or the dumping of toxic wastes and other pollutants produced by the global Northern industry in the global South (Ibid. 180, 246).

The central argument is that TNCs appropriate “carrying capacity” for the core nations by transferring hazardous products, production processes, and wastes to the peripheral nations (Frey, 2003). For instance, the “export processing zones” within the periphery are specially designated areas to promote export-oriented growth through less stringent import-export restrictions, taxes, and environmental regulations (Frey, 2003). In these zones (or *free trade zones*) that are established in periphery (like in Turkey), the WTO rules by enforcing trade liberalization through free trade agreements. These zones, in many cases (see Turkish case), function as various *circuits of capital accumulation* centers, which accelerates the transnational
treadmill of production. These circuits of capital accumulation centers serve to “distance” the environmental externalities of industrial production while taking full advantage of capital accumulation in the world economy (see Princen et al., 2002).

As ecological economists (such as Giljum & Eisenmenger, 2004; Muradian et al., 2002) argue, the measuring the environmental-terms-of-trade, which is the environmental pressures of a country’s exports relative to its imports, can make the externalization of environmental additions created by the production, consumption, and accumulation activities more visible. Roberts and Parks (2007) confirm the most problematic dimension of the transnational organization of production on global climate change by referring to the historical emissions of greenhouse gases and the impacts of deforestation in the periphery. On the other hand, Grime and Kentor (2003) found higher levels of overall FDI within periphery produce greater levels of total CO₂ emissions due to the expansion of export-oriented manufacturing. Moreover, the CO₂, both total and per unit of GDP, and other greenhouse gas emissions within periphery, are intensified by FDI investment in the manufacturing sector (Jorgenson, 2006; 2009; Jorgenson et al., 2007). Specialization of trade concentrates pollution in “production zones” (or productive and waste circuits of capital accumulation centers) and usually it is the South that absorbs most of the environmental costs of free trade (Clapp & Dauvergne, 2005; Clapp, 2001).

Herman Daly argued that free trade would provide an incentive for heavily polluting industries in developed countries, such as U.S., to move their operations to regions where pollution control is more inexpensive and lax (cited in Clapp, 2001). Thus, neoliberal globalization has created a condition in which hazardous industries escape regulation on a global scale by taking advantage of economic inequalities between countries (Clapp, 2001:10). In
The literature on the pollution haven hypothesis (PHH) is extensive and contradictory (Neumayer, 2001; Kukla-Gryz, 2009; Kearsly & Riddle, 2010), and is dominated by economic analyses which use narrow definitions of “dirty industry” and “environmental costs” (Strohm, 2002). The PHH explains that polluting industries tend to migrate toward poorer countries, looking for weaker (or not well enforced) environmental standards (Muradian, 2004; Copeland & Taylor, 2004; Neumayer, 2001). Thus, according to the PHH, disparities in national environmental standards should lead to an unequal distribution of environmental burdens among different world regions, concentrating the most resource- or environment-intensive activities in developing nations (Muradian, 2004). By using the standard definition of PHH as the starting point, the majority of these studies have concluded that pollution havens are “elusive” or “transitory” (Clapp, 2002; 2005). Therefore, it is challenging to prove that peripheral nations have a disproportionate share of dirty industries due to weak or weakly enforced environmental regulations. Even though some studies argue against or do not support the definition of PHH cited above (Mani & Wheeler, 1998; Wheeler, 2001; 2002), others support and/or document
mixed results (Cole, 2004; Xing & Kolstad, 2002; Low & Yeats, 1992), while some empirical works disagree with the statement that environmental standards are a variable conditioning the international location of polluting industries (Mani & Wheeler, 1998; Neumayer, 2001; Wheeler, 2001; 2002; and see Muradian, 2004).

There are various studies on the role of pollution-intensive industries in trade patterns of different nations. In general, the trade effects of pollution havens are examined within the framework of the Heckscher-Ohlin (H-O) model, where the environment is treated as a factor or input of production (Gallagher, 2008). This H-O model, if extended in this context, suggests that countries that have lax environmental standards will, under a free trade regime of the WTO, specialize in pollution-intensive goods (Akbostanci et al., 2007). In following the H-O model, some scholars, argue that a country’s relative factor intensity is revealed through various services embedded in that country’s trade flows (see also Appleyard & Field, 2001). This means the countries which have comparative advantage in dirty industries are also expected to be major pollution-intensive exporters (Akbostanci et al., 2007).

Economists contend that international trade effects on the quality of the environment which may arise from trade liberalization can be separated into three main categories (Copeland & Taylor, 2004). As Kukla-Gryz (2009) details, *scale effect* describes changes in the overall scale of the economic activity (that is, if trade causes an increase of real incomes and growth in overall economic activity). *Structural effects* (composition) reflect the increase of production in sectors in which the country enjoys a competitive advantage. This reflects both the changes in the structure of economic activity and the changes within each sector (industry, agriculture, and services) of the economy. If a competitive advantage derives largely from the differences in
environmental regulation, then reduction in trade barriers may lead to shifting pollution-intensive activities from countries with stringent regulations to countries with weaker regulations. They call this effect a PH hypothesis. Finally, the *technique effect* reflects the effects of the relaxed restrictions on foreign investment, which may follow trade liberalization, and assumes that Northern producers will transfer modern cleaner technology to the global South. Kukla-Gryz (2009), who analyzes the impact of economic growth and international trade on the level of air pollution, concludes that the composition effect of trade liberalization leads to emissions growth in the developing countries. Thus, the scale effect of income growth on air pollution increases with high income levels (Ibid. 338).

The literature that focuses on empirical results related to the trade effects of pollution havens is also diverse and inconsistent. Some scholars (such as Van Beers & van den Bergh, 1997), investigated if countries that have strict environmental regulations experience relatively low levels of exports and relatively high levels of imports. These researchers could not locate a significant effect of environmental policy stringency on dirty export flows. A study done by Xu (2000), who investigates whether or not more stringent domestic environmental policies reduce the international competitiveness of environmentally sensitive goods by including some OECD countries (except Turkey), confirmed that countries with more stringent environmental regulations do not reduce their exports of environmentally sensitive goods. Contrastingly, other scholars (such as Grether & de Melo, 2004) provided evidence on the production and international trade flows and found that dirty industries have higher barriers to trade (except for non-ferrous metals), thus providing only moderate support for the PHH.
Within this line of arguments, there is a group of scholars whose research shows similarities. For instance, Low and Yeats (1992) find that pollution-intensive sectors are concentrated in less-developed countries, and that the developed-countries' share of "dirty" exports (as part of overall world exports) has remained higher than the developing-countries' share. Leonard and Tobey (1988; 1990) examine the relationship between countries' policies toward pollution and international trade and investment patterns. The authors found little systematic relationship between countries' policies toward pollution and international trade and investment patterns. However, since they restricted their analysis to the most polluting industries, they conclude that regulation may have resulted in some affected investment overseas. Similarly, Tobey’s (1990) research confirmed that hazardous industrial waste concentration rate is directly related to trade. In a related study, Hettige et al. (1992) also find supporting evidence that toxic pollution intensity is higher in low-income countries as opposed to high-income nations.

Interestingly, Cole and Elliott (2003) report that net exports from iron, steel, and chemical industries are highest in capital-abundant countries, whereas net exports from non-ferrous metals, paper, and pulp industries are highest in mineral- and forest-abundant nations. These scholars also found statistically significant relations between trade flows (both intra- and inter-country) and environmental regulations.

Grossman and Krueger’s (1991) infamous research on whether industry-level variation in strict environmental policy affected US-based net trade of manufacturing industries showed that abatement costs in three-digit SIC manufacturing are not statistically significant. Also, Grossman and Krueger (1993) found that lower-income nations had higher rates of pollution per capita.
whereas the reverse occurred for higher-income nations. However, Wilson et al. (2002), who address the issue of linking trade agreements to the environment from a developing country perspective, find a negative relationship between the stringency of environmental standards and exports, which may imply a possible trade-off between trade expansion and improvements in environmental standards. On the other hand, the research done by Ederington et al. (2005) found no evidence for the hypothesis that trade flows are more sensitive to changing environmental regulations in the polluting industries. Hence, the econometric studies cited above show no conclusive empirical finding about the trade effects of the pollution haven hypothesis.

The empirical studies that do not support the PHH, such as Wheeler (2001; 2002), argue that poor nations have weaker regulations and higher pollution intensity for a host of reasons that have nothing to do with the deliberate creation of “pollution havens.” The authors emphasize that the poor nations fail to deliver on promises of OECD level regulation (Wheeler, 2002). Mani and Wheeler (1998) view the “pollution concentration” in peripheral nations as only temporary while rejecting the PHH. For Wheeler (2001:241), the race-to-the-bottom model is flawed because its basic assumptions misrepresent the political economy of pollution control in developing countries. Thus, the advice of some scholars is: grow now through trade liberalization and worry about the environment later (Bhagwhati & Daly, 1993).

However, the opponents of free trade claim that trade liberalization will result in a mass migration of pollution-intensive industry from developed countries with stringent environmental regulations to developing countries with lax environmental standards (Gallagher, 2008). They

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63 The EKC’s school of thought also found a similar relationship between income inequality and GDP per capita in a cross-section of countries in the 1950s (see also van Alstine & Neumayer, 2008). Although the overall levels of growth (scale effect) have vastly increased, they have been offset by composition and technique effect (Gallagher, 2008).
further argue that such pressure will then be exerted on developed countries' standards in the name of competition and less-developed nations will fail to emphasize environmental quality, which will effectively create a race-to-the-bottom standard (see also Chapter Two). The reason why so many studies fail to find evidence for pollution havens (or find small effects) in developing nations is that the economic costs of environmental degradation are relatively smaller than those of many other factors of production—especially those that determine comparative advantage (Gallagher, 2008). Copeland (2008), who examines consumption- and production-generated pollution and cross-sectoral pollution, predicted that capital accumulation in the global South will stimulate the growth of capital-intensive polluting industries. The global South, with less stringent regulation, becomes a “pollution haven” for pollution-intensive economic activity (Gallagher, 2008:4).

Recent studies have found pollution havens in the world economy. For instance, Cole (2004), who examines North-South trade flows for ten air and water pollutants, finds evidence for the PHH with small effects (see Gallagher, 2008). Following the Cole (2004) study, a study investigated by Kearsley and Riddel (2010) uncovered little evidence that pollution havens play a significant role in shaping the EKC.64 The authors examined the effect of trade on EKC, including carbon dioxide and greenhouse gases in aggregate by using a data set of emissions from the 27 OECD countries, including Turkey, and bilateral trade data for 100 developing countries. The researchers estimated EKCs for seven oft-studied pollutants, but found wide...

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64 According to the EKC scholars, economic growth is positively correlated with degradation until some peak level of emissions is reached. Subsequent growth is then correlated with reduced emissions and steadily improving environmental quality (Kearsley & Riddel, 2010).
confidence intervals around EKC turning points. Accordingly, the scholars are in doubt about the optimistic view that economic growth eventually leads to environmental quality improvements.

**Internationalization of Second Contradiction of Capital and Pollution Havens**

Today, “external conditions” lead to discussions about the viability of ecosystems, the stability of various natural resources, and capacity of atmospheric ozone levels (O’Connor, 1998:160). For O’Connor (1998:128), “ecological destruction theorizes the ways that capitalist production and circulation, and capitalist accumulation and economic crisis, articulate with the ‘conditions of production’ and state policy,” that is, the ways that a “second contradiction of capitalism” can be created. As capital undermines or destroys its own production conditions and accumulation, it also undermines its own profits, and it creates social and political opposition. Thus, the rise of new social movements, especially global environmental movements that struggle over restructuring the conditions of production, can raise the costs of capital while making capital not only less flexible. The pollution haven hypothesis serves as an example of the second contradiction of capital, which essentially shows how capital externalizes costs to maximize profits while simultaneously destroying its future conditions of production.

Frey (2003) systematically describes how core-based TNCs externalize environmental and ecological degradation resulting from production processes to peripheral regions, a process which has continually increased through the broadening and deepening of material production in the global economy. Furthermore, political and economic forces operating at the international level promote transfer of core nation-based hazardous industries to the periphery (Frey, 2003). For instance, Shandra et al. (2003), who examined the flow of FDI to peripheral nations during 1980-1996, showed how international financial institutions played a pivotal role in directing and
attracting FDIs. As the authors claimed, IMF conditionality is both a signal of approval and a
generator of policies that create access to foreign investors. Many marginalized peripheral
nations — both economically and politically — have pursued export-oriented industrialization
and they are all willing to accept almost any industry offers them, including hazardous materials
(Dicken, 2003). For instance, Xing and Kolstad’s (2001) findings related to the PHH illustrated
that the laxity of environmental regulations in a host country is a significant determinant of FDI
from the U.S. for heavily polluting industries and is insignificant for less polluting industries. In
contrast, some scholars have argued that the rising intensity of pollution in developing countries
may just be part of the normal product cycle of industrial development and is not necessarily the
result of foreign investment (Low & Yeats, 1993; Mani & Wheeler, 1998).

In a recent study, Cole and Fredriksson (2009) note that the PH hypothesis is often tested
by examining the impact of environmental regulations on patterns of FDI and argue that such an
assessment misses a crucial inverse relationship – the impact of FDI on environmental
regulations. The research found that the lobbying power of TNCs can be quite strong, especially
in countries heavily dependent on FDI, so the scholars investigated the influence of TNC
lobbying on host countries' governments. Their results demonstrate that FDI affects the
stringency of host countries' environmental regulations, and the effect is “institution-specific” —
that is, conditional upon the host country’s domestic political institutions. In particular, the
number of legislative units and government parties (veto players) within a host country play an
important role in determining how TNC industry lobbying can influence environmental policy.
The level of “aggregate honesty” (which they measure by taking into account the number of
legislative units and their corruptibility) within a government is also shown to be important (Cole
& Fredriksson, 2009) Their results indicate that FDI affects environmental policy more strongly in countries with fewer veto players in its political institutions and lower levels of aggregate honesty. More importantly, they reach a conclusion that this type of environment is where pollution havens are most likely to develop.

Scholars also investigate to what extent TNCs dedicated to practicing corporate social responsibility (CSR) tend to avoid locating their operations in countries where environmental regulations are weak. Dam and Scholtens (2008) examine the influence of CSR initiatives on the relationship between the location of TNC subsidiaries and host countries' environmental regulations. Their study was designed to look at the subsidiary locations of 540 large European TNCs, and they find that CSR policies do matter in terms of TNCs' location-based behavior. Furthermore, the researchers argue that these firms do not perceive low environmental regulation as being a comparative advantage helpful to their business. Thus, there is less incentive for them to locate “dirty” production in countries with weak environmental regulation. However, firms with poor CSR appear to move their operations to these countries. Also, their research finds that larger firms are more socially responsible since they are more dispersed globally and need to consider a wider array of stakeholder demands (Dam & Scholtens, 2008).

For proponents of neoliberalism and their ecological modernization counterparts, the economic benefits of hazardous industry trade will outweigh the environmental and social costs in the future. According to Dietz et al. (2001), it is difficult to identify, estimate, and value the costs and benefits associated with hazardous industries in monetary terms. The usual strategy is to look to the marketplace for such valuation, but adverse health, safety, environmental, and social consequences are not traded in the marketplace (Martinez-Alier, 2002; 2007). For
instance, Frey (2003:334), based on his work in Mexico, argues that most costs are borne by the peripheral nations and most benefits are captured by the core nation-based TNCs and by elites (both urban and rural) located in the periphery. Sklair (2001) also assessed the situation regarding Mexico and claims that even if the economic costs and benefits associated with the transfer of hazardous industries could be estimated and valued in a meaningful fashion, it is doubtful that the benefits accrued by Mexico would cover the cost. Gallagher (2002:119) confirms that industrial air pollution is outstripping trade-led economic growth in Mexico. By the same token, Frey (2003) finds Grossman and Kruger’s (1991) argument problematic since they assume the cross-national relationship between aggregate economic output and environmental degradation is a result of intra-country changes in consumption, values, regulation, and technology resulting from affluence. However, Rosa and Dietz (1998: 436) report that the new international division of labor has shifted the most environmentally disruptive activities to the least affluent and powerful nations, leaving relatively clean service industries in the most affluent nations. More importantly, York et al. (2003) presented cross-national evidence that the “affluence” variable has a positive effect on eco-footprints that take into account a country’s domestic and international impact. In other words, the costs of the transfer of hazardous production processes to the peripheral nations outweigh the benefits for the core nations (Frey, 2003:338).

**Physical Trade Flows and Flow of Pollution**

Ecological economists bring a new perspective on trade effects and the pollution haven hypothesis (such as Giljum & Eisenmenger, 2004; Muradian & Giljum, 2007; Weisz, 2007). Muradian and Giljum’s (2007) study considers the “proxy propositions” of Neumayer (2001),
such as: (1) production in and exports from developing countries become increasingly pollution-intensive and (2) pollution-intensive industries tend to flee industrialized nations. Focusing on these propositions, the authors utilize trade data in units of weight, which provides new awareness for investigating the PHH for the following reasons.

First of all, it is less challenging to predict the relationship between physical flows (in comparison to monetary flows) and environmental burdens. There is a need to utilize thermodynamic principles (e.g. mass and energy account in all production activities) in order to assess the burdens and risks (Muradian & Giljum, 2007). Second, physical flows provide a better picture of the overall scale of economic activity. Whereas environmental standards normally refer to environmental performance at the micro-level of the production plant, the actual environmental implications of an economic activity in a certain location also depend on the overall scale of economic activities at the macro-level. As Weisz (2007) and Muradian and Giljum (2007) confirm, physical inputs (resources) must correspond to physical outputs (products and wastes). Therefore, physical flows are a better alternative than monetary flows for estimating the environmental transformation associated with the scale of the economic activity. More importantly, this type of “scale effects” has been neglected in the PHH arguments. Third, real prices for most primary commodities have been steadily declining during the last three decades of the past century (Muradian & Giljum, 2007; see World Bank, 2003). Especially in the case of extractive economies, research focusing on monetary trade flows might yield misleading results, as declining prices may lessen export flows in monetary terms, while physical exports actually increase (Muradian & Giljum, 2007). This is salient to detailing findings about the environmental implications of trade patterns. Fourth, environmental burdens are greater in the
early stages of the commodity chain, but towards the end the material intensity of produced goods tends to decrease as the economic added value tends to increase (see Fisher-Kowalski & Amann, 2001). Thus, it is crucial to focus on physical flows instead of pure monetary flows, which would fail to illustrate distribution of environmental burdens.

Muradian and Giljum (2007) stress that polluting industries tend to migrate toward nations in the global South with weakly enforced environmental standards and mainly focus on the most resource- or environment-intensive activities during the process of economic globalization. Thus, environmental flows move both from and to the periphery as globalization enhances ecological unequal exchange. Following thermodynamic considerations and ecological economists’ research, integration into the world economy through material-intensive and low value added products might entail significant environmental burdens linked to a rising scale of the physical outflows of the economy (Giljum, 2004). One of the contributions of ecological economics has been the analysis of the physical dimension of the economic system (Giljum & Eisenmenger, 2004; Muradian & Martinez-Alier, 2002; Schuetz et al., 2004). Nevertheless, investigations related to the PHH based on physical trade flows (or PTB) are very few.

Trade Liberalization and Previous Studies on Pollution Havens in Turkey

“The economic integration is contributing to worldwide environmental degradation, but not so much because the developing world is serving as a “pollution haven” for developed-world pollution.”

Gallagher (2008:5)

The first part of this section focuses on regional and national level free trade zones as well as foreign direct investment and categories of pollution-intensive manufacturing in Turkey. The second part presents an overview of previous studies related to the pollution haven hypothesis mainly done by economists.
Liberation of Trade: Export of “Dirty” Industries, FDIs, and Free Trade Zones

Due to unstable political conditions and domestic debt, the Turkish economy experienced difficult years; especially after oil crises in the early 1970s (see Chapter Three). In order to eliminate government debt, major structural changes were made in the early 1980s. Some of the changes to solve long term problems included strengthening of financial institutions, adopting new exchange rate policies, creating new monetary and fiscal policies, and more importantly, adopting export-based open economic policies. This liberalization process was stimulated by the Customs Union with the EU in 1996. During these globalization and regional integration processes, the environmental concerns, such as water and air pollution, created a new burden for Turkey (see Adaman & Arsel, 2007). For instance, an exporting country needs to determine environmental and social aspects of its goods, in addition to lower prices (Bekmez & Gokalp, 2005). The WTO and IMF put mandatory regulations on countries that are not sensitive to specific environmental concerns (see also Chapter Three). Turkey also signed treaties promoting economic liberalization processes that put additional environmental burdens on the country. Through the implementation of economic and trade liberalization policies between 1980 and 1990, Turkey has become more fully integrated with the world. The average growth rate of the industrial sector between 1990 and 2000 reached 4.8 percent and this high industrial growth rate resulted in environmental pollution (Ibid. 30).

As international trade becomes an increasingly critical driver of economic development, a growing a number of developing countries, including Turkey, consider trade and investment as a central part of their development strategies. Turkey’s trade in manufacturing industries has shown tremendous improvement after 1980 due to the trade liberalization policies that were
adopted. Total volume of trade has grown from $780 million in 1980 to $17 billion in 2001; however, the growth rate is not stable since there are large swings in the growth rate of the volume of trade (Akbostanci et al., 2006). Turkey’s trade balance in the manufacturing industry during the period of 1980-2001 has always been in deficit, and this deficit has grown since 1988, and the crisis years of 1994 and 2001 appear to be breaks in this trend (Ibid.).

The early 1980s marked an unprecedented rise in the exports of goods from the three “dirty” industries in Turkey. Accordingly, from 1980 to 1987, 27 percent of manufacturing exports originated from the iron and steel, nonferrous metals, and metal products industries (Odekon, 2005:119). The average growth rate of exports from these industries reached a record of 70 percent (Ibid. 120). This strong export performance attracted the core OECD nations’ attention, and the OECD admitted to the migration of “dirty” European industries to Turkey (Odekon, 2005:120; see also OECD, 1994, 2002). About 50 percent of manufacturing industry exports are destined for the EU and 10 percent are destined for the U.S. (Akbostanci et al., 2007). Economists Bekmez and Gokalp (2005) detailed the most pollution creating manufacturing sectors in Turkey as: iron and steel, petroleum refineries, non-metallic mineral production, industrial chemicals, non-ferrous metals, pulp and paper, and the textile industry (see Table 5.1).

For instance, textile exports grew rapidly after 1980, but protectionism in core nations, including the EU and the U.S., threatened the sector's growth (Metz, 1995). Recent investigations show that some “dirty” industry exports have increased immensely. For instance, there has been a trend toward exports in the paper products industry in the last decade (Sonmez, 2001).

For instance, the textile sector contributed 20 percent of the total manufacturing output and employed 33 percent of all workers in the mid-1990s (Metz, 1995). Installed capacity is equivalent to around 33 percent of that of the EU in terms of cotton spinning and around 11 percent of EU woolen yarn and textiles (Metz, 1995).
2008). The disposable paper product exports totaled $153 million in 2003 and increased to $400 million in 2007 (Ibid.). In addition, the chemical industry, the dirtiest sector, has developed significantly in recent years (Bektasoglu, 2007). Turkey is now exporting various chemicals to 180 countries throughout the world. Major markets for these chemicals are the EU, Eastern

<table>
<thead>
<tr>
<th>Largest Industrial Polluters</th>
<th>% Share</th>
<th>Cumulative Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>353 Petroleum Refineries</td>
<td>60,44</td>
<td>60,44</td>
</tr>
<tr>
<td>371 Iron and Steel</td>
<td>10,48</td>
<td>70,92</td>
</tr>
<tr>
<td>369 Non Metallic Min. Product</td>
<td>7,33</td>
<td>78,25</td>
</tr>
<tr>
<td>351 Industrial Chemicals</td>
<td>3,73</td>
<td>81,98</td>
</tr>
<tr>
<td>372 Non-Ferrous Metals</td>
<td>3,65</td>
<td>85,35</td>
</tr>
</tbody>
</table>

**Water Pollution**

<table>
<thead>
<tr>
<th>Largest Industrial Polluters</th>
<th>% Share</th>
<th>Cumulative Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>371 Iron and Steel</td>
<td>78,42</td>
<td>78,42</td>
</tr>
<tr>
<td>372 Non-Ferrous Metals</td>
<td>6,63</td>
<td>85,05</td>
</tr>
<tr>
<td>353 Petroleum Refineries</td>
<td>4,17</td>
<td>89,22</td>
</tr>
<tr>
<td>341 Pulp and Paper</td>
<td>3,50</td>
<td>92,72</td>
</tr>
<tr>
<td>351 Industrial Chemicals</td>
<td>1,99</td>
<td>94,71</td>
</tr>
</tbody>
</table>

**Toxic Pollution**

<table>
<thead>
<tr>
<th>Largest Industrial Polluters</th>
<th>% Share</th>
<th>Cumulative Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>353 Petroleum Refineries</td>
<td>42,64</td>
<td>42,64</td>
</tr>
<tr>
<td>351 Industrial Chemicals</td>
<td>19,19</td>
<td>61,83</td>
</tr>
<tr>
<td>371 Iron and Steel</td>
<td>13,06</td>
<td>74,89</td>
</tr>
<tr>
<td>372 Non-Ferrous Metals</td>
<td>7,78</td>
<td>82,67</td>
</tr>
<tr>
<td>321 Textiles</td>
<td>2,80</td>
<td>85,42</td>
</tr>
</tbody>
</table>

**Total Pollution**

<table>
<thead>
<tr>
<th>Largest Industrial Polluters</th>
<th>% Share</th>
<th>Cumulative Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>353 Petroleum Refineries</td>
<td>44,19</td>
<td>44,19</td>
</tr>
<tr>
<td>371 Iron and Steel</td>
<td>28,45</td>
<td>72,64</td>
</tr>
<tr>
<td>369 Non Metallic Min. Product</td>
<td>4,89</td>
<td>77,53</td>
</tr>
<tr>
<td>372 Non-Ferrous Metals</td>
<td>4,79</td>
<td>82,32</td>
</tr>
<tr>
<td>351 Industrial Chemicals</td>
<td>4,63</td>
<td>86,95</td>
</tr>
</tbody>
</table>

**Data source:** Bekmez and Gokalp (2005: Table 4)

Europe, the Middle-East and Gulf countries, North Africa, and the Far East and Asian countries (Ibid. 6). The value of chemical exports reached about $3.6 billion in 2006, or about 4 percent of the total exports in Turkey (Ibid. 4,6). In terms of the steel and iron industry, raw steel production rose to 25.7 billion tons and Turkey became the 11 th largest steel producing country
in the world by the end of 2007 (Sezgin, 2008:2) It is reported that iron and steel articles exports reached about $12.4 billion in 2007, with a significant increase of 30 percent (Sezgin, 2008:4). On the other hand, mining exports reached $2.6 billion in 2007, and the main markets are the EU and Asian countries (Uyanik, 2008:8). Similarly, the Turkish machinery industry has recorded a substantial increase in exports compared to Turkey’s overall exports (Kose, 2008). In 2006, the export value of the machinery industry was $6.51 billion, in 2007 the exports’ value increased to $8.77 billion (Ibid. 5).

There are a number of examples of how core nations have contributed to the worsening environmental quality in Turkey and in the “waste-circuit of capital” in particular. For instance, in 1994, Eurogold, a multinational mining company, was taken to the Turkish courts by the inhabitants of the villages near Bergama on charges that the company used cyanide leaching in its mining process that polluted underground water resources and affected human health (see Konak, 2004). Another example involves barrels of Italian toxic waste that were being shipped from Italy to Bulgaria in 1998, but were dumped into the sea and washed up on the Turkish Black Sea coast (Odekon, 2005). The old ship breaking industry represents another source of pollution. About one hundred old ships per year are broken and scrapped in Turkey’s shipyards (see Bailey, 2000). Shipping companies export their old vessels for breaking and Turkish authorities, for economic reasons, have systematically failed to invoke either a 1995 ban regarding the imports of hazardous waste to Turkey or the Basel Convention on Transboundary Movements of Hazardous Waste (1989), which prohibits the export of such hazardous material (Odekon, 2005).
Free Trade Zones in Turkey: Capital Accumulation Centers

The “old” Mediterranean region, where Turkey is located, has a major free trade zone project. Besides Turkey, twelve nations are included in the Mediterranean Free Zone (MFTZ) project. Katz (1999:48) calls this project a “Duty-Free Environmental Degradation,” and stresses that

Incorporating environmental concerns into trade zones seems to have been forgotten in constructing the MFTZ, however. Despite sharing a common ecosystem — the Mediterranean Sea — and despite member nations’ commitments to incorporating environmental concerns into other policy spheres, including trade policy, no corresponding recognition of environmental concerns is included in the MFTZ. Environment is not mentioned at all in most of the bilateral association agreements (i.e., trade agreements) being drafted between the EU and the Mediterranean partner countries as the basis for eventual MFTZ.

Following Katz (1999), Neumayer (2001b) argues that if not accompanied by strong environmental provisions, the prospective MFTZ is bound to increase existing pressures on scarce natural resources in the region. The existing bilateral association agreements between the EU and Southern Mediterranean countries, including Turkey, are clearly insufficient from an environmental perspective. The pollution haven problem is not only originating from manufacturing industries, but also from resource-extracting industries (Neumayer, 2001b). Transnational Corporations (TNCs) take advantage of low environmental standards in developing member nations of the FTAs (Free Trade Agreements) to re-locate their business in these so-called pollution havens (Katz, 1999). There is sometimes a fear that those potential hosts of foreign investment will even lower their environmental standards in order to attract more investment. However, the strategies of TNCs have changed. Instead of re-locating businesses from developed nations, their main goal is to establish businesses from scratch in developing nations if there are natural resources to be exploited (Katz, 1999). Inevitably, this would be
regarded by host nations as “ecological imperialism” (Neumayer, 2001b). The composition of Turkey’s FTAs is quite extensive. For instance, the Customs Union between Turkey and the EU constitutes the legal basis of Turkey’s FTAs, in addition to the Mediterranean, OECD, and other nations (WTO, 2007).

Twenty free trade zones (or free zones), which are all supported through the Turkish Government Foreign Affairs and Trade Division, have been established since the passage of the law on free zones in 1985. These zones are operating close to the EU and Middle Eastern markets, which are special sites that provide easy access to global markets, designed to increase the number of export-focused investments (Togan, 2010). These zones have the following attributes. First, valid regulations relating to foreign trade and other financial and economic areas are not applicable or only partly applicable. Second, special measures are taken in order to increase trade volume and exports for some industrial and commercial activities as compared to other parts of the country. Third, the Free Zones Law's rules promote export-oriented investments and production; attract FDI and the latest technologies; and direct enterprises towards exports and developing international trade. In other words, these zones are open to a wide range of activities, including industrial and commercial service operations. There is no limitation on foreign capital participation in investment within the free zones and 100 percent repatriation of capital is allowed without prior permission, taxes, duties, or fees. Financial incentives are available to free zone companies and these include exemption from payment of customs duties and fees as well as value added taxes, and no restrictions on profit transfer or foreign exchange transactions. Under Law No. 5084 of 2004 on the “Encouragement of

Investments and Employment,” only free zone users who operate under a production license are exempted from income or corporate taxes until the end of the taxation period of the year in which Turkey becomes a full member of the European Community (Ibid. 43).

Table 5.2: Trade in Free Zones, 2002-2006 (US$ million)

<table>
<thead>
<tr>
<th></th>
<th>2002 (%</th>
<th>2003 (%)</th>
<th>2004 (%)</th>
<th>2005 (%)</th>
<th>2006 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free zones to domestic market</td>
<td>3,729</td>
<td>5,406</td>
<td>7,465</td>
<td>7,888</td>
<td>7,939</td>
</tr>
<tr>
<td>Domestic market to free zones</td>
<td>1,528</td>
<td>2,119</td>
<td>2,882</td>
<td>3,160</td>
<td>3,071</td>
</tr>
<tr>
<td>Other countries to free zones</td>
<td>3,589</td>
<td>5,638</td>
<td>7,520</td>
<td>7,704</td>
<td>7,951</td>
</tr>
<tr>
<td>Free zones to other countries</td>
<td>2,257</td>
<td>3,445</td>
<td>4,243</td>
<td>4,610</td>
<td>4,863</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,103</td>
<td>16,608</td>
<td>22,110</td>
<td>23,363</td>
<td>23,824</td>
</tr>
</tbody>
</table>

Data source: WTO 2007: Table III.17 (Information provided by the Turkish authorities)

Table 5.2 shows various incoming and outgoing activities of trade in “free zones” between 2002 - 2006. Total free zones trade increased from $11.1 billion in 2002 to $23.8 billion in 2006, and almost 40 percent of this free trade is with OECD and EU countries (WTO, 2007:40).

The lands of the organized industrial zones (OIZs) and free zones are owned by the state, private individuals, or the “capitalist class.” The OIZs are designed to allow companies to operate within an investor-friendly environment with ready-to-use infrastructure and social facilities. There are 262 OIZs in 80 provinces, 148 of which are currently operational, while the remaining 114 OIZs are being constructed throughout Turkey. There are also “industrial zones” which are designed to provide sites suitable for large-scale and technology-intensive
investments. These trade zones or capital accumulation centers are the specific sites for foreign direct investments (FDI) and TNCs’ operations. As Figure 1 attests, there has been a sharp increase in FDI inflows to Turkey after the mid-1980s. In 1980, $35 million inflows were reported and this number increased to $1.2 billion by the early 1990s. During the 2000s, FDI inflows reached $1.7 billion. In parallel to FDI inflows, the number of foreign capital firms in Turkey has increased over the years. In 1980, there were only 78 firms. The 1990s witnessed a steady increase in the number of foreign capital firms from 2,123 in 1991 to 5,328 in 2000 (Foreign Investors Association of Turkey (YASED); see Deichmann et al., 2003). During two decades of steady growth in multinational/TNCs' activity, the sub-national distribution of FDI in Turkey has been characterized by an uneven pattern that mirrors social, economic and political disparities (Ibid.). According to the authors, the location determinants vary dramatically by broad industrial category, investment composition, and country of origin. In terms of the distribution of cumulative investment of FDI in Turkey through 1995, for instance, the city of Antalya (where the Köprülü Canyon National Park is located) is in the highest category (Ibid.).

**Figure 5.1: Temporal Breakdown of FDI Inflows to Turkey, 1980-2000**

Data source: Turkish Department of Treasury (also in Deichmann et al., 2003, Figure 3)
As Neumayer (2001a:147) pointed out, the essence of the PH hypothesis is that countries set inefficiently low environmental standards or set efficient standards, but fail to enforce them to attract FDI. In their econometric study, Cole and Elliott (2005), who investigated the relationship between the FDI and the capital intensity of “dirty” sectors, argue that developing countries, including Turkey, with reasonably high capital-labor ratios, may have reasonably low levels of environmental regulations. Since export-oriented industrial development is the priority of public authorities, the environment has not been given enough importance in Turkey (Akbostaci et al., 2007). Even though there are attempts to comply with international standards, the implementation of environmental regulations is weak (Bekmez & Gokalp, 2005; Akbostaci et al., 2007; Tunc et al., 2007). Examples of appropriate policy actions already taken include the 1983 Environmental Law, which is based on the “polluter pays” principle, the formation of the Ministry of the Environment in 1991, laws enacted to protect environmentally sensitive areas and control hazardous waste, laws governing natural resources, conservation laws, and numerous regulations controlling water pollution and air quality (Adaman & Arsel, 2005; Yeldan, 1993; Odekon, 2005). Turkey has been a signatory to several international treaties (but not the Kyoto Protocol) and has adopted a National Environmental Action Plan (1999). However, even though these rules and regulations are in place, an effective and efficient institutional enforcement framework is missing (Odekon, 2005). Unless these requirements are met, even the “polluter pays” principle could easily be corrupted into a bribery-driven “pollution-pollutes” scheme (Ibid.121).

Previous Research: Is Turkey a “Pollution Haven”?

It is critical to investigate the effects of trade liberalization on the environment for the
Turkish economy since liberalization policies related to trade have been implemented since the 1980s. There are only a few econometric studies that have investigated whether Turkey is a pollution haven or not. The earliest study in the literature with regard to the impact of Turkey’s environmental regulations on exports in the leather industry was conducted by Larson et al. (2002). The authors found that the leather industry is a highly pollution-intensive industry and one of the traditional sectors of the Turkish economy. In another econometric study, Bekmez and Gokalp (2005) calculated scale and composition effects of industrial sectors in the Turkish economy. Due to the lack of reliable data in Turkey, the authors used the U.S. EPA's Toxics Release Inventory data, which enabled them to construct sector-wise pollution coefficients. The findings of their study indicate that chemical and plastic sectors are the leading sectors of pollutants. Even though levels of pollution increase in aggregate, the authors claim that it is due to scale effect. They showed that “composition effects” are negative (pollution decreased) and “scale effects” are positive (pollution increased). However, the scale effect dominates composition effect. Therefore, the total effect is positive. They conclude that changes in the Turkish industrial sector due to liberal trade policies caused more pollution in Turkey.

After Bekmez and Gokalp (2005), Akbostanci et al.’s (2007) study is the only one that explores the impact of industrial “dirtiness” on manufacturing exports for the Turkish case. By using econometric data sets and foreign trade statistics, the authors found that “exports increase as the dirtiness of the industries increases” (Ibid.308). Another group of economists, Tunc et al. (2007), worked to develop a “pollution terms of trade” (PTOT) index using input-output methodology for CO2 in 1996 and in 1998. This index measures the CO2 content of one Turkish Lira (TL) worth of Turkish exports relative to the CO2 content of one TL worth of Turkish
Table 5.3: Pollution Terms of Trade (PTOT)

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 embodied in exports</td>
<td>9.13458E-05</td>
<td>9.010533E-05</td>
</tr>
<tr>
<td>CO2 embodied in imports</td>
<td>18.69E-05</td>
<td>8.63638E-05</td>
</tr>
<tr>
<td>Pollution Terms of Trade (PTOT)</td>
<td>48.87</td>
<td>105.43</td>
</tr>
</tbody>
</table>

Data source: Tunc et al. (2007)

imports. Even though the authors’ analysis does not cover a long period, a significant increase in the overall PTOT value has been observed — for 1996 the value of PTOT is 49 and for 1998 it is 105 (see Table 3). As the authors claim, the CO₂ content of exports significantly increases relative to the CO₂ content of imports in 1998. Specifically, one of their primary conclusions is that the manufacturing industry is first place in both the rankings for CO₂ emissions and CO₂ responsibilities, while agriculture and husbandry is last place. The researchers also pointed out that 1998 is the special year in which the Turkish current account demonstrated a surplus. Also, 1998 is the year in which the Turkish economy was impacted by a series of foreign shocks, like the Asian and Russian crises. Due to Turkey’s close trade ties with Russia, this had serious ramifications for the Turkish economy (Alper & Öniş, 2003). Therefore part of the variation captured in the PTOT by this study could be due to this macroeconomic fluctuation. Thus, using time-series analysis to investigate the long term trends, as employed in this chapter, becomes important.

Research Hypothesis, Methods and Findings

Similar to the hypothesis cited in Chapter Four, if one conceives of international flows of environment-intensive products in general as ecological flows, that is, ecological cost-shifting from the importing to the exporting country, then free trade can promote increased environmental-load displacement from the importing to the exporting country. Thus, the
hypothesis stated below is focused on pollution-intensive manufacturing that moves from the global North to the global South. More specifically, it explores historical trends in trade flows of pollution-intensive manufacturing products through physical trade analysis (PTB) as well as regression analysis. This is consistent with the increased internationalization of the productive circuit of global capital and the movement of polluting and environmentally hazardous production processes to the global South (Faber, 2002; 2008). This is also consistent with “trade effects” of pollution haven hypothesis or flow of pollution embedded in international trade flows. I argue that as a result of the process of economic globalization, exports increase in the manufacturing sector under an export-led growth strategy. Subsequently, I state that as the polluting industries, especially CO2 intensive-manufacturing, move from the global North to the global South, as may be evidenced in Turkey, the amount of CO2 produced in Turkish manufacturing (including metal, iron and steel production, etc.) increases over forty years. 67 Greater export flows of “dirty” industries are positively correlated with the pollution-intensive manufacturing activities in Turkey.

Following a previous line of arguments by Neumayer (2001), Giljum (2004), Muradian & Giljum (2007), this hypothesis tackles the issue of the physical scale of exports within the context of PHH. More specifically, the production in, and exports from, developing countries (exemplifying Turkey as a case) may become increasingly pollution-intensive. The international distribution of environment-intensive exports (more weight-intensive) is associated with the process of corporate-led globalization. As discussed earlier, physical flows are a better proxy than monetary flows for estimating the environmental transformations associated with the scale of the economic activity (Muradian & Giljum, 2007: 309 and personal contact). Two primary

67 Related literature emphasizes the importance of CO2 as the strongest indicator in such studies (Muradian & Giljum, 2007; Peters & Hertwich, 2008).
methods, physical accounting (long-time series PTB) and regression analyses are utilized to test the stated hypothesis.

**Physical Trade Balance Approach (PTB)**

As detailed in Chapter Four, the Physical Trade Balance (PTB) approach, a sub-category of Material Flow Analysis (MFA), has been widely used to test unequal ecological exchange or unbalanced international trade (Weisz, 2007; Giljum et al., 2007; 2008). Since Global Footprint Network (GFN)’s database’s trade section is based on PTB (in tons) at 1- and 2-digit SITC level (Standard Industrial Trade Classification, referring to the detail in the composition of commodity classification groups), I used the terms interchangeably. After examining the yearly database, I selected certain categories for each year, and compiled them according to the PTB (imports minus exports in tons) method.

**Findings and Results:** Based on forty-three years of observations, Figure 5.2 illustrates that pollution-intensive manufacturing (which produces millions of tons of CO2/year) started to increase in the 1980s, with a sharp increase observed in the 1990s. Of particular importance, a non-specified industry68 showed a steady increasing trend as did the iron and steel industry especially between 1975 -1980. This trend continued into the 2000s. The amount of CO2 produced in manufacturing (such as metal, iron/steel production, chemical industry, paper/pulp, non-metallic minerals, etc.) has increased over the last few decades; hence the pollution-intensive manufacturing is evident in Turkey. These results are consistent with recently reported trends in the “dirty” industrial sector of Turkey.

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68 For non-specified industry, the GFN database states, “data kept as secret.”
Figure 5.2: Pollution embedded in Manufacturing Industries in Turkey (1961-2003)

Data source: Author’s calculation by using GFN database 1961-2003

Figure 5.3 illustrates selected categories of “dirty” manufacturing and/or products of Turkey exported in 2002. The data obtained from Global Footprint Network’s new method called PLUM –“product land-use matrix” provided an additional analysis of physical input/output flows. The analysis of the data confirms that shipping, and the iron and steel industry produce much higher CO2 per year in comparison to paper, textile/clothing, and other related products and industries. Consistent with earlier discussions about the shipping industry, these findings mark a production- and waste-circuit of capital accumulation. I observed additions (e.g. “pollution”), which are a result of unequal exchange with Turkey’s trade partners in the neoliberal trade system.
As Figure 5.4 demonstrates, overall, the dirtiness of manufacturing has increased since the 1970s. During the 1980s and 1990s, there was a strong increase in both manufacturing exports and the dirtiness of the manufacturing. These findings support Akbostanci et al.’s (2007) econometric time-limited (1994-97) analysis. More importantly, my finding shows a long-term physical trade “imbalance,” which is not based on econometric approach. Accordingly, this long-term “snapshot” presents a strong indication of net “dirty” export flows. Specifically, this finding demonstrates the flow of pollution embedded in international trade patterns, and supports ecological economists’ argument related to the PHH. Furthermore, this long term analysis indicates that Turkey has been a pollution haven since late 1970s. For example, the iron and steel industry conform to the export-led growth policy that started in early-to- mid-80s, marked by a sudden increase in exports (Figure 5.4). This means Turkey served as net-exporter of “dirty”
Figure 5.4: PTB of Pollution-intensive Industry


Data source: Disaggregated and calculated by the author, using GFN database

industry from 1984-2004. On the other hand, as found in the Bekmez and Gokalp’s (2005) analysis, another component of the “dirty” industry sector, the non-metallic minerals, started in the late 1960s. Similarly, as Figure 4 attests, these non-metallic minerals exports have more than doubled since the late 1960s in Turkey.

Another “dirty” sector, fertilizer, showed more than thirty years of net-exports starting in 1960s. From 1962 to the early 1970s Turkey saw a net-exporting of crude fertilizers and crude minerals (see Figure 4). In the 1980s, this pattern continued, coupled with only a few years of importing these products. Since mid-1980s, however, both crude fertilizers and minerals showed a pattern of net-export. Then, by 2000, a sharp increase in net-export of fertilizer/minerals occurred. These findings also support the recent data (2007-2009) on the export of fertilizer,
which demonstrate a continued increase. Additionally, Turkey has been a net-exporter of crude chemicals (coal, leather, etc.) for a few decades, albeit with a fluctuating pattern. The above findings provide support for unequal “pollution” exchange, and illustrate the flow of pollution embedded in trade; all of which represents a case of environmental and climatic injustices. Turkey has a diverse export profile in the manufacturing sector (as well as agricultural sector, argued earlier), and as Parks and Roberts (2007) claim, developing countries with relatively diversified export profiles pose a special challenge for climate policy makers. Exporters of manufacturers consistently exceed their emission limits, while pursuing carbon-intensive development path.

**Regression Analysis**

*Dependent Variable:* The dependent variable, the pollution-intensive manufacturing, shows the calculation of “dirty” industry (in millions tons of CO₂ per year) as a result of PTB analysis. The forty-three years of observations of this set is compiled by using the GFN database. The PTB analysis (see Figure 5.2) serves as a key independent variable in this regression analysis. This variable has yet to be used for regression analysis in the case of Turkey or for any other national and cross-national study by other scholars (especially environmental sociologists) who conduct quantitative analyses.

*Key Independent Variable:* The exports of “dirty” or pollution-intensive manufacture in tons (as calculated by using PTB in long-time-series over 42 years) was the key independent variable. Again, such data have not been incorporated in similar studies.

*Additional Independent Variables*

*Energyland (Fossil Fuels) Embedded in Manufacture:* *Energyland* is the term adopted
from GFN scholars and their database system. As detailed in Chapter Four, the energy consumption (from non-renewable sources) is calculated as CO$_2$ sequestration footprint (gha/cap) in GFN’s original data. GFN’s research group calculated an energy area or energyland embedded in trade by following a standardized category in the COMTRADE database. After examining their calculations in time-series, I selected only the “manufactured goods” and other related sections at 1-digit SITC level (Standard Industrial Trade Classification, referring to the detail in the composition of commodity classification groups) and then I compiled totals for each manufacturing-related sections for each year (from 1961 through 2003). This is also the first time this variable has been used for regression analysis for Turkey or other national and cross-national studies.

**Foreign Direct Investment (FDI) stocks:** As mentioned in Chapter Four, there is a broad and deep history of literature about FDI. In general, the theory of foreign direct investment dependence contends that the accumulated stocks of foreign investment make a less-developed country more vulnerable to different global political and economic conditions, often leading to negative consequences for domestic populations within investment-dependent nations (Chase-Dunn, 1998; Jorgenson, 2007). Scholars include FDI as a variable in their cross-national, quantitative analyses (Jorgenson, 2006, 2009; Rice, 2007).

**GDP/capita and nominal GDP:** Both GDP per capita and nominal GDP are included as independent variables. Prior studies also utilized GDP as an additional independent variable for similar types of research (see Jorgenson, 2006, 2007, 2009). As mentioned in Chapter Four, this controls for the base level of economic development. The data are obtained from World Bank’s Development Indicators dataset.
Findings and Discussions: Results of the regression diagnostics and models are reported in Table 5.4.

Model 1 includes one of the independent variables—energyland (fossil fuels) as embedded in manufacture. This variable has not been used in any other cross-national or national quantitative investigation on unequal ecological exchange. Both exports of “dirty” manufacturing and the amount of energyland embedded in manufacturing production have positive independent effects on the levels of pollution-intensive manufacturing. Both explanatory variables are very statistically significant – even at the 0.01 level. In this model, R square is .858 and the unstandardized coefficient is positive. 69 This result is important because it shows that ‘materials’ and ‘energy’ are also appropriated. Thus, Turkey has to ‘import’ energy, which is problematic, just to keep up with its manufacture-based industrialization and related projects. This is consistent with one form of unequal ecological exchange - withdrawal (e.g. fossil fuels) of energy and other natural resources as well as additions (e.g. pollution) in the periphery as a result of relations with the core in the capitalist world system. Ocak et al. (2004) also confirm that Turkey is an energy importing country with more than half of its energy requirements supplied by imports. As the authors emphasize, due to increasing energy consumption, environmental pollution (especially air and water) is becoming a serious problem. Hence, the scholars suggest that renewable energy sources appear to be one of the most efficient and effective solutions for sustainable energy development and environmental pollution prevention in Turkey.

69 Due to high correlations, unreported tests are conducted for the multicollinearity.
Model 2 presents another independent variable, FDI stocks (inward), which run with “dirty” manufacturing industries. The correlation is very significant at the .01 level (2-tailed), and positive R is .903. Once again, “dirty” manufacturing exports appear to have a direct impact on the level of pollution-intensive manufacturing; with this result being statistically significant at the .05 level. Foreign direct investment is positively associated with the amount of CO₂.

<table>
<thead>
<tr>
<th>Dependent &amp; Independent Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3a</th>
<th>Model 3b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution-intensive Manufacture</td>
<td>[8.938] (.000)</td>
<td>[14.018] (.000)</td>
<td>[6.168] (.000)</td>
<td>[4.448] (.000)</td>
</tr>
<tr>
<td>Exports of “dirty” manufacture</td>
<td>1.181*** (.000)</td>
<td>.481*** (.000)</td>
<td>.243** (.000)</td>
<td>.422*** (.000)</td>
</tr>
<tr>
<td>Energyland (fossil fuels) embedded in Manufacture</td>
<td>.339*** (.000)</td>
<td>(.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI stocks (inward)</td>
<td></td>
<td>.437*** (.000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP/capita</td>
<td></td>
<td></td>
<td>.751*** (.015)</td>
<td></td>
</tr>
<tr>
<td>GDP nominal</td>
<td></td>
<td></td>
<td></td>
<td>.603*** (.001)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>42</td>
<td>24</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>R Square</td>
<td>.858</td>
<td>.816</td>
<td>.972</td>
<td>.974</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.851</td>
<td>.800</td>
<td>.945</td>
<td>.948</td>
</tr>
</tbody>
</table>

Note: First number reported is standardized coefficient, unstandardized coefficient in brackets, standard errors in brackets/italics, in parentheses is significance level: *p<.05 **p<.01 ***p<0.001 (2-tailed tests)

production, all else equal, and this latter result is very close to being significant at the .05 level.

In this model, R square is .816 and the unstandardized coefficient is positive (.001). This finding
supports previous discussions on FDIs and how TNCs appropriate “carrying capacity” for the core by transferring hazardous products, production processes, and wastes to the periphery within the process of unequal “pollution” exchange. 70

**Model 3 (a/b)** In model 3a, the GDP per capita has a fairly large and positive effect on the level of pollution-intensive production, with the result being very statistically significant— even at the 0.01 level. Exports from the “dirty” manufacturing sector also have a direct, statistically significant impact on CO₂ production. Again, the correlation is statistically significant, and R is .974 and the unstandardized coefficient is positive (.141). In model 3b, the higher nominal GDP and exports from “dirty” manufacturing are both associated with higher levels of CO₂ production, all else equal. These results are very statistically significant – even at the 0.01 level (2-tailed test). R is very high at .972, as in Model 4a, and the unstandardized coefficient is positive (.008).

In a recent econometric research, Gurluk (2009) utilized EKC analysis to explain the relationships between economic growth and industrial pollution in Mediterranean countries, such as Turkey. The author showed that these countries follow logarithmic or inverse-logarithmic curves that shape the industrial pollution path in intensive natural resources exploitation. The Mediterranean nations have not yet experienced a turning point in their industrialization path. This suggests that human development should be the first objective or priority of economic

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70 In a different study including Turkey, Grimes & Kentor (2003) showed that foreign capital penetration in 1980 has a significant positive effect on the growth of CO₂ emissions between 1980 and 1996. The authors emphasized that FDI is more concentrated in those industries that require more energy, and the movement of inputs and outputs resulting from the global distribution of production over 30 years is likely to be more energy-expensive in countries with poorer infrastructure. Also, power generation in the countries receiving FDI is considerably less efficient than within the core nations.
development, especially in the Southern countries of the Mediterranean, including Turkey (Gurluk, 2009). As Tisdell (2001) stresses, negative environmental impacts of production are shifting to other regions while the “clean” final products are imported, instead of being produced within their own territory. Accordingly, it is also critical to fully include aspects of trade in the evaluation of EKC perspectives in the global North (Tisdell, 2001).

**Further Discussion: Environmental and Climate Injustices?**

The flow of pollution through international trade has the ability to exacerbate environmental and climate injustices in an age of corporate-led globalization. The separation of consumption and production has prompted many studies on the pollution embedded in international trade. In their study, Peters & Hertwich (2008) found that core nations are the net-importers of CO2 emissions, and emissions coverage based on consumption is greater compared to the production processes. In other words, for non-core countries (Turkey included), consumption-based CO2 emissions are much lower compared to production. A distinct advantage of the consumption-based inventories is that they eliminate carbon leakage, as all emissions associated with consumption are connected to the consuming country. According to the calculations by Peters & Hertwich (2008) for 2001, Turkey’s production-based emissions were 196.3 Mt CO2 and consumption-based were 188.0 Mt CO2, (not sectoral-based). Some 27.5 percent of exports and 23.3 percent imports had embedded emissions, whereas total percent of carbon leakage was 8.6 (Ibid. 1404). They claim that when an international climate regime has limited participation, such as in the Kyoto Protocol, the problem of carbon leakage arises due

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71 Industries may either close down and move to nonparticipating countries, or more problematic, expanded production may occur in nonparticipating countries as is clearly demonstrated by the rapid growth of production in China (Peters & Hertwich, 2008)
to two factors. First, industries close down in a participating country and migrate to a nonparticipating country with lax environmental regulations, which indicates pollution havens. Second, increased consumption in a participating country is met by increased production in a nonparticipating country, which signifies a weak PH hypothesis. However, given dynamic economic development, the weak PHH would be sufficient to cause substantial concerns for the effectiveness of a climate regime with limited participation.

As of April 2008, 178 states have signed and ratified the Kyoto protocol, but Turkey is one of 17 countries that have refused to sign on (Halicioglu, 2008). Turkish officials’ refusal to sign the protocol is mainly related to the perception of excessive implementation costs that would decrease competitiveness in international trade. However, the Turkish government recently declared its intention to participate (Ibid.). Among several environmental pollutants causing climate change, CO₂ is held responsible for 58.8 percent of the world’s GHG in a report of World Bank, and the combustion of fossil fuels is the largest single contributor to CO₂ emissions (2007). Turkey’s share of CO₂ emissions in the world was 31st in 1960 and it moved to 21st in 2005 (World Bank, 2007). The country’s share of total world CO₂ emissions is just 0.81 percent, but some 71 percent of Turkish energy production in 2005 was generated from the combustion of fossil fuels (Halacoglu, 2008). Apart from rules and regulations to reduce pollutant emissions, Telli et al. (2008) claim that the market based solutions in the form of pollutant taxes (or carbon taxes) would ease the extent of this problem. They maintain that the best environmental policy is reducing energy intensities in production which will result in a 1.5 percent decrease in GDP annually. This action, however, requires 23 percent tax rate on energy inputs usage in Turkey. In addition, in econometric studies of Tunc et al. (2007), and Telli et al.
(2008) results indicate that Turkey should incorporate environmental concerns into her macroeconomic policies more intensely in order to reduce the pollutant emissions and to sustain economic growth.

As the findings of this chapter illustrate, the “flow” of pollution embedded in trade has the tendency to perpetuate and aggravate environmental and climatic injustices. The disproportionate use of “environmental space” includes the disproportionate emissions of carbon dioxide; a manifestation of climatic injustice and carbon colonialism (Martinez-Alier, 2002:228; Bachram, 2004). The historical legacy of a country’s incorporation into the global economy has a critical impact on its available avenues of development and its carbon future (Parks and Roberts, 2007). As Parks & Roberts (2007:24) indicate, the best climate policy interventions may be undermined by the structural shift in manufacturing and the extraction of resources in the world economy. Thus, the globalization of economic production and trade causes many peripheral nations to become heavily reliant upon earnings from carbon-intensive export products and manufactures whose components require energy-intensive transport and processing.

More importantly, severe debt burdens create pressures for “austerity” and the need to generate revenues through yet more export earnings—regardless of long term environmental consequences (Roberts et al., 2003). In other words, neoliberal globalization enhances the process of unequal ecological exchange. This corporate-led globalization strategy creates governance structures at the local, national and transnational levels to support its interests. Faber (2008:211) suggests that stringent environmental standards must be applied to all nations in order to foster global environmental justice. A reworking of established “free-trade” agreements in favor of more positive “fair-trade” agreements is an important first step in the struggle to
defeat neoliberal economic policy. What is clear is that if the environmental justice movement cannot curb the excesses of capital and the unrestrained governments of the global North, it surely will be ill equipped to challenge global corporations on unfamiliar territory in the global South (Pellow and Brulle, 2005). The newly emerging climate justice movement, on the other hand, brings ecological unequal exchange and ecological debt concepts to the center. A growing numbers of scholars have documented that energy and materials disproportionately flow from the global South to the global North. As shown in this chapter, material flow analysis, with a focus on long time physical trade analysis, revealed important findings about Turkey.

**Conclusion: Appropriation of Energyland and Pollution Havens**

By utilizing two different methods—a specific component of material flow analysis, Physical Trade Balance, and regression analysis—this chapter demonstrates that pollution (especially CO₂ intensive-manufacturing) moves from the global North to the global South. Specifically, this explains Turkey’s increase in the CO₂ produced in manufacturing (including metal, iron/steel production, etc.). First, the PTB analysis illustrates that Turkey has been a net-export of “dirty” manufacturing for about forty years. Second, regression analysis confirms that the greater export flows of “dirty” industries are positively correlated with the pollution-intensive manufacturing activities over the years. More importantly, while “dirty” net-exports created “pollution havens,” “energyland” embedded in the manufacturing of “dirty” industry has also increased. In other words, both the exports of “dirty” manufacturing and the amount of energyland embedded in manufacturing production have positive independent effects on the
levels of pollution-intensive manufacturing. As argued in Chapter Two, trade can be considered a form of *thermodynamic imperialism*, and this chapter shows how *environmental surpluses* are extracted from the periphery. For instance, the theory of unequal exchange based on thermodynamics in Odum’s (1988) work deals with an embedded energy (or *emergy*) and is similar to Marx’s labor theory of value, which indicates the amount of human energy invested in a product (Martinez-Alier, 2002). Hornborg’s *exergy* (available energy) presents a different view of unequal exchange. He argues that market prices are the specific mechanism by which the world system extracts exergy from, and exports entropy to, their peripheries. It is not easy to understand accumulation, ‘development’, or modern technology itself without referring to how exchange value relates to thermodynamics; the way in which market institutions organize the net transfer of energy and materials to world centers (Hornborg, 1998:132). Hornborg (2001:38) details that

one way to assess the occurrence of unequal exchange may be to look at the direction of net flows of energy and materials (concrete, *productive potential*), but without falling into the trap of equating *productive potential* with economic value. On the contrary, it can be analytically demonstrated that unequal exchange emerges from a kind of inverse relationship between *productive potential* and value (emphasis is mine)

*Ecological dumping* occurs when weaker environmental standards are adopted while prices are set up below the marginal damaged costs as compensation for negative externalities.

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72 My unreported preliminary regression model shows that physical export flows of “dirty” industry increases organic water pollution in Turkey for twenty years. However, the In this model, urban population growth, another independent variable is included to refine the model. Surprising, yet consistent with similar research done by Jorgenson (2007) and Shandra et al. (2008), I found that urbanization is decreasing water pollution and is statistically significant at the .05 level. Overall, I find that the higher carbon dioxide emissions and exports of “dirty” industry are both positively associated with higher levels of organic water pollution in Turkey for twenty years. These results are statistically significant at the .02 level.
The recent global North-to-global South export of the most polluting industries and waste suggests a new form of ecological imperialism, where world system peripheries are converted into dumping grounds for entropy generated by affluent core areas. The periphery is exploited both as sources of negative entropy and as sinks for entropy. Environmental sociologists argue that a large proportion of FDI in the periphery funds highly polluting and ecologically inefficient manufacturing processes and facilities, much of which are outsourced from the core (Rice, 2009; Grimes & Kentor, 2003; Jorgenson, 2006b; Jorgenson et al., 2007; Jorgenson, 2009).

Furthermore, it is argued that these activities contribute to the emission of carbon dioxide and are the largest anthropogenic contributor to global warming and climate change (IPCC, 2007; WRI, 2005). Our national study of the flow of pollution embedded in trade flows models showed the positive effect of FDI in manufacturing “dirty” industry. More importantly, we find an association with the amount of CO2 production because “dirty” manufacturing exports have a direct impact on pollution-intensive manufacturing.

Accordingly, the contribution of this chapter is two-fold. First, it provides a support for the theory of unequal ecological exchange—that is, the withdrawal of energy (e.g. fossil fuels) and other natural resources and additions (e.g. pollution) in the periphery as a result of relations with the core in the capitalist world system. In the context of the transnational treadmill of production, the results show that the state (and capitalist class) responds to demands for environmental withdrawals (like fossil fuels) or additions (like “pollution”) by mandating policies that encourage further economic expansion. Second, the structure of the transnational treadmill has served to integrate global trade institutions in order to accelerate capital accumulation. However, the findings run counter to macroeconomic orientations that predict an
environmental Kuznets curve (EKC), detailed earlier. The regression models find that Turkey’s “pollution havens” serve as an example of the second contradiction of capital, which essentially demonstrates how capital externalizes environmental costs resulting from production processes in order to maximize profits while destroying future conditions of production.

The world’s nations are being asked to give attention to the extent to which they are exporting their un-sustainability—that is, their use and possible degradation of environmental functions beyond the thresholds necessary for assuring long-run ecological-economic sustainability—to other nations (Muradian & O’Connor, 2001: 336). Attention to international environmental load transfer (“displaced environmental loads”) as well as ecologically unequal exchange again emphasizes that environmental functions are not ‘allocated’ through markets or other institutional mechanisms at all, but rather a relation of power in a situation of conflict (Ibid. 343). There are many ecological distribution conflicts that involve struggles between commercially oriented interest and territorially defined social groups resisting the dispossession of their lands, water, forests, and pollutants or toxic wastes that degrade their environment (Martinez-Alier, 2002; 2007). As our findings show, the energy embedded in manufacturing production and the carbon intensity of Turkish trade is the dissipated energy and carbon dioxide produced by each export and import. As evidenced by Turkey, exporting countries are specialized in non-renewable resources, while the global North is transferring environmental costs to the global South—the cost shifting success. The capital accumulation does not take place on its own, and it is not based solely on the exploitation of labor and technological change

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73 Displaced environmental loads are defined as environmental pressures (pollution, resources depletion, etc.) linked through international trade chains to consumption in an importing country, but suffered in an exporting country (Muradian and O’Connor, 2001)
(Martinez-Alier, 2007). As industrial capitalism advances, it uses *more* and *more* materials and energy while producing *more* waste, and thus undermines not only its own conditions of production but the condition of existence of peripheral peoples (Ibid.). *Externalities* are best understood as cost shifting. As argued in previous chapters, the disproportionate use of *environmental space* of the periphery and the ecological cost shifting (or *externalities*) are at the root of most ecological distribution conflicts in the global South.

The long time-series analysis shows that Turkey is on the industrial development path; with trade playing an increasing role in its economic development (see Akbostanci et al., 2007). Due to Turkey’s eagerness to reach higher levels of growth in order to fulfill the requirements for full accession into the EU, the Turkish government is less enthusiastic about passing environment-friendly laws (Akbostanci et al., 2007; see also Chapter Six). However, a number of international organizations, including NGOs, put forth obligatory regulations that Turkey should adopt and comply with (Bekmez & Gokalp 2005; see Chapter Eight). The EU also insists on policies that respect human rights, democratic institutions, and environmental protection. Which way will Turkey go?
CHAPTER SIX
UNEQUAL ECOLOGICAL EXCHANGE: TURKEY AND THE EU ENVIRONMENTAL and CLIMATE INJUSTICES

Introduction

This chapter investigates unequal ecological exchange between Turkey and the EU-15 by utilizing a special input-output matrix called Product Land Use Matrix (PLUM) within the context of a political economy framework. The first part of this chapter provides an overview of the EU’s environmental policy, free trade agreements, EU’s cost-shifting successes and evidence of pollution havens. The second part of this chapter, which focuses on the political economy of Turkey-EU trade, is divided into four sections. The first section offers an overview of the EU-Turkey Custom Union agreement. Turkey’s agricultural and manufacturing industry trade agreements with the EU are discussed in the second and third sections. The shortcomings of the Customs Union with the EU are outlined in the last section. Next, the third part of the chapter re-states research hypotheses, research methods, and empirical findings. Both unequal agricultural trade and pollution related results are documented in the last section. The final part of the chapter provides further discussion of Europe’s eco-debt and the overuse of environmental space. My concluding remarks review my findings from an environmental and climate (in)justice perspective.

The European Union’s Trade Agreements and Environmental Cost-Shifting

Overview of EU’s Environmental Policy and the Free-Trade Agreements

In 1957, six European States signed the Treaty of Rome and formed the European Economic Community (EC) in order to increase the economic performance of its member
nations (Cave and Blomquist, 2008). Starting with the 1972 Stockholm Conference, the EC explicitly focused on environmental issues and implemented environmental action plans. However, until 1986, there were no environmental laws to govern the EC’s environmental policy. The year 1992 marks the era of revolutionized policy making in the EU. Through the Maastricht Treaty, which requires *de facto* unanimity in passing environmental policy, the EU has the power to issue binding directives to its member nations, allowing for centrally defined environmental controls. For instance, under the Kyoto Protocol, which the EU signed, the EU is required to reduce greenhouse gas emissions 8 percent below 1990 levels by 2012. However individual member reductions vary from 28 percent in Luxembourg to an increase of 27 percent by Portugal. The individual member countries requirements were determined under the June 1998 “Burden Sharing Agreement” (Cave & Blomquist 2008). The policy of the Treaty, such as *Climate Change Policy*, leaves the actual implementation to the member nations and raises the concern that compliance and enforcement of environmental policy would fail to occur in a uniform system. Furthermore, if those countries that were theoretically able to meet EU environmental standards were not in conformity, a downward bias on any pollution haven effect might result (Ibid. 3). Even though development of EU environmental policy began in 1970, community-wide changes did not occur until 1993.\(^{74}\)

Although the Uruguay Round Agreements and the creation of the WTO have strengthened the multilateral trade system, there has also been a proliferation of free-trade agreements (FTAs) in the world economy. Since 1995, the EU and the US have been

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\(^{74}\) For that reason, scholars usually investigate the time period 1993 onward whether more stringent environmental policy in the EU led to increased importation of products of dirty industries.
instrumental in the creation of such trade agreements in the world economy. The EU has been
the major driving force behind the spread of FTAs in the developing world. The combination of
economic and political factors, including accessing new markets for its exports, has motivated
the EU to conclude FTA agreements. For peripheral nations, the attraction has been preferential
access to the large European market and the prospect of increased aid. As of 2005, five such
agreements have been finalized with South Africa, Mexico, Chile, Turkey, and Egypt. These
individual countries are relatively small trading partners for the EU and accounting for only 3.7
percent of total EU exports and 2.9 percent of total EU imports (IMF DTS, 2001). In contrast,
the EU is a major export market for most of its FTA partners accounting for 54.6 percent of
exports in Turkey (Francois et al., 2005).

A structural transformation in the export patterns during the 1970s and 1980s is evident
in the rise of manufacturing as well as in a decline in the share of agriculture and processed food
products of the EU’s partner countries (Francois et al., 2005). For instance, the share of
manufacturers in Turkey’s total exports increased from 8 percent to 86 percent (GTAP 5).
Duties on EU imports of manufacturers from Turkey have now been phased out under the
Custom Union (CU) agreement. Turkey has reasonably low rates for most products (notably only
7 percent for manufacturers) with the exception of processed food (Ibid. 1548). Because of the
CU agreement related to industrial products with Turkey, which aims at eventual membership in
the EU, the trade agreement covers the removal of duties on all industrial products by both
parties. However, agricultural products are not included in the CU Agreement with Turkey and
both parties have agreed to progressively improve their preferential regime in the agricultural
sector with the objective of allowing Turkey to adapt EU’s the Common Agricultural Policy
(CAP). The Commission estimates that 93 percent of Turkey’s agricultural exports to the EU and 33 percent of EU agricultural exports to Turkey are covered by the 1998 scheme of preferences (Ibid. 1554).

The EU’s CAP has been criticized by a number of scholars. As Green and Griffith (2005) argue, the CAP truly exemplifies unequal agricultural trade relations. According to the authors, the CAP serves as a mechanism that promotes over-production and “dumping” of cheap goods that undercut local markets in developing countries. At the same time tariffs and other obstacles prevent agricultural producers in these countries from accessing the European markets for their own goods. Therefore, these scholars suggest that the EU should support a "development box" in the WTO’s Agreement on Agriculture, which would change the rules and allow governments the right to protect small-scale farmers from influxes of cheap goods.

In addition to CAP, the FTAs are increasingly creating free trade between the EU and partner developing countries, and the EU has been subjected to a considerable degree of criticism over the past few decades. For instance, the EU is going beyond the legitimate purpose of ‘rules of origin’ in preventing trade deflection and using this as a means of import protection (see Ghoneim, 2003). The EU seeks to mitigate the restrictive effect of the rules of origin by allowing a partner country to count imports of intermediate products from the EU used in production as “originating” products (known as bilateral cumulation). However, the EU is not the most efficient source of supply, and bilateral cumulation causes ‘trade diversion’ (Ulgen & Zahariadis, 2004). Francois et al., (2005) argue that the EU restrictions, both in product coverage and in rules of origin, adversely impact trade in agricultural goods and labor-intensive manufacturers. This significantly reduces potential gains from trade liberalization for
developing countries, which have FTAs with the EU, including Turkey. Only the agreements with Mexico, Chile, and Turkey are wider and deeper than commitments available under the WTO agreements. The authors emphasize that the negotiation of bilateral trade agreements comes with certain costs which require the use of negotiating both limited resources, including human capital and other related resources. Developing nations’ capital might also be committed to other issues and processes, such as WTO based multilateral negotiations. In their view, a direct approach to the liberalization of market access through the WTO provides a much broader avenue for developing country gains than is available under the bilateral approach.

As Catalano (2011) has detailed, the EU has traditionally advocated for a multilateral approach in dealing with international economic matters. However, 2006 marked a profound change in attitude (especially after the Treaty of Lisbon), in line with the reconfiguration of trade politics at global level. As a result of this shift, the EU started to use bilateral and regional agreements. There are various reasons behind this major change. For instance, in the Doha Development Round’s outcome, the effort of the EU to include multilateral negotiations on ‘competition and investments,’ was promptly halted by developing countries’ opposition. Through this new shift, the EU-FTAs could neutralize trade diversion effects brought about by the FTAs among third parties. FTAs would be viable tools to establish deeper commercial relations with countries experiencing rapid economic growth while serving as a way to enforce international trade rules. The EU utilizes a mechanism of conditionality, which is implied in the FTAs (Catalano, 2011). Through this mechanism, the EU not only transforms its economic power into the leverage capable of shaping other countries’ actions, but also exercises its power through trade channels.
The European Union’s Approach to Physical Trade and Resource Extraction: Externalization of the Environmental Burden

Is the EU shifting a resource burden to other countries? In recent years, analyzing the North-South trade in physical terms has become more important than the North-North monetary trade. The EU imports from OECD countries (e.g., the North) are roughly equivalent in monetary value to all those from the non-OECD (e.g., the South and East). But in physical terms (in millions of tons) imports from the non-OECD are about twice as important as those from the OECD (Eisenmenger & Giljum, 2006). For instance, EU imports from Africa are much less than those from Asia in monetary value, but those from Africa are greater than those from Asia (and close to those from the OECD) in physical weight (Ibid.). As ecological economists argue, these findings serve as clear example of the misleading discrepancy between the physical importance of raw materials to the production process (which is absolute) and their market value versus manufactured goods (which is much less). More importantly, there are significant structural differences of the external trade relations in monetary and physical terms. Even though total EU exports and imports are roughly balanced in monetary value, EU exports are less than a third of imports in terms of physical weight (Eisenmenger & Giljum, 2006)

The EU’s physical trade is characterized by a large surplus with all other world regions (including the non-EU OECD countries). This is mainly due to the high import of fossil fuels and raw materials and semi-manufactured products. The physical amounts are much smaller than imports in the two categories mentioned above, but they still do not compensate the physical deficit. It is estimated that more than two thirds of physical imports originate in countries outside

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About 60 percent of all imports in terms of weight (Giljum and Eisenmenger, 2007)
the OECD region, whereas OECD countries are a larger share of EU exports (Giljum et al., 2004). On the average, EU-15 exports have a value four times higher than imports (Ibid.). In regard to trade relations with the global South, such as Africa and Latin America, one ton of EU exports exemplify a value ten times higher than one ton of EU imports (Giljum & Hubacek, 2001).

As detailed in Chapter Two, externality theory views environmental degradation and use of unpriced natural resources as a negative effect outside the market by one economic agent on another, without any form of compensation taking place (Kapp, 1950). More importantly, as “dumping” occurs from global South to global North, poor and powerless nations are not able to slow down the rate of resource exploitation or charge ‘natural capital depletion taxes’ to the North (Martinez-Alier 2002; 2009). The successful appropriation of land, raw materials, and other resources by more powerful trading partners without the internalization of the full social and ecological costs refers to undervaluation (Muradian & Martinez-Alier 2001). Ecological economists find that the global South has a net trade deficit in physical terms which clearly demonstrates the draining of their resources (Giljum et al., 2007), as this chapter illustrates a case of Turkey-EU. Researchers argue that the "value chain" creates an illusion of trade reciprocity, where in fact there is a net appropriation of resources by one side. In particular, it is the politically determined hierarchy of economic values that allows this unequal exchange to take place.

Germany's Wuppertal Institute (2004) has provided evidence showing that changes in European resource use are increasingly shifting the environmental burden onto other world regions, especially the periphery. Based on a detailed analysis of EU trade patterns in the quarter
century to 2000, the Wuppertal report exposes trends not only in monetary terms but also in physical terms, and in terms of implicit environmental impacts—known as ‘ecological rucksacks’. Ecological rucksacks show how resource flows are intertwined internationally. The weight of such rucksacks is usually many times higher than the weight of the imported good itself and thus reflects the harm done to the environment in other countries by domestic consumption of imported products (Giljum & Rocholl, 2009). As Wuppertal scholars confirm, the EU’s trade balance with the rest of the world is roughly even in monetary terms whereas its physical trade balance has grown increasingly uneven, so that by 2000 imports exceeded exports by one billion tons. This ‘unequal ecological exchange’ is even more unbalanced if ecological rucksacks are included (Wuppertal, 2004). The EU’s real net resource requirement is “three to five times” larger than the simple volume of trade (Ibid.). The EU enjoys the benefits of resource exploitation elsewhere to meet its consumption demands without having to deal with its physical consequences as do local ecologies and economies of the global South. This ecologically asymmetric trade pattern has been magnified during the era of corporate-led globalization.

There are number of EU-based studies focus on CO₂ leakages due to geographical shifts in production (Bruckner et al., 2010; Giljum et al., 2007). As a result, the resource base for many industrialized nations has increasingly shifted to other world regions over the past 20 years (Weisz & Schandl 2008). Therefore, domestic raw material extraction has decreased, as resource imports from other world regions have expanded. The global North is thus becoming

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76 Ecological rucksacks include all materials that have to be extracted from nature in order to access other valuable resources, even if they do not have any value and therefore no price. One example is residues (rocks and topsoil) from mining or harvest residues in agriculture. Even if those materials are not used economically, they often have a negative impact on nature, like a washout of acid substances from mining dumps into the groundwater (Wuppertal, 2004; Giljum et al., 2007)
increasingly dependent on foreign providers, particularly in the areas of fossil fuels and metal resources. For example, Europe's import dependency in non-renewable raw materials is 83 percent for iron ores, 80 percent for bauxite and 74 percent for copper (EC, 2006). Thus, Europe has significantly reduced the domestic extraction and processing of metal ores through increasing imports of semi-manufactured metal products from other world regions (Giljum et al., 2007; see also Appendix C). This implies that the CO₂ emissions related to the very energy and emission intensive processes of metal extraction and purification are also relocated from Europe to other world regions. Hence, the phenomenon of CO₂ leakage becomes a common pattern, especially with the increased trade flows. (Bruckner et al., 2010)

**Pollution Havens and the EU**

As argued in Chapter Five, the pollution haven hypothesis (PHH) proposes that environmental stringency differences between developed and developing countries encourages developing nations to specialize and gain a comparative advantage in the production of “dirty” goods. Ecological economists, Cave and Blomquist (2008) argue that the 1990s was a decade in which environmental standards were tightened throughout the developed world, including in Europe, which has led to a discussion about the PHH (Cave & Blomquist, 2008). From their point of view, developed nations should observe a rise in imports of “dirty” goods from developing nations during a period of increased environmental stringency. The authors investigated the period after 1993, and especially in 2002, to uncover whether the EU-15 has increased its imports of pollution intensive goods from poorer, less developed countries. They found that an increased amount of EU energy intensive trade with poorer nations during a period of more stringent environmental standards. Furthermore, they discovered some evidence of
increased EU imports of toxic goods from poor OECD and non-European countries. More importantly, their findings support the pollution haven hypothesis for the EU energy intensive trade. Energy intensity captures those industries that use large amounts of fossil fuels in the production process, while industries that have high toxicity measures are those that produce significantly large amounts of carcinogens during the production process. As the authors claim, these findings illustrate that poorer nations in general have a comparative advantage in the production of energy intensive industries relative to similar industries in the EU, particularly as these industries are more heavily regulated.

The Political Economy of Turkey-EU Trade

The EU-Turkey Customs Union (CU): Overview

Turkey-EU relations have developed along a complicated, troublesome and lengthy route (see Akcapar, 2007; Harrop, 2004). The relationship evolved through legal frameworks such as the ‘Ankara Agreement’ (1963) and Added Protocol (1971) where Turkey was accepted as an associate member and three stages were proposed for full membership (Acar 2007). The Additional Protocol entailed a remarkable reduction of EC protectionist barriers for Turkish industrial goods (however textiles were excluded). Similarly, Turkey agreed to lowering tariffs and quotas on the EU’s exports (Öniş 2001). In 1995, Turkey and the EU established a CU in industrial products with a 5-year period, which became effective at the beginning of 1996. It proposed elimination of tariffs and levies on imports of manufacturing products originating from the EU, and adoption of Common External Tariff (CET) of the EU on imports from the third regions. Practically this implies a substantial reduction of the tariffs imposed by Turkey on its imports from the non-EU countries (Acar, 1999:4). Also, Turkey is obligated to provide
preferential access to its markets to all countries to which the EU grants preferential access (Catalano, 2011).

The economic stabilization and liberalization of 1980 had the objective of aligning the Turkish economy with the changing European economic environment. As Mütfüler (1995) detailed, structural adjustments carried out throughout the 1980s were aimed at offsetting European economic integration’s effects over the Turkish economy. Non-tariff barrier removal and the new membership of Southern countries further maximized the EU’s market integration at the expense of Turkey’s welfare gains. Freer circulation of productive factors increased intra-EU trade; in particular, the rest of the EU achieved free access to new EU-members dynamic markets. Thus far, Turkey’s external trade has been dominated by the EU: the absolute volume of imports and exports steadily increased. Turkey’s share of exports directed to the EU went sharply above the average of 45 percent respectively in 1985 and below the same percentage in 1988 (Catalano, 2011: Table 1). It is then arguable that CET imposition on the new members’ markets increased intra-EU trade at the expense of Turkish goods’ competitiveness in the European markets. Nonetheless, Turkey’s competitiveness problem may also be explained by looking at Turkey’s specialization in lower value-added goods, such as textiles, iron and steel (Catalano, 2011). Throughout the 1980s Turkey actively shifted from an import-substitution to an export-oriented economy, maintaining the EU as the main trade partner. Yet, it is not accurate to speak of a proper ‘growth effect’ deriving from the 1980 export-based growth decision (Ibid.).

77 Despite stable GDP growth rate, capital accumulation was undermined by high volatility of financial markets and even higher levels of inflation. Restrictive monetary policies further curtailed rooms for human capital accumulation (Catalano, 2011)
The CU has deepened economic integration between the EU and Turkey both in terms of legislative harmonization and trade volume. 78 The CU requires the: (1) bilateral removal of industrial tariffs; (2) harmonization of Turkey’s external industrial tariff with the CET on imports from third countries; (3) protection of competition, administration of border procedures, protection of commercial, industrial and intellectual property rights; and the (4) adoption of EU’s commercial policy towards third countries, which means accepting all FTAs between the EU and trade partners while implementing their provisions (Catalano, 2011; Ülgen & Zahariadis 2004).

EU-Turkey external trade volume in the period 1999-2008 experienced an almost steady increasing trend (Eurostat 2010). Interestingly, this pattern changed during the period of 2001-2010. Instead, the EU’s share of Turkey’s total trade volume started to decline from 53.63 percent in 2003 to 42.29 percent in 2010 (Catalano, 2011:40). From 2001 to 2010, Turkey started to gradually diversify its trade patterns, especially among Middle Eastern and Asian countries. Yet, Turkey has also become the EU’s seventh largest import partner, accounting for 3.0 percent of the EU’s total imports. Turkey is also the EU’s fifth major export partner, receiving 4.1 percent of the EU’s exports (Catalano 2011: 35) Turkey’s trade diversification may be understood by taking into account several factors (see Table 6.1). According to Tekin and Williams (2009), Turkey is acting to become Europe’s ‘energy-corridor;’ bringing hydrocarbons directly to European markets. Despite the fact that the EU is still its main commercial partner, Turkey’s centrality within countries with abundant energy resources, dynamic economies and

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78 On the import side, in the year of the inception of the CU, Turkey’s overall imports raised by 22.2%, but in terms of imports from the EC the increase was by 37.2%. In the period of 1995–2002 the average share of imports coming from the EU was around 49.3%, but the pattern was highly uneven. On the export side, Turkey traded on average with the EU the 50.7% of its total exports, especially in 1998 and in the 2000s (Catalano, 2011: 39).
Table 6.1: Trade competitiveness between Turkey and the EU

<table>
<thead>
<tr>
<th>Year</th>
<th>Export (TR)</th>
<th>Change (%)</th>
<th>Export (to the EU)</th>
<th>Change (%)</th>
<th>EU Share of Export</th>
<th>Import (TR)</th>
<th>Change (%)</th>
<th>Import (from the EU)</th>
<th>Change (%)</th>
<th>Import share from the EU</th>
<th>Change (%)</th>
<th>Trade Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>21.6</td>
<td></td>
<td>11.1</td>
<td></td>
<td>51.2</td>
<td>35.7</td>
<td></td>
<td>16.9</td>
<td></td>
<td>47.2</td>
<td>-5.8</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>23.2</td>
<td>7.3</td>
<td>11.5</td>
<td>4.2</td>
<td>49.7</td>
<td>43.6</td>
<td>22.2</td>
<td>23.1</td>
<td>37.2</td>
<td>53.0</td>
<td>-11.6</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>26.3</td>
<td>13.1</td>
<td>12.2</td>
<td>6.1</td>
<td>46.6</td>
<td>48.6</td>
<td>11.3</td>
<td>24.9</td>
<td>7.5</td>
<td>51.2</td>
<td>-12.6</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>27.0</td>
<td>2.7</td>
<td>13.5</td>
<td>10.2</td>
<td>50.0</td>
<td>45.9</td>
<td>-5.4</td>
<td>24.1</td>
<td>-3.2</td>
<td>52.4</td>
<td>-10.6</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>26.6</td>
<td>-1.4</td>
<td>14.3</td>
<td>6.3</td>
<td>54.0</td>
<td>40.7</td>
<td>-11.4</td>
<td>21.4</td>
<td>-11.0</td>
<td>52.6</td>
<td>-7.1</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>27.8</td>
<td>4.5</td>
<td>14.5</td>
<td>1.1</td>
<td>32.2</td>
<td>54.5</td>
<td>34.0</td>
<td>26.6</td>
<td>24.3</td>
<td>48.8</td>
<td>-12.1</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>31.3</td>
<td>12.8</td>
<td>16.1</td>
<td>11.1</td>
<td>51.4</td>
<td>41.4</td>
<td>-24.0</td>
<td>18.3</td>
<td>-31.3</td>
<td>44.2</td>
<td>-2.2</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>35.8</td>
<td>14.1</td>
<td>18.1</td>
<td>12.0</td>
<td>50.5</td>
<td>51.3</td>
<td>23.8</td>
<td>23.1</td>
<td>26.5</td>
<td>45.1</td>
<td>-5.1</td>
<td></td>
</tr>
</tbody>
</table>

Data source: Sate Planning Organization (SPO); Catalano (2010:39) IFM.

Growing internal demands seems to set the basis for ongoing economic growth. Also, Turkey aims at strengthening these trade partnerships while establishing new cooperation agreements. This would increase
document might make Turkey a regional center for trade and energy. This would increase

Table 6.2: Turkey and the EU: Monetary Flows

<table>
<thead>
<tr>
<th>Selected Sectors/Categories</th>
<th>Agricultural Products (Millions of Euros)</th>
<th>Textiles and Clothing (Millions of Euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Imports (Euro)</td>
<td>Exports (Euro)</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>2005</td>
<td>2,907</td>
<td>1,129</td>
</tr>
<tr>
<td>2009</td>
<td>3,007</td>
<td>1,934</td>
</tr>
<tr>
<td>2010</td>
<td>3,633</td>
<td>3,022</td>
</tr>
</tbody>
</table>

Source: EUROSTAT (2006; 2010; 2011)
Turkey’s economic role vis-à-vis the EU, as the membership does not seem a certain alternative. After the CU, in monetary terms, Turkey-EU trade balance has been negative since 1995 as Table 6.2 attests. In addition to physical flows, Turkey’s monetary terms of trade balance suffers especially for two major sectors: agricultural and textiles for recent years. Even though trade volume has increased, however, the monetary balance has still been negative (see EUROSTAT, 2006 - 2010).

**Turkey’s Agricultural Trade Agreements with the EU**

When Turkey and the EU formed the CU in 1996, Turkey adopted the EU’s common external tariff (CET) for non-agricultural products, and eliminated import duties and quotas for non-agricultural item of EU and EFTA origin (Burrell, 2005: 163). For products imported from third parties (non-EU and non-EFTA nations), adoption of the CET meant the average tariff dropped to below 6 percent (Ibid. 170). The CU has not been extended to agricultural products. However, the EU has been granting trade preferences to Turkey for agricultural products since the 1963 Association Agreement. As part of this process, the EU abolished most *ad valorem* tariffs on agricultural imports from Turkey in 1987, and rates for some specific tariffs have also been reduced. However, there remain high specific tariffs for many of the core CAP products (such as cereals), substantial specific duties for many processed products, an entry price system for some fruit and vegetables, and high above-quota tariffs (Grethe, 2004:58-59). Since 1998, Turkey has given preferential market access to many EU agricultural products, but for the most part, preferential concessions have been accompanied by a quota limit (for the most part with zero in quota-tariffs).
The largest discretion in policy making is in agricultural products within the context of trade policy (Togan, 2010). While they are subject to bilateral liberalization measures negotiated between Turkey and its foreign trade partners, they are not part of CU agreements, and respective regulations vary between Turkey and the EU, which are in some cases “unequal” or “asymmetric.” In addition, as the EU-Turkey CU went into effect after the completion of the Uruguay Round of multilateral trade negotiations, Turkey’s tariff commitments differ from those of the EU (Togan, 2010; Burrell 2005). As argued earlier, some scholars find a multilateral approach more beneficial for developing nations than a bilateral approach.

A group of scholars had investigated the implications of incorporating agriculture into the CU with the EU, and the results are mixed. As Mercenier and Yeldan (1997) argued, due to continued presence of non-tariff barriers (NTBs) and the opportunity of strategic incentives of price discrimination by the European and Turkish oligopolists, Turkey is likely to suffer welfare losses under the simple tariff harmonization episode of CU. On the other hand, Acar (1999), an economist, shows that integrating agriculture will be beneficial for Turkey in terms of equivalent variation, per capita utility, per capita income, investments and real growth. For Samoggia et al., (2008:30), the Turkish agricultural sector’s share of GDP is 9.2 percent (compared to 1.9 percent of EU-15), thus reaching the 17th position as economic dimension among world economies.

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79 See Andersson (2007) for asymmetric exchange (or gains from trade unequally distributed) in the EU.

80 Economists, Adam and Moutos (2008), analyzed the effects of the CU between Turkey and the EU-15 by differentiating between exports from (a) lower-technology EU-15 countries (or ‘Southern group’) to higher-technology EU-15 countries (the ‘North’), (b) North to South, (c) South to Turkey, (d) North to Turkey, and (e) Turkey to EU-15. Their econometric results indicate that, in contrast to North's exports to the other EU-15 countries (which have remained intact), the Southern countries’ exports to the other EU-15 countries have declined as a result of the CU. Moreover, the extra penetration of the Turkish market by the EU-15 countries has not been more favorable to the Southern (low-tech) group.
Also, agricultural employment in the EU is much lower than in Turkey where it comprises 27.3 percent of the total employment (Samoggia et al., 2008:43). Even though these figures provide the picture of an agriculture-oriented economy, it is important to underline that Turkish agriculture has a contradictory structure; on one side, commercial farms and export-oriented chains, on the other side, a subsistence or semi-subsistence farming. The food industry constitutes 20 percent of the manufacturing industry production value and provides employment to approximately 250,000 persons (Tansug, 2008). Some EU countries are aware of the opportunity of making Turkey a privileged commercial partner in the agricultural sector while reinforcing political and economic relations.

For agricultural economists Atici and Kennedy (2005:553), the agricultural sector becomes less compatible with EU integration, and the trade-off between supporting farmers and providing cheap and sufficient agricultural products for low-income consumers becomes a major dilemma. Turkish agricultural policies are aimed at providing a standard level of income. However, as a member of the WTO, Turkey has agreed to reduce its tariffs and other protection levels (see GATT 1994). At the same time, the EU plans to reform its agricultural policies to become more competitive and to comply with the WTOs rules. And there is a good reason to believe that there will be an unequal income distribution within the agricultural sector after integration into the EU. The reason for this deterioration is the diverse base level of protection for the selected agricultural products coupled with the EU’s various levels of protection for these products in case of integration (Ibid.562) Thus, this deterioration worsens with integration. Also, Turkish consumers are vulnerable to negative changes in consumer prices due to liberalization of agricultural trade (Atici & Kennedy, 1998). If agricultural policy is intended to benefit society as
a whole, it must consider the needs of low-income consumers as well as influential producer groups (Ibid. 562).

An agro-economic study done by Eruygur and Cakmak (2008) showed that the overall welfare effects of including agro-food products in the CU are small. The researchers showed that the winners of a possible enlargement of Turkey-EU customs union to agricultural products are, not surprisingly, EU-15 countries. In a recent report, Catalano (2011:40) argues that Turkey’s eventual membership would widen the EU’s agricultural area of 39 million hectares. In fact, Turkey is a major agricultural producer and net exporter: in 2007 its cereal production equaled 11.4 percent of the EU’s production, fruit and vegetables equaled 60 percent (Ibid. 40). Given this data it is possible to understand the EU’s reluctance to fully liberalize agriculture (Ibid.). Still, no fixed timetable is scheduled to thoroughly include agriculture in the CU.

In the event of full inclusion in the CU framework, Turkey would be constrained to lower its prices in accordance with the WTO-led trend pushing towards the liberalization of agricultural goods. This in turn would negatively affect the welfare gains of Turkish farmers, who are already in a disadvantaged position (Catalano, 2011). Lowering agricultural prices would increase the need to support producers through export subsidies, administered prices and direct payments. The ongoing liberalization of agricultural goods in fact has already affected Turkey in this sense (Grethe, 2003). Given the exclusion of agriculture from the CU arrangement and Turkey’s maintenance of relatively higher tariffs, the agricultural sector has ended up being a more protected sector [“border protection”] (Catalano, 2011). This has led in turn to the increase in the “asymmetry of the integration depth within the CU, with negative effects for Turkey” (Ibid. 41). In order to balance different exports levels between the industrial and the agricultural
sectors, Turkey would have to subsidize agricultural goods by boosting exports in an inefficient way and this negatively affects fiscal deficit (Ibid. 42). Therefore, the ‘asymmetric nature’ of the CU poses some problems that should be addressed, fostering widening and deepening measures in the context of trade with the EU. In terms of agricultural trade, there is no investigation of the ‘unequal agricultural exchange’ in physical terms between Turkey and the EU-15.

**Turkey’s Manufacturing Industry Trade Agreements with the EU**

The EU is one of Turkey’s major trade partners, constituting more than 50 percent of the country’s total average manufacturing industry trade from 1980 to 2001. Because of the CU, Turkey’s weighted rates of protection for imports of industrial products originating from EU and EFTA member states have fallen from 5.9 percent to 0 percent and from 10.8 percent to 6 percent for similar goods originating from third countries (Bayar et al., 2000). With the implementation of the CU, Turkey reduced her nominal protection rates (NPR) on industrial imports from the EU to zero (Togan, 2000). Turkey also adopted a Common Customs Tariff (CCT) against third countries and became more open to international competition compared to other developing nations (Akbostanci et al., 2006). Hence, the CU not only “deeply” liberalized Turkey’s trade with the EU but also through the CCT it liberalized trade with other major partners. Between 1980-1990, the manufacturing sector grew by 7.9 percent annually, while in the following decade its growth reached 5.9 percent (World Bank 2000 cited in Catalano, 2011:37) However, this growth rate is not stable, and there are large swings in the growth rate of the volume of trade. Turkey’s trade balance in the manufacturing industry during the period of

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81 With the implementation of the Uruguay Round reductions, Turkey’s average rates for third countries is lowered to 3.5 percent (Togan, 2010:30)
1980-2001 has always been in deficit, a deficit that has grown since 1988 with no end in sight (Akbostanci et al., 2006)

There are econometric studies that investigate the impact of the CU on Turkish manufacturing industry trade and the environment. Utkulu and Seymen (2004) examined the demand for exports and imports for Turkey in relation to the EU for the 1963-2002 period. The only study that focused on the CU and its impact on the environment was done by Elif Akbostanci et al. (2006). These scholars investigated whether the trade in the manufacturing industry complies with the PHH, and whether the free trade environment provided by the CU altered the trade pattern of clean and dirty industries. Their results have shown that while the CU positively affects import demand, it does not have any significant impact on the export demand for Turkish manufacturing industry. In terms of the environmental impact, distinctions between clean and dirty industries turn out to be significant for both the import and export sectors. The researchers find that both clean and dirty industries’ Turkish import demand increased between 1980-2000. The authors report that this last result could be taken as evidence for the trade effect of the pollution haven hypothesis even though their findings suggest that the CU agreement has no significant effect on the Turkish export demand for clean and dirty industries. They only find weak evidence that the demand for dirty imports declined slightly during the CU period. In terms of export demand, the export demand for Turkey’s clean industries declined, whereas export demand for Turkey’s dirty industries increased in comparison to the total demand during the same period. In this chapter, I investigate the EU’s impacts on both agriculture and manufacturing sectors during the year of 2002 by utilizing a special input/output matrix called
PLUM. I examine both at the EU-15 level and individual nations within the EU-15, and also focus on variables associated with embodied cropland/ grazing land impact (in ha.).

Liberalized trade regimes and market determined exchange rates will increase the incentive for exports, which in the end will cause greater exploitation of natural resources (Akbotanaci et al., 2006). Furthermore, free trade also undermines environmental legislation, agreements, and protection. In short, free trade increases industrial pollution in developing countries through the movement of dirty industries from developed countries having strict environmental regulation to developing countries where such regulations are lax or non-existent. Trade liberalization negatively affects domestic environmental policies in developing countries, particularly when the governments of these countries are a party to international trade agreements like the NAFTA and the CU.

**Shortcomings of the Customs Union with the EU**

The CU between Turkey and the EU goes far beyond a basic custom union with free international trade and common external tariffs, while giving a new force to the liberalization process in Turkey (Utkulu & Seymen, 2004). However, the CU has some loopholes and produces several drawbacks. First, the CU’s main weakness seems to be the lack of cooperation and consultation between the two parties in dealing with commercial policy choices, since Turkey has actually said ‘no’ to EU external trade policy. This, in turn, has brought about some inconsistency between the EU-Turkey trade policy (Catalano, 2011). After 1996, Turkey is not included in the critical decision-making process, as Ülgen and Zahariadis (2004) detailed. Moreover, Turkey was forced to conclude FTA agreements with ‘third countries’ after the EU did. This trend is seen as the origin of a highly detrimental situation for Turkey (Catalano, 2011). EU’s trade partners have been unwilling to negotiate with Turkey because of FTA’s establish-
ment with the EU (and in virtue of EU-Turkey CU) and their ability to export tariff-free goods to the Turkish markets. On the other hand, since the preferential agreement just included goods originating from the EU, they were not bound to lower their tariffs vis-à-vis Turkish goods. To this extent, EU-Turkey CU created a typical case of ‘trade deflection’ (Ibid. 43). Therefore, Turkish exporters found themselves at a disadvantage in regards to the EU’s exporters to third countries as their goods did not fall within the preferential agreement (Ulgen & Zahariadis, 2004). Accordingly, the loss of potential tariff revenues from goods coming from third countries entered into the Turkish market via the EU (Kutlay 2009:127).

Secondly, there are several areas that are not included in the CU. Besides the ‘in-between’ solution offered via the CU in the agricultural sector, which is not satisfying, the liberalization of ‘trade in services’ could have a strong impact on the productivity and competitiveness of Turkey’s service sector (Catalano, 2011). Currently, the Turkish economy is rapidly shifting towards a service-led economy, thus the liberalization of this sector could further improve CU parties’ mutual gains in terms of efficiency and lower prices, as Catalano (2011) has detailed. However EU members’ fear for ‘social dumping’, yet magnified by the latest enlargement, is likely to deny Turkish enterprises the right to settle and eventually bring their labour force to the EU (Ibid. 43).

Third, given current patterns of trade globalization, the high volatile nature of the international financial system and the growing intra-systemic asymmetry, multi-lateral arrangements seem harder to achieve and became less attractive in terms of the immediate gains and positive outcomes (Catalano, 2011). Thus, it is argued that FTAs will continue to be the most used trade arrangements insofar as trade liberalization on wider sectors is concerned. In
In this context, the EU-Turkey CU looks more like a liability, rather than an asset (Ibid. 46). On the other hand, the geography of Turkey’s economic role is radically changing. In the mid-1990s, when the CU agreement took place Turkey was in fact exclusively dependent on the trade flows with the EU. Up till now, Turkey’s trade patterns have widened and diversified to a great extent. For Catalano (2011), the ‘mismatch’ among Turkey’s expectations, the commitment towards membership and the EU’s ambiguous behavior is deepening while current arrangement appears too rigid and too less inclusive to match with Turkey’s economic dynamism.

Another important drawback derives from ‘hidden protectionism’ (Ulgen & Zahariadis, 2004). More specifically, the ‘contingent protection’ (anti-dumping82 and countervailing83 duties) continues to represent a serious barrier in bilateral market access (Ibid. 4). Estimates suggest that the continuation of EU anti-dumping duties have led to welfare losses of up to $70 million for Turkey (Ibid. 4). Equally, in the area of technical barriers to trade, Turkish exports produced under European specifications continue to be restricted due to the EU’s lack of recognition of certain Turkish certification procedures. If Turkey’s certification procedures were to be recognized by the EU, then the gains from the abolition of technical barriers in this area could reach up to 0.8-1 percent of the GDP (Ibid. 10).

Ulgen and Zahariadis (2004) questioned whether the elimination of conventional border controls increased pressures in the EU for more trade-defense measures against Turkey. The fact is that the EU’s anti-dumping measures against Turkish exporters have increased over the years.

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82 Anti-dumping measures consist of special import duties imposed on products when the price of imports is alleged to be below the price (or normal value) charged by the foreign firm in its domestic market.

83 These measures involve special import duties imposed when subsidized exports in foreign countries result in a costly reallocation of resources in the importing country or when subsidized exporters are able to pre-empt competitors in the home market and enjoy monopoly power.
On the Turkish side, there are anti-dumping cases initiated against EU member states; however such barriers have a minimal impact on the EU exporters’ side. In the context of the EU, the Commission has used anti-dumping for the protection of European cartels against foreign competition in the past (Messerlin, 1995). There are no such allegations in the context of EU-Turkish relations (Ulgen & Zahariadis, 2004). Nevertheless, there have been cases where the allegedly dumping Turkish firm has a negligible share of the EU market, which would suggest that European complaints were not targeting environmental predation, but rather protecting their dominant position in the market (Ibid. 12). As for Turkey, the most important aspect related to the current functioning of the CU would be to eliminate the “hidden forms of protectionism,” especially in the area of technical barriers to trade. Scholars suggest that both partners should focus on the elimination of trade defense instruments vs. each other and should define the conditions related to the abolition of these instruments in clearer terms (Ibid. 30).

Lastly, the EU must undertake a significant effort to alleviate the concerns of the Turkish side in terms of the ‘policy-dependency’ framework, particularly in relation to the development of a genuinely common commercial policy. It is argued that the CU is an intrinsically complex arrangement to carry out. With this policy-dependency approach, managing two sovereign entities of different sizes becomes more difficult (Ulgen & Zahariadis, 2004) The CU only placed importance on Turkey’s obligations to catch up to the International Standards (Ozturk & Sertoglu, 2007). However, in comparison to other candidate countries, Turkey had benefited very little from FDI and technology transfer from the EU due to its unstable internal political arena (Carikci, 2001). In the light of the growth in the trade volume and a lack of significant change in trade direction, it is concluded that the Turkish-EU’s CU has been welfare-creating, leading to
more trade creation than trade diversion (Ulgen & Zahariadis, 2004). Overall, the EU appropriates not only Turkey’s ecological space (as shown below) but it also appropriates Turkey’s political space through the CU and its related agreements.

Research Methods, Hypothesis and Findings

Research Methods

As argued in Chapter Two, de-coupling economic growth from underlying biophysical flows is a goal of sustainable development advocates for two reasons. First, it can help avoid the risk that ecological degradation will generate economic problems. Second, de-coupling creates the opportunity for societies to continue progressing without ecological constraints (Giljum et al. 2008; Moran et al. 2008).\(^{84}\) In order to quantify biophysical flows, an input-output index called PLUM (Product Land Use Matrix), which was developed by GFN scholars, is used to measure the ecological trade balance. How large of an EF (ecological footprint) a given country exerts inside the borders of each of its trading partners is the question that PLUM methods attempt to answer. By using PLUM, one can see a single step in the supply chain: a product’s most recent source. This method does not follow traditional input-output formulation; however, it is a special case of a generalized input-output calculation (Weidman et al., 2007). The PLUM was chosen by Moran and other scholars to measure ecologically unequal exchange. One limitation is that PLUM does not capture the trade in services between nations (Moran et al., 2008). The CU between Turkey (argued earlier) and the EU-15 does not include trade in services. For this

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\(^{84}\) For Schutz et al., (2004:19) the direct material input of the EU-15 remained more or less constant during the last two decades of the 20\(^{th}\) century, which indicates a relative de-coupling from monetary economic growth.
chapter, the PLUM is specifically utilized to see how much CO$_2$ 85 embodied in the agricultural and industrial products in 2002 during physical trade between Turkey and EU-15. 86 This dataset also includes how much hectare of cropland and/grazing land is embodied into the products that are exported and imported.

**Research Hypothesis**

The central questions as stated in Chapter One are the following: To what extent is unequal ecological exchange occurring between Turkey and the EU? In other words, to what extent has Turkey been "feeding" the EU with agricultural exports and supplying manufacturing goods produced by “dirty” industry? The PLUM matrix is used to examine whether the EU is fostering the creation of pollution havens in Turkey. This is an important inquiry since the integration of the EU is still in process. The specific hypotheses stated below are related to trends in pollution terms of unequal ecological trade and trends in agricultural exchange between the EU-15 and Turkey. The deeper ecological unequal exchange analysis at the regional level focuses on products that have a large ecological impact, what Turkish trade looks like with the EU.

I hypothesize that the “pollution haven” created in Turkey by the EU, which is marked by increasing “pollution-intensive” activity, is associated with the increased CO$_2$ embodied in exports of Turkey’s non-agricultural products through trade with the EU.

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85 As Lohl (2002:73-74) indicates, CO$_2$ makes a good environmental indicator for several reasons: CO$_2$ comes from the burning of fossil fuels that power development; CO$_2$ effluents impact relations among states in that effluents generated in one location become part of the atmosphere where they are dispersed, and their consequences are felt everywhere; CO$_2$ a key and important components of the natural environment. The burning of carbon-based fuels constitutes both a modification to the natural environment and a linkage between the social and natural environments.

86 The “t\_CO$_2$” in the database is estimated embodied CO$_2$ in the product, in metric tons. Embodied footprint areas (in cropland/grazing land) are given in true hectares.
Similarly,

I also hypothesize that both the creation of a ‘pollution haven’ and the appropriation of Turkey’s cropland (increased utilization of cropland in ha.) is associated with the increased CO₂ embodied in exports of Turkey’s agricultural products through the trade with the EU.

**Empirical Findings**

Based on the index of input/output matrix, the physical trade balance (PTB) as well as monetary trade balance is calculated. Based on PLUM matrix (which includes about 61,556 products), the whole PTB of pollution intensive products is calculated as (weight) over -96.95 millions tons for all trading partners of Turkey. In monetary terms this balance, not surprisingly, is over $ -15.5 million, according to the PLUM data.

**Unequal Agricultural Trade: the EU and Turkey**

In PLUM, the agricultural sector (and other sectors) is formulated as input/output data (aggregate level from 1-digit to 4-digit highest resolution). First, it is observed that the total weight of CO₂ embodied in imported agricultural products is just under 4.6 million tons as opposed to total weight of exported agricultural products, which is just over 4.1 million tons, a little less than imports for all Turkey’s trade partners. This difference between the export and import flows encouraged me to narrow the unit of analysis down to EU-15 nations. Second, similar to the CO₂ embodied in imported and exported products, a relatively small difference between the weight of exported and imported products is observed. For all trade partners of Turkey, the total weight of agricultural imported products is calculated as over 4 billion kilograms, whereas for exported products total weight is just under 3.7 billion kilograms. Even

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87 EU-15 defined as: United Kingdom, Germany, Italy, France, Austria, Ireland, Netherlands, Denmark, Belgium, Sweden, Luxembourg, Portugal, Spain and Greece.
though the entire PTB balance is negative, the agricultural sector PTB is positive. However, the
difference between imports/exports is quite small, and requires further analysis. For the
agricultural sector, the ‘food and animals’ section is selected (which corresponds to the same
category in COMTRADE) for the EU-14. A few members of European Environmental Agency
(Norway and Switzerland) are also included in my analysis. As Figures 6.1, 6.2 and 6.3 attest,
unequal exchange in terms of embodied CO₂ in exports and embodied (or used) cropland (eco-
footprint of crop), is calculated in true hectares, and observed for the year 2002. Even though the

**Figure 6.1: Physical trade between Turkey and some countries in the EU-15 (UK, Sweden, Netherlands, and Germany)**
‘intensity’ or ‘degree’ of unequal ecological exchange varies among EU-14 nations, as shown in Figure 6.2 and 6.3, Turkey used more cropland (in ha.) and has a cropland deficit (degradation) in comparison to the countries included in the analysis. While the EU-14 maintains their cropland, the degradation in cropland in Turkey is observed. Similarly, the trade between

Figure 6.2: Physical trade between Turkey and some countries in the EU-15 (Denmark, Austria, Finland, and France)

all EU-14 nations shows that embodied CO\(_2\) in Turkey’s exports is much higher, whereas lower amounts of CO\(_2\) are embodied in imports in comparison to the total demand. For instance, trade
between Sweden and Turkey illustrates that embodied CO₂ in Turkish exports is much higher than its imports. In other words, Turkey’s ‘dirty’ exports are higher, even in agricultural trade, with all the nations of EU-14. In terms of embodied cropland (or use), only Portugal has used a lesser amount of cropland (in ha.) than Turkey for the year 2002.

Figure 6.3: Physical trade between Turkey and some countries in the EU-15 (Belgium, Ireland, Italy, and Portugal)

As Figure 6.4 attests, only Greece, which is a non-core nation of the EU, is a special case. In terms of embodied CO₂ in exports of agricultural products, Turkey’s exports are slightly
higher than on Greece’s side. In terms of cropland used, however, Greece utilized more cropland for the year 2002 doing trade with Turkey. In other words, a cropland deficit is observed on Greece’s side, but not in Turkey. In regards to Norway and Switzerland (see Figure 6.4), embodied CO₂ in exports of agricultural products is relatively higher (whereas imports are very low) in comparison to the total demand. The same trend is also observed in all EU-14 nations as mentioned above. In terms of cropland, Turkey used more cropland in ha. (or crop ecological footprint is higher) for exports whereas almost no cropland is utilized in both Norway and
Switzerland (in comparison to the total demand). All these findings support the notion that Turkey’s ecological space is being appropriated by the EU while also serving as a pollution haven.

**Pollution terms of Unequal Ecological Exchange: the EU and Turkey**

This section utilizes the PLUM to examine trade in selected non-agricultural sectors, while considering the categories of dirty industry documented from the most dirty to the least dirty by Akbostanci et al (2006). First, it is observed that embodied CO₂ in Turkish exports of non-agricultural products are relatively high, whereas imports are very low, when compared to the total demand at 1-digit resolution (corresponds to SITC in COMTRADE). In contrast to the agricultural sector, Turkey’s non-agricultural sector’s embodied CO₂ in imports is just under 206.8 million tons, as opposed to nearly 304.2 million tons in exports. Thus, the PTB is negative -97.4 million tons, which is an important indication of unequal ecological exchange between Turkey and all trade partners. Unequal ecological exchange denotes such inequality between imports and exports (Andersson and Lindroth 2001). This preliminary finding, unequal exports and imports, is ripe for further investigation. Second, by examining the 1-digit level data, some of the categories in the export section encouraged additional analysis at 4-digit level, the highest resolution (that is specific, individual products, such as steel). Thus, the analysis is narrowed down to the EU-15 in regards to embodied CO₂ in exports/imports from 1-digit to 4-digit resolution (or from general product categorization to specific one product). The following seven different categories are examined at the level of EU-15.  

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88 Due to some “mismatch data cells” in the PLUM, not all categories examined down at country level; instead all categories investigated at EU-15 level.
Textiles: Textiles and clothing reveal themselves as the leading export sector in Turkey (Mercier & Yeldan 1997). It is also one of the ‘dirty’ industries in Turkey (Akboştancı et al., 2006; Bekmez & Gokalp, 2005). For textiles, not only the embodied CO₂ in textile products are analyzed, but so are the embodied crop/grazing land. For all the trading partners with Turkey, about 129,951.5 in true hectares of cropland and 170,839.3 hectares of grazing land are utilized to export products under the ‘textiles’ category by Turkey. It is observed that over 27.7 million tons of CO₂ are embodied in Turkish exported ‘textile’ related goods, whereas 30.7 million tons of imports in comparison to total demand. These baseline given data (at 1-digit resolution) prompted an examination of data at the highest resolution (or at product level) while focusing on EU-15.

In applying the PTB approach for the EU-15 at 4-digit high resolution, it is found that embodied CO₂ in Turkey’s exported textile products (15.6 million tons) is more than the imported products (9.3 million tons) in comparison to the final demand (see Figure 6.5). In other words, the striking difference between the imports and exports is observed, which refers to unequal ecological trade. Then, the 4-digit resolution data is also examined at country level to
uncover ‘deeper’ ecological unequal trade. During the analysis of all 15 nations of the EU at product level, it is found a negative PTB in embodied CO₂ in textile products exchange. Figure 4 clearly shows the negative imbalance of physical trade in embodied between Turkey and all the EU-15.

In terms of cropland and grazing degradation during textile trading, the ‘export’ side is quite higher than imports at 4-digit resolution for the EU-15 (see Figure 6.6). This means that the EU-15 preserves it’s grazing and cropland while Turkish grazing and cropland run deficits. Accordingly, this finding demonstrates the appropriation of environmental space in Turkey by the EU-15. These findings prompted further examination of all 15 nations of the EU at 4-digit, product level. This high resolution data is analyzed country by country within the EU-15 to

**Figure 6.6: Physical Trade between Turkey & EU-15: Embodied Crop/grazingland**

![Embodied Cropland & Pastureland in Textiles Trade: Turkey & EU-15](chart)

capture a ‘deeper’ understanding of unequal ecological exchange. More detailed analysis showed that except for a few nations, all other 12 nations of the EU’s consumption demand resulted in relatively high embodied CO₂ in exported textile products from Turkey. Similarly, both Turkey’s crop and grazing lands have been appropriated by European capitalism.
As argued earlier, the PTB for the entire EU-15 is negative (for both embodied energy and crop/grazing land). Only three nations (Austria, Greece and Italy) can be considered as ‘outliers’ in this analysis. For Austria, Turkey’s grazing land is recorded as in ‘deficit’ in terms of the PTB approach, which is relatively high (-4159.4 ha.), marking Austria’s appropriation of Turkey’s environmental space. However, the PTB of embodied CO₂ in exports is positive in the case of Austria for the year 2002. A deeper analysis of Greece shows that CO₂ embodied in exports’ PTB which is -198304 tons. That is to say, Greece contributes to creating pollution haven. However crop/ grazing land PTB is positive. This means that in 2002 Greece, as one of the non-core nations within the EU, utilized its crop/grazing land more than Turkey. Italy is another ‘outlier’ in the case of embodied CO₂ in textile products which is higher than exports when PTB approach is applies. However, in terms of total weight (kilogram) of all textile products, the PTB becomes negative (-13.4 million kg.). It is also observed that embodied cropland’s PTB is negative (-17,201 ha.).

**Stone, Cement, Ceramic:** This category, which includes various products from millstones, glass to asbestos fibres, is reported as one of the dirty industrial sector in Turkey by a number of scholars (Akbostanci et al., 2006; Bekmez & Gokalp, 2005) Similar to other industrial categories, a snapshot of the entire trade for the ‘stone, cement, ceramic’ category prompted further investigation due to the relatively high embodied CO₂ for exported products, which was 6.6 million tons for all trade partners of Turkey during 2002. Since this variable is at 1-digit resolution, a deeper analysis is conducted at 2- and 4-digit product levels. A result of the highest resolution analysis for the 15 nations of the EU showed that the CO₂ embodied in products exported from Turkey are much higher in comparison to the products imported in comparison to
the total demand (see Figure 6.7). As summarized in Figure 6.7, all EU-15 is included in the
analysis to obtain more detailed results for pollution terms of unequal ecological exchange
between the EU-15 and Turkey. The deeper unequal ecological exchange is observed when PTB
approach is applied. A relatively high negative PTB, which is -3125095.41 tons, is another

**Figure 6.7: Physical trade flows between Turkey & EU-15: Stone, Cement, and Ceramic**

![Physical "dirty" Trade (Stone, Cement, Ceramic): Turkey-EU15](image)

strong indication of ‘pollution haven’ created by the EU-15. Some of the EU-15 nations’
contribution to the creation of pollution haven is more noticeable, such as in Belgium, France,
Germany, Greece, Ireland, Italy, Spain, Netherlands, and the UK. In other words, the total
embodied CO₂ in exported products to cover the EU’s consumption demand is much higher in
comparison to embodied CO₂ in imports. The findings of this category—stone, cement,
ceramic—a growing traditional industry, calls for environmental and climatic justice.

**Machinery:** This category is also one of the dirtiest industries in Turkey. In 2002, the
one-digit level resolution of trade data showed that embodied CO₂ in exported machinery
products for all trade partners of Turkey is observed as 25.2 million tons. This preliminary
finding provoked further analysis at EU-15 level. As Figure 6.8 shows, the embodied CO₂ in
exported products (144.5 million tons) exceed the CO2 embodied in imported products which is 105.7 million tons at 4-digit (or product) level. The PTB becomes as negative, which is another strong indication of unequal “pollution” exchange between Turkey and EU-15 for this category.

**Vehicles:** At one digit-level resolution in trade for 2002, this category marks the highest embodied CO₂ (136.8 million tons) in exported all kinds of ‘vehicles’ related products. In contrast to exports, 1-digit level of embodied CO₂ in imported goods is just only 16.3 million tons for all trade partners of Turkey. This preliminary finding provoked for further investigation. Thus, the 4-digit resolution data is analyzed by focusing on the EU. As a result, (see Figure 6.9), in contrast to the *machinery* category discussed above, even though export as volume is less than exports, the embodied CO₂ in exported products is relatively higher (220.8 million tons) than the embodied CO₂ in imported products (105.8 million tons). Obviously, the PTB is negative (-11,496,001), which is a strong indication of unequal *pollution* exchange between Turkey and EU-15.
**Prepared Food:** Since 2000, Turkey’s trade in prepared food has been one of the fastest growing sectors; some EU nations now approach Turkey for partnerships in this sector. In analyzing the 1-digit level PLUM data on Turkey’s physical trade with all trade partners showed that embodied CO₂ in exports of prepared food products is relatively higher (4.4 million tons) whereas the imports, which is half as much 2.3 million tons in comparison to the total demand. This preliminary finding convinced me to undertake further investigation at the 2 and 4-digit high resolution of EU-15. In this category, similar to textiles, not only embodied CO₂ (energy) but also cropland (ha.) is analyzed. As Figure 6.10 attests, the negative PTB is noticeably high for both energy (embodied CO₂) and embodied cropland (footprint demand in ha. or cropland used to produce those products). Turkey’s cropland shows a ‘deficit’, which means the country’s ecological space is being appropriated by the EU-15. A pollution haven is being created at the same time. Among the EU-15, Germany, Netherlands, UK, and Belgium contribute more to the

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89 See Samoggia et al. (2008) Agro-food sector: is Turkey a competitor or partner to the EU states?
pollution terms of unequal exchange. In other words, it illustrates the disproportionate use of Turkey’s environmental space by the EU-15.

**Mineral Products:** This category, which includes products such as ores, mineral fuels, mineral oils, sulfur, and salt, is also recognized as a ‘dirty’ sector in Turkey. My analysis shows that CO₂ embodied in the export of mineral products at 1-digit level recording is 7.2 million tons, which is little higher than the ‘stone, cement, ceramic’ category discussed earlier. Even though PTB is positive at 1-digit level for all trade partners of Turkey, the analysis of 4-digit resolution (see Figure 6.11) showed that the total export of embodied CO₂ in mineral products is considerably higher (nearly 3 million tons) than embodied CO₂ in import of mineral products, which are only 635,521 [not even a million!] tons in comparison to the total demand. It is found that this category, in particular, has a relatively high negative physical trade balance (-2.3 million tons) (see Figure 10). Once again, the pollution terms of unequal exchange are revealed in this category, and point to the need for a climate justice perspective.

**Base Metals:** This category, which includes iron and steel industries/articles and many other metals, is also identified as one of the dirty industries (Akboštanci et al., 2006; Bekmez & Gokalp, 2005). The snapshot of the entire trade section for the year 2002, the base metals category captures a very high level of embodied CO₂ for exported base metals, which is 77.4 million tons for all trading partners of Turkey. Since this variable is at 1-digit resolution, a further analysis is conducted at 2- and 4- digit product level. The highest resolution analysis (4-digit, product level) for the EU-15 showed that the CO₂ embodied in all the base metals that are

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90 In addition to agricultural products, coal and steel products are not covered by the customs union (INRA, 2008).
exported from Turkey, are higher (27.3 million tons). In contrast, embodied CO₂ in imported products (nearly 18 million tons) is much lower in comparison to the total demand. Accordingly, a negative PTB (-9.3 million tons) for the whole category is a strong indication for the pollution terms of unequal ecological exchange (see Figure 6.12).

In this category, a few products (at 4-digit level) are also separately analyzed by focusing on only one of the nations of EU. For instance, Turkey-UK physical trade for ‘iron and steel’ products showed that embodied CO₂ in exports is higher (close to 2 million tons) than embodied CO₂ in import of base metals (only 968,000 tons or close to 1 million) in comparison to the total demand. This result marks a negative PTB between Turkey and UK. Frederiksen et al. (2007) argue that increased consumption depletes domestic supplies, thus the EU’s core nations import materials to fulfill demand. By increasing Turkish imports Europe outsources CO₂ emissions. Based on these findings, the disproportionate content of CO₂ emissions as well as cropland
/grazing usage, indicate a significant appropriation of energy and the ecological space of Turkey through trade.

**Further Discussion and Conclusion: Europe's Ecological Debt, Environmental and Climate (in)Justices**

The European economy has been increasingly dependent on material inputs from outside its territory in the course of the 1990s (Wuppertal 2003). Through international trade, the EU appropriates material resources from all over the world without reciprocally re-exporting physical resources (Giljum 2007). At the end of the 1990s, the EU had a net import of almost 1 billion tons of materials per year from outside its territory (Giljum and Hubacek 2001: 34). In terms of material flows, the trade relations between the EU and the other world regions can thus be characterized as ecologically unequal (Giljum et al., 2007). The EU is importing most of the pollution-intensive products from other world regions, including developed and developing nations, such as Turkey. This chapter also demonstrates the physical “dirty” trade balances for pollution terms of unequal exchange in the case of trade with Turkey. This result complements the findings of Bringezu and Schütz (2001b: 36-37), who assessed that the total material requirements of the EU are increasingly satisfied by imports instead of domestic material extraction. This chapter’s findings on the agricultural and non-agricultural sector’s demand on land and ‘energy footprint’ (in the form of embodied CO₂ in exported products) contributes to specific regional studies—Turkey and the EU. The socioeconomic system of the EU is indeed to some extent draining off ecological capacity from other world regions (including non-EU countries, such as Turkey) and is heavily dependent on resource inputs provided by other countries.
European ecological economists (Frederiksen et al., 2007) claim that allocating CO₂ emissions to producers masks the effects of consumer behavior. In the Kyoto Protocol, for instance, the current scheme of carbon accounting follows an approach of “producer responsibility” which means that CO₂ emissions are counted in the country where the actual CO₂ emissions occur. As a result, the Kyoto emission inventories of some countries could reveal a positive (downward) trend, while the consumption patterns of the population remain unchanged. However, as the authors emphasize, the absolute amounts of CO₂ are actually increasing. These scholars agree that the current accounting system should be changed to a “consumer responsibility,” approach where the final consumer is responsible for all CO₂ emissions related to the consumption of products, independent from the location of its production. This would, however, require allocating all CO₂ emission related to different process steps along the international production chains to the final consumers in the different countries.

Recently, Bruckner, Polzin, and Giljum (2010) investigated whether the producer or consumer is responsible for the CO₂ emissions embodied in trade. This comparison raises political questions relating to environmental justice, the responsibility for carbon emissions and climate change. The researchers stressed that production-related emissions in many export-oriented developing economies are to a considerable extent driven by the consumption patterns in industrialized nations. They conclude that debate on global environmental responsibility should not only focus on CO₂ emissions but also consider the unsustainable use of raw materials, land, water, and other resources.

As detailed in Chapter Two, the overuse of global environmental space by European and other industrialized nations during the last decades can be expressed by the so-called ecological
debt. For ecological economists such as Giljum and Roskoll, (2006), ecological debts are induced by the fact that resource prices do not make up for regional environmental harm caused by resource extraction and destruction of the basis of life of the local population in the global South. On the other hand, core nations draw upon or damage a disproportionately high share of “global property,” without compensating the periphery (SERI, 2006). This becomes evident in the case of embodied CO₂ emissions in products (or energy footprint) as exemplified by the EU-Turkey case.

Whereas industrialized nations emit(ted) the major part of greenhouse gases, it is the poorest countries that are most strongly affected by global environmental changes. Weisz et al. (2006), who investigated the level and composition of domestic material consumption reported that trade plays an increasing role in the physical economies of the EU. Domestic resource dependency is still high for some materials physical trade volume, thus trade intensities are increasing rapidly in all EU member states. This supports, as the authors emphasize, the increasing attention afforded to issues of global inequality and ecological unequal exchange. The Wuppertal Institute urges the EU to take the issue into account as it crafts a strategy on the sustainable use of natural resources.

International trade has created numerous environmental injustices between different parts of the world (Hornborg, 2010). The global North, in particular the EU, has been able to shift ‘their’ environmental loads onto the global South (to places such as Turkey), where labor and natural resources are cheaper and environmental legislation less of an obstacle. Recent approaches which analyze unequal ecological exchange and environmental load displacement use various biophysical metrics rather than monetary ones to measure the uneven flows and the
environmental impacts of international trade. Thus, one of the approaches, such as PLUM (input/output matrix, an advanced footprint analysis) is utilized to measure pollution terms of unequal ecological exchange, more specifically pollution-intensive, embodied energy (or embodied CO₂ in products). This has been one of the demanding research subjects in recent years. In addition, cropland and grazingland (in ha.) embodied in trade is integrated in this study.

As a result of analyzing PLUM from 1-digit to 4-digit resolutions, it is revealed that the EU is ‘contributing’ to the ‘degradation’ of cropland in Turkey while protecting ‘theirs’ through trade. The ‘deeper’ analysis of ecological unequal exchange also shows that through the exports of ‘dirty’ products, the EU is creating a ‘pollution haven’ in Turkey. In other words, the expansion of European capital accumulation is predicated on the consumption of growing quantities of natural resource flows (both in the form of crop/grazing land and embodied energy in exports) from Turkey to the EU-15. Two main conclusions: (1) exports from Turkey are more pollution-intensive in comparison to the export flows of the EU-15; and (2) Turkey’s embodied crop/ grazing land in exports is higher than the EU-15. The disproportionate use of environmental space is also about the disproportionate emissions of carbon dioxide. It is also a form of European thermodynamic imperialism in terms of the appropriation of energy and land. In order to respond to its consumption demands, the EU appropriates ecological space through trade without having to deal with its local ecological consequences.

Yet, the EU mandates that Turkey comply with CAP, CU, and several other regulations, which are all under critical reviews, so that Turkey becomes one of the nations of the EU. The part of the EU’s environmental acquis that Turkey would have to adopt by 2015 is legislation
aiming to avoid adverse impacts of agricultural activities on the environment (Oskam et al 2005:192; Adaman & Arsel, 2005).\footnote{According to Izci (2005:97), compliance with the EU’s \textit{environmental acquis} presents a two-way challenge in terms of capacity building and financial resources.}

Then, the question is, for instance, how can one explain the EU’s impact on Turkish cropland through trade? In addition to the appropriation of ecological space through FTAs and CU agreements, Turkey is expelled from critical decision-makings processes and denied an appropriate ‘political space.’ As detailed above, deep liberalization through EU FTAs, the restricted access, especially in form of ‘rules of origin’ which designed to support EU industries, whereas tariff concessions in FTAs are also minimal (see Oxfam Intl, 2007).

Membership in the EU would imply that Turkey surrender its right to a national trade policy. This means that, whilst remaining an individual WTO member, Turkey would no longer negotiate independently in multilateral negotiations, and its own import and export regimes and protocols would become those of the EU (Oskam et al., 2004:196). During the pre-accession phase, one would expect Turkey’s position on international trade issues to become closely aligned with that of the EU (Ibid. 194). Recently, Turkey is considering revisions to its CU treaty with the EU. It is reported that CU has problematic aspects, including a lack of Turkish involvement in decision-making processes, signing agreements with third parties (Hurriyet Gazetesi, April 26, 2011). Therefore, Ankara would now be more careful about the readmission agreement. As Cakmak (2007) predicted, an actually perceived threat for agriculture\footnote{With EU membership, fruit and vegetables remain competitive but cereals and livestock products are uncompetitive (Osham, 2005). For Grethe (2004), in both the full liberalization scenario and the agriculture-in-the CU scenario, Turkey appears to be a net exporter of fruits and vegetables and a net importer of cereals and processed products. Under both scenarios, Turkey} may turn
to a nightmare in the future even for a slight ‘decline’ in protection status against the EU. For Catalano (2011:42), without any serious evidence of an eventual membership, the CU long-term sustainability could start to be put into question while addressing its shortcomings.

In regards to environmental justice policy in the EU, Muhovic-Dorsner (2005) found that the ecological justice discourse in the EU is under-developed. In terms of official legislation, the EU’s governing bodies do not explicitly incorporate *environmental justice* or *ecological justice* into legal principles or rules of the community. A similar trend characterizes the legislation of individual European nation states (Ibid.240). By contrast, *environmental justice* has specific legal meaning in the United States (Executive Order No. 12,898, 1994) and can be the basis for legal action against private or public sectors that are believed to violate the principle. Moreover, the existing European ecological justice discourse does not have an evident concern with regional climate policy issues (Ibid.). For example, official publications of the EU do not mention the issue at all, and leading European research think tanks (e.g., the Wuppertal Institute and the Oxford Institute for Energy Studies) have largely confined their attention to North-South issues.

According to the Environmental Justice and Climate Change Initiative (EJCCI), climate justice is a vision to dissolve and alleviate the unequal burdens created by climate change. Current efforts are certainly in question in terms of stabilizing the world climate for the next 50 years (Giljum et al., 2008). It is argued that the reduction of CO₂ emissions will have an effect if an increasing number of people in developing countries start consuming the same amount of energy (Giljum & Roskall, 2006; Wuppertal 2009). As a form of environmental justice, climate justice is the fair treatment of all people and freedom from discrimination with the creation of

also remains a net exporter of plant products as a total, including fruits, vegetables, cereals and other crops. These findings are consistent with those of Cakmak and Kasnakoglu (2003).
policies and projects that address climate change and systems that create climate change perpetuate discrimination (EJCCI, 2009:1). Climate justice coalitions believed that Kyoto would fail to combat the climate change crisis as the Protocol continues to promote corporate and the core nations’ interests (Roberts & Parks, 2009:394). In fact, the Kyoto Protocol and the EU’s Emission Trading System have produced no demonstrable reductions in emissions (Storm, 2009; Lohmann, 2009).

Carbon markets and carbon trading, as developed in the Protocol and other exchanges, were promoted by the traders and neoclassical economists who invented them as a means for a transition to a fossil fuel-free future (Lohmann, 2009). In their decade of existence, however, they have done precisely the opposite, by offering the heaviest fossil fuel polluters in industrialized societies new means for delaying the steps toward structural change that need to be taken immediately, while simultaneously providing supplementary finance fossil-intensive industrial pathways in the South (Ibid. 1073). Furthermore, during the last decade, increases in atmospheric CO₂ concentrations have accelerated at the fastest rate ever recorded. Global climate conditions have gone from bad to worse. The worst-case IPCC projections are being realized (Storm, 2009; see Kintisch, 2009). Thus, an enormous ‘carbon debt’ is owed to future generation and to the poverty-stricken people of the world who have produced fewer GHG (Martinez-Alier, 2009). Ecological/ carbon debt as well as ecologically unequal exchange are

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93 The International Energy Agency predicts that, on current trends, GHG emissions will increase by 100 percent by 2050 (IEA, 2008, cited in Storm, 2009).

94 For Martinez-Alier (2009:1105), one of the effects of the economic crisis is a shift in the unsustainable trend of increasing CO₂ emissions.
two important concepts that the climate justice network of coalitions tirelessly remind the issue of ecological debt of the global North to the global South (Jubilee Debt Campaign, 2008).

The concept of global environmental justice has gained momentum within the world-system during the last decade. The local-global connection has always been important (historically) due to ecologically unequal exchange and the externalities caused by transnational corporations in the age of corporate-led globalization. In the context of inter-regional trade, such as with the EU, ‘regional’ environmental injustices become more visible through physical accounting studies, as illustrated by this chapter. Through global free trade and accompanying impositions on the global commons, core regions of the world system now live largely on bioproductivity imported from other nations. In fact, almost every nation is running an ecological deficit. However, the EU’s and core’s ecological deficit is more visible. The North-to-South export of the most polluting industries and waste suggests new ecological imperialism, where world system peripheries are converted into dumping grounds for ‘entropy’ generated by affluent core areas. This is a global environmental injustice since the periphery is exploited both as source of negative entropy and as a sink for ‘entropy.’ Analyzing the notion of ‘unequal exchange’ objectively, for instance in the case of Turkey-EU, shows asymmetric transfer by which the productive capacity of one social group is augmented at the expense of another. For those, who have access to resources with their economic and political power can reduce their exposure to these limits by absorbing the increased prices for commodities whereas the powerless cannot (Pellow and Brulle 2005). Again, those who have wealth and power can decide how to use global biocapacity. Then, what would be the global environmental justice

95 For detailed information, see Faber 1998; 2002; 2008; Adeola, 2000; Pellow, 2007; Pellow and Brulle, 2005; Bullard 2005; Bryne et al., 2002.
considerations? As we have gone beyond the *carrying capacity* of the natural resources of the world, the *limits to growth* is not shared equally among world populations. It can be argued that the ecological debt, ecologically unequal exchange, appropriation of ecological footprints, disproportionate use of the environmental space of the periphery, and ecological cost-shifting are *some* of the ‘ecological distribution conflicts’ which all refer to as ecologically unsustainable practices indicating the current logic of ecological imperialism, and also refer to global environmental injustice. Some scholars (Faber 1998, 2002; 2008; Adeola 2000; Guha 1997; Martinez-Alier 1998, 2002, 2009; O’Connor 1998; Shiva 1989; 2003; 2009) locate the root causes of environmental injustices (both in the North & South) at the expansionary dynamics of global capitalism. From the global environmental injustice perspective, Adeola (2000: 689; 691) articulates well that

the condition of environmental injustice is directly related to the global stratification system in which economically and politically powerful states are able to shift or impose the environmental burden on weaker states…[such as] transnational toxic waste imperialism schemes and resource exploitation in underdeveloped nations, [and]… global commons are under a serious threat by proponents of ecological imperialism, which has been implemented through MNCs [and, especially]…inequitable distribution of environmental hazards (or externalization of costs of production) by […] powerful foreign interests…

The next chapter, Chapter Seven, explores the impacts of unequal ecological exchange at the local level by focusing on the Köprülü Canyon National Park region in southern Turkey.
CHAPTER SEVEN

KÖPRÜLÜ CANYON NATIONAL PARK & ITS BUFFER ZONES: A LOCAL CASE STUDY OF UNEQUAL ECOLOGICAL EXCHANGE

...capitalist production, by collecting the population in great centres, on the other hand concentrates the historical motive power of society;...it disturbs the circulation of matter between man and the soil, i.e., prevents the return to the soil of its elements consumed by man in the form of food and clothing; it therefore violates the conditions necessary to lasting fertility of the soil. (Marx, Capital, Volume One: 416)

Introduction

In this chapter, I undertake a qualitative analysis of the socio-ecological impacts of unequal ecological exchange in Köprülü Canyon National Park and its buffer areas in Turkey. In the first part of the chapter, I explain the research methodology, questions, and hypothesis. The second part of the chapter has three sections. Here I define the social ecology of the yayla-peasantry at Köprülü Canyon, and focus on the colonization of the local ecosystem through an examination of the agricultural (yaylacilik) practices of the yayla-peasantry. I also investigate the transformation of traditional villages to transitional villages. Finally, I focus on the capitalization of the ecosystem, paying special attention to the flows of material and energy in an extractive economy. I also present a commodity chain analysis of the study area, emphasizing the ecological costs of export crops. In the concluding section of this chapter, I discuss the winners and losers of unequal ecological exchange from a “class” perspective.

The Köprülü Canyon: A Socio-Ecological Case Study (1990- 2010)

Qualitative Investigation: Research Questions and Methodology

This chapter focuses on the consequences of unequal agricultural exchange at the local level, and more specifically the socio-ecological impacts on the yayla peasants. I argue that the process of unequal ecological/ agricultural exchange has facilitated the destruction of agro-
forestry systems of *yayla* peasants in the Köprülü-Canyon National Park and its buffer areas, which had been balanced with local social and ecological conditions. Traditional peasant villages have been transformed into “transitional” export crop enclaves. Accordingly, they now participate in the domestic and export sectors of the economy as ecological victims of unequal ecological exchange. I will show that as villages inside and outside of the “protected” areas of park become engaged in export agricultural trade there is an associated destruction of well-established agro-forestry systems. In turn, this precipitates processes of ecological degradation in Köprülü Canyon National Park and its buffer areas.

In this ecological case study, I have adopted a number of data gathering methods and research procedures. More specifically, I use an ‘extended case method’ to test the central theory of unequal ecological exchange. I ask the following questions: what are the socio-ecological and economic indicators of transition and drivers of change? How do we define and explain the marketing channels for exporting agricultural products? Who are the actors involved in the marketing and trade of agricultural products? In other words, my research analyzes the role of ‘yayla peasants’ and other actors in contributing to the marketing of agricultural products (fresh fruit/vegetables, cotton, cut-flower, etc.) in Köprülü Canyon and its buffer areas.

Methodologically speaking, I adopt a case study format that focuses on the qualitative investigation of unequal ecological exchange at local level. I utilize three methods of data collection: (1) previous research results from my unpublished MA thesis; (2) semi-structured, long-distance interviews conducted between August-September 2010 and June 2011; and (3) the use of secondary literature sources, including online sources, newspaper archives, and

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96 See Buraway (1991) for an extended case study methodology.
government documents (See Appendix B for semi-structured interview questions, protocols, etc. and IRB forms). This study integrates previous research into the current semi-structured interviews as needed.97

After I reached a saturation point, I closed enrollment of new participants in June of 2011 (sample size: 20 participants). I then started to code my data listing the concepts reflected in my notes and diagramming the relationships between them.98 I then categorized the data into groupings. The goal of qualitative researchers is often to create “grounded theory” –that is, to inductively build up a systematic theory that is “grounded” in, or based on, the observations from the research (Schutt, 2001: 296). Thus, theory building is a vital part of the analyzing of qualitative data (as discussed by Coffrey and Atkinson, 1996: 23; and Schutt, 2001). However, the goal of the qualitative analysis of this chapter is not so much the creation of a new theory. I am also look to extend or add new components to the theory of unequal ecological exchange.

In this case study, I transcribed the interviews and then analyzed the data in order to find potential codes and recurring themes related to my research questions, all of which center on some aspect of persistence and transfer. For the final phase of my analysis, I interpreted these codes and themes to outline common patterns of persistence and transfer and located these patterns within the broader context of the social conditions and institutional arrangements that have shaped and organized them. That is to say, I mainly explored themes related to

97 This chapter incorporates the study done in 1990s which examined the period 1960-1990s.
98 See Maxwell, 1996: Designing Qualitative Research: An Interactive Approach. As Becker (1958) detailed, the analytic insights are tested against new observations or interviews provides an interactive process throughout which the researcher interacts with the data (cited also in Schutt, 2001).
considering the differences and similarities in considering local actors at the village, town, and provincial levels.

In this type of socio-ecological study, it is necessary to identify key components of long-term socio-ecological transitions. To accomplish this, I utilized long-term socio-ecological analyses (Fisher-Kowalski and Haberl, 2007). Socio-ecological transitions represent fundamental changes in the relation between natural and social systems, and merit special attention. In order to understand the challenge of sustainability, understanding such transitions are of particular importance. Transitions from the agrarian to the industrial mode of production entail qualitative changes in the sustainability problems experienced by a society (Haberl et al., 2004). This very transition process is currently underway in developing countries, accompanied by soaring energy consumption and greenhouse gas emissions (Haberl, 2006). Land use often maximizes certain services, (such as biomass production) at the expense of others, such as the regulation of water flows, biodiversity, resilience (Maass et al. 2005). Moreover, the economic or social value of services depends not only on preferences, but also on the mode of production (industrial vs. agrarian), market access, and the organization of the economy (Maass et al., 2005). Long-time socio-ecological research is necessary in order to compare the conditions of the past and present. In this case, my previous research in 1990s serves well for comparing of a number of variables involved in this case. Following my previous analyses of yayla-peasants in early 1990s, I decided to focus on not only on Köprülü Canyon (see Figure 7.1) but also on its buffer zones in 2010.

**Socio-ecological Transitions and Change at Köprülü Canyon National Park and its Buffer Zones**

Capitalist production… develops technology, and the combining together of various processes into a social whole, only by sapping the original sources of all wealth—the soil and the labourer (Marx, Capital, Volume One: 417)
For general theoretical direction, I mainly utilize Bunker’s (1985; 2005), de Janvry’s (1981), and Faber’s (1993) conceptual frameworks. These authors focus on capital accumulation, and the appropriation of land, resources (both renewable and nonrenewable), and energy amongst those who have the power. Besides capital and labor, incorporating the concepts of *energy and material*, as stated by Bunker (1985), helped me to operationalize

**Figure 7.1: Protected Areas of Turkey & the location of Köprülü Canyon National Park**

Data source: Cetinkaya, 2002:13, Fig II.2; Scale 1:25 000

ecologically unequal exchange for this qualitative investigation. In related to the themes of this ‘short’ case study, I have also taken into consideration a number of political ecologists and ecological economists’ view, such as Weisz et al. (1999; 2007), Martinez-Alier (2002; 2009), Shiva (1989, 2005, 2008), Guha (1997;2000), O’Connor (1998), Ciccantell and Smith (2007; 2009), Giljum et al. (2007), and Hornborg (2001).
Social Ecology of Yayla-peasantry at Köprülü Canyon

The traditional yayla peasantry, one form of agroforestry, is a well-suited system of livelihood in the Middle and Western Taurus Mountain region—a Mediterranean Region of Turkey where the Köprülü Canyon National Park (or what I call the Köprülü Canyon, which refers to both Köprülü Canyon and its extended buffer areas towards the city of Antalya) is located. The combination of agriculture, livestock herding, and forestry that compromise this system is ecologically well adapted to existing natural conditions because its development has been based on both the environmental and cultural background of the area. Differentially developed agriculture with differently practiced migratory livestock can be detected in each climatological and altitudinal range, depending on the geomorphological and hydrological requirements (Karaoglu, 1994). The utilization of forest for protection, for secondary forest products (e.g. sap, medical plants, herbs, and honey) and wood is essential to these communities. The economic use of the forest and open fields within the forests are thus crucial to the population's well-being. Accordingly, subsistence has been achieved through a combination of yayla farming (traditional, dry farming) and forest economics. Practicing alternating farming with a fallow system, the tillage areas, next to maquis and medium high scrub formations, serve as a pasture that is annually rotated (Ibid.). These areas are worked with a wooden plough to cultivate (mostly) wheat.

Agriculturally suitable land can only be found in certain stream beds and its valley sides, which are terraced. By practicing alternating fields (2 farms) with a yearly fallow system, the fields next to forests serve as pasture during winter (Ibid.). The summer droughts or general water scarcity in the Mediterranean and supra-Mediterranean ranges traditionally forces villagers to migrate to the yayla locations during the last week of June every year. After breeding time, animal
herds are taken to higher sites on the mountain and finally to the summer pasture areas. Until fall, communities occupy yaylalar [plural of yayla] in the higher ranges of the limestone plateau and in the high altitudes of Bozburun Mountain. The ridges of Bozburun Mountain provide sufficient water which is harnessed in some yaylalar by karst wells. On the limestone plateau, drinking water can be obtained from cisterns. From August to September almost all springs run dry and the pastures wither. Therefore, livestock are fed by cutting leafage from the valleys' trees. At higher altitudes there are neither springs nor wells, and cisterns are not possible. Instead, water is secured by collecting snow from the fields.

Overall, within the yaylacilik (as an “activity”) pattern, timing of the movements is arranged according to the ecological conditions of the area. Communities have well-developed migration routines for summer, winter, and spring, as well as routines between their permanent and yayla locations, all of which are communally managed. The rotational movements or migrations are arranged according to the community's socioeconomic needs in addition to the rhythm of vegetation growth (Karaoglu, 1994) Yayla peasants migrate to yayla together in a specific period, grazing their livestock under a well-established system. The peasants accept joint responsibility for protecting their pasture lands and forests through communally accepted rules. Overall, the migratory rhythm is adapted to vegetation cycles (Ayasligil 1987). While they are in yayla, they live in simple traditional huts that consist solely of xerowalls with roofs covered with wooden panels. This usage is, however, handled very economically and sustainable. If there is enough water at the yaylalar, communities practice home gardening by fencing small areas near springs for

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99 The practice of rotation/fallow system is uncertain since mostly hired herders (cobanlar) are observed who take care of grazing. Since few families are left in this area, the social control on the utilization of forests/trees is not certain.
growing summer vegetables for their own consumption. They produce butter, cheese, and çökelek (a kind of local cheese) for winter. Any surplus of dairy products is sold at the local market. 

Yaylalar have numerous year-round springs beneath the high plain which allow them to grow vegetables along with tillage on the slope. In certain villages, such as Demirciler, about 70% of the population migrated to yayla in early 1990s (Karaoglu, 1994). Today, fewer and fewer families choose to migrate to yaylalar.

**Modern vs. Customary Land-Tenure:** Today, we observe the abandonment of all these customary rules in most of the villages located at the border of the park area and in the park’s buffer areas. Only a few highland villages in or near the protected areas, such as Degirmenozu, are still practicing yaylacilik. Lowland villages are largely transformed (or what I identified earlier in my 1990s research as “transitional” villages) and have different characteristics than the highland villages (which retained traditional subsistence economic patterns even in 2000s). When the first forest plans were laid out during the 1960s, two changes emerged as a result. Firstly, forest paths and gravel roads were established and the harvesting of wood was restricted to certain areas.

Secondly, a modern system of land-tenure versus the customary systems became a critical issue. Land tenure was more of a concern of villagers who lived inside the declared park boundary. By 1982, their lands had been nationalized by the National Park Law in Turkey. To this extent, the cadastral survey of land was imposed mainly in this park area. In fact, a new title of land was proposed by authorities in 1992 but it was not endorsed by the villagers (Karaoglu, 1994). The new land-use rights and title system is strongly opposed by the villagers. They are not willing to compromise by giving up any small portion of land. According to the newly proposed law, their agricultural and pastoral capacities will be diminished. These villages have titles to land in these
protected areas which date back to approximately 200 years ago. For instance, the village of Altinkaya has held a title to its land in a customary "squatters" sense to its land for 209 years (Karaoglu, 1994). Each village holds the ownership of certain land as common resources for the village. Also, many villagers have been paying tax in the modern legal sense for about 40 years. Some villages also have partial cadastral records—the legal documents showing ownership of their land and houses. However, the construction of any new unit (supplementary housing unit, small restaurants or shops etc.) is prohibited, particularly in the protected area.

As of today, uncertain legal and practical ownership of land is still an issue. Because of these limitations on local use-rights, the villagers perceive that the declaration of this area as a national park is highly disadvantageous to them. Despite all these efforts by the national park authorities, tensions still exists between national park authorities and customary land-use rights. Villagers perceive the national park concept as a threat to their communally managed resource-use activities as well as to their lands. Most villagers’ views oppose those of officials based on the fact that they have not yet received any direct benefits from this arrangement. Over the past 20 years, limitations on allowed pasture areas and the enlargement of a roads has prompted an increase in outmigration. On the other hand, some of the village population has been retained by the leadership of active local organizations, rich cultural-historical sites, and a strong natural resource base that offers some opportunities (Karaoglu, 1994). Currently, there are still number villages that have incomplete cadastral records in Köprülu Canyon and its buffer areas.

**Transportation and Access to Markets in 1990s (subsistence with market access)**

As argued earlier, migratory livestock represent an important branch of the villagers’ economy. In early 1990s, this is exemplified by the number of families that go up to the yaylalar
each year. For instance, in 1991, some 80 percent (38 out of 45) of families engaged in *yaylacilik* activity in one village (Karaoglu, 1994). Annual growth amounts to one third of the herd. About 75 percent of the bucks are sold every year at the markets in Serik and the province of Antalya.

Table 7.1: Access to District/Market by Transportation Vehicles between 1988-1990

<table>
<thead>
<tr>
<th>VILLAGES</th>
<th>Number of Tractors</th>
<th>Number of Truck/Lorries</th>
<th>Number of Cars</th>
<th>Market Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bozyaka (Beskonak)</td>
<td>4 Inside</td>
<td>8 Inside</td>
<td>3 Inside</td>
<td>Cotton, watermelon</td>
</tr>
<tr>
<td>Altinkaya</td>
<td>None</td>
<td>1 Inside</td>
<td>None</td>
<td>Weekly, goat dung</td>
</tr>
<tr>
<td>Ballibucak</td>
<td>None</td>
<td>1 Inside</td>
<td>None</td>
<td>Dairy products</td>
</tr>
<tr>
<td>Demirciler</td>
<td>None</td>
<td>1 (or 2)</td>
<td>None</td>
<td>goat dung</td>
</tr>
<tr>
<td>Düzagaç</td>
<td>None</td>
<td>1 Truck-Outside</td>
<td>None</td>
<td>goat dung, vegetable</td>
</tr>
<tr>
<td>Burmahan</td>
<td>None</td>
<td>1 Outside</td>
<td>None</td>
<td>vegetable, goat dung</td>
</tr>
</tbody>
</table>

Notes: Inside (in the park); Outside (buffer areas of the park).

Data source: Karaoglu, 1994

As shown in Table 7.1 the number of tractors can also be an indicator of the early phases of mechanized agriculture (see below for recent agricultural activities, etc.) This data is important for comparing the current situation detailed below. Transportation data, especially the data on vehicle ownership has presented a different scenario. Based on my semi-structured long-distance interviews with key informant and other participants (A1b; A2c; A3d; A4e; A5Gf; B1a; B2b; B3c; B4d; B5E; C1a; C2b; C3c; C4d), the majority of each household (including the villages investigated in 1994 (see Table 1), and other villages (located in Tasagil, Manavgat, Serik counties- both inside and buffer areas of the park) either have a *dolmus* (small van), or a car or a
lorry/small truck, or a tractor or some combination of some of these (see Table 3 below for comparison)

**Colonization of Ecosystems: Yayla-Peasantry with Intensified Agriculture**

Ecosystems can be colonized in various ways, including the removal of forests in favor of agricultural land, pasture, and settlement areas. These kinds of intervention typically result in a reduction or withdrawal of biomass energy from natural ecosystems in favor of its utilization by local communities. According to the results of both my research during early 1990s and my recent interviews in 2010, two different types of villages now exist due to colonization of ecosystems: Traditional and Transitional (with variations in each type).

The inhabitants of the study area—both traditional yayla peasants and today’s transitional farming communities—share the same local cultural and national identity in society. The lowland villages adapted by utilizing natural resources unique to their location. The result has been the development of cash-cropping in the lowlands. Highland villages, on the other hand, retained traditional, subsistence patterns. Over 40 years ago the two patterns closely resembled each other\(^{100}\), but since then changes in the traditional character of some transitional villages have produced distinct characteristics. Accordingly, some villages have altered and developed less while others have become more integrated into the market economy of the nation, thus enhancing their relational development. As a result, some prosperous yayla peasants became cotton-farmers (and/or fresh fruit/vegetable farmers) or export crops producers, such as those in the lowlands of the Beskonak Valley. Other villages high in the mountains, such as villages around the Bozburun

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\(^{100}\) According to the reports of elders, communities in the Beskonak Valley (Yaris, Koyluler, Bozlar, Yardibi) were used to go up to the yayla, except for the sick and the elderly until the first road at Beskonak (Bozyaka) was built in 1956 (Karaoglu, 1994)
Mountain, depend upon traditional systems of near-subsistence farming and herding. Today, these are the last “representatives” of yayla-peasants.

Micro-ecological units of production are inherent in the yayla peasants' agricultural activity in both traditions and transitional patterns. However, in the transitional pattern, micro-ecological production becomes less important when the farm properties are larger and more mechanized. In contrast, in the traditional pattern, yayla farmers with limited technology at their command are less able to alter or standardize their environment (i.e. through leveling, smudge plots, drainage, or soil reconstruction). Small parcels of land are more important for traditional communities; hence, they often adjust their activities in accordance with the micro-ecological conditions of the area. The transitional villages differ from the stereotype of traditional villages in many ways: their reliance on a mixture of market and subsistence activities, the occurrence of new types of housing (as well as coffeehouses), the planting of new crops due to market demand, a decrease in field rotation and transhumance, the intensification of agriculture, and the eagerness of community members to accept new ideas by. In contrast, traditional patterns in highland settlements are indicated by the occurrence of only a few new buildings, the reliance on essentially subsistence crops, transhumance as they were 20-30 years ago and the proper use of alternating fields with a yearly fallow system (2-3 field rotation system).

Certain factors induce a progression from the traditional pattern towards the transitional pattern in many communities. Here, I limit the analysis to three main variables to analyze changes among the yayla-peasantry: (1) population dynamics & density; (2) access to markets (domestic and/or external); and (3) state intervention.

**Population dynamics:** Statistics from the early 1990s and 2000s show that there is an
outmigration in many villages, versus stable population growth in others. Even though the villages inside the park and around its buffer areas have not experienced high population growth, ecological degradation is very visible (Ayasligil, 1987; Karaoglu, 1994). Outmigration has resulted in overgrazing and the overexploitation of resources, as explained earlier (under yaylacilik activity). As people left the area, the traditional social control system which mandates the management of their resources became less effective (Karaoglu, 1994). Accordingly, the partial breakdown of yayla-peasantry was observed due to their increasing access to markets and trade (see details below). In contrast to the Malthusian paradigm, it is not the population growth \(^{101}\) that caused land degradation, but instead the growing pressure on land due to the expansion of export-oriented agriculture. Intense market integration—both domestic and external—and the monopolization of resources by the capitalist export sector are the driving factors responsible for the ecological collapse of yayla-peasantry system. This has led to the devastation of natural resources.

Between 1940 and 1980, the population of the village Bozyaka, as well as the whole Beskonak district, increased more than two fold (Karaoglu, 1994). A road opened in the 1950s and enabled people to obtain better health care and other essentials. A later drop in population, especially in the 1960-70s, was due to out-migration (Ibid. 245). Selected village populations as of the 1990 general census in Turkey, are presented in Table 4 \(^{102}\). According to this table, it can be concluded that for selected villages in the Beskonak District, recent population changes follow a

\(^{101}\) For instance, Guha (1997) states that population pressure and pressure of exports on land is increasing, while in the other areas of the Mediterranean the land is now deteriorating because of depopulation.

\(^{102}\) The data was provided by the Beskonak Census Department in Manavgat, Antalya according to the results in 1990 that were obtained from the National Statistical Institute of Turkey.
pattern similar to that observed in the 1980s. The villages located in the Köprülü Canyon region showed either a stable or decreasing population (see Table 7.2).

<table>
<thead>
<tr>
<th>VILLAGES</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altinkaya</td>
<td>676</td>
<td>628</td>
<td>485</td>
</tr>
<tr>
<td>Ballibucak</td>
<td>375</td>
<td>357</td>
<td>205</td>
</tr>
<tr>
<td>Demirciler</td>
<td>782</td>
<td>787</td>
<td>922*</td>
</tr>
<tr>
<td>Caltepe</td>
<td>578</td>
<td>578</td>
<td>440</td>
</tr>
<tr>
<td>Degirmenozu</td>
<td>518</td>
<td>604</td>
<td>363</td>
</tr>
<tr>
<td>Duzagac</td>
<td>1235</td>
<td>1054</td>
<td>658</td>
</tr>
<tr>
<td>Bozyaka</td>
<td>Not reported</td>
<td>1806 (in 2007)</td>
<td>1750</td>
</tr>
<tr>
<td>Burmahan</td>
<td>471</td>
<td>508</td>
<td>505</td>
</tr>
<tr>
<td>Cakis</td>
<td>1912</td>
<td>1872</td>
<td>1865</td>
</tr>
</tbody>
</table>

Data source: State Institute of Planning, YEREP project (www.yerelnet.org.tr)

*Early State Initiatives and Change*

Intensive road development in Beskonak Valley's settlements has occurred in the 1980s. According to some village council members, the whole village, (except the old and sick) used to go up to the yaylalar before the first road was constructed in 1956 (Karaoglu 1994). Also, 10-15 years ago, each family had just a small herd of goats and the pasture was managed mainly through a rotational/ fallow system based on commonly accepted rules. Social control, therefore, limited each small livestock holders' behavior in ways that preserved forests over many years. The reduction in transhumance has occurred in some areas of Köprülü Canyon starting in the late
1980s and early 1990s. For instance, in one of the villages in the study area, 24 families out of 170 migrated. Thus, many pasture sites have not been used (Karaoglu, 1994). The reason was attributed to the development of roads\(^{103}\) which accelerated the out-migration during the mid-1980s. Most migrants attained jobs in nearby districts or cities (mostly tourist places) for summer employment.

Communities from the village Altinkaya in particular are attentive to the benefits of tourism. According to one elderly council member in one village inside the park area, about 50-60 percent of villagers are eager to get involved in tourism as an additional income-generating activity to supplement their subsistence (Karaoglu, 1994). Furthermore, there is another small group of people in Antalya or Alanya serving as unskilled labor during the summer (5 percent of the population by the mid-1980s). In the early 1990s, about 10-15 percent of the population worked in urban settings (mostly in hotels) during the summer (and continued their traditional activities during the winter). Today, about 60-70 percent of the population works in urban places.

The state’s initiatives are geared oriented towards boosting agricultural production. For instance, the State Department of Soil and Water's extension program built a canal system for farmers in Beskonak Valley (partly inside the park area) to boost agricultural production. Credit has also been provided since the 1980s for those who want to practice dairy-farming. Many families at mahalle Yaris had received these types of credits from the aid program under the office for forest villages at the Regional Head Forest Administration in Antalya (Ayasligil 1987).

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\(^{103}\) After the opening of these traditional communities’ ‘territories’ the interaction with urban/rural intensified; therefore it is hard to put a border [even in physical sense]. Thus, I extended the research area towards to the major city where we started to observe number of ‘cotton-farmer’ originally yayla-peasants selling their products and/or contact with exporting firms and/or commissioners who work with those major agro-exporters in the region.
Additionally, agricultural credit cooperatives in Bozyaka village aimed to provide loans for farmers to purchase machinery, pesticides, and seeds.

After the roads were established, the population grew and transformed the subsistence economy to a market-oriented cultivation structure. Many families have either totally given up small livestock farming or reduced the number of goats they own by sending them to their neighbors (usually relatives) in the yaylálar. Due to this interchange, families then started to use the former pasture areas of the respective family. Once the lowland farmers started to spending more time on more profitable commercial agricultural, their custom of migrating to yayla has slowly faded. Likewise, the number of goats per individual family has increased (Ayasligil, 1987). Instead of having the livestock on the yayla during the summer, grazing is now concentrated on the pastures near the winter quarters. Additionally, market pressures to achieve higher yields eroded the rotational/fallow system. Today, the existence of grocery stores and bakeries on the first floor of the houses, and the occurrence of coffeehouses, are indications of a transitional stage that leads this village from subsistence farming to greater involvement in the outside market.

**Partial Abandonment of Yayla-peasantry and Ecosystem Degradation**

Even though traditional land use is characterized by ecologically well-adjusted modes of production, and despite the traditional rules and rotational activities (especially herding), the system has been breaking down since the late 1980s. Traditional patterns of mobility have decreased and yayla farmers now convert forest into pasture land. This situation has caused the devastation of mountainous conifers (Ayasligil, 1987). Improved accessibility to other districts and emigration has resulted in the disturbance of the traditional control and governance system and
the partial abandonment of the yayla peasantry livelihood strategy (Karaoglu, 1994). As of today, it is difficult to locate traditional yayla-peasants in the same region since most of them have become cotton-farmers, specialized vegetable/fruit-farmers, or commissioners (brokers) in the wholesale markets. Some are now owners of agro-exporter firms. One respondent (C3b) told me that

… now some families are still going up there [yayla]… but not like old days… first, feeding the livestock is very costly nowadays…it is not worth it; so they grow vegetables more in the lowland…that brings some income.

In comparison to my previous research in the early 1990s, I could only locate a few villages in the ‘highlands’ of Köprülü Canyon park that could still be considered to be composed of yayla-peasants. Transportation to the major towns from these villages is very limited: the trip can only be made during two or three days of the week. Thus, their access to markets is somewhat limited, especially since most of them do not own their means of transportation. Also, the roads are not well developed. Yet, time to time they bring their extra agricultural products to the Serik Hal.

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104 For instance, as of 1981, the inhabitants of one village committed themselves to forbid the cutting the cedar trees for five years. This decision was made at a communal meeting attended mainly by the muhtar, Village Council (Muhtarlik Organization) and notables. The village administrative unit decided to put up the "grazing/usage law" to prohibit cutting or grazing. Individual or groups are punished under the law by a fine based on the degree of damage or number of the animals. Afterwards the collected money is transferred to the village treasury -Köy Sandigi -- for village expenditure. There was an authorized person to monitor and control these activities. But, the strong social cohesion and moral culture of the inhabitants forced families to control each other to prevent any kind of abuse. This was a very advanced system for preserving and regenerating the cedar trees (Ayasligil 1987), In 1983, the area was examined and the result was that cedars were returning to healthy conditions (Ibid.). The credit for this is owed to the community's decision to preserve the area for a period of 5 years. Based on their knowledge on regeneration process, this period was found to be sufficient (Ibid: 201). The persistence to customs can lead the community to protect their renewable resources (see Karaoglu, 1994)
(wholesale market) (see also Table 7.3 for village economy, transportation, market access, yayla tradition, and main issues).

**Table 7.3: Socio-economic problems, economy, marketing access, and yayla-tradition in Manavgat (selected 7 villages) and Serik (selected 7 villages) Counties**

<table>
<thead>
<tr>
<th>Villages</th>
<th>Economy</th>
<th>Transportation</th>
<th>Yayla tradition</th>
<th>Marketing</th>
<th>Main issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altinkaya (Manavgat County)</td>
<td>Agriculture Livestock Vegetables/Fruit</td>
<td>1 bus 5 minivans 10 cars/1 lorry 2 tractors</td>
<td>No</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>Protected zone Unemployment Not enough income</td>
</tr>
<tr>
<td>Ballibucak (Manavgat County)</td>
<td>Livestock Agriculture Vegetable/Fruit</td>
<td>1 bus 2 cars 2 lorries 1 tractor</td>
<td>Yes (less families)</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>No water Outmigration Unemployment</td>
</tr>
<tr>
<td>Bozyaka (Serik County)</td>
<td>Agriculture Livestock Tourism</td>
<td>2 buses 2 minivans 45 cars 25 trucks 30 lorries 35 tractors</td>
<td>Yes (few families)</td>
<td>Serik County Wholesale market; Yayla Bazaar (and Antalya-from my interviews)</td>
<td>No electricity No main water canals No transportation (roads)</td>
</tr>
<tr>
<td>Burmahyan (Manavgat County)</td>
<td>Fruits Livestock Fishery</td>
<td>8 minivans 15 cars 5 lorries 10 tractors</td>
<td>Yes (less families)</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>No school No mobile education unit No phone</td>
</tr>
<tr>
<td>Cakis (Serik County)</td>
<td>Agriculture Vegetables/Fruit</td>
<td>1 bus 3 minivans 50 cars 200 tractors</td>
<td>No</td>
<td>Serik County Wholesale market (and Antalya-from my interviews)</td>
<td>Transportation Weather conditions Not enough income</td>
</tr>
<tr>
<td>Caltepe (Manavgat County)</td>
<td>Livestock Agriculture Vegetable/Fruit</td>
<td>1 bus 1 minivan 3 cars 1 lorry 12 tractors</td>
<td>Yes (less families)</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>Outmigration Unemployment No school</td>
</tr>
<tr>
<td>Camlilepe (Manavgat County)</td>
<td>Agriculture Livestock Olive growing</td>
<td>2 minivans 20 cars 6 tractors</td>
<td>Yes</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>Unemployment Outmigration Not enough income</td>
</tr>
<tr>
<td>Degirmenozu (Manavgat County)</td>
<td>Livestock Agriculture Vegetable/Fruit</td>
<td>1 minivan 10 cars 1 truck 1 lorry 5 tractors</td>
<td>No</td>
<td>Manavgat County Wholesale market, and other villages</td>
<td>Transportation (roads) Unemployment Outmigration</td>
</tr>
<tr>
<td>Demirciler (Serik County)</td>
<td>Agriculture Livestock Olive growing</td>
<td>1 minivan 1 lorry 2 tractors</td>
<td>Yes</td>
<td>Serik County Wholesale market</td>
<td>Not enough income</td>
</tr>
</tbody>
</table>
Data source: State Institute of Planning, YEREP project (yerelnet.org.tr) [translated by the author] and author’s interviews included, when necessary for yayla tradition section.

A recent ecological study was completed (Karахalil et al., 2009) in Köprülü Canyon National Park analyzed changes in forest structure from 1965 to 2008. The results indicated clear changes in the spatial dynamics of land cover/forest cover. In the park area, some 459 hectares of pure cedar stands were entirely converted to degraded and mixed forests. This study supports the ecological investigation of Ayasligil (1987) at Köprülü Canyon (see Table 2 below).

**The Socio-Ecological Collapse of Yayla-Peasantry**

Today, most of the yayla–peasants have adopted a semiproletarian lifestyle. In this case, women typically engage in growing various agricultural products depending on the needs of domestic and external markets. The men have secondary occupations driving cabs, working in nearby hotels, factory wage-labor, or engaging in seasonal tourist work. One of the farmers (B1)
told me that his wife was involved in growing agricultural products, mostly fruits and vegetables, and some cotton, while he owns a minivan and works as a cab driver. He usually brings in their products to the wholesale markets either in Antalya or Serik for sale [detailed below]. As one respondent (B1a) stated, “…exporting products bring more money much faster than the internal market…” Semi-prolaterization marks the break down of the yayla peasantry system and the degradation of the ecosystem. Families stop going up to the yaylalar and instead conduct intensified agricultural activities absent land rotation. Recently, Coskun & Aydin (2007) compared pasture capacity with actual usage and found that pasture lands are being overgrazed. For instance, in the towns of Manavgat and Serik, where Köprülü Canyon and its surrounding villages are located, the “actual situation-usage potential” is negative (see also Figure 7.2)

**Figure 7.2: Soil Degradation (includes Köprülü Canyon and Its Buffer areas)**

![Soil Degradation Map](image)

Data source: FAO (last updated December 12, 2005)
(Note: *Colored Legend* is applicable)
Capitalization of Ecosystem: Commodification of the Yaylacilik with Fossil Fuel-Based, Capitalist Export- Agriculture

Extractive Economy: Flows of Material and Energy

During the 1980s, the exploitation of resources in the global South increased in order to cover the balance of payments. The ‘adjustment programs’ failed to address the redistribution of income and spawned an ‘environmentalism of the poor.’ As a result of the current wave of neoliberal trade policies in Turkey, there is now an increased pressure to increase exports at the expense of local socio-ecological systems. In this regard, the Köprülû Canyon and its extensive buffer areas (especially, Antalya province) in the Mediterranean region serve as a special case. Land use in general has changed dramatically in the Mediterranean Region since the 1950s as a result of the new agricultural and economic policies (Tanrivermis, 2003:558). For instance, most pasture and meadow land has been transformed into crop cultivation. Productive farmlands have been transformed by processes of industrialization, urbanization and tourist development. The remaining farms in Antalya utilize agri-chemical inputs such as pesticides and fertilizers. We also observed a significant increase in consuming fertilizer in Turkey, especially after the 1980s (See Chapter Four). The fact is that farms require more chemical input and more irrigation to increase agricultural productivity, which all are costly in terms of both energy and capital inputs (Tanrivermis, 2003: 560). These factors have resulted in eco-degradation (Ibid. 557-559).

The embedded energy in agricultural production at the national level is analyzed in Chapter Four within the context of ecological unequal exchange. This chapter delves more into the local analysis of energy and matters. As Guha (1997) argues, exporting renewable and nonrenewable resources are the outcome of unequal ecological exchange. Similarly, Bunker
(1985) included not only materials but also energy into his analysis in order to demonstrate the end results of unequal ecological exchange. In contrast to the logic of capitalism, Bunker (1985) claims that the fundamental value of natural products (such as minerals, timber, oil) is in the goods themselves rather than in the labor incorporated into them. However, the critical point, as he explained, is that value is generally realized in the core and not in the periphery. Thus, the extractive economies are deprived of the value of their exports of raw materials (Ibid.). Bunker (1985) contends that with the rapid growth in industrial production there was a net increase in the demand for raw materials and new areas searched to meet this demand of the core.

In this regard, the colonized areas of the Köprülü Canyon region have served as suppliers of raw materials to the core nations, especially through Antalya’s free trade zone.\textsuperscript{105} This is resulting in unbalanced flows of energy and matter from the “extractive semi-periphery” to the “productive core” (mainly the EU, US, and others). In other words, the energy component provides a special way of analyzing unequal ecological exchange in Köprülü Canyon and its buffers areas. It is mainly the profit-maximizing logic of extraction for trade that leads to an over-exploitation of the local ecosystem and the simultaneous collapse of traditional yayla-peasantry. Furthermore, there is a lack of local political power in the semiperiphery to prevent such unequal exchange. For instance, an \textit{environmentalism of the poor}\textsuperscript{106} is developing whereby yayla-peasants try to protect their resources from \textit{commodification} by the bourgeoisie.\textsuperscript{107} As the

\textsuperscript{105} In accordance with neoliberal trade policies, the state initiated to set up ‘free zones’ in number of places and one of the oldest ‘free trade zone’ is located in district of Antalya, built in 1989. Today, there are number of export-promotion centers in Turkey (see Ch.3).

\textsuperscript{106} See also Martinez-Alier (2002; 2009) for the concept of environmentalism of the poor.

\textsuperscript{107} This is a social movement which is beyond the goal of this chapter; however it will be included in my future research.
capitalist export sector expands in the region, negative externalities in the form of soil erosion, pollution, and sedimentation are increasing. These externalities have been observed by number of ecologists and agricultural economists (Ayasligil, 1987; Coskun and Aydin 2007).

**Export-based Agriculture, Market Integration, and Trade**

There are various export-based industries that utilize energy and materials (such as fresh cut-flowers, fresh fruit & vegetables, and cotton) in the Köprülü Canyon region.

*The Ecological cost of the Export-based Fresh-Cut Flower Industry*

The Köprülü Canyon region has a long history of producing fresh cut-flowers. Commercial cut-flower production first began in Turkey in 1946 and cut-flower production began in Antalya in 1970 (Baktir et al., 1990). However, most growth in the flower industry has occurred since 1985. Antalya province, where Köprülü Canyon is located, has become a major center for export-based cut-flower production (representing 87 percent of this industry) due to the availability of rapid air transportation to the EU, which gave Antalya a competitive advantage over many sites in Turkey. The total production area devoted to cut flowers in Antalya increased very rapidly from 39.4 ha (97.36 acres) in 1987 to more than 125 ha (308.9 acres) in 1989 (Table 4). The production declined slightly in the beginning of the 1990s due to inadequate air freight capacity (Ozkan & Karaguzel, 1997). After 1992, Turkish Airlines increased its freight capacity, and some private cargo planes also were used to export flowers. The golden years were from 1985-1990 and both small and large scale contract growers in the

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108 There is an unregistered [suitcase trade], which is about 5 million/year [p. 369]. Most are taken to Russia, Romania, or Bulgaria on buses as luggage.
area have faced some challenges in recent years (Ozkan, Brumfield, Karaguzel, 2003). The most common method for arranging cut-flower export sales was personal contact with the importers. Growers use fewer commission contracts, and the main concerns raised by managers were related to increased competition, price-cutting, and transportation expenses for export, training, and labor supply. As seen in the table below, Köprüllü Canyon’s contribution to this sector has increased over the years. This demonstrates the capitalization of this protected area in order to support export-based cut-flower industry.

The original list of all the cut-flower export growers in Antalya province contained 45 companies. Women (70 percent) do most of the work (Ibid. 371). The Antalya Exporter Unions goal is to make a profit, and they are supported by Eximbank credit to cover exporting expenses (Ibid. 370). Major markets include the EU, Russia, Eastern Europe, and Japan during major holidays (Ibid. 372). In 2010, exports of fresh-cut flowers from the Antalya region increased significantly. According to the Turkish government’s foreign trade affairs, the city of Antalya has the highest export rate of exporting cut-flower (65 percent at national level) (T.C. Disisleri Bakanligi, 2008). Since the 1990s, the demand from the EU has been very high and the majority of companies (about 84 percent) export their product via wholesaler supermarket chains, agencies and auctions (Ozkan et al, 1997). The Turkish cut-flower industry is very competitive among the growers, who also serve as retailers (Ozkan & Karaguzel, 1999).

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109 For instance, Turkish cut-flower exports grew from about $100,000 in 1985 to $11 million in 1995 (Ozkan et al., 2003)


111 In 1999, for instance, major markets were Germany 21.07%, USA 19.49%, UK 13.97%; France 11.01% of the total exports of fresh-cut flowers (Sayin et al., 2002)
This cut-flower industry is classified into two sectors: those with export-oriented production (modern enterprises or export growers) and those with domestic market oriented production (small-family enterprises or contract growers) (Baris & Uslu, 2009). Two of my respondents (B2b; C2d) mentioned that villages inside the Köprüülü Canyon, such as in Serik and Manavgat counties, used to be more directly involved in the flower industry. Now villages located in Köprüülü Canyon sell their products in either wholesale markets or to merchants visiting their villages. Thus,

…in 1990s they were growing fresh cut-flowers… selling to merchants, and again last year for instance, villages of Manavgat county have grown and sold to [them] (B2b)

Table 7.4: Fresh-cut Flower Production area in the Antalya province (including Köprüülü Canyon National Park) of Turkey (1987–1996)

<table>
<thead>
<tr>
<th>Years</th>
<th>Protected area (ha)²</th>
<th>Open area (ha)</th>
<th>Total area (ha)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>32.0</td>
<td>7.4</td>
<td>39.4</td>
<td>---</td>
</tr>
<tr>
<td>1988</td>
<td>56.1</td>
<td>7.7</td>
<td>63.8</td>
<td>61.9</td>
</tr>
<tr>
<td>1989</td>
<td>115.6</td>
<td>10.0</td>
<td>125.6</td>
<td>96.9</td>
</tr>
<tr>
<td>1990</td>
<td>110.5</td>
<td>11.4</td>
<td>121.9</td>
<td>-2.9</td>
</tr>
<tr>
<td>1991</td>
<td>107.3</td>
<td>12.8</td>
<td>120.1</td>
<td>-1.5</td>
</tr>
<tr>
<td>1992</td>
<td>134.1</td>
<td>8.2</td>
<td>146.9</td>
<td>22.3</td>
</tr>
<tr>
<td>1993</td>
<td>148.2</td>
<td>4.5</td>
<td>152.7</td>
<td>3.9</td>
</tr>
<tr>
<td>1994</td>
<td>155.7</td>
<td>8.4</td>
<td>163.9</td>
<td>4.2</td>
</tr>
<tr>
<td>1995</td>
<td>163.9</td>
<td>1.1</td>
<td>165.0</td>
<td>3.7</td>
</tr>
<tr>
<td>1996</td>
<td>189.5</td>
<td>1.6</td>
<td>190.9</td>
<td>15.7</td>
</tr>
</tbody>
</table>

²1.0 ha = 2.471 acres.

Data sources: Ozkan et al., (2003): Table 1 (p. 368) and Agricultural Director of Antalya Province, 1998

Today, a special fresh-cut flower called the ‘karanfil’ is the source of income for more than 1,000 families’ on 2,400 acres of land in Antalya’s villages (namely Altınova, Serik, Kundu, Kadriye and Çamköy). During the past three years, the ‘exporting season’ has been extended to
the end of August when most villagers spend time in *yaylalar*. Therefore, most villages that still practice going up to the ‘yayla,’ but are also growing fresh-cut flowers for exports. As a result of the strong international demand for flowers, farmers are motivated to extend the flower growing season up to ‘yayla’ in order to maximize profits. Traditionally, farmers used to utilize small parcels of land for alternate grazing and cultivation. One of my respondents (B3c) explained that engagement in the fresh-cut flower industry requires eleven months of work, which includes the time spent at the *yaylalar*. Without any ‘break,’ the soil is utilized all year long, and begins to suffer declining fertility. For one participant (B1a), about 200 acres of the whole *yayla* in one village was utilized for the purpose of fresh cut-flower production. Along with the extension of the ‘exporting season,’ the ‘marketing season’ has been extended as well. This provides an advantage for exporters to search for more markets. Between 2001-2002, a total of 156 million cut-flower branches were exported. If ‘unregistered trade’ is included, then this number is more than 220 million branches which brought about $35 million of foreign exchange into Turkey.

In terms of ecological costs, one respondent (C2b) mentioned that

> currently some *yaylalar* have lower levels of productivity…we used to get more agricultural products [outcome was better], now it is not… and soil erosion has become more visible… in some villages it is very bad… again, since the productivity is very low, we have to use fertilizers… and we have to use a lot…otherwise, we can not get anything as an outcome product… all these requires more money [input], and this has been very challenging for small farmers nowadays… [translated by the author]

**The Ecological cost of the Cotton, Fresh Vegetable and Fruits**

According to the state’s regional officials, conducting agricultural activities on small plots is not economical. Large-scale and more profit-oriented agricultural production has been suggested instead (see Cihan Haber, 2010). The regional and local officials’ motto is: We don’t want to see small agricultural enterprises in agriculture [translated, source, Cihan Haber, 2010].
This strategy started in the 1980s and claims to solve the problems of agricultural trade and marketing problems. There are a number of state organizations, such as Antalya Exports Unions, located in the study region. There are a number of small farmer owners in the study area that became major exporting companies, as my key informant stated. During the mid-1970s and 1980s, for instance, a family used to sell their products under a small tent in the *hal* or wholesale market. Then, they became one of the commissioners in their town while selling the products to both external and internal markets. By 1994, they had become a major agricultural firm specializing in fresh fruit and vegetables. In 2007-08, they exported 15,000 tons of fresh vegetables and fruits. This is just one example of how a family-based, subsistence farming operation evolved into a major multinational agri-firm.

Sayin and Tascioglu (2003) emphasize that the IMF plays a major role in supporting cotton production and trade in Turkey. Based on my semi-structured interviews, I found out that almost all farming families, especially among the semi-yayla-peasants, have small parcel of land devoted to cotton production. One respondent (C3c) said “…almost all the villagers in Manavgat county have small or large cotton fields.” This is because cotton is very profitable, as one of my key informants (B2b) indicated. This cotton parcel is needed in case of a ‘bad’ year for other ‘export crops.’ For instance, as one farmer (C3c) complained,

…2009 was not a productive year for some export vegetables due to a certain insect, and we kept using the pesticide while practicing some other methods. Every year we have to deal with a new bug…

This scenario in Köprülösung Canyon’s buffer zones is similar to Faber’s (1993) study of the ‘pesticide treadmill’ in Central America. Since local farmers heavily focus on fresh fruits and vegetables, the pesticide treadmill is evident in the Canyon region. This year (2010), this same
informant said “…the crops were plagued by a different insect, and we didn’t know what to do…so we almost lost all our vegetables…” Another respondent said that “especially for tomatoes, this summer (meaning 2010) we had to figure it out how to fight with it…” On the other hand, my key informant mentioned that

now, government started to control more…the fines are very high (about 25,000 TL)…but usually the big corporations are still using a lot of chemicals for their large hectare of lands…farmers have small parcel of lands, but large corporation have at least 50-100 donum [6.7-13.4 ha], and they do it very intensively… of course, these chemicals reach our rivers in here… we haven’t heard a series of illness so far…but there were some skin diseases, irritations, things like that…

In a related literature, Ozkan et al., (2002) argue that the application of both pesticides and fertilizers for exported fruits in the counties of Antalya province has increased over the years. In a related literature, Tekinel & Doorenbos (2000:4), who investigated land degradation in Turkey, also point to the heavy use of agricultural chemicals. Muhammetoglu et al., (2002) reported that chemical fertilizer application to agricultural fields caused severe groundwater pollution in Antalya province (includes Köprülü Canyon and its buffer areas).

What is the impact of land tenure on cotton growing? Yilmaz & Ozkan’s (2004) study of 64 cotton farmers located in the villages of Central, Serik and Manavgat (where Köprülü Canyon is located) concludes that land tenure systems had no significant effect on cotton production. Furthermore, the land tenure systems did not show any differences in the type of cotton production technology pursued by farmers. Even tenant systems are expected to have a positive impact on cotton production. However, it is evident that the farmers who own their land have a greater incentive to utilize sustainable production methods than farmers who rent land. Moreover, farmers without land ownership do not have the collateral required to obtain loans for
investment in relation to sustainable production. In general, farmers who have credit constraints face more investment restrictions (Ibid. 1025). For one participant (C1a),

There is no support for small farmers [in terms of cotton]… growing cotton costs more due to its input requirements, fertilizers, etc… Some peasants have only small land, 3-4 donum (0.4-0.5 ha.) and used to be larger, like 5 donum (0.6 ha.), so the government support is very limited because we don’t have land large enough to get credit… and we have land use problem…

Greenhouse production plays a pivotal role for fresh vegetable and fruit production, especially in the buffer areas of Köprülü Canyon. As one of my key informants stated “government fully supports such project while providing credit very quickly for those who want to start greenhouse business nowadays…” An economic analysis done by Ozkan et al (2001) showed that more than 88 farms produced greenhouse vegetable crops in Antalya province. Ozkan (1995), who conducted research on vegetable farms that produce in the counties of Serik, Kumluca and Central, indicated that female farmers play a major role in this business. One of the farmers (C2b) from Tasagil county (Köprülü Canyon is partly located), told me that his wife usually takes care of their greenhouses while he works as a seasonal worker in the city. This is another indication of the semi-proletarian life style that occurs in the study area.

Antalya province has been a central production center for greenhouses since the 1990s. More than 5 percent of the total products grown are exported, including 20 percent of all citrus fruits. Exports bring more than $1 billion dollars into the region, and it is expected to triple in 2011. As of September 2010, fresh vegetable and fruits exports from Antalya had already increased by 35 percent (Cihan Haber Ajansi, 2010). On the other hand, one farmer from Manavgat county said that he spent too much money and time on his tomatoes, and could not make a profit in 2009. Then, he had to sell his products well below the normal market price in
order to feed his family (Cihan Haber Ajansi, 2009). This is an indication of one of the components of unequal ecological exchange: the undervaluation of natural resources. An industrial mode of production can sustain itself only by extracting surplus energy and matter (Bunker, 1985:246). Bunker asserts that a short term acceleration of industrial production requires a relatively high valuation of human energy in the articulated industrial social formation and a corresponding undervaluation of natural resources and extractive labor. There are number of similar examples in the study area. For instance, in Manavgat county, 2009 was a bad year due to climatological and soil conditions, and some cotton-farmers lost money. The same scenario is also true for villages of Taşağıl County, and one of the participant farmers (C1a) indicated that they had to re-plant about 4,000 *donum* (536 ha.) to recover some of their losses.

*Patterns of Marketing and Commodity Chain*

According to Ciccantell & Smith (2009), global commodity chains analyses offer potential insight into the issue of ecological unequal exchange. Bunker (1984:1017) emphasized that commodities can emerge only from locally based extractive and productive systems. Mineral deposits and agricultural economies tend to be tied to specific *natural* geographies. Thus, *enclave economies* frequently develop that are globally integrated but locally disarticulated (Ciccantell & Smith, 2009). Again commodity chains and production processes are both raw materials and energy. Both involve the dirty work of extracting value from the environment. This requires the development of large, often very ecologically destructive infrastructure and transport systems [mainly in the peripheral regions of the world economy] to evacuate them from areas where natural resources are found (Ibid. 379). In Turkey, the production process generally happens in rural areas whereas the consumption primarily occurs in urban areas and/or abroad. The brokers,
one of the important local actors and merchants in the wholesale market (or hall), play an important role. For Sayin et al., (2004), the marketing system is irrational in Turkey. The authors argue that merchants, especially export merchants, are exempt from fees and taxes. They are under no obligation to show their invoices to the wholesale market directorship. In other words, they are independent of the wholesale market directorship. These merchants buy the goods from the brokers at the wholesale market (hal) and sell them in their own name. They can be individuals or corporate entities and they are required to present the customer with a dispatch. Bignebat, et al., (2009) emphasize that producers are not aware of the final buyer of their produce because intermediaries hinder the visibility of the marketing channel. Their econometric results show that wholesale market agents act as a buffer in the chain and protect small producers from negative shocks. However, they also stop positive effects as well, and thereby reduce incentives.

The methods that I adopted to investigate my research questions also gave me a chance to identify patterns of marketing and to understand the commodity chain in this region. Based on my interviews, one form of commodity chain analysis or pattern can be a solid indication of how transitional village farmers connect to the capitalist class. As one of my key informants explained (below) when I asked if they sell their products to overseas,

…yes, of course, we [Turkey in general] sell mostly to the EU, if there is no economic crisis, if there is, than Russia is the most important one in terms of selling agricultural products, unless they [Russians or other nations] don’t close their border very suddenly…then, everything goes up [meant prices] here in Turkey…we loose, because all input materials are very costly… that’s the big problem, we can’t cover this cost…
My key informant answered the second part of my question regarding the commodity chain as detailed below.

... brokers [or commissioners] are in the ‘middle’ [middle-man], first the farmers bring their products to the commissioners in the wholesale market [called hal]... corporation in the city of Antalya, for instance, do not deal with the farmers, most of the time, but there are times, for instance in the summer, they [exporting firms] go to the villages and contact with farmers... all based on the demand... domestic and overseas...so, brokers sell the products [to the merchant wholesaler/exporter] that they obtained from...

Based on my interviews with other participants, I came up the scheme below (see Figure 7.3). In a related literature, Giljum (2007) argues how “value chains” conceal unequal exchange. For instance, he emphasized that agricultural raw materials are the foundation of all commodity production, but most of the exchange value of final products is "added" in the refining,

**Figure 7.3: Marketing Pattern in the Köprülü Canyon and its buffer areas**

```
<table>
<thead>
<tr>
<th>Producers</th>
<th>(yayla-peasants, all other farmers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brokers/Commissioners</td>
<td>in the Hal (in counties) (wholesale markets)</td>
</tr>
<tr>
<td>Exporting Corporations</td>
<td>in the city of Antalya</td>
</tr>
<tr>
<td>Other Retailers</td>
<td>(domestic or foreign)</td>
</tr>
<tr>
<td>Consumers</td>
<td>(domestic or foreign)</td>
</tr>
</tbody>
</table>
```

manufacturing, transport and retail stages of production. The further up the "value chain" one goes to the more concentrated ownership becomes. As Giljum (2007) confirms, an estimated
one-third of all world trade actually "intra-firm trade," meaning trade between branches of the same TNC. This allows them to "sell" primary commodities below global market prices.

**The Commodification and Capitalization of Yaylacilik**

The appropriation and capitalization of yaylacilik started about 8-10 years ago, as one of my respondents (B3c) explained. He said,

> many people started to involve more in cut-flower industry and/or they use yayalar to conduct more agriculture, in addition to grazing animals, and rest during the summer...now people stay there for a long time that they used since the planting season has been extended in accordance with the market (hall) situation, and don’t go by the rules of rotation, because some people have given up their livestock...and who is going to control?...they focus on more income-generating activities... [translated by the author]

In other words, the yaylalar is capitalized for the purpose of producing use-values, particularly commodities for sale in the domestic and foreign markets. The development of tourism also plays a role, including the creations of rental housing [mostly modernized single homes] for domestic and foreign tourists. All these factors have changed the characteristic of yayla tradition.

**The Commodification of Water**

Since the 1980s, the state has established hydro-electric dams and expanded roads. In addition, the various regional various state departments, including the national park service and forestry sector, provide forestry-related jobs (seasonal and/or yearly) to locals. In the case of the commodification of Köprülü Canyon’s river, there has been a movement to protect Köprülü Canyon’s water resources since 2005. Even though this is beyond the purpose of this chapter, the villagers, environmentalists, and people involved in rafting are all fighting for against the building of a large canal across the national park. Their slogan is simple: “We don’t want
Köprülü Canyon to completely dry out!” 112 They collected signatures and have been meeting with regional officials for the last five years.

As I learned from my key informant in June 2011 “the canal will be established; their voices were not heard…” According to one local official, “this water that flows through this canal will be beneficial to rich people’s golf courses and luxury hotels. There is nothing for local people and Köprülü Canyon will dry out.” One of my respondent said, “it is all politics… and local politics plays a major role since some ‘strong’ local authorities want this project to run.”

Socio-Ecological Evaluations at Köprülü Canyon National Park and its Buffers

Some scholars that worked in the area to evaluate the local ecological conditions, especially in the park area. After Ayasligil’s (1987) infamous forest-cover change recordings that I utilized in my 1990s research in the area, Karahalil et al., (2007) investigated forest compositions in the area, as seen in Table 7.5.

<table>
<thead>
<tr>
<th>Land Types &amp; Size</th>
<th>1965</th>
<th>1984</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destroyed forest (%)</td>
<td>287.7</td>
<td>377.3</td>
<td>698.7</td>
<td>713.8</td>
</tr>
<tr>
<td>Open areas (%)</td>
<td>328.2</td>
<td>405.6</td>
<td>466.2</td>
<td>463.4</td>
</tr>
<tr>
<td>Settlement (%)</td>
<td>--</td>
<td>119.4</td>
<td>54.9</td>
<td>66.3</td>
</tr>
<tr>
<td>Average landscape size (ha.)</td>
<td>309.8</td>
<td>236.3</td>
<td>63</td>
<td>63</td>
</tr>
</tbody>
</table>

Data source: Karahalil et al. (2007: Table 3) [translated by the author]

The researchers observed an increased fragmentation of the landscapes in Köprülü Canyon. The major difference in terms of land-use/ forest cover change and forest degradation

112 All the translations are done by the author.
was observed from 1965 to 1984. The degradation of the ecosystem has continued as Karahalil’s (2007) documented especially in the 2000s. Coskun (2009), on the other hand, analyzed socio-economic conditions of seven forest villages in Köprüülü Canyon National Park during the 2007-2008 period. According to Coskun (2009), the villages’ problems mainly included infrastructural development, agriculture-related issues, and tourism-related issues. As seen the Table 7.6, the

Table 7.6: Socio-economic development in selected villages at Köprüülü Canyon

<table>
<thead>
<tr>
<th>Village Names</th>
<th>Population 2007-08</th>
<th>Total Jobless</th>
<th>Index of Socio-economic Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bozkaya</td>
<td>1915</td>
<td>320</td>
<td>15,90</td>
</tr>
<tr>
<td>Altinyaka</td>
<td>492</td>
<td>60</td>
<td>8,20</td>
</tr>
<tr>
<td>Ballibucak</td>
<td>312</td>
<td>47</td>
<td>6,88</td>
</tr>
<tr>
<td>Caltepe</td>
<td>466</td>
<td>50</td>
<td>-0,25</td>
</tr>
<tr>
<td>Degirmenozu</td>
<td>468</td>
<td>59</td>
<td>-6,26</td>
</tr>
<tr>
<td>Gaziler</td>
<td>411</td>
<td>71</td>
<td>-9,76</td>
</tr>
<tr>
<td>Karabuk</td>
<td>535</td>
<td>82</td>
<td>-9,82</td>
</tr>
</tbody>
</table>

Data source: Coskun, 2009

researchers created a socio-economic development index and ranked the villages from the most to least developed. Four out of seven villages showed very low rates of socioeconomic development. In their earlier research, Coskun et al. (2007), point out that even though national income per capita has increased over the last 35 years, forest villages have showed no improvement.

Further Discussion and Conclusion: Winners & Losers of Unequal Eco-Exchange

Most of the villages in the study area are net exporters of agricultural products. As such, they experience the degradation of their land due to the competitive economic pressures placed on resources. Contrary to the Malthusian paradigm, population levels are not a source of resource pressure. For Bunker (1985: 247), the issue of power is central to question of unequal
ecological exchange: those who suffer unfavorable rates of exchange are likely to have less power.

Based on my interviews, four main classes are identified in the study area: (1) the capitalist class (exporting corporations—either domestic and/or co-owned with foreign firms); (2) owners of small businesses (brokers or commissioners, traders); (3) semi-proletariats (or semi-yayla peasants/ transitional villages, semi/near subsistence economy); and (4) yayla-peasants (near subsistence economy with limited market access, working for forestry department- seasonal worker, somewhat practice yaylacilik). During my interviews with members of a few the exporting companies (either small or large) (A3d; A5f; A7h; A9h), they told me that they have no major issues, the government supports their businesses and all projects within their companies are generally doing well. One firm mentioned (A4e) daily problems small business transactions, but these all are considered normal. Another firm official (A2c) also explained: “we try to limit our business with our domestic customers…because it takes about 5-6 months to get our revenue - the turnover time is very long. However, exporting is highly profitable. It takes about one month to get our profits when we deal with our foreign customers, so its much faster and the surest way…” The websites of these exporting firms are well-developed and the number of firms is increasing every year. As of 2010, 128 fresh fruit and vegetable exporting firms are located just in the province of Antalya. Large corporations have satellite office outside of Turkey. A Turkish-German corporation, for instance, is located in the Antalya Free Trade zone exports various fresh-cut flowers and seeds. When the economies of semi-peripheral nations have undergone massive structural changes, as Petras and Veltmeyer (2001) argue, a new business class specializing in international finance and trade emerged as an
important part of the “national bourgeoisie” in all developing nations. The policies of the state’s export trade center have supported the accumulation of capital by large companies through fiscal subsidies, tax holidays, and physical access to resources. There is strong evidence that the Antalya free trade zone and export promotion centers in the region have accelerated all foreign trade activities. This class can be categorized as the “winners” of unequal ecological exchange.

The second category includes small businesses headed by brokers/commissioners. The participants in this group consider themselves to be as the ‘middle-class.’ They have connections with export-based firms, the semi-proletariat and farmers. They buy the products from the farmers and sell to small and/or large corporations—mostly small corporations. Large corporations tend to own their greenhouses. When the demand is high, they go to the major wholesale markets (mainly the Antalya Hal) or go to the brokers and farmers. In general, both wealthy exporters and brokers are anxious to maximize their profits from the booming international market through trade in their region.

The third category has two sub-categories. The first sub-group is transitional yayla-peasants who engage in both farming and side jobs—such as working as a cab driver (who own their van-style car) or working in factories or hotels in the Antalya area. The second group are yayla-farmers’ who are employed by the national park and/or forestry department, while also working on their farms. For instance, one village has transportation to major Hall (wholesale market) or city only three days a week. Their agricultural land is small in comparison to transitional/semi-proletariats. Their economy is very close to subsistence or near-subsistence with some market access. One respondent (C1a) said,

We don’t know whether we are ‘peasants’ or ‘farmers’… we have a small land… 3-4 donum; you have to at least 10 donum (1.34ha.) of land in order to get special
documentation so that you can get government’s credits… since 2005 this is a problem with land use issues, of course; we have 2-3 jobs, in addition to agricultural work, but still not enough…

However, the first sub-category of labor are mostly migratory, semi-proletarian workers. Some of them told me that “we are orta-halli (a kind of middle-class)”. The reason is they have at least a house and a transportation vehicle. Still, they are working hard to make ends meet, as some respondents complained (C1a; C3c). They have a mid-sized amount of land and have a close connection to brokers. One participant (B3c) also emphasized that

both husband and wife has to work nowadays, one income is not enough to survive, sometimes I [he] work more than three jobs, such as I am a cab driver… and I also do some bakery job… but my wife take care of our greenhouse… [translated by the author]

For instance, the county of Tasagil, according to their website, has mostly middle-class people who engage in both agricultural activities while working as wage-labor at surrounding hotels and various factories in the area (mostly as a seasonal worker). They basically serve the export-oriented economy, which demands for some exploitable wage labor. A few people have small grocery stores. Farmers grow mostly fresh vegetable and fruits in accordance with the market’s demand while operating their greenhouses. Some villages are employed by either department of forestry or national park management. Based on my interviews (especially C3c), it is interesting to find out that is mostly Kurdish people, who sell their labor-power to collect cotton for local dominant classes / exporters in the area. Overall, this class is not as ‘happy’ as the capitalist exporters since they “sometimes lose when they sell below market price, which is mostly the case” as one respondent replied. They are the victims of unequal ecological exchange.

As mentioned earlier, those local dominant classes’ responses to world market opportunities ultimately impoverished the resource base upon which their own wealth and profits
depended. It is not just the labor and capital incorporated into commodities (like cotton, fresh-cut flowers, fresh vegetables/fruits, etc.), but all forms of matter and energy which are embedded in production. As Bunker (1985) confirms, such inclusion also allows us to shows how that unequal ecological exchange between regions occur not simply in terms of ‘more’ labor for less labor, or in the channeling of surplus value from one region to another. Rather, productive economies gain flexibility and adaptability while extractive economies become increasingly rigid, inflexible, and vulnerable to the shifting demands of global capital accumulation. This short ecological case exemplifies the negative consequences of underdevelopment characteristic of many resource-exporting regions and showed how extractive economies make regions more vulnerable to the unstable nature of commodity prices on the world market. Integration into the global economy not only resulted in ecological degradation and transformation of their well-established system of resource-use, but also impacted domestic class structures. The macro-structural empirical consequences of unequal ecological exchange are manifest in an interrelated process. That is, the environmental cost shifting or externalization of the social and ecological costs of extraction and distribution of natural resource exports to Turkey is manifest as increased environmental degradation at the local level in Köprülû Canyon.
CHAPTER EIGHT
CONCLUDING REMARKS

Theoretical Arguments in the Present Study

A primary purpose of this dissertation is to empirically demonstrating support for the theory of unequal ecological exchange in the case of Turkey. Ecological crises under capitalism are complex, requiring analysis at the local, regional and the global level. I argue that unequal ecological exchange, especially the disproportionate appropriation of environmental space in the periphery, are at the root of most ecological distribution conflicts in the global South. As such, environmental injustices (both in the North & South) are grounded in the expansionary dynamics of global capitalist accumulation, which contributes not only to global environmental change but also the continuing underdevelopment of global South. Asymmetric power relations in the global economy, which increase the intra-generational income differences between the core and periphery, also distort the prices of biocapacity intensive goods. The countries and/or their corporations with greater wealth and power can decide how to use global biocapacity. Since these products are exported from countries with such “weak” bargaining positions, their global terms-of-trade are worsening and resulting in greater negative ecological externalities (Muradian and Martinez-Alier 2001).

Unequal ecological exchange provides a framework for conceptualizing how socioeconomic metabolism or material throughput of core nations may negatively impact marginalized (or vulnerable) nations in the global economy by stressing the uneven flow of energy and natural resources, and waste products between countries. I also argue that an ecologically-oriented focus upon the uneven processes underlying capital accumulation enhances
(but not replaces) the traditional Marxist concern with labor exploitation. In addition to the transformative dynamics of labor, human societies require the continual appropriation of energy and raw materials (Hornborg 1998) and the externalization of waste products or pollution within the ecological systems.

The systemic undervaluation of natural resource exports, which is a key mechanism of unequal ecological exchange, is a result of cross-national power and advantage in international exchange relations. In the age of capital accumulation, not only capital and technology are transferred from global North to global South, but a cluster of social and environmental costs are transferred as well. Daunting challenges now confront governments of the global South who bare the socio-cultural and environmental costs of natural resource extraction. They are unable to compel capital to “internalize” negative externalities. Instead, the global South has to export their ecological resources at prices dictated by the market. The market prices are the specific mechanism by which the world system extracts exergy from and export entropy to their peripheries and it is vital to address how exchange value relates to thermodynamics, which is the way in which market institutions organize the net transfer of energy and materials to world centers (Hornborg, 1998). The productive economies become increasingly adaptable whereas extractive economies become more and more vulnerable to the shifting demands of global capital accumulation (Bunker, 1998 and Hornborg, 2001). It is imperative to note that the semi-periphery had the largest increases in energy use, whereas the core is able to outsource energy inefficient sources of income to semi-peripheral and peripheral nations.

The value is appropriated not only through the labor process but also via the acquisition of energy and natural resources (Bunker, 1998). This transfer of value, which cannot be
calculated fully in terms of wages, prices, and profit, is recognizable in biophysical terms. Instead of using monetary indicators, ecological economists utilize “physical accounting” methods to illustrate the transfer of energy and materials between core and peripheral nations. Such analysis stresses that the core nations externalize the environmental costs to the peripheral nations while they preserve their natural resource base and succeed in disproportionate rates of material consumption. To this end, the core consumes a disproportionate amount of environmental space at the expense of periphery. Physical accounting studies of international trade can clarify whether a relative dematerialization in the North is going along with a de-intensification of trade flows or is linked to increased physical inputs of natural resources from the South. Concerning the distribution of negative environmental consequences through specialization in the world economy, physical accounting studies can investigate whether negative environmental consequences are disproportionately concentrated in particular world regions.

At the age of globalization, the acceleration of the production treadmill and its destruction is more pronounced in the global South. The recent expansion of more liberalized global trade has contributed to an increase in social and environmental inequalities between global North and global South. The ecological footprint provides one strategy for operationalizing the concept of environmental space, which assists us in understanding and meeting the enormous challenge of achieving ecological and social sustainable development within the context of environmental and climatic justices. Below sections detail the theoretical views further with empirical results according to chapters.
The Political Economy of Agriculture, Unequal Agricultural Exchange and

Turkish Fallacy in the Age of Climate Change

In Chapter Three of this dissertation, I detail the political economy of Turkish agricultural trade in the age of neoliberal globalization. I argue that a number of factors, such as low agricultural prices, reductions in subsidies and support prices, aggressive U.S. and EU policies to restructure the world agricultural system, and anti-agricultural bias in the stabilization programs have all contributed to the transformation of the agricultural sector in Turkey, leading to worsening conditions for those whose livelihood depends on agriculture. In the case of Turkish agriculture, the one-size-fits all model, and “getting the prices right” which was insisted by the IMF and WB, not only constrains the modernization of agriculture but also limit farmers’ access to information and to domestic and foreign markets. Small farming communities especially lack the necessary economies of scale and financial resources to take advantage of all agrochemical inputs, mechanization, and the ability to utilize hydroelectric dams, which threaten the water resources and livelihood of local people. The recent push by the WTO to implement the URA on Agriculture to reduce “trade distortions” could aggravate the short-term and medium-term problems of Turkish agricultural sector.

In Chapter Four, I empirically explore the contributions of Turkey to climate change. Turkey still has cropland, grazing land, and timber land footprint remainders. However, Turkey’s major ecological deficit originates from its “energyland footprint”—that is an “energyland deficit” over the years. As scholars emphasize, if these services were sold to a second country, then the corresponding demand on the first country’s biocapacity would be part of this first country’s “Production Footprint”, as well as part of the second country’s Ecological Footprint of
consumption (Wackernagel et al. 2004). A state of “ecological overshoot” occurs when resources are used more rapidly than the biosphere can replenish them or assimilate their waste, breaching the principle of sustainability. The scholars contend that it is possible for a country to run a negative ecological trade deficit (remainder) while in a state of ecological overshoot. In such a situation, the country would literally be liquidating natural capital to service exports. For instance, Turkey still has cropland, grazing, timber remainders even though there is a state of ecological overshoot resulting from energy deficits.

In Chapter Four, I challenge the popular notion that the “over-consumption” of resources by the Turkish people is at the root of the country’s ecological crisis. This misconception assumes that “over-population” is overcoming efforts by the Turkish state to protect the environment. Instead, I agree with scholars that see the more affluent nations (such as the Netherlands) protecting their own environments through the importation of resources and exportation of wastes from peripheral nations such as Turkey. This misconception that such advanced nations are strong protectors of the environment is commonly referred to as the Netherlands fallacy (Jorgenson 2005; Muradian & Martinez-Alier 2001). In contrast to the Netherlands fallacy, I argue that the inability of the Turkish state to protect the environment is not due to “overpopulation” but rather conditioned by the exportation of resources and importation of wastes. I term this misconception the Turkish fallacy. The over-consumption of resources occurs not only in agricultural sector (agriculture), but also in the manufacturing sector.

The empirical evidence supports the specific hypothesis of Chapter Four, which proposes that the increase in flows of agricultural exports is negatively correlated with the “remainder of
cropland” and “remainder of agroforestry land” over forty years in Turkey. Also, the PTB analysis illustrates that Turkey has been a net-export of agricultural products for four decades. As Turkey moves towards EOI, increased pressure on the cropland, grazingland, and timberland translates into greater appropriation of Turkey’s biospace. As articulated by the theory of unequal ecological exchange, the resource consumption and ecological degradation paradox as well as the decrease in “biocapacity” is at least partly a function of core nations which utilize their advantageous positions in the world economy to externalize their consumption-based environmental costs to Turkey. The result is the destruction of Turkey’s biocapacity or more specifically ‘ecological reserve.’

The findings of this chapter are relevant to the discussion in Chapter Two about capital accumulation and the appropriation of energy within the context of analyzing trade as thermodynamic imperialism. The world system scholars locate the origin of unequal ecological exchange in the internal dynamics and logic of accumulation between extractive and productive economies. The findings of Chapter Four showed that the semi-periphery (including Turkey) had the largest increases in energy use, whereas the core is able to outsource energy inefficient sources of income to semi-peripheral and peripheral nations. Disorder, or entropy, is exported to the semi-periphery and periphery.

Pollution Havens & Unequal Ecological Exchange: Trade Flows of “Antiwealth”

For the global South, increased integration into the capitalist world economy through material-intensive and low-value-added products will likely entail significant environmental burdens linked to a rising scale of physical outflows (Giljum 2004). In Chapter Five, I utilized a time-series PTB approach and regression analysis to demonstrate that polluting businesses
(especially CO₂ intensive-manufacturing) are moving from the global North to the global South. This is evident in Turkey where the amount of CO₂ produced in manufacturing (including metal, iron/steel production, etc.) has steadily increased over the past few decades. In other words, the PTB analysis illustrates that Turkey has been a net-export of “dirty” manufacturing over forty years. Also, regression analysis confirms that the greater export flows of “dirty” industries are positively correlated with the pollution-intensive manufacturing activities. More importantly, while “dirty” net-exports created pollution havens, energyland embedded in manufacturing of “dirty” industry has also increased. Hence, both exports of “dirty” manufacturing and the amount of energyland embedded in manufacturing production have positive independent effects on the levels of pollution-intensive manufacturing. In this case, the trade can be considered a form of thermodynamic imperialism.

In Chapter Five, I show how environmental surpluses are extracted from the periphery. Odum’s work focuses on an embedded energy (or emergy) is similar to Marx’s labor theory of value, which emphasizes the amount of human energy (labor) that has been invested in a product. Accordingly, one of my contributions in this chapter is to demonstrate that the withdrawal of energy and other natural resources from the periphery is a result of exploitative relations with the core in the capitalist world system. In the context of the transnational treadmill of production, my results show that the state (and capitalist class) largely ignores the impacts of environmental withdrawals or additions (like “pollution”) by mandating policies that encourage further economic expansion. However, my findings run counter to macroeconomic orientations that predict an environmental Kuznets curve. My regression models find that Turkey’s “pollution havens” serve as an example of the second contradiction of capital, which essentially
demonstrates how capital externalizes environmental costs resulting from production processes in order to maximize profits in a manner that destroys future conditions of production. As my empirical results attests, the energy embedded in manufacturing production and carbon intensity of Turkish trade is the dissipated energy and carbon dioxide produced by each export and import.

**Unequal Ecological Exchange between the EU and Turkey**

As I detail in *Chapter Six*, if some sectors of a country have surpluses, then the “ecological reminder” may still be used for providing services that are consumed in other countries (Wackernagel et al., 2004). The overuse of global environmental space by European and other industrialized nations during the last decades can be expressed by the so-called *ecological debt* (see Chapter Two). The core nations draw upon or damage a disproportionately high share of “global property,” without compensating the periphery (SERI, 2006). This becomes evident in the case of embodied CO₂ emissions in products (or *energy footprint*) as exemplified for EU-Turkey case. The global North, in particular the EU, has been able to shift ‘their’ environmental loads onto Turkey and the global South, where labor and natural resources are cheaper and environmental legislation less of an obstacle. Recent methods utilize various *biophysical metrics* rather than monetary ones to measure the uneven flows and the environmental impacts of international trade. Thus, one of the approaches, such as PLUM (an input/output matrix), is used to measure pollution terms of unequal ecological exchange, more specifically pollution-intensive, embodied CO₂ in products. In addition, the quantity of cropland and grazing land embodied in trade is integrated into the methodology utilized in this chapter.

As a result of analyzing PLUM from 1-digit to 4-digit resolution, it is uncovered that trade with the EU is contributing to cropland degradation in Turkey and cropland protection in
Europe. My ‘deeper’ analysis of ecological unequal exchange also shows that the high level of ‘dirty’ product exports to the EU reveals the creation of a ‘pollution haven’ in Turkey. In other words, the expansion of capital accumulation in Europe is partially predicated on the consumption of growing quantities of natural resource flows (both in the form of crop/grazing land and embodied energy in exports) from Turkey to the entire EU-15 (except for Greece in some sub-sectors). Hence, my conclusions are two-fold. First, exports from Turkey are more pollution-intensive in comparison to the export flows of the EU-15. Secondly, Turkey’s embodied crop/ grazing land in exports is higher than EU-15 exports. It is clear that the disproportionate use of environmental space is also about the disproportionate emissions of carbon dioxide. This is also a form of European *thermodynamic imperialism*. The EU appropriates ecological space through trade without having to deal with its local ecological consequences.

**“Outcomes” of Unequal Ecological Exchange at Köprülü Canyon**

The extraction and export of natural resources from the global South constitutes a transfer of value embodied in both matter and energy (Bunker 2006). As such, the undervaluation of natural resource exports is a key mechanism of unequal ecological exchange, for it fails to account for local negative externalities associated with natural resource extraction and transport (Bunker, 2006). Hence, these impacts are encountered at the local level within the periphery/semi-periphery—at the destruction of sustainable ecological and social systems, as exemplified at Köprülü Canyon of “yayla” peasants --- subsidizing the profits of foreign capital. On the other hand, strengthening local democratic systems empowers communities to more properly manage their local natural resources. Such empowerment generally reduces the
“underpricing” of natural resources and reduces the ecological footprint of foreign capital (Agarwal & Narain: 9).

In conducting semi-structured interviews with residents of the Canyon region, it is clear that the shift to export agriculture has made the yayla-peasants more vulnerable to ‘external market’ conditions. Thus, they experience the degradation of their cultivated land due to increased competitive economic pressures rather than excessive population pressures on resources (Karahalil et al., 2007). Major social class transformations have been observed at Koprulu Canyon. Whereas the exporting firms are the ‘winners,’ yayla-peasants are the ‘losers’ of unequal ecological exchange.

Conclusion: Moving Towards (un)Sustainable Ecological Exchange?

The international recognition of the need to facilitate a transition to ecologically sustainable production and consumption systems is growing. The overuse of environmental resources is incompatible with sustainable development (McLaren 2003:20). A fairer distribution of environmental space requires cooperation among societies and recognition of the carrying capacities of local ecosystems (Ibid.). At the 1992 Rio Conference, the debate was centered on trade, environment, and sustainable development. Participants from the global South argued that many nations are locked into a vicious circle in which production is centered on commodity exports: poverty and debt force them to increase exports without internalizing cost, leading to further environmental degradation. Furthermore, these nations face economic barriers in the North, from escalating tariffs and a barrage of non-tariff barriers, to increased competition from other exporters following the same order. The results are: low revenues, further increases in exports, and greater environmental degradation (Int’l Inst for SD, 1998).
For McLaren, (2003), ecological sustainability implies maintaining the economy at a scale without damaging the life support systems of the planet. It also implies fair resource distribution between present and future generations. For ecological economists, “no development path is sustainable if it depends on the continuous depletion of production capital.” (Rees 2000: 27). The major problem is that the dominant neoliberal economic order and trade agreements ignore carrying capacity and sustainability considerations. Commodity flows and trade are guided by short term monetary considerations, not longer-term ecological concerns. In these circumstances, international trade privileges profits through the depletion of essential natural capital (Ibid.).

Andersson & Lindroth (2001) use ecological footprint analysis to distinguish between different types of unsustainable trade. For them, there is growing evidence that the world as a whole uses its natural capital in an irrational way. Exchange is ‘ecologically unequal’ if there is an imbalance- calculated in ecological footprints between exports and imports. From their point of view, “the core countries affect the periphery negatively in the short run; decrease their ecological footprint by changing or decreasing their consumption, by improving their technologies and organization and by reducing their dependence on imports of low priced biocapacity.” (Ibid. 121). In order to maintain their status, a large ecological footprint may be a condition for the economic prosperity of the global North.

As the Table 8.1 below demonstrates, Turkey is not on a sustainable path, according to an historical ecological footprint data from 1961-2003 (obtained from Global Footprint Network). It shows ecological demand (as primary consumption) and ecological supply (as primary production) in global hectares. This data includes ‘energy’ which is an important resource in
Turkey (as discussed in empirical chapters, Turkey imports energy in order to keep up with her economic growth). The sharp changes can be observed in the ‘demand’ side. Turkey’s ecological deficit, which became more visible in 1990s, is originating from her ‘energy’ sources. In terms of ecological demand, primary consumption is slightly higher than the primary production in 2000s. There has been a decrease in biocapacity. As a result, a growing number of scholars are calling upon the North to pay their ecological debt (Torras 2003, Rees & Westra)

Fig 8.1: Turkey’s Ecological Demand and Ecological Supply Patterns from 1961 to 2003

Data source: Disaggregated by the author, using GFN database (Unit: global hectares)
Climate Change: Environmental Space, Eco-debt and Eco-imperialism

Climate equity and climate justice are now beginning to be better understood in terms of the concepts of ecological footprints, ecological debt and environmental space (Agyeman et al., 2003: 9). Scholars actively support reducing consumption in the North to allow for a redistribution to access to resources at the age of “climate change.” Equity-based strategies that reduce overall global consumption levels present a number of challenges to export-led development and globalization policies. For one thing, reduction of the North’s consumption capacity economies threatens economies of the South that depend on the export of commodities (McLaren, 2003). Thus, policy makers need to reduce such dependence on export commodities to satisfy needs of the domestic population (McLaren, 2003). This can be done by rebuilding locally controlled markets. In the South, elites often consume more than the fair share of resources in comparison with the majority of the population. It is the political-economic power of the transnational capitalist class that dictates how resources are controlled and who consumes the product.

As Martinez-Alier (2009:1109) details, current global accounting conventions do not include damages to the environment.” The end result is an enormous ‘carbon debt’ owed to future generations and to those poor people of the world who have produced few greenhouse gases (Ibid. 1110). The North not only ought to pay its eco-debt, but also it should “adjust” its own productive economy, which is most destructive and polluting of its own environmental space (Martinez-Alier 1998). Martinez-Alier (2009: 1029) also asks: who has the power to
simplify complexity and impose a particular language of valuation? He reiterates the claim that the environmental justice movement (EJM) knows that conventional economic accounting ignores the physical and biological aspects of the economy, the value of unpaid domestic and voluntary work, and that it does not measure the welfare and happiness of the population. For him, new social and financial institutions must be created to address climate change, and to promote “de-growth” in the North as necessary conditions for climate stability and justice. To achieve this requires that the “confluence of interests of Northern conservationists and the “environmentalism of the poor” in the South provide a base for global political mobilization against the neo-liberal growth model. According to Vandana Shiva (2008: 41),

> how land is used, and how its ownership is distributed, is part of the politics of climate change…, and is not just about what happens in the air… those who are controlling and monopolizing the land and water of the poor are also privatizing the air, first through pollution, and then through “market” solutions to climate change.

Shiva (2008:15) stresses that “mechanical-industrial systems” are responsible for the increasing amount of greenhouse gases in the atmosphere and the decreasing ability of societies and ecosystems to adapt to the resulting climate change. It is a known fact that the imposition of the “mechanical-industrial paradigm” for production and distribution of all kinds of goods and basic needs in the global South were initially carried out by the World Bank and IMF through “development” aid (Ibid.). Now, it is imposed by WB/IMF structural adjustment programs (SAPs) and WTO’s free-trade policy, which are in effect, rules which grant capital the freedom to destroy resources, deplete energy, and pollute the atmosphere. In the face of climate change, Shiva (2008:15) argues that corporate globalization advocates act as business as usual, and this
path can only last a few decades, and at very high social, economic, and ecological costs. She calls this path of “eco-imperialism” a mechanistic paradigm that assumes limitless growth.

*Climate (in)Justice: An Emerging Global Ecological and Social Movement? Addressing the Unequal Costs of Climate Change*

Climate negotiations and policy have led to regulation of the ecological crisis which has characterized by three fundamental shortcomings details: (1) an overemphasis on market-based economic instruments; (2) defining the issue in overly ‘objective’ scientific terms; and (3) by concentrating on the international level of policy-making, even though at this level the consensus required for action is very weak (Brunnengraber, 2007). Many climate policy analysts dismiss the claims of "environmental imperialism," "ecological debt," "ecologically unequal exchange," “environmental load-displacement,” “declining environmental terms of trade,” and "climate injustice" made by developing country negotiators as empty and distracting rhetoric used as a negotiating tactic." (Roberts and Parks, 2007: 29; 137). On the other hand, it is widely known that carbon dioxide emissions are the largest anthropogenic contributor to global warming and climate change (Houghton et al. 2001; IPCC 2007; National Research Council 1999). Total CO₂ emissions and emissions per unit of production have increased over the past few decades in less developed countries (WRI 2005; 2007). In fact, within less-developed countries, total emissions more than doubled, while emissions per unit of production increased from 1980-96 and then “plateaued” from 1997 to 2000 (Jorgenson 2009: 64). In order to show the natural limits which societies come up against due to the over-strained consumption of resources and too high

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113 See also: Climate Change Science and Policy, Schneider, S, Rosencranz, A, Mastrandrea, M, Kuntz-Duriseti, K., (eds.), 2010 (Island Press, Washington)
emissions of pollutants, the Wuppertal Institute speaks of a limited “global environmental space” (Brunnengraber 2007: 213).

Since the early 1990s, the emerging climate justice movement has brought together many environmental activists. To what extent the emerging transnational network around climate justice will influence the current climate regime is still in question. Recent activities of ‘insider-outsider networks,’ including non-governmental advocacy groups, are observed both in the U.S. and the EU. However, NGO coalitions and movement proposals to address climate change face resistance from neoliberals (Okereke 2008). For Lohmann (2009:1031), carbon trading only “serves to postpone “investment” in a long-term, non-fossil fuel future. Instead, it encourages more ingenuity in creating possibilities for short-run (windfall) profits than in fostering innovations that lead to a trajectory away from fossil fuels.” The market solutions to climate change essentially give “property rights” to the atmosphere “to a selection of historical polluters—wealthy countries and companies—for free (cited in Shiva 2008:17). In his view, techno-fixes (carbon sequestration) create more carbon emissions than they clean up. Lohmann (2009) suggests deeper reforms which replace the market by alternative democratic coordination and decision-making mechanisms.

Environmental Justice Movement (EJM) must be global?

As we have seen, the limits to growth are not impacting everyone equally (Rees, 2000; Wackernagel et al., 1999). Those with greater political-economic power can reduce their exposure to these limits by absorbing the increased prices for commodities, whereas poor cannot (Pellow & Brulle 2005). How can the EJM best address globalization and its impacts on environmental inequality at the age of capital accumulation and mobilization? The movement
must be able to combat and excesses of capital in the North if it is to take on the task of battling these forces in the South. Transnational environmental injustices present unique challenges to local and national movement efforts. Does a disproportionate environmental burden constitute a violation of basic human rights?

As Pelllow and Brulle (2005) argue, the sources of environmental inequality are global. The North has to pay off its ecological debt. If the EJ movement cannot curb the excesses of capital and Northern governments, it surely will be unable to effectively challenge global corporations on unfamiliar turf in the global South (Pellow & Brulle 2005). As the environmental justice movement framework attests, *procedural equity* requires full democratic participation in environmental decision making (Lake, 1996:1). For Fischer (2000), citizen participation is deliberation on issues affecting one’s own life is the normative core of democracy, and citizens, as local experts, bring their *local knowledge* to the community of the scientific establishment. The solution to achieve environmental justice (*and* climatic justice) might be a participatory mode of democracy. As Daniel Faber (1998) details, *ecological democracy* means bringing citizens and experts together to resolve the issues. For Lake (1996:167),

> removing the environmental burden on a community, say through….site remediation, and environmental cleanups, may well be a significant accomplishment but it will not have empowered that community to control its environment. Redistributing outcomes will not achieve environmental justice [*and climatic justice*] unless it is accompanied and, indeed, preceded by a procedural redistribution of power in decision making (*emphasis added*).

Can EJ be a force for sustainability? Faber and McCarthy (2003) argue that linkages between sustainability and EJ can further the goals of ecological democracy. This means communities should have equal opportunities to provide for their basic needs in a healthy and vital economy.
Ecological sustainability also calls for a new vision of how humans relate to nature. As Ranji Kothri states,

[it] requires an ethical shift, not a change in the way we employ technology and financial resources, but a shift in viewing nature not in terms of resources to be turned into economic commodities but as valuable in itself and for the way it supports life. Sustainability is intertwined with social justice” (Ranji Kothri cited in Agyeman et al., 2003)

To achieve sustainability, Shiva (2008) claims that energy systems need to be embedded in society and ecosystems. Earth democracy recognizes the survival of our threatened species, and aims at bringing about climate, energy, and resource justice on a small and fragile planet (Shiva, 2008).

*Sustainable Development Related Studies in Turkey*

“A national 'development' model based on big infrastructure projects and nuclear plants is totally unsustainable,” commented a delegate of the European Green Party (EGP) in Turkey (EuropeanGreens.EU, 2011:1) The EuropeanGreens.EU (2011) published an article, “‘Big works’ and power plants make Turkey’s future unsustainable,” which discusses how The Turkish Green Party is campaigning for an ecological constitution. They are at the forefront of the Initiative for an Ecological Constitution (IEC), supported by various politicians, academics, and lawyers. Greens have argued that the new constitution should incorporate an ecological approach or at the very least an amendment.114 The physical trade balance analyses, in addition to quantitative findings of this study, show that Turkey is in an unsustainable ecological exchange trajectory, as I indicated in Chapter One. The European Greens (2011) emphasize that Turkey

114 See also [http://europeangreens.eu/menu/news/news-single/?tx_ttnews%5Btt_news%5D=2422&tx_ttnews%5BbackPid%5D=1&cHash=ecbecf5339ca37428958e1be63cf83f4](http://europeangreens.eu/menu/news/news-single/?tx_ttnews%5Btt_news%5D=2422&tx_ttnews%5BbackPid%5D=1&cHash=ecbecf5339ca37428958e1be63cf83f4)
needs a real reform of the development model, the current one being unsustainable and unsuitable with the rapid development and economic growth of the country built at the expense of the environment and the people. According to this study’s findings regarding unequal ecological exchange with the EU, it is imperative to reiterate that Turkey should require the EU to pay “their” ecological debt to Turkey. Turkey can make this claim during the negotiation process.115

On the other hand, a number of environmental studies and conferences related to environmental science, ecology, and sustainable development took place in Turkey since mid-1990s.116 There is various ecologically sustainable, small scale projects have been implemented throughout the country, which are all promising. One of them, for instance, called an eco-village initiative in Ankara, a community-supported agriculture project in Balaban Valley where ecologically grown vegetables are distributed to other towns in the city. Another project is to set up a small-scale ecological settlement in Ankara. There is also various academic research which focuses on sustainability. For instance, Keles and Aydogdu (2010) analyzed the impact of ecological footprint applications used as tools of environmental education. The authors found out that ecological footprint is an environmental education tool effective in changing the awareness, attitudes and behaviors of the prospective science and technology teachers towards environment and sustainable life.

Based on my qualitative ecological case study, it is imperative to examine agroforestry


116 A recent environmental, international conference took place in Istanbul, Turkey on December 7, 2011.
system and revival of such systems in Turkey. If the goal is to bring sustainable development at the local level, then the agroforestry communities should be given an opportunity to become “decision makers” and “managers” of their land and the region which they live in. Tolunay et al. (2007:41) argue that agroforestry application could be put into major agroforestry practices in Turkey. The authors emphasize that promotion of agroforestry in Turkey will help the country address various problems such as environmental degradation, lack of food security, and deforestation. There is great potential and justification to start with implementing agroforestry (Ibid. 47). Also, Kahveci et al. (2003) suggest that ecotourism implementations in suitable forest villages may be the best income-generating activities that are also ecological. The authors argue that such ecotourism projects should aim for direct and indirect improvement of income levels and living standards of the local people.

As the findings of this study show, energy deficit has become more visible in Turkey. As Bilen et al. (2008) demonstrate, Turkey is heavily dependent on expensive imported energy resources (oil, gas and coal) that place a big burden on the economy and air pollution is becoming a great environmental concern in the country. In this regard, renewable energy resources appear to be one of the most efficient and effective solutions for clean and sustainable energy development in Turkey. Turkey’s geographical location has several advantages for extensive use of most of these renewable energy sources. This article presents a review of the potential and utilization of the fossil fuels and the renewable energy sources in the world and in Turkey. Similarly, Yuksel (2010) stresses that Turkey's energy production meets nearly 28 percent of its total primary energy consumption. As would be expected, the rapid expansion of energy production and consumption has brought with it a wide range of environmental issues at
the local, regional and global levels. For Yuksel (2010:1469), with respect to global environmental issues, Turkey's carbon dioxide (CO₂) emissions have grown along with its energy consumption, and renewable energy resources (small hydropower, biomass, geothermal, solar and wind) appear to be one of the most efficient and effective solutions for clean and sustainable energy development in Turkey.

Turkey’s sustainable development policy has always been ambiguous (Mazlum 2005:643). However, there is an ongoing effort to adjust established policy patterns to meet the demands of sustainable development in Turkey (Ibid. 648). So far, all the attempts to promote sustainability have utilized different, disintegrated mechanisms. Therefore, a well-integrated, comprehensive policy strategy is needed to achieve ecological sustainability.

**Future Research**

This dissertation tests the theory of unequal ecological exchange between Turkey and the EU, as well as its local “outcomes” at Köprülü Canyon. It would be worth examining unequal ecological exchange with other core nations, such as with the U.S., by utilizing advanced physical trade balance approaches. By focusing on global ecological unequal exchange, the carbon/ecological debt can be further investigated. At the local level, exploring the relationship between social movements (such as commodification of water in Turkey, hydroelectric dams, energy crisis) and consequences of unequal ecological exchange from an environmental justice perspective will be in my future research agenda. It is also vital to investigate models of environmental governance (in active collaboration/ participation with local communities) which might be most effective for marginalized, vulnerable populations to address climate change.

Analyses of renewable energy production, consumption, and environmental pollution
within the context of development will become emphasized in the near future research. It is clear that corporate-led neoliberalism produces uneven development at global level. One central inquiry will be: Can climate change be reversed? In this line of investigation, the analysis of reintroduction of gender and class analysis within the context of both environmental and climate injustices is indispensable.
APPENDIX A

Unsigned Consent Document (2009)

| Northeastern University, Department of Sociology & Anthropology |
| Name of Investigators: Prof. Daniel Faber and Lora Karaoglu |
| Title of Project (proposed): Globalization, Unequal Ecological Exchange, Environmental & Climate Injustices: EU, Turkey and Köprülü Kanyon. |

We would like to invite you to take part in a research project. The purpose of this research is to understand the complicated relationship between international trade and the growing pressure on the environment. In my local analysis, I am focusing on your region to identify the socio-ecological impacts of the “free trade zone”/trade policies on local people, especially on their “yaylacilik” activity (one form of agroforestry) and their environment.

If you would like to take part in this study, you will be interviewed about your past and present farming/agriculture/forestry activities, transportation, marketing your crops, receiving subsidy, your general income and housing, and any environmental and related health problems that you have observed.

The interview will be conducted at a time of your choice and will last about 30-40min. With your permission, I will digitally record your interview.

Your part in this study will be handled in a confidential manner. Your name and contact information, and the name of your farm and/or business we discuss will not be revealed in the final product. There are no foreseeable risks or discomforts to you for taking part in this study.

There are no direct benefits to you for participating in the study. However, your answers may contribute to gaining more knowledge about the economic and ecological impacts of “free trade zone” policies at the local level and help us to inform future policy decisions.

The decision to participate in this research project is up to you, thus it is completely voluntary. You do not have to participate and you can refuse to answer any question. Even if you begin the study, you may quit at any time.

You will not be paid for your participation in this study.

If you have any questions about this study, please feel free to contact either Professor Daniel Faber, the Principal Investigator (+1-617-373-2878) or me (+1-508-615-7696) at the Northeastern University, Department of Sociology.
If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115 (+1-617-373-7570).

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Recruiting Phone Script (stakeholders #1)

Hi, my name is Lora Karaoğlu. I am a doctoral candidate at Northeastern University in the U.S. I am conducting a study of the complicated relationship between international trade and the growing pressure on the environment. In my local analysis, I am focusing on your region to identify the socio-ecological impacts of the “free trade zone”/trade policies on local people and their environment.

I would like to interview you about your past and present farming/agriculture/forestry activities, transportation, marketing your crops, receiving subsidy, your general income and housing, and any environmental and related health problems that you have observed in your family and/or your neighbors/neighborhoods.

The interview is expected to last about 30-40min. I am willing to call you at a time of your convenience. [conversation answering questions, setting up date and time]

Thank you so much for your help. I look forward to talking to you again.

Recruiting Phone Script (stakeholders #2)

Hi, my name is Lora Karaoğlu. I am a doctoral candidate at Northeastern University in the U.S. I am conducting a study of the complicated relationship between international trade and the growing pressure on the environment. In my local analysis, I am focusing on your region to identify the socio-ecological impacts of the “free trade zone”/trade policies on local people and their environment.

I would like to interview you about your experiences with trade and marketing processes as well as your relationships with “middlemen” and/or villagers during this process.

The interview is expected to last about 30min. I am willing to call you at a time of your convenience. [conversation answering questions, setting up date and time]

Thank you so much for your help. I look forward to talking to you again.
APPENDIX B

Phone Interview Questions

Interview questions for the two general sets of actors:

A. Interviews with villagers (yayla-farmers/peasants and/or small business at wholesale market, “Hal,” commissioners)

Questions:
1. Do you still go up to the “yayla” (a place/summer quarter where they conduct their agro-forestry, including grazing) during the summer? If so, how long do you stay up at the “yayla”? Please explain if you still obey the customary rules, etc.


3. Do you have (own) land? If yes, how big is your land? If not, how do you earn

4. Do you own a truck or car? Which road do you usually use to go to the Serik or Antalya (village or country)?

5. Access to market and “free trade zone”:
   a). Do you grow fruits/vegetables for your family or to sell in the market?
   b). If for the market, who is usually in charge of taking your products (cotton, fresh-cut flowers, vegetables, fruits, and so forth) to the market (at Serik, Antalya – free trade zone, etc)?
   c). Do you make some arrangements with “contractors”?
   d). What are the legal issues that you face during the marketing/trading process (patent, rights, etc)? What are your concerns/problems? Please specify.

6. Is water contamination an issue in your village? Do you get sick (or have health issues) because of working on the farm and/or drinking water? If so, please explain the causes. Please explain.

7. Do you earn enough money to make a living when you sell your product in the market? On average, what is your annual household income? What else do you do in order to support you/your family?

8. What kind of housing/living quarters do you live in? Please describe. Do you own a car/ small truck, tractor, etc? If so, how many? Please explain.
9. Is there anything and/or any issues you would like to add that I did not already ask you?

B. Interviews with other stakeholders including but not limited to: Free Trade Zone offices, other related businesses (commerce/trade/industry/production) and some “brokers” located in the city of Antalya (including Köprülü Canyon National Park region) and its surroundings.

Questions:
How long have you been doing this business? Who are your customers? Where do they grow their product usually? Please explain.

1. Are you shipping out some products either overseas or to other cities/towns in Turkey? What kind of products (like cotton, fruits, flowers, etc.) do you usually get?

2. Do you get these products go through a “middleman” in the Serik or Antalya or directly from the villagers and/or their farms? Please explain.

3. What are the legal issues that you face during the marketing/trading process? Please explain.

4. Is there anything you would like to add that I did not already ask you?

* * * *

Turkish Translation:

Telefon görüşmesi Soruları

Iki ayrı gruba sorulacak telefon görüşmesi soruları:

A. Koyluler ile görüşme:

Sorular:

1. Halen “yaylalara” cikiyormusunuz (yazin, biraz tarim ve hayvanlarını otlatmak amaci için dagların tepesine cikarlar) Halen, geleneksel kurallara göre mi haraket ediliyor yaylalarda, luften anlatin.


5. Carsi/ Hal ve ‘serbest bolge’ ticaretine bağlı durumu:
   a). Sebze ve meyvaları kendi aileniz içini mi yoksa “halde” satmak için mi yetiştiriyorsunuz?
   b). Eğer “halde” yada “serbest bolge” (Antalya, Serik) de satmak içinse ne tur sebze ve meyva, yada pamuk gibi diğer ürünlerinizi getiriyorsunuz?
   c). Haldeki komisyoncularla anlaşarak onlara mı satiyorsunuz?


7. Pazarda sattığınız ürünlerin gelirini temin edecek parası kazanabiliyormusunuz?
   Ortalama geliriniz ne kadar? Ailenizi geçirmek için başka neyle ugrasıyorsunuz?


9. Bu sorulara eklemek isteginiz, fakat bizim sormadığımız, herhangi bir problem yada sorununuz var mı?

B. Diğer ilgili kişi ya da kuruluşlarla görüşme: bunlar içinde ‘serbest bolge ticareti’yle mesgul olanlar, diğer ilgili isyerleri (endüstri, ürünleme, pazarlama, ticaret), bazı komisyoncular, Antalya ve Koprulu Kanyon Milli Parkı’nın geniş çevresi.


1. Bu aldigınız ürünlerin yurticine mi yoksa yurtdışına mi yolluyorsunuz? Ne cesit ürünlerin (örneğin, pamuk, meyva, sebze, çiçek, ve benzeri) pazarliyorsunuz?
   Bunları direk olarak koylulerden mi yoksa Serik yada Antalya daki komisyonculardan mı alıyorsunuz. Lütfen anlatın.

2. Bu isi yaparken herhangibir yasal bir sorunuz var mı? Lütfen anlatın.

3. Bu sorulara eklemek isteginiz, fakat bizim sormadığımız, herhangi bir problem yada sorununuz var mı?
APPENDIX C: Direct Material Input (DMI): EU and Non-EU Members

Data source: Wuppertal Institute (Schutz, 2000).
Direct Material Input (DMI) per capita compared to Gross Domestic Product (GDP) per capita, 1999 (2000) scatterplot: EU and Non-EU Nations, including Turkey.

Data source: Wuppertal Institute (Schutz, 2002). Direct Material Input (e.g. fossil fuels, minerals, biomass, and others; unit: tons per capita): EU countries and non members, including Turkey.
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