

An Eco-Marxist Reading of Paolo Bacigalupi's *The Windup Girl*

Dr. Nader Mostafa Helmy

An Abstract

Guided by the Marxist ecological ideology, represented mainly by the ecological writings of Karl Marx, James O'Connor and John Bellamy Foster, the present study aims at investigating the destructiveness of capitalism on the ecosystem in Paolo Bacigalupi's apocalyptic novel, *The Windup Girl* (2009) with particular emphasis on the devastating effects of capitalist agriculture. Bacigalupi is an American fantasy and science fiction writer whose debut novel, *The Windup Girl*, won the Nebula award and the Hugo Award for the best novel in 2010. A close reading of Bacigalupi's novel from an Eco-Marxist perspective reveals to what extent humans become alienated from nature and to what extent the contradictions of the capitalist systems wipe out their treasure (nature) while pursuing wealth and profit.

Key Words: Eco-Marxism, Paolo Bacigalupi, *The Windup Girl*, Environment, Capitalism.

قراءة ماركسية إيكولوجية لرواية "الفتاة الزنبركية" للكاتب باولو باسيجالوبي

ملخص

استرشادا بالأيدلوجية الإيكولوجية الماركسية المتمثلة في الكتابات الإيكولوجية لكارل ماركس، وجيمس أوكونور، وجون بيلامي فوستر، تهدف الدراسة الحالية إلى الكشف عن الجوانب المدمرة للنظام الرأسمالي على النظام الإيكولوجي في رواية "الفتاة الزنبركية" (2009) للكاتب الأمريكي باولو باسيجالوبي مع إبراز الآثار السلبية للزراعة الرأسمالية على البيئة. ومن خلال قراءة متأنية لرواية باسيجالوبي يتجلى للقارئ المدى الذي انسلخ فيه الإنسان عن بيئته، فضلا عن تناقضات النظام الرأسمالي الذي ساهم بشكل كبير في القضاء على الطبيعة، والتي تمثل المصدر الرئيس لثروات الرأسمالية.

An Eco-Marxist Reading of Paolo Bacigalupi's *The Windup Girl*

Dr. Nader Mostafa Helmy

The exploitation of the earth and the degradation of our environment have recently reached an alarming rate. Climate change, urban sprawl, natural resources depletion, loss of biodiversity, genetic engineering, the pesticide treadmill, industrial pollution, deforestation and many other problems are just examples of the harmful human activity in the ecosystem. Driven by 'accumulation for accumulation's sake', cruel capitalist systems usually place profit above such ecological problems. According to Jonathon Porritt, capitalism is in an incessant process of "destroying natural habitats of every kind for profit purposes." (27) Eco-Marxism has emerged as a critique of the destructive impact of capitalism on the ecosystem. Guided by the Marxist ecological ideology, represented mainly by the ecological writings of Karl Marx, James O'Connor and John Bellamy Foster, the present study aims at investigating the destructiveness of capitalism on the ecosystem in Paolo Bacigalupi's apocalyptic novel, *The Windup Girl* (2009) with particular emphasis on the devastating effects of capitalist agriculture. Bacigalupi is an American fantasy and science fiction writer whose debut novel, *The Windup Girl*, won the Nebula award and the Hugo Award for the best novel in 2010. A close reading of Bacigalupi's novel from an Eco-Marxist perspective reveals to what extent humans become alienated from nature and to what extent the contradictions of the capitalist systems wipe out their treasure (nature) while pursuing wealth and profit.

Eco-Marxism: A Survey

The term 'Eco-Marxism' was first introduced in 1979 by Ben Agger in his *Western Marxism: An Introduction, Classical and Contemporary Sources*. Eco-Marxism is defined as a "sociopolitical ideology that fuses the Marxist critique of capitalism with ecological issues and pro-environmental movements." (Pepper 23) As a modern theory, Eco-Marxism was first introduced and established by James O'Connor in his 1988's article "Capitalism, Nature, Socialism: A Theoretical Introduction" in which he analyzed the contradictions embedded in the capitalist systems when dealing with ecological issues.

Although Marxism and Ecologism may seem at first as two incongruent doctrines, for the former is concerned with class relations and is alleged to promote man's mastery over the environment while the latter is concerned with the appropriate interactions between humans and the environment, Marx's contributions to our understanding of the ecological issues are invaluable. Whereas Ecologism "advocates a transformation in human–nature relations, challenges anthropocentric values, emphasizes respect for natural limits, and calls for significant social and economic change" (Hards 132), Eco-Marxism has given an equal importance to the same transformation in the human–nature relations; Karl Marx writes:

Man lives from nature, i.e. nature is his body, and he must maintain a continuing dialogue with it if he is not to die. To say that man's physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature (Marx, *Early Writings* 328)

Marx, accordingly, stresses the reciprocal harmonious relationship between man and nature. Moreover, the Marxist approach to the ecological issues is globally acclaimed by economists, politicians and environmental thinkers. Barry Commoner, one of the founders of the modern environmental movement, gives explanations to a number of ecological contradictions relying on Marx's 'metabolic rift' in his *The Closing Circle: Nature, Man, and Technology*. John Bellamy Foster and Paul Burkett in "Ecological Economics and Classical Marxism: The Podolinsky Business Reconsidered" underscore the interconnectedness between Marxism and Ecologism. In his preface to *Eco-Socialism: From Deep Ecology to Social Justice*, David Pepper notices that "the more capitalist economy was failing, the more attention publishers devoted to Marx's works". (vi) Chinese writers also see Eco-Marxism as not only "one of the most influential movements in contemporary Western Marxism," but also "a very important force among various ecological theories." (Wang, Zhihe, He, Huili, and Fan Meijun 43) Recently, socialist thinkers have unraveled the basics of ecological sustainability relying on Marx's ecological critique of capitalism and his seminal work of sustainable human development (Pepper 12-16).

In order to fully understand Eco-Marxism, five key Marxian terms should be first introduced: 'social metabolism', 'metabolic rift', the 'commodity economy', 'capitalist agriculture' and 'the second nature'. These five terms were originally coined and explained by Karl Marx, and then developed by modern Eco-Marxist writers like James O'Connor and John Bellamy Foster.

In his *Capital: A Critique of Political Economy*, Karl Marx contends that natural systems, such as the nutrient cycle, has a kind of metabolism (an exchangeable dynamic process of matter and energy), which "operates independently of and in relation to human society", which ultimately guarantees its continuance (553). Marx then applies this metabolism to humans' interaction with nature. Marx calls this interaction the "social metabolism" which is a "process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature." (Marx, *Capital* 554). In other words, Marx's social metabolism refers to the mutual need of man and nature, i.e. man needs nature to support his/her survival whereas nature needs man's nutritious waste for its existence.

However, the aggressive greedy policies of capitalist systems have resulted in what Marx calls "metabolic rift" which threatens the ecological grounds of human existence. For example, because of the shipping of food from the countryside to distant markets, the soil nutrients in these distant markets are collected as waste, instead of being returned to its normal habitat, the soil. Marx points out that this type of production "hinders the operation of the eternal natural condition for the lasting fertility of the soil." (Marx, *Capital* 637) Consequently, a metabolic rift has been created in the nutrient cycle. Karl Marx analyzes different types of metabolic rifts such as climate change, energy crisis and desertification.

Karl Marx's 'commodity economy' and 'capitalist agriculture' are connected together for the former is a prerequisite for the latter. According to Marx, capitalism is mainly based on growth. To meet this end, capitalists tend to commodify merchandise, services, and also the laborers to

prompt higher levels of consumption. It was thus essential for land to become a commodity that can be "owned, used, bought, and sold". (O'Connor *Natural Causes* 97). Although capitalist farmers know the time needed for the soil to replenish its fertility, they also know that time is money and the market has its own laws. Hence, ignoring the sustainable fertility of the soil to amass a fortune in short time leads to more ecological disasters. In his *Capital*, Marx describes the aggressive policies through which capitalist agriculture is moving to its end by undermining the source of its wealth, soil viability:

All progress in capitalist agriculture is a progress in the art, not only of robbing the worker, but of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress towards ruining the more long-lasting sources of that fertility.
(639)

Having been separated from land, people become dependent upon their labor alone; they become themselves commodities bought and sold on the labor market according to their productivity power rate. Hence, the worker feels attachment only "for the price of their production, the monetary product." (Foster, *Marx's Ecology* 104)

Treating nature as a free gift and the soil as a commodity leads the capitalists to create a new nature, or the "second capitalist nature" according to Eco-Marxists. The second capitalist nature exists when capitalists attempt to fix whatever rifts they create through following disastrous measures with the same intentions of making quick profits. Artificial fertilizers is just an example of the capitalists' attempt to fix what they have created in the soil. However, such solutions simply shift the crisis somewhere else, creating "additional environmental concerns and compounding the overall problem" (Clark and Foster *Marx's Ecology* 147). Even today, the excessive usage of artificial fertilizers has caused "runoff, polluting waterways and overloading marine ecosystems with nutrients" (Ibid 150). In light of the enormous expenses associated with repairing and/or adapting to the capitalist ecological rifts, Marx's critique of capitalism is quite relevant.

Prompted by Marx's ecological thoughts, contemporary Eco-Marxists have developed these thoughts into a sociopolitical theory. Based on Marx's 'metabolic rift', James O'Connor in his *Natural Causes: Essays in Ecological Marxism* explains the two contradictions embedded in the capitalist systems:

the first contradiction is between the forces of production and the relations of production [...] and a second contradiction is between the forces and relations of production taken as a whole and the ecosystem which leads capital to destroy the basis of its potential wealth by destroying the ecology and producing the second contradiction of capitalism (103).

In his *Marx's Ecology: Materialism and Nature*, John Bellamy Foster points out that the first contradiction of capitalism refers to a tendency towards oligopoly and thus restricting the access to the natural resources to the "moguls"; hence, these resources become "class linked." Those moguls in turn accelerate the second contradiction of capitalism with their tendency to accumulate wealth and profit at the expense of the natural cycles of organisms; Foster writes, "the greater capitalism's expansion, the more intense its ecological demands, and the greater the level of ecological destruction it imposes" (66). Accordingly, capitalism is considered by the Eco-Marxists as the root causes of all ecological crises. This means that any solution to our ecological problems entails first eliminating the two contradictory principles of capitalist systems: oligopoly and profit-seeking economics. Transcending these two economic dilemmas will inexorably lead to a healthier sustainable environment.

The Windup Girl as an Eco-Marxist Critique of Capitalism

Set in the 23rd century, Paolo Bacigalupi's *The Windup Girl* imagines a dystopian future ecology marked by the spread of plagues due to the scarcity of organic agriculture and the hegemony of genetically-modified food corporations, known in the novel as "calorie companies". Bacigalupi wrote *The Windup Girl* as a radical response to the sophisticated debate over the excessive use of GM food (genetically-modified food) which could result in serious health

problems. (Straetz 14) The food crisis in 2005 that swept the world is the backdrop of the story:

From 2005-2009, a series of major food shortages– caused both by crop blight and poor climate conditions for harvest – spread across the world and resulted in riots in Egypt, Haiti, Mozambique, Bangladesh and elsewhere. Between 2005 and the summer of 2008, the price of wheat and corn tripled, and the price of rice climbed fivefold, spurring food riots in nearly two dozen countries and pushing 75 million more people into poverty. (Joel Bourne)

In a world where economic considerations took precedence over ecological considerations, the ecosystem was expected to collapse resulting in what Marx called "metabolic rifts". The ecological rifts in *The Windup Girl* are manifested by catastrophic climate changes. Global warming has increased the volume of the oceans and several countries have drowned underneath. Thailand, where events take place, is now below the sea level but protected by dikes and levees. Other nations, however, have undergone appalling experience:

Malaya is a morass of killing. [...] Kowloon is underwater. [...] China is split and the Vietnamese are broken and Burma is nothing but starvation. The Empire of America is no more. The Union of the Europeans splintered and factionalized. (Bacigalupi 219)

Furthermore, Bacigalupi's apocalyptic world suffers from a global energy crisis; petroleum is a thing of the past now. As a result, international trade has regressed and calories, instead of money and because of food scarcity, have become the new currency in the globe. Due to this energy crisis, machines are powered by springs, treadles, and genetically-engineered humans and animals to maintain life on the damaged planet. As indicated in the theoretical part of the paper, laborers under capitalism are transformed into commodities to boost the production process. Bacigalupi has exaggerated this notion in his novel by introducing transhumans created and manufactured in Japan to help nations with low population to overcome food crisis by boosting productivity with the least expenses, an idea which permeates Marx's writings about the relationship between labor and capitalism.

Despite the energy crisis, Western capitalists' rapacity drives them to search for other alternatives to exercise the same imperialistic power over other countries. In this way, Bacigalupi, like Eco-Marxists, stresses the capitalists' doggedness to create a second nature after draining the first one. Having drained nature from its fertility, capitalist agriculture shifts its business to the genetically-modified seeds (GM seeds). Bacigalupi, thus, underscores the capitalists' overweening ambition to be readily "retrofitted into a sustainable economic system with greater profit margins than the current version" (Hageman 284). The novel also presents how Western capitalists "might survive oil's depletion, undermining any notion that the end of oil will end capitalism by pointing towards the lack of imaginable alternatives" (Donnelly 160).

In order to maximize their profit, the GM seeds are created sterile, i.e. they cannot be reproduced. In doing so, massive agricultural corporations called Agrigen, HiGro, UTex and PurCal prohibit the access to the formula of their GM seeds under intellectual-property rights, and thus maintaining their oligopolistic policies. The capitalists' second nature is not, however, secure, for the new GM seeds are also more susceptible to plagues that infect both crops and humans. Because most countries depend on the calorie companies to secure their own food, humans' survival depends on the success of these companies to create new GM crops that cannot be affected by such plagues.

As viruses adapt and mutate, more and more people die of starvation. However, only Thailand is still intact due to their strict measures of international embargo and a strictly guarded seedbank which is not vulnerable to plagues. Consequently, Thailand is not tied to global capitalism that has already devastated several nations. The second contradiction of capitalism which O'Connor and Foster discuss in their writings is thus delineated early in the novel when Bacigalupi brings to light the contradiction between "capitalist commerce and ecological sustainability". (Hageman 284)

Because Thailand possesses its own natural seedbank which is kept hidden from the global calorie companies, the novel witnesses a conflict between three main forces: Lake Anderson, an American businessman

representing West capitalism, the Environment Ministry, run by General Pracha and directed by Jaidee Rojjanasukchai, striving to protect the Thais from ecological disasters caused by capitalistic economy, and the Trade Ministry, run by General Akkarat, aiming to restore international trade with the West by sharing their seedbank secrets. With the help of Akkarat, Anderson secretly tries to pursue the secrets of Thailand's seed-bank while covertly running an energy-technology factory in Bangkok. Inhabiting this world and involved in the conflict but with different degrees are “the windup girl”, a transhuman named Emiko who was created and manufactured in Japan, Kanya, Jaidee's assistant, who will take over after the death of Jaidee, Gibbons, a rebel scientist, who has left the AgriGen company and now helps the Thais in creating new seeds resistant to the plagues he formerly created in America, and Hock Seng, an ethnic Chinese refugee and a former capitalist, who runs Lake Anderson's energy factory. Finally, there are the “generippers.” Like computer hackers, the generippers are Thai genetic engineers who manipulate genes in seeds so that they could arrive at the natural DNA formulas of all crops. While other nations lack the variety of food crops due to the spread of plagues, in Thailand and thanks to the generippers, "fruits and vegetables return from the grave, extinct flowers blossom on the avenues" (Bacigalupi 6)

By shifting the warring ground for power to Bangkok, Bacigalupi disrupts the long-seated centre of power (the West), for he "transfers present day Global South from periphery to center of this map by setting the novel in Bangkok". (Hageman 287) Accordingly, *The Windup Girl* is considered "a re-mapping of global capitalism as a dynamic of ecology, economy, and geopolitics." (Ibid 287) In addition, shifting the power struggle to Bangkok has an allegorical function as Bangkok is presented in the novel as the target of what Marx calls "ecological imperialism." Ecological imperialism is a process of exploiting the natural resources of other countries. This can be seen in Marx's famous reference to how, for more than a century, England had “indirectly exported the soil of Ireland,” undermining the long-term fertility of Irish agriculture. (Marx *Capital* 860)

Being aware of the West's ecological imperialistic ambitions and in pursuit of securing Thailand's independence, the Environment Ministry will not allow for a "tiny" harm for their environment, for they (the officials in the

ministry) know that people with short-sighted vision (capitalists) will not be pleased with the rigid restrictions and control over trade:

All life produces waste. The act of living produces costs, hazards and disposal questions, and so the Ministry has found itself in the center of all life, mitigating, guiding and policing the detritus of the average person along with investigating the infractions of the greedy and short-sighted, the ones wish to make quick profits and trade on other's lives for it. The symbol for the Environment Ministry is the eye of a tortoise, for the long view. And if others call them the Turtle Ministry, because they are not allowed to manufacture as many products as they would like, so be it. (Bacigalupi 126)

The slow movement of the "tortoise" refers to a society where production policies are to be based on human need, not human profit; i.e. it is not necessary to accelerate the production rate to produce goods humans actually do not need. The Environment Ministry is, thus, determined to reduce the effects of slow violence to the environment by limiting the usage of natural resources. This actually echoes the Eco-Marxist ideology of sustainability. Capital as a system is essentially linked to the "maximum possible accumulation regardless of human needs or natural limits". (Marx *Capital* 742) John Bellamy Foster also refutes the assumption that capitalist economy can be sustainable. Since capitalist systems' expansion takes place at the expense of the destruction of nature, the concept of sustainable capitalism must be viewed with great suspicion (Foster *Marx's Ecology* 87). Taking into our consideration that the national budgets allotted to mitigate and repair ecological problems do not keep pace with the daily breach of all ecological agreements, capitalism is irreversibly at odds with a sustainable planet. According to a study carried out in 2000 by five major European and U.S. research centers:

Industrial economies are becoming more efficient in their use of materials, but waste generation continues to increase... One half to three quarters of annual resource inputs to industrial economies are returned to the environment as wastes within a year (Speth 56).

The symbolism of the tortoise, therefore, copes with the philosophy of the Environment Ministry, for all tortoises "have very good vision." ("Totally Tortoise: Information, Guides & Husbandry Techniques For Your Tortoise"). The Ministry's vision is already based on past disasters which the Ministry managed to transcend:

The plagues were but the latest insult to the Kingdom's survival. First came the rising sea levels, the need to construct the dikes and levees. And then came the oversight of power contracts and trading in pollution credits and climate infractions. [...] Then there was the monitoring of fishery health and toxin accumulations in the Kingdom's final bastion of calorie support. [...] And there was the tracking of human health and viruses and bacteria. [...] There was no end to the duties of the Ministry. (Bacigalupi 125-26)

The Environment Ministry's success to help the Thais to overcome all these environmental crises helps it to gain much power; the Ministry is now supported by both the ruler (the queen of Thailand) and the Thai people themselves. Moreover, the officials in the Ministry are role models for the Thai people. For example, the environmentalists (the Ministry's officials) travel daily using muscle-power transportations like bicycles, "when Lieutenant Kanya is finished here, she'll give you a ride back on our tandem" (Bacigalupi 124). Though slow like the tortoise, the tandem saves and maintains the sustainability of the planet. To strengthen the ecological overtones of the environmentalists' behavior, the novel presents an opposite image when the Thai people are shocked to see the extravagance of the officials in the Trade Ministry while riding "petroleum-burning cars." (Bacigalupi 218) The juxtaposition of the conflicting ecological behaviors in the two ministries enhances the main conflict in the novel between capitalists and environmentalists.

Because the Environment Ministry grasps the significance of having control on trade in Thailand, the Ministry forms a kind of militias to enforce the environmental laws. Captain Jaidee, the leader of the white shirts militia, succeeds in confiscating valuable merchandise which belongs to the Trade Ministry and calorie companies. In an encounter with a Chinese

businessman who tries to flee goods not conforming to the environmental standards, Jaidee violently attacks him:

Jaidee is sitting atop that man's chest now [...] "You of course understand that we have coal rationing because we are a city underwater. Your carbon allocation was exceeded many months ago." [...] The ocean is not some marching army. Once we accede to the waters, we will never again throw it out." [...] "And so we must all do our part. We must all fight together [...] to keep this invader from our streets, don't you think?" (Bacigalupi 122-23)

This minor act of violence foreshadows the civil war between the Environment Ministry and the Trade Ministry to take place at the end of the novel. In fact, the Environment Ministry's restraining policies anger the Trade Ministry and other businessmen, who in turn collude together in order to get rid of the Environment Ministry's firm grip on trade. An analysis of such collusion reveals that in the margin of the novel even in a country which is located under the sea level, capitalists are still blind to the repercussions of breaching the environmental laws by following the same destructive policies toward nature. Bacigalupi, therefore, dramatizes the capitalists' obsession for the short-term gain while ignoring the long-term pain.

Thailand is now ready to witness the slow creep of capitalists' business which gradually leads to another apocalyptic future:

Beyond the factories, the rim of the seawall looms with its massive lock system that allows the shipment of goods out to sea. Change is coming. The return to truly global trade. Supply lines that circle the world. It's all coming back, even if they're slow at relearning. (Bacigalupi 68)

The "change" has already come with the presence of Anderson Lake who manages through smuggling and bribery to bring substance non-

conforming to the environmental standards. This substance is used to enhance the productivity of crops; the issue of capitalist agriculture is, thus, central to the story. However, this substance turns out to be the cause of the spread of contamination in Lake's energy factory. The health of the factory workers as well as the whole population is prone to a new wave of plagues. The conversation between Hock Seng, the factory manager, and the worker who discovers the contaminated tanks emphasizes the short-sightedness of the capitalists about future environmental threats:

‘The tanks and cultures cannot be fully cleaned. Eventually it will be a vector. And the rest of the tanks will be contaminated.’ ‘Eventually? Is that all? Eventually’ Hock Seng scowls at him. ‘I don’t care about this ‘eventually’ you speak of. [...] Don’t worry about tomorrow. Worry about whether Mr. Lake throws us all out on the street today. Use your imagination. Find a way to make this tamade algae breed (Bacigalupi 136)

As the capitalists are only interested in the present 'immediate' profit, they usually turn a blind eye to tomorrow's potential threats even if these threats can bring about their own destruction. As long as the capitalist sells his/her commodity, "he is satisfied and does not concern himself with what afterwards becomes of the commodity and its purchasers". (Engels "The Part Played by Labor" 260) Paradoxically, the decision to overlook the alarming consequences of the contamination 'eventually' kills Anderson Lake, for he is the first one to catch the virus. The death of Anderson signifies the vulnerability of the capitalist systems. Hence, the second contradiction of the capitalist systems is underscored in the narrative, for Bacigalupi like Eco-Marxists points up "the ways in which capitalism produces adverse ecological conditions that threaten its stability along with the stability of nature." (O'Connor "The second contradiction of capitalism" 96)

The Ecological Destructiveness of Capitalist Agriculture

Because their main goal is to make the utmost profit in short time, capitalists invest in bio-agriculture farming for the profit is higher yields. Having failed in other fields of production due to the energy crisis, the GM seed

business has become the new enterprise adopted by the capitalists to expand and make quick profit. The GM seed business is seen as what Eco-Marxists call "the second capitalized nature". The second nature here has been created by manipulating the genes of the natural seeds that eventually form new unnatural genetic crops. The latent threat of the second capitalized nature lies in the intervention in the natural processes of evolution.

Since the GM seeds are created sterile, capitalist agriculture has become another type of oligopoly. In the dystopian future of *The Windup Girl*, GM seed business has become the source and the center of the society; not only the source of food, but also the source of power and authority:

Processes like hybridization are the technological means that stop seed from reproducing itself. This provides capital with an eminently effective way of circumventing natural constraints on the commodification of the seed. Hybrid varieties do not produce true-to type seed, and farmers must return to the breeder each year for new seed stock. (Shiva 49)

GM seed business, however, has its own drawbacks. The novel discloses the economic threat which accompanies the GM food, a debate which is rarely discussed in literary works (Hageman 285). In the margin of the novel, Bacigalupi does not only express his concern with the chemical effect of genetic engineering on human's health, but he is equally upset with the escalating power of GM seed corporations in controlling the means of subsistence. While Bacigalupi is writing his novel, he is speculating about a world "where seeds are patented [...] where hunger looms" and where man's survival "is to be determined by capitalist tycoons." (Straetz 12)

Bacigalupi understands that food is the most crucial source of control. As discussed earlier, food under capitalism has become a commodity; hence, this commodity should be sold in large quantities with the highest prices. As ethics have a limited access to the capitalist systems, the capitalists heavily rely on creating crises to secure their continuous profit plan. Although the calorie corporations know that plants need time to adapt to their environments,

they are determined to control the market by producing sterile seeds that will ensure a lifetime of domination, "AgriGen and PurCal and the rest were shipping their plague-resistant seeds and demanding exorbitant profits" (Bacigalupi 125) Bacigalupi, thus, shows that when food, the source of sustenance, is controlled by greedy corporations, humans are prone to their whims. Martin Spence maintains that genetic engineering in agriculture is "the capital's latest attempt to impose upon nature both commodity-time, and private property rights, in a secure and effective way."(100)

In order to exercise complete control over nature and production and in pursuit of amassing fortunes, calorie companies intentionally unleashed different waves of diseases to the farms that violate their patent rights. In *The Windup Girl* "biotech companies present a serious threat to freedom in markets and have the potential to exercise a disturbing amount of control through their manipulation of seeds, *crop disease*, and environments" (Kurtz 183, emphasis added). Crop diseases have resulted in the extinction of different types of vegetables and fruits. While still holding control over farmers, the GM seeds companies have to constantly reformulate the genes of their seeds in order to resist the mutating viruses. Furthermore, these diseases infect humans themselves leading to devastating epidemics. However, unleashing these diseases have their blowbacks as they also infect the GM crops resulting in more starvation and lack of biodiversity in the world. *The Windup Girl*, thus, draws attention to an emerging problem, the lack of biodiversity, which is a byproduct of interfering with the natural genes of plants. Concerned with the loss of his country's diverse crops, if it comes under the control of the calorie companies, Jaidee wonders:

In a thousand years will they even know that bo trees existed? Will Niwat and Surat's great-grandchildren know that there were other fig trees, also all gone? Will they know that there were many many trees and that they were of many types? [...] Will they understand that we were not fast enough or smart enough to save them all? That we had to make choices? (Bacigalupi 173)

Diversity guarantees survival. Without a diverse range of seeds, existing strains can be wiped up by only one disease, as is the case with other countries

in the novel. The novel, therefore, suggests that having too much control on nature and natural resources could eventually result in mass destruction.

Having realized the destiny of the neighboring countries, Thailand keeps its seedbank in a secret place as a source of survival and independence. Ecological imperialists do not, however, allow for such autonomy; thus, they resort to devious methods to penetrate Thailand's source of wealth, its seedbank. In a conversation with General Akkarat, Trade Minister, Lake Anderson deceitfully admits that his goal behind accessing the Thai seedbank is to develop a new seed susceptible to the mutating viruses to save the world from starvation:

"We need new genetic material," Anderson says. "We've exhausted many of our options and the plagues keep mutating. We don't have a problem sharing our research results. Profits, even." "I'm sure you offered the same to the Finns." Anderson leans forward. "Finland was a tragedy, and not just for us. If the world is going to keep eating, we need to stay ahead of cibiscosis and blister rust and Nippon genehack weevil. It's the only way." "You're saying that you yoked the world to your patented grains and seeds, happily enslaved us all—and now you finally realize that you are dragging us all to hell." (Bacigalupi 156)

Finland was once having its seedbank too, but AgriGen managed to sneak into this bank robbing its genes' formulas. Once obtaining the genes' formula, AgriGen spread waves of diseases to sweep the Finnish crops; tragedy then ensued. Akkarat recognizes that Anderson's offer is just an attempt to maintain his company's technological preeminence and economic power. When Anderson stresses his good intentions of having mutual interests with Thailand in case of opening up its borders to international trade, Akkarat ridicules Anderson's suggestion reminding him of the West's ecological imperialistic past:

Ever since your first missionaries landed on our shores, you have always sought to destroy us. During the old Expansion

your kind tried to take every part of us.[...]. With the Contraction, your worshipped global economy left us starving and over-specialized." (Bacigalupi 155)

Akkarat, thus, sees the capitalists as industrial titans and bioterrorists who seek to drain the nations' natural resources to get more and more profit. Despite his insight about Anderson's ecological imperialistic plans, Akkarat agrees to help Anderson to get access to the Thai seed bank on the condition that AgriGen supports his coup to get rid of the Environment Ministry. In this way, Akkarat is not very different from the image of the capitalists as he himself exhibits the same opportunistic manner by sacrificing the ecological future of his country for the sake of present victory.

Humans' Alienation from Nature under Capitalism

As it was essential for capitalist agriculture to commodify the soil and the food, labor also had to be treated in the same way. Eco-Marxism stresses that under capitalism there is a contradiction between the forces of production and the relations of production, i.e. the tendency towards oligopoly. Oligopoly has its shadows on the relationship between humans and nature, for the former is forcibly alienated from nature through privatizing the land and converting all sources of production including humans themselves into commodities. This antagonistic relationship between capitalism and labor is manifested in *The Windup Girl* through Emiko, the genetically modified transhuman. Emiko is genetically created in Japan to be used as a slave worker, i.e. to obey her owner. The presence of Emiko in Thailand is, however, illegal, for it is considered a threat for the Thai population. The Environment Ministry's firm rules against New People (the Windup people) mean that if Emiko's presence is disclosed, she will be immediately killed. Thus, Emiko has to obey her new master, Raleigh, by working submissively in a sex club in Bangkok. Moreover, the creation of Emiko's skin was initially designed to suit the cold weather of Japan; this means that if Emiko goes out of the sex club during the day she could melt because of the hot climate of Thailand. Emiko's powerlessness, accordingly, reflects the same desperate situation most laborers experience under capitalist systems. Emiko cannot escape the sex club as she

needs the money and the protection of her employer. In this context, Andrew Hageman maintains that “Emiko’s story reveals a reticence on the part of human beings to face her existence as a product of their own participation in global capitalist economy” (295).

It is quite important to acknowledge that Emiko does not only symbolize the laborers’ loss of independence, but she is also a female transhuman. This fact serves as an allegory of the predicament of working women in the East. As a woman, Emiko is depicted as the one who suppresses her desire to rebel. She frequently reminds herself of the task she was created for in order to mitigate her inner conflict: is she a sentient being or a slave laborer? This aspect of self-discipline troubles Emiko’s thoughts, “two warring ideals” in one body (Kurtz 188). As a result of this internal conflict, Emiko persistently struggles with her identity.

Having been excluded from nature, being treated as a commodity, and being forced to work as a prostitute, Emiko eventually sees herself as just “trash”: “Emiko sits against a wall, exhausted and broken. [...] Inside, she is dead. Better to be dead than a windup. She is trash. Emiko understands this now.” (Bacigalupi 261) Consequently, *The Windup Girl* investigates the Marxist assumption of how value is achieved through work. By reading the genetically created laborers as an allegory for the status of laborer under capitalist systems, one can understand how “a capitalist rationale influences our understanding of being alive or being lifeless and devalued within society”. (Straetz 4) Emiko's body is only valued because she can be used and sold; she is just another aspect of commodification in the production process. When we know that Japan basically creates the windups because it lacks young laborers who can be employed in agricultural business, the Eco-Marxist reading of the novel reveals this antagonistic relationship between labor and capitalism:

Laborers in global capitalism are turned into machines who are devalued, mistreated like slaves, and left without alternatives. Being aware of their low status, they experience a feeling of lifelessness and not-belonging— just like the windup

girl who is neither considered sentient nor part of society (Straetz 5)

Laborers' Revolution & Nature's Rebellion

Bacigalupi, however, rejects the idea that a laborer should be satisfied with the humiliating conditions imposed upon him/her from his/her capitalist masters. The turning point in the story takes place when Lake Anderson informs Emiko about a Windup community in the North where these windups live freely. Prompted by her desire to join this community and empowered by her superhuman strength and speed, Emiko grows increasingly dissatisfied with the daily abuse at Raleigh's sex club; she is now ready to liberate herself.

Meanwhile, Anderson and Akkarat were trying to figure out a way to have the approval of the Somdet Chaopraya, the Child Queen's protector, for their ambitious plan to do a trade deal. On hearing a rumor that the Somdet Chaopraya is libertine, Anderson prepares a private party for him at Raleigh's club. On trying to gang rape Emiko, she gets steamed and violently kills Raleigh, the Somdet Chaopraya and his men. Emiko, then flees to Gibbons, the gene scientist, to change her sterile nature. Although Gibbons cannot change Emiko's sterility, he promises her that he will create new windups capable of reproducing, "A strand of your hair would do. You cannot be changed, but your children— in genetic terms, if not physical ones— they can be made fertile, a part of the natural world." (Bacigalupi 360) This scene, which echoes the one between Victor Frankenstein and the monster in Mary Shelley's *Frankenstein*, eventually stands for the consequences of interfering with nature. Gibbons now promises to interfere, for the second time, to repair the imperfections of the previous interference with the natural structure of human's DNA. Capitalism operates in the same way as they are in pursuit of repairing the damages they frequently cause to the mother earth. Gibbons representing the capitalist ego in the novel admits that man is nature's "god":

We are nature. Our every tinkering is nature, our every biological striving. We are what we are, and the world is ours.

We are its gods. Your only difficulty is your unwillingness to unleash your potential fully upon it. (Bacigalupi 247)

This authoritative view about the relationship between man and nature blinds Gibbons and other capitalists as well about the fact they will soon suffer the blowbacks of their interference with the natural cycle of all organisms; as Friedrich Engels writes, "Let us not, however, flatter ourselves overmuch on account of our human victories over nature. For each victory nature takes its revenge on us". ("The Part Played by Labor" 250)

When taking into consideration that both nature and laborers were commodified by the capitalists to serve and obey, Emiko's rebellion is eventually seen as the epitome of nature's rebellion and the laborers' revolution against all injustices. While the capitalists are trying to play the role of "god" by harnessing both the human and the environment, they are at the same time producing an out-of-control nature that will ultimately destroy them. Emiko's rebellion also carries a significant suggestion that one's suffering will not be noticed as long as he/she is invisible. The symbolism of Emiko's incarceration at Raleigh's club is perceived as the incarceration of the oppressed laborers who are kept as cogs in the capitalist machines. Accordingly, being visible is an Eco-Marxian step towards full emancipation:

The social combination and organization of the labor processes is turned into an organized mode of crushing out the workman's individual vitality, freedom and independence. [...] Through revolt, man is free again (Marx *Capital* 505).

Seizing the opportunity of the power vacuum resulting from the death of the Somdet Chaopraya, Akkarat and Anderson attack the environmental militias. The attack results in the death of the enthusiastic enforcer of the Environment Ministry's policies, Jaidee. With the death of Jaidee, Akkarat pays back the calorie companies' assistance in his successful coup by revealing the secrets of the Thai national seedbank. Kanya, now the leader of the Environment Ministry, is ordered by Akkarat to guide the calorie companies' experts to the secret place of the seedbank. Kanya, however, makes an impetuous decision to maintain her country's independence by killing the

experts and ordering the guards who protect the seedbank to evacuate the city with the seedbank. She then orders her troops to blow up the levees and dikes around the city, preferring to flood Bangkok than surrendering it to imperialist opportunists. Paradoxically, Kanya's willful act of self-destruction is an act of conserving her country's symbol of heritage and independence, the seedbank:

Seeds from more than a hundred years ago, seeds that every so often are cultured in the strictest of isolation chambers and then carried back to this underground safe, to be stored again. The heritage of millennia in the boxes, the heritage of the world (Bacigalupi 354).

The novel ends with Emiko surviving alone in the drowned city. Emiko is, therefore, the driving force that destabilizes the hierarchal structure of the country for she was the root cause of Akkarat's coup and the transition of the Thailand from socialism into capitalism. Such transition was also the reason of flooding the city of Bangkok at the hand of Kanya. The flood, symbolically, stands for the purification of an area of the earth, the annihilation of the anthropocentric attitude towards nature, and the restoration of natural cycle of the ecosystem. In this respect, Andrew Hageman writes, "The capacity of Thailand to survive and maintain national sovereignty has necessitated a return to non-capitalist ideology joined to their monarchy." (Hageman 288)

The final chapter of the novel does not suggest that Bacigalupi persuades his readers to abandon a system and to adopt another as an easy green ideological solution, but the novel compels the reader to imagine a new ideological pattern that will ecologically repair the metabolic rifts caused by capitalism. In this respect, Bacigalupi like the Eco-Marxists stresses that humans and nature are one entity; this means the destruction of one equals the destruction of the other for they are connected.

To conclude, in order to expose the contradictory attitudes towards ecological issues, *The Windup Girl* sets examples of binary oppositions like: global corporations versus national governments; natural crops versus genetically modified crops; heroes versus villains; autonomous Thailand versus dependent nations, and environmentalism versus capitalism. All these oppositions while representing conflicting ideologies and approaches toward ecological issues offer an array of multiple consciousnesses that will eventually

exclude the idea that a single doctrine is able to put a stop to the degradation of our environment. Unlike Eco-Marxists, Bacigalupi does not recommend socialism to replace capitalism to solve our ecological problems. Rather, Bacigalupi invites his readers to start a long battle against all systems that do harm to our planet; such a battle will bring about the "social metabolism", the Marxist ecological term that supports sustainable development.

Interestingly, however, Bacigalupi disrupts the globalization of ecological issues by linking Ecologism to nationalism. In Thailand, it is the duty of national organizations represented by Environment Ministry to enforce environment laws in isolation from the international organizations. *The Windup Girl*, thus, assigns the responsibility of protecting the environment to a nation towards its population.

Reading *The Windup Girl* from an Eco-Marxist perspective reveals how Bacigalupi attributes much of the damage in the ecosystem to capitalist agriculture. Bacigalupi in a Marxist manner condemns capitalist agriculture not only for commodifying and privatizing the land and the food, but also for treating humans in the same manner. Though capitalism was initially established on the concept of "freedom", Bacigalupi follows the Eco-Marxist critique of the capitalist servitude system. *The Windup Girl* illustrates that all capitalists seek to convert the laborer into a tool that obeys the employer's mandate. When the laborer feels detached from the earth, he/she will not care about its damage on the one hand, and he/she may take part in this damage by serving the capitalist's exploitation of nature on the other hand. Herein lies the power of Eco-Marxism which stresses that the ecological crisis mainly stems from the capitalist hegemonic systems that heavily rely on the exploitation of limited natural resources. Eco-Marxism also provides a thorough approach for studying the dialectical interchange between society and nature. Because Eco-Marxism provides the tools that help materialize ecological abstractions, Bacigalupi's *The Windup Girl* can be eventually read as a social order that seeks the sustainability of nature and natural resources for the future generations.

Works Cited

Agger, Ben. *Western Marxism, an Introduction, Classical and Contemporary Sources*. Goodyear Pub. Co, 1979.

Bacigalupi, Paolo. *The Windup Girl*. Night Shade Books, 2009.

Bourne, Joel K. "The Global Food Crisis: The End of Plenty." *National Geographic*, June 2009.

<https://www.nationalgeographic.com/magazine/2009/06/cheap-food/> accessed 10. Jan. 2018

Burkett, Paul. *Marx and Nature: A Red and Green Perspective*. Haymarket, 2014.

Clark, Brett and John Bellamy Foster. "Marx's Ecology in the 21st Century". *World Review of Political Economy*, Vol. 1, No. 1 (March 2010), pp. 142-56.

Commoner, Barry. *The Closing Circle: Nature, Man, and Technology*. Alfred A. Knopf, 1990.

Donnelly, Sean. "Peak Oil Imagining in Cormac McCarthy's *The Road* and Paolo Bacigalupi's *The Windup Girl*." *English Academy Review: Southern African Journal of English Studies*, Vol. 31, No. 2, 2014, pp. 156-169,

Engels, Friedrich. *Dialectics of Nature*. Translated by Charles Dutt. Foreign Languages Publishing House, 1954.

Engels, Frederick. "The Part Played by Labor in the Transition from Ape to Man," in *The Origin of the Family, Private Property and the State*. International Publishers, 2007, pp. 240–86.

Foster, John Bellamy. "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology," *American Journal of Sociology* Vol. 105, No. 2. 1999, pp. 366–405.

Foster, John Bellamy. *Marx's Ecology: Materialism and Nature*. Monthly Review Press, 2000.

Foster, John Bellamy and Paul Burkett. "Ecological Economics and Classical Marxism: The Podolinsky Business Reconsidered". *Organization & Environment*. Vol. 17, No. 1. 2004, pp. 32 - 60

Foster, John Bellamy, Brett Clark and Richard York. "The Ecological Rift: Capitalism's War on the Earth". *Monthly Review Press*, 2010, pp. 68- 99

Hageman, Andrew. "The Challenge of Imagining Ecological Futures: Paolo Bacigalupi's *The Windup Girl*". *Science Fiction Studies*, Vol. 39, No. 2 (July 2012), pp. 283-303

Hards, Sarah. *Ecologism*. In *Green Politics: An A-to-Z Guide*. D. Mulvaney & P. Robbins (Eds.). SAGE Publications, Inc. 2011, pp. 132-134. doi: 10.4135/9781412971867.n44

<http://sk.sagepub.com/reference/greenpolitics/n44.xml>

accessed 15 Jan. 2018

Kurtz, Malisa. "A Dis-(Orient)ation: Race, Technoscience, and *The Windup Girl*". *Black and Brown Planets: the Politics of Race in Science Fiction*. Edited by Isiah Lavender III. University Press of Mississippi. 2014, pp. 177-194.

Marx, Karl. Early Writings of Karl Marx. Translated by Gregor Benton. Penguin, 1975.

Marx, Karl. *Capital: A Critique of Political Economy*. Translated by Ben Fowkes. Penguin, 2004.

O'Connor, James. "Capitalism Nature, Socialism A Theoretical Introduction." *Capitalism Nature Socialism*. Vol. 1. No. 1. 1988, pp. 11-38.

O'Connor, James. "The second contradiction of capitalism." *The Greening of Marxism*. T. Benton (ed.) The Guilford Press. 1996, pp. 81-119

O'Connor, James. *Natural Causes: Essays in Ecological Marxism*. Guilford Press, 1998.

Pepper, David. *Eco-Socialism: From Deep Ecology to Social Justice*. Routledge, 1993.

Porritt, Jonathon. *Capitalism As If the World Matters*. Earthscan, 2007.

Shiva, Vandana. Biopiracy: The Plunder of Nature and Knowledge. South End Press, 1997.

Spence, Martin. "Capital Against Nature: James O'Connor's Theory of the Second Contradiction of Capitalism". *Capital & Class*. Vol. 24, No. 3. 2000, pp. 81-110

Speth, James Gustave. *The Bridge at the End of the World: Capitalism, The Environment, and Crossing from Crisis to Sustainability*. Yale University Press, 2008 .

Straetz, Juliane. "The Struggle of Being Alive: Laboring Bodies in Paolo Bacigalupi's *The Windup Girl*". COPAS— Current Objectives of Postgraduate American Studies. Vol. 18. No. 1. 2017, pp. 1-21.

Totally Tortoise: Information, Guides & Husbandry Techniques For Your Tortoise.

<http://www.totallytortoise.co.uk/guides/a-tortoises-body/a-tortoises-eyes/>

accessed 11 Feb. 2018

Wang, Zhihe, He, Huili, and Fan Meijun. "The Ecological Civilization Debate in China: The Role of Ecological Marxism and Constructive Postmodernism—Beyond the Predicament of Legislation". *Monthly Review Archives*. Vol. 66, No. 6 (November 2014), pp. 37-59 .