CHAPTER 1

Introduction

1.1 Background and rationale

1.1.1 Agricultural industrialization and neoliberal development crisis

A seed is more than just a tiny thing involving both foodstuff and the means of production, as Kloppenburg (Kloppenburg 2010: 368) insists in his work that "As both foodstuff and means of production, seed sits at a critical nexus where contemporary battles over the technical, social, and environmental conditions of production and consumption coverage and are made manifest. Who controls the seed gains a substantial measure of control over the shape of the entire food system". At the global scale, the control of certain actors over seeds can be, at least, reflected here by the mega-profits of global seed companies. In 2007, it was revealed that the world's top 10 seed companies account for $14.8 million or two-thirds of the global proprietary seed market (ETC Group 2008). Also, the takeover of small seed companies is one of their efforts to monopolize the global seed business. Since 1970, it was noticed that the pharmaceutical, petrochemical and other transnational corporations purchased more than 1,000 once-independent seed companies (Ehrenfeld 2003).

The global bio-companies have become powerful actors who can highly influence the global and national regulations that govern the seed trade, as well as the use of technologies in the biological control over seed re-production (Kloppenburg 1988a; Kloppenburg 2010; Kumbamu 2009; Lipton and Longhurst 1989; Roa-Rodríguez and Dooren 2008). Undoubtedly, the biotech-economic

domination of the global seed companies is inevitably criticized by scholars and activists who are concerned with the impact by bio-companies using modern biotechnologies on the livelihood of the farmers and the biodiversity destruction, especially in the Global South. Kumbamu (2009) sees the diffusion of genetically modified (GM) technologies as the dispossession and deskilling of farmers away from local knowledge of biodiversity management. In terms of post-colonialism, Shiva (1997) points out, while the Green Revolution is an example of the destruction of biodiversity through monoculture, the efforts of the industrialized countries to patent the genes is seen as a form of biopiracy of the wealth from the poor in the South. Moreover, Shiva and her colleagues (2000) criticize GM seeds as the seed of the poor farmers' suicide in India. Geevan (1984) proposes the technologies of the Green Revolution, like the hybrids increasing the dependence of the Third World farmers on transnational companies as high-yielding varieties, were designed to serve for the imported agro-chemical package.

The modern biotech-economic transformation is seen as a part of nationalism emerging in many Asian countries, such as China, India, Malaysia, Japan and Taiwan (Gottweis 2009; Gupta 1998; Smeltzer 2008). In India, the emergence of Cargill Seed India Private Limited, an Indian subsidiary of the giant U.S. grain-trading multinational, can represent the postcolonial state and elite support towards the agricultural industrialization for increasing food surplus, serving both self-sufficiency and export (Gupta 1998). The development of the biotechnology industry in Malaysia since the 1990s is also one of the key visions of the Malaysian government, called Vision 2020, in order to shift the status of Malaysia to a "developed nation," meanwhile the agricultural sector and indigenous people, seen as an obstacle to progress, is translated to the "new" commodities and the potential group with traditional knowledge for pharmaceutical biotechnology profit (Smeltzer 2008: 192-196).

Today, not only the GM seeds but many conventional biotechnologies, like hybrid seeds, still have a crucial role in the global seed market. Although hybrid seed is not the same as genetically engineered seed, it can be categorized into the gene-control pollinating species and be widely produced and sowed in many farming areas

around the globe. To explain more, these hybrid seeds are found to be commercially produced in Third World countries where many transnational companies benefit from low production costs, such as a number of cheap wage-laborers and natural resources. Whereas many other industries may head to industrial sites located nearby ports and urban areas, the seed industry needs rural areas appropriate for its production sites. By this, it shapes the rural landscape with specific agricultural patterns for the production of the market-preferred crop varieties. After seed harvest, they are packed and mostly exported for a much higher price in the world market.

Thus, seeing the rural landscape in the "Third World" countries as a traditionally isolated place, where agrobiodiversity is shaped only by the farmer-preferred crop varieties, is no longer applicable in the situation of rural agricultural industrialization and globalization of the seed market. In my research case, the rural landscapes with agrobiodiversity and livelihoods of the small-scale farmers should be understood in the linkage of the globalization of the seed industry and the neoliberalization of agrobiodiversity.

For the term, neoliberalization of agrobiodiversity, I refer back to the notion of neoliberalization of nature. Neoliberalism as the contested ideology of Keynesianism emerged during the 1970s, especially in its specific context of the Thatcher and Reagan era of the 1980s when the early stage of neoliberalism was implemented to roll back the state welfare (Leitner, et al. 2007). As seeing the connections between neoliberalism, environmental change and environmental politics, McCarthy and Prudham (2004: 275) explain such a link including, neoliberalism seemingly causes serious environmental impacts and is constituted by changing social relations with biophysical nature; neoliberalism and modern environmentalism emerge together as the most serious political and ideological foundations of post-Fordist social regulations; environmental concerns represent the most powerful source of political opposition to neoliberalism. By these, the concept of the neoliberalization of nature embraces the contradictory relationship between the market growth and conservation of nature at the same time.

Thailand is a crucial case for such a contradictory aspect. As one of the New Agro-industrial Countries (NACs) of Asia, the growth of the agro-food industry since the late 1970s has gradually integrated Thailand into the world market (Christensen 1992). The growth of the hybrid seed industry benefited this path as the sub-business of the agro-food industry. For example, in the case of the hybrid tomato seed industry, since Thailand benefited the low-cost product lines like the canned tomatoes exported to the West in the late 1980s, the hybrid tomato seed industry enjoyed the extraction of the tomato processing industry (Pritchard and Burch 2003; Rosset, et al. 1999). But hybrid tomatoes were not the first crop in the beginning of the seed industry in Thailand. When the Board of Investment (BOI) called for seed industry investment in 1980, the first starting crops for hybrid variety improvement were corn and sorghum (Seed Association of Thailand 2007).

With the effort to increase the competitive capacity in the global and regional markets, Thailand has also promoted the role of life-science institutes and the private sector. The seed production strategies of Thailand are then shifted from the public sector to the private sector for the new direction of the national agro-industrial development to move from low value to high value commodity production. The shift of seed production strategies from the public to private orientation began during the last few decades when the Government of Thailand decided to liberalize the vegetable seed industry by inviting foreign investment. It was reported in 1999 that the liberalization had resulted in the significant growth of the private seed industry as the vegetable seeds of both open-pollinated varieties and hybrids in Thailand (75%) were supplied by about 50 private seeds companies and only 5% was supplied by the public sector (Nath, et al. 1999). And now it can be said that nearly 100% of corn and sorghum, as well as vegetable crops, are replaced by hybrid varieties (Seed Association of Thailand 2007).

But not just in Thailand, the expansion of the hybrid seed industry is also experienced throughout the SEA region. Under the state support as agricultural industrialization and rural development, it was reported on January 21, 2008, by Bangkok Post (2008) that CP group, Thailand's largest food product manufacturing multinational company, expanded its sourcing of corn in the GMS area, including

Cambodia, Lao PDR, Myanmar and Vietnam. Corn sales in these countries are covered under a tariff-free arrangement backed by the Ayerawaddy-Chao Phraya-Mekong Economic Co-operation Strategy (ACMECS). CP was among the first Thai corporations to grow corn in the region, planting about 160,000 hectares of the crop. In 2003, a programme was established to promote the regional economy by increasing farm income in Cambodia, Laos, Myanmar, Vietnam and Thailand. Under the contract farming format, CP provides hybrid seeds and farm technologies to farmers and buys the produce back at the market price.

Recently, with the neo-liberal regulations like the national strategic plans to make Thailand to be the Seed Hub of Asia by the year 2016 (Naewna Newspaper 2010), the role of the private sector is emphasized more to produce hybrid seed under the brand name of the Thai Seed Industry (see National Center for Genetic Engineering and Biotechnology 2008). Significantly, whereas disputes of genetically modified organisms have spread around the globe, including Thailand, the growing of GM seed is still legally prohibited in Thailand, except for closed laboratories and field trials of scientific experimentation. As a result, the biotechnologies like Marker-Assisted Selection (MAS), which is a molecular breeding technology, are emphasized, and it is the non-GM seeds which Thailand aims to produce for the world seed market (see National Center for Genetic Engineering and Biotechnology 2009b).

With the ban on GM seed production, however, it does not mean that the market share of the seed trade of Thailand is small, as Thailand holds the high rank of seed exportation countries in Asia. At the present, there are over one hundred seed companies in Thailand with six to seven large-sized producers, mostly from foreign brands, while seed exports in the Asia-Pacific run at about $450 million annually, with Japan, China, Thailand, Australia and New Zealand the top players, respectively (Bangkok Post 2009). During the past five years, the volume of hybrid seed production has increased, and these seeds have been exported to 53 countries (Seed Association of Thailand 2007).

The growth of the global seed industry is interwoven with the rural development through the agro-industrialization of Thailand. Consequently, with the

global seed complex and rural industrialization, the expansion of the global seed industry has contributed to the transformation of the rural small-scale farmers into the hand-pollinating farmers through contract-farming for hybrid seed production. Simultaneously, it intensifies the market-oriented regulations over the production process in the rural landscape, as the contracting farmers have to work on the seed production process based on the quality controls of the seed companies, such as land preparing, planting seedlings, weeding, fertilizing, cross-pollinating, uprooting, seed harvesting. After harvesting, the farmers are still under the quality control of the companies in order to make them concerned with the purity and germination rate of the hybrids.

Also the restructuring of the national regulations has been implemented in order to serve the proper conditions for the growth of globalized seed business. For example, there are several legal acts in Thailand for promoting breeder's rights, plant breeding science, seed trading, and intellectual property protection, such as Patent Act B.E. 2522, Copyright Act B.E. 2537, Trademarks Act B.E. 2534, Plant Variety Protection Act B.E. 2542, Trade Secret Act B.E. 2545, and Protection of Geographical Indications Act B.E. 2546. Thus, the shifting of seed production strategies of Thailand reflects the government's preference of the private sector to boost the seed trade of the country.

The hybrid seed production, then, discloses the neoliberalization of nature in "the molecular scale" (McAfee 2003) through the strong protection of private intellectual property, in particular the Plant Variety Protection Act. This act is relevant to the international regulation, TRIPS Agreement, defining the genetic materials, seed and other products as private property (Harvey 2005). Ironically, Thailand is, at the same time, expected to implement the international regulations, especially the Convention on Biodiversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), as well as the national regulations for sustainable conservation of biodiversity. These regulations underline agricultural biodiversity in the farming environment through the in situ conservation. To make it clear, the labor-intensive production of hybrid seed exists together with

agrobiodiversity conservation in the same landscape. This is found in the villages where I conducted my field research sites in Nan Province.

In my research, Nan Province is one of the core areas of the hybrid vegetable seed production industry of Thailand, together with the area of biodiversity conservation. In the targeted village, there are not only the global seed firms, such as Chia Tai (Thailand-rooted seed company, now under CP), East-West Seed (the Netherland-rooted seed company) and Monsanto (USA-rooted seed company), but also development agencies like extension officials, as well as NGOs, promoting the farmers' roles in the community-based crop genetic conservation and development. Consequently, not only are the farmers grouped and networked, but also seed production center and the community seed bank are also established for collecting and distributing seeds for the village and others.

As such, the privatization of the seed sector and the commodification of crop genetic materials through the hybrid seed production industry take place in the same locale, where NGOs and the extension officials promote the Farmer Field School (FFS) scheme. This scheme contributes to the community-based agrobiodiversity management for crop genetic conservation as part of the sustainable development. It means that there are the different preferences of plant genetic resource governance as well as the socio-spatial practices of agricultural development during the transformations of local small-scale farmers' livelihood in the globalization of hybrid seed production.

Rather than just seeing the privatization of the seed sector, which is a relational moment in the capitalist commodification, the contradictory environmental governance over crop genetic resources in my research possibly illustrates the notion of "accumulation by dispossession as a mean to expand the scale and scope of capital accumulation via so-called extra-economic means" (see Glassman 2006; Prudham 2007). For Prudham, the patent on genes can be counted for extra-economic means as the specific genes, parts and the whole organism become assembled in the fiction of the inventions – making them a "thing" invented and owned by individuals so as to geographically displace them semiotically and

materially from their social and ecological context. Specifically for the seed, the accumulation by dispossession makes materiality of life legible as "discrete entities, individuated and abstracted from complex social and ecological integument" (Prudham 2007: 414).

The capacity of capitalism to dispossess the farmers from the commodity they produce parallels the production of space with the uneven geographical development for the survival of the capitalist market (Harvey 2005; Smith 1984). In this way, the neoliberalization of nature simultaneously constitutes the "environmental fix" (Castree 2008b) for the nature being produced and governed under the controversial capitalist logics embedded in both rationales – destruction and conservation of nature, here agrobiodiversity. To govern the plant genetic resources, the association of human and plants are de-/re-territorialized through the making of the cuts of dichotomous boundaries including nature/culture, the global/national polity and heritage/invention (Whatmore 2002). In short, all said, it reflects what Heynen and Robbins (2005) have drawn for understanding the dominant aspects inherent to neoliberalization of nature: governance, privatization, enclosure and valuation.

1.1.2 The question of small-scale farmers struggles under neoliberalization of nature

This research focuses on the production of seed in relation to agrobiodiversity, the expansion of the hybrid seed industry, and the livelihood struggles of the small-scale farmers of Nan Province in Northern Thailand. While the seed and its politics are complex, multi-faceted and contradicted, there are fewer works by critical social science, especially the political economy of agro-food globalization towards the hybrid seed industry in leading seed export countries, like Thailand, and its consequences upon the livelihood of the small-scale farmers in the labor-intensive production. Partly, but crucially, because of the secretive characteristics of the plant breeding business, the global hybrid seed industry is consequently less understood by critical social science, whereas a number of scientific literatures on hybrid seed production and techniques are found (Pritchard and Burch 2003). The work of

Rosset, et al (1999) stands as one of outstanding texts for illustrating the expansion of the hybrid seed industry in the agro-food studies in response to the agrarian questions. However, this work does not raise any questions for the politico-ecological dimension, especially for one that links to agrobiodiversity destruction and conservation.

As the agrarian studies begin to delve into new theoretical and political terrain, the political ecology, which embraces the political economy, is starting to take biodiversity seriously in both material and discursive struggles under globalization (see Escobar 1998; Moore 1996; Nygren 1999; Rocheleau, et al. 1996; Yos Santasombat 2004). Notably, the old agrarian studies might not recognize biodiversity and, specifically, the genetic aspects, such as the structure of DNA was that "discovered" in the 1950s and the scientific culture just assembled the knowledge of the genome, which produced the meaning of gene as information since the late 1970s (see Chrispeels and Sadava 2003; Haraway 1997). Significantly, biodiversity and its sub-term, agrobiodiversity with the genetic resource concern, were just officially raised in the global development and environment discourses in the 1980s (Brown 1998; Escobar 2008; Jeffries 2006; Wolff 2004). Biodiversity is, in this sense, constructed in the development discourse with scientific knowledge a few decades ago and has become governed, resisted, and negotiated among different actors with different knowledge, values and power. Shiva (1997: 120) radically argues that "Biodiversity is fast becoming the primary site of conflict between worldviews based on diversity and nonviolence and those based on monocultures and violence."

However, to focus mainly on the farmers struggling in the marginalized or the remote rural areas, like the protected area with biological hotspots (eg. Swiderska, et al. 2008), I wonder if the struggles of farmers outside the parks in the remote, rural areas, but already integrated into agro-industrialization, might be left in the narratives of biodiversity destruction and the victimized farmers in the attack of the capitalist market with modern technologies. To say more, the contradictory neoliberalization of nature needs to be dismantled to understand the farmers who are facing difficulties in managing their agricultural environment, as well as the agrobiodiversity outside the protected areas, while the market-preferred production strategies are supported by the

neoliberal state (Lockie 2009). More than black or white, the situation is complicated in many recent collaborative development projects aiming at developing the sustainable use of agrobiodiversity by integrating rural communities in Thailand into the value chain of the market. For example, there is a project in which community groups, agribusiness and retail companies collaborate with Chiang Mai University to link biodiversity-conserving small-scale rice farming with consumer markets (see DGIS-Wageningen UR Partnership Programme 2010).

But after the capital market integration, did the history of peasantry end? Do the global seed companies really gain control over the entire seed production and the governance of biodiversity? These questions can be debatable against the linear evolutionary assumption for the struggles of farmers in the capitalist society and their mode of agency (see Hart 1986; McMichael 2008; Scott 1976; Scott 2009; Smith 1989; Yos Santasombat 2008). Without carefully empirical exploration on the ground, not just the misleading understanding in the realistic effects of neoliberalism (Castree 2008a), it might be too risky to use a 'strong' scenario of the neoliberal global market to simplify the livelihood struggles of small-scale farmers and the cultural politics of agrobiodiversity. To see the neoliberalization of agrobiodiversity in relation to crop genetic resources as the absolutely governed environment by the state and elites, like the agronomist, the middlemen, NGOs as well as the "global governance" of international treaties and institutions over the farmers, is problematic (see Agrawal 2005; Brand and Görg 2003; Bryant 2002; Cotter 2000; Gupta 1998; Li 2007). Rather, in terms of farmers' agency, it would be better to investigate the ways, if any, that the small-scale farmers can influence agrobiodiversity governance among different resource users (Himley 2009).

Thus, I wonder how the different subjects of peasantry are re-constructed in the cultural and environmental movements (Corrado 2010; Kearney 1996; Yos Santasombat 2008) and how the neoliberal market as well as its environmentalism plays a key role in re-structuring social relations to biophysical nature (Bakker 2005; McCarthy and Prudham 2004). Also what different natures after 'the death of Nature' (Escobar 1996) are produced, not just by the neoliberal market, but also by the small-scale farmers interacting with heterogeneous actors and how such produced natures

are assembled in the livelihood struggles of small-scale farmers in the interplay of the global seed market expansion and sustainable development of Thailand.

To make it clear, my main research question lays at how the neoliberalization of agrobiodiversity transforms the livelihoods of the small-scale farmers and simultaneously shapes their cultural politics of agrobiodiversity among heterogeneous actors with different values, knowledge and power relations. My research hypothesis is that, in their livelihood struggles under the integration of the global seed market, the small-scale farmers can co-produce different agrobiodiversities which re-shape the neoliberalization of agrobiodiversity. From the main research question, I have sub-questions in the next part.

1.2 Research questions

Main question:

How have the neoliberal policies vis-à-vis agrobiodiversity led to the simultaneous emergence of global seed production and the local seed conservation in Nan Province?

Sub-questions:

- How is the neoliberalized agrobiodiversity, produced by different actors, experienced by the small-scale farmers in their everyday life?
- How does the integration of the global seed market influence the farmers' practices in seed production and conservation?
- What are the consequences of the livelihood struggles of the small-scale farmer on the production of agrobiodiversity re-shaping the farmers' identity and the facet of globalization of hybrid seed production?

1.3 Objectives of the study

According to theses research questions, this study aims:

- To explore the neoliberalized agrobiodiversity produced by different actors and experienced by the small-scale farmers in their everyday life.
- To investigate the integration of the global seed market influencing the farmers' practices in seed production and conservation.
- To assess the consequences of the livelihood struggles of the small-scale farmer on the production of agrobiodiversity re-shaping the farmers' identity and the facet of globalization of hybrid seed production.

1.4 Literature review

In order to understand the production of seeds in relation to the expansion of the seed industry, conservation of agrobiodiversity, and the livelihood struggles of small-scale farmers in the rural areas under the integration of the global seed market, in this research I use three main conceptual frameworks according to the literature review, including the political economy of seed industry, the political ecology of agrobiodiversity, and governmentality.

1.4.1 The political economy of seed industry

We should not see seed just as a simple small entity, especially when the seed industry is found to have a link to the agro-food industry. In the political economy approach, there are many scholars illustrating the seed industry through many critical aspects: the shifting from a public to a private seed system as the rise of corporate "seed regime" with its own norms and regulations within the evolution of the food regime (Kuyek 2007); the contractual seed production in India and the increased dependency relationship on the seed companies by the local producers (Poinetti 2005); the economic monopolization, privatization and commodification of life

through biotechnological advancements and patenting (Kloppenburg 1988a; Prudham 2007); the neoliberalism at the molecular scale through scientific- and market-reductionism (McAfee 2003); the growing seed industry in relation to the export-oriented agro-food processing industry in the New Agricultural Countries (NACs) (Pritchard and Burch 2003; Rosset, et al. 1999); the historical agro-food order and international conflicts over crop genetic governance (Pistorius and Wijk 1999).

Kuyek (2007) studies the historical development of the Canadian seed system and found that it was remarked by *three seed regimes*. For this, he proposes that once within the food regime, the seed regime can show that the control over seed has passed from farmers to the state and now to corporations. *The first seed regime*: decisions about seed were mainly made at the local level – on the farm and by the farmer – with less intervention of the state supporting its settled populations to feed themselves. *The second seed regime*: seeds were under sets of control from the state agricultural development policies for large-scale production of certain commodities for large export markets. *The third seed regime*: it is still under the construction and contestation as the state facilitates the transfer of decision making to the transnational corporations that seek the proprietary control of seed as a way to build new markets and secure their positions in a re-structured global agro-food system. This involves conditioning agricultural research through privatization and shifting the regulations of the second seed regime for the public sector to support the needs of the seed industry, leading to new laws on intellectual property rights in order to prohibit farming practices once common but protect the breeder's rights.

Moreover, my research of the global seed industry is related to the globalization of agro-food. As a result, not being separable from the history of food regimes, the hybrid seed production in the rural areas of Thailand can be historically analyzed through the global division of labour in the growth of agro-food globalization (Pritchard and Burch 2003). Under globalization, the emergence of New Agricultural Countries (NACs), for example Thailand, can be seen as uneven relations. Watts and Goodman (1997: 12) state that "the emergence of high-value agriculture is highly uneven – like the 'Third World' manufacturing itself – and the underbelly of new agricultural countries is agricultural marginality."

Though occupying the advanced biotechnologies, the global agro-industry, including the seed industry and the agro-food industry, still needs the rural areas. Pistorius and Wijk (1999) explain this as a key aspect of the rural agricultural industrialization under globalization. According to the theory of agro-industry development, as they refer to it, there is a process called "appropriation": transforming controllable elements of farming into agricultural inputs. This is a key process in which the industry needs the transformation of farmers to labour and the control over nature for capital accumulation. This means that the global seed industry cannot leave the rural areas because they have become a production site that must be under control for stable production and securing the accumulated capital.

The endeavor to maintain their accumulation is found in the competition among companies. This is also a significant aspect for understanding the relationship among the different seed firms, as there are seed firms competing with each other in Nan Province. In their work investigating the contract farming industry in Northern Thailand, Songsak Sriboonchitta and Wiboonpoongse (2008) found that contract farming had expanded from Chiang Mai to other provinces in the North. Commodities include poultry and hogs, Japanese rice, basmati rice, organic rice, vegetable seed, corn seed, and various fresh vegetables for frozen and pickled products. The commodities are contracted by large and medium companies owned by multinational companies, and joint ventures, or by domestic companies. After the 1997 economic crisis, smaller companies left the industry while competition continued among fewer but larger companies. Based on their research, companies need to use different strategies in order to keep their contracting farmers, such as price strategy or quality strategy. This can indicate the industrial companies' market force to gain labor control, suitable land and desirable production environments.

Actually, the transformation of farmers to labour and nature to private property and commodities for capital accumulation is not a new phenomenon, as people in Southeast Asia experienced the moment of dispossession in the growing of industrial plantations in the colonial state under imperialism in the early nineteenth century (see Daniel, et al. 1992). This can show that the primitive accumulation, which Marx pointed out in *Capital Volume I*, is still on-going today (Glassman 2006;

Harvey 2005). Harvey (2005) modifies Marx's notion of primitive accumulation in order to ask about the accumulation by dispossession in the rise of neoliberalism in the late twentieth century. For Harvey, neoliberalism should be seen as a process. In this sense, neoliberalization through globalization creates uneven geographical development. By this, he means that certain territories benefit at the expense of others and the interests of the ruling class are taken for granted as necessary for the socio-economic transformation. Glassman (2006) discusses the on-going primitive accumulation as the primitive accumulation by dispossession via the extra-economic means.

Prudham (2007) then takes Harvey's and Glassman's notions of accumulation by dispossession to analyze the biological, economic, political, legal, and ethical conflicts between the farmers and the gene giant, Monsanto, on genetic patenting, which influence the property relations and definition, the circulation of capital, and the rise of resistance among the civil groups. Prudham expands the notion of extra-economic means as he sees accumulation by dispossession in the deepened scale and the stretched scope of capital accumulation to private life forms as exclusive, alienable, and saleable property. For this, he points out the institution formed by the fiction of autonomous invention in relation to the biotechnological discovery and invention of "things", leading to the Patent Act's definition to claim over the privatizable, enclosable, commodifable genes, parts and whole organisms. This is, as Prudham argues, controversial if looking from the notion of socionatures. This can be far more than a problem of language description, but it is the myth of the autonomous invention.

In Thailand, such situations can be found, too. In 2010, in order to make Thailand become the Asian Seed Hub, the Seed Association of Thailand put more pressure on the Thai government to restructure the Plant Variety Protection Act in order to gain stronger patent protection on seeds as an invention owned by private companies (see Naewna Newspaper 2010). In the production sites where I aimed to conduct my research, the contracting farmers did not have a claim on the hybrid seeds, even though they used their (dispossessed and commoditized) labour in producing these seeds.

However, it can be problematic if the global-local conflict of seed governance will be defined by using the opposition between the Global North (with neoliberal states and TNCs) and/over the Global South (with threatened traditional peasantry under globalization) (eg. Shiva 1997). More specifically to the structural Marxism-oriented political economy, although the class struggle is useful in analyzing accumulated capital, it can dominate the understandings of how small-scale farmers struggle under the integration of the global market. This means that seeing through the opposition between the Global North and the Global South among the traditional Marxists and the neo-Marxists can contribute to the divide (Glassman 2006). There are many works reflecting the politico-economic conflicts more than just the opposition between North and South; in disputes of GM food trade between the EU, with civil pressure and from farmer pressures on bio-safety regulations, and the USA with corporate pressure for free-trading (Oosterveer 2005); Indian farmers in the post-colonial era and Indian seed companies versus Indian NGOs in contesting the sustainable agriculture and biotechnological application (Gupta 1998; Herring 2007); the female farmers in the native plant variety conservation versus the male farmers in applying the GM varieties in India (Kumbamu 2009).

Glassman (2006) calls for trans-class struggles in order to cross the North-South and other divides. To say more, while capitalists competing and changing their bases contribute to both cause and effect in the dialectics of globalization, using the totalizing analysis of neoliberal globalization can mislead complexities of which global industry articulates with regional and local structures, creating the complex patterns, spatially and temporally differentiated (Watts and Goodman 1997). For my research, using such opposition can simplify too soon the nested politico-economic relations in the network of seed production as there are different actors, including the seed giants, state extension officials, agronomists, middlemen, NGOs and even among farmers both within and outside their households, kin groups and villages.

The political economy helps me in understanding the shifting of the seed regime in relation to the agro-food globalization and the property relations influenced by the rise of the seed industry in the neoliberal context. But, analyzing the seed

regime through the global food regime can raise questions because the global regime analysis cannot explain or be sensitive to the specific aspects in the particular locations and to the variation in the national context (Robinson 2004). The conception of globalization in the work of Pritchard and Burch (2003) is found useful here to rethink of "globalization" as a process that is forever incomplete, contested and dynamic. In this sense, the shifting of the seed regime in regard to the neoliberal globalization should be understood as the interaction of global processes with those at the national, regional, and local scales. The task for globalization scholars is therefore to identify "the ways places, products and ideas influence one another" (Pritchard and Burch 2003: 11).

The social struggles over the market suppression in the capitalist development, according to what Karl Polanyi called "double movement", can also influence the heterogeneity and geographical historical complexity (Glassman 2006: 621). Glassman refers to such movement as "the growth in the market orientation of society and simultaneous growth in popular social movement reactions against market society's untoward effects." The movement of BioLinux, for example, can be seen in such way as it is the politico-economic movement by the farmers and activists to struggle for repossessing the plant seeds being enclosed and dispossessed by the monopolization by the private sector (Kloppenburg 2010). This can remind us in the grounded understanding of globalization as agrarian studies have to pay more attention to the heterogeneity and multiplicity of the livelihood struggles of local farmers. In order to avoiding the class 'essence' (Tsing 1999: 5), understanding of the peasantry politics cannot look from only the class struggles because there are heterogeneous actors being differentiated by age, gender, ethnicity and environmental subjectivities formed in their discursive and material struggles (see Agrawal 2005; Kearney 1996; Moore 1996; Yos Santasombat 2008).

Furthermore, with the regulation framework analysis, the international division of labour in agriculture can refer to the global production and distribution of farm products according to the dissimilar capacity of different countries to produce, export and import (Pistorius 1997). In turn, this reflects the preferences of the specific production strategies of the countries as a political process contested among the

heterogeneous actor if the state is not a unit but a contested institution. As a result, the actor-oriented approach should be brought into the political economy for investigating the different actors' powers in re-shaping seed production under globalization of the seed market. This is important for this research because those institutions are not given and static but occur in relation to the struggles of actors.

From the political economy approach, I then frame my research by turning to the political ecology approach. On the one hand, the political ecology can embrace the Marxism political economy in order to criticize the neoliberalism and accumulation by dispossession. On the other hand, the actor-oriented approach can be taken into account for better understanding of the farmers' agency according to the recent transition of the political ecology approach. More specifically for my research, the political ecology is useful for investigation of the contradictory neoliberal development and conservation. That is, in the research site, there are the state officials, NGOs and small-scale farmer groups implementing the project for agrobiodiversity conservation as part of the agricultural sustainable development during the sites of the global agro-industry of hybrid seed production are simultaneously located.

1.4.2 The political ecology of agrobiodiversity

In this part, the interplay between neoliberalism and agrobiodiversity is seen in the neoliberalization of nature, and then I turn to further emphasize the cultural politics in order to understand the livelihood struggles of small-scale farmers and their politics of the production of agrobiodiversity. This can help me in understanding the simultaneous destruction and conservation of the agrobiodiversity in my research.

- **Neoliberalization of nature**

According to McCarthy (2012: 621), political ecologists started to theorize their cases in terms of "neoliberalism" only from 2004 or so, on. In this sense, the political ecology studies of agrobiodiversity in relation to the emergence of neoliberalism, in addition, might not have been so long when compared to the peasant

studies in the Marxist political economy approach. This can be roughly explained by three reasons: first, the emergence of neoliberalism as policy in the 1970s; second, the emergence of biodiversity in the 1980s and third, beginning of political ecology itself in the 1970s. First, while neoliberalism is understood as the most powerful ideological and political project in global governance in the wake of Keynesianism, it is seen as the latter phase of capitalism beginning in the 1970s and clearly being noticed in the 1980s in the extreme forms of neoliberal state rollbacks and market triumphalism in countries like US and UK under Reagan and Thatcher, respectively (McCarthy and Prudham 2004: 275). Second, the emergence of "biodiversity" in the development discourse of the 1980s is also significant for marking the beginning of the political ecologists on this issue. Finally, the political ecology was seemingly coined in the 1970s (see Peet and Watts 1996: 4).

In order to identify the characteristics of neoliberalism, it can be referred back to the classical liberalism on what Karl Polanyi called the "self-regulating market" (McCarthy and Prudham 2004: 276). For Polanyi, the market economy can be seen that: "Transformation implies a change in the motive of action on the part of members of society: for motive of subsistence that of gain must be substituted. All transactions are turned into money transactions, and these in turn require that a medium of exchange be introduced into articulation of industrial life. All incomes must derive from the sale of something or other, and whatever the actual source of a person's income, it must be regarded as resulting from sale… But the most startling peculiarity of system lies in the fact that, once it is established, it must be allowed to function without outside interference." (quoted in Worster 1990: 1100). As such, market is not just a place here and there where buyers meet sellers, rather it is of market economy or market system. This is important for seeing the capitalist transformation of nature.

Harvey (2005: 159) explains neoliberalism as a process of which he sees its achievement in a rubric called "accumulation by dispossession". For this, neoliberalization is the continuity and the proliferation of accumulation which Marx criticizes as the primitive accumulation in the rise of capitalism. There are many examples, as Harvey argues, for understanding these processes, including the commodification and privatization of land and the forceful expulsion of peasant

populations; the conversion of various forms of property rights into exclusive private property rights; suppression of rights to the common; commodification of labour power and suppression of the alternative forms of production and consumption; the colonial, neocolonial and imperial processes of appropriation of assets and so on. The role of the state is noticed, in this circumstance, as both backing and promoting these processes.

The notion of "neoliberalizing nature" refers to the term neoliberalism, which is seen to be more than just a political economic project with impacts on the environment; rather, neoliberalism is conceptualized as being constituted by, and of, processes of socioenvironmental change (Bakker 2005: 543-544). Yet McCarthy and Prudham (2004: 275) note that the connections between neoliberalism, environmental change, and environmental politics are less investigated, while neoliberalism is criticized in the political economic and environmental problems. It needs to be analyzed through empirical effects of neoliberalism in order not to be overstated (Castree 2008a).

Bakker (2005: 544) sees that the term, neoliberal nature, can be found around the concepts of privatization, commercialization, marketization, and commodification. So, as to Heynen and Robbins (2005: 6), they present that neoliberalism should be seen as a process far from being 'a single, monolithic and undifferentiated process' or as natural. As such, Heynen and Robbins propose the main rubrics for helping us in understanding the dominant relations regarding the neoliberal agenda, which include *governance*, which refers to the institutionalized political compromises upon the capitalist societies; *privatization*, which refers to the transferring of resource governance from states to firms and individuals; *enclosure*, which refers to the capturing of common resource and the exclusion of communities; *valuation*, which refers to resources being commoditized and the complicated values being reduced through pricing.

Seen as a process, neoliberalizing nature relates closely to the arrangement of relations of actors and their environment for the growth of the capitalist market. Castree (Castree 2008b: 146-150) further provides four scenarios of what he calls

"the environmental fix" for illustrating the capitalist logics towards nature. The idea of a fix here can explain the environmental governance in four forms: the state-led, the market-led, the expert-led and the hybrid-led that recalls the responsibilities of the actors like the state, firms, and civil society, to ensure the appropriate use of resources. This helps us in understanding how nature is governed and under which logics that such governance is implemented in the claim of economic development and environmental conservation.

Thus, no matter how "green" or "polluted", the neoliberal market gets along with both rationales – conservation and destruction – to produce the new commodity. This means that neoliberal nature indeed involves institutional transformation (for Marx, it needs the power to achieve the project of capital accumulation and capitalist restructuring) of the livelihood of the actors and biodiversity to survive in the market (to protect nature through selling it in the market), while the position of the state is shifted to be institutionally supportive of market intervention. In other words, neoliberalism is, in fact, the political project, or "the politics of transforming and governing nature", that not only changes the social relations with biophysical nature but also bypasses the power of the state to the market (McCarthy and Prudham 2004).

As we shall see, paradoxically, the neoliberalization of nature not only involves the natural degradation but also the conservation of nature. There are many critical works on this: the destruction and conservation of nature at the same time as the "creative destruction" (Harvey, 2006); the same capital logics of accumulation found in GM and hybrid seed production and technology as the production of the second nature (Castree 2001); the international-national regulations on intellectual property rights, the transnational companies and the biopiracy problem in relation to the local knowledge-related biodiversity conservation in Thailand (Robinson 2007); and the fixing of the conservation zone and the limits of potato seed exchange in local farmer networks (Zimmerer 2006).

Gollin (1993), in his discussion of how global biodiversity initiatives have contingently embraced the market-oriented approach for conserving biodiversity resources, argues that market mechanisms are just an option, and perhaps not the best,

for genetic resource management. For this, he points out the free-trade promotion upon global governance on intellectual property rights (IPRs) for biodiversity conservation. This means that the "Third World" states are waking up to take their role in making policies for biodiversity conservation, as it is conditionally based on their membership under the Convention on Biological Diversity (CBD). But this situation of the Convention ratification has become, in the long run, the promotion of the U.S. goal of strengthening intellectual property rights in developing countries.

Although his work might not primarily question the problem of biodiversity destruction in rural areas, Rigg (2006) points out the contradictory re-agrarianization of neoliberal development policies being launched in rural areas in Southeast Asia, like Thailand, Laos, Vietnam and the Philippines. He sees that the neoliberal development of the state, in turn, de-links the farmers from land, whereas the rural development of the state and NGOs still set certain aims to improve the rural livelihood through farmland and agri-business.

The neoliberalization of nature is, thus, useful as it can raise critical questions toward the industrial hybrid seed production and agrobiodiversity conservation in the neoliberal era. This is crucial for my case study, as the state supports the growing hybrid seed market and the agrobiodiversity conservation together with NGOs via the participatory approach under the Farmer Field School (FFS) programme. In the next part, I turn to the actor-oriented approach in order to understand the livelihood struggles of the farmers through the farmer's agency and the cultural politics of biodiversity. This is important as it is noticed that, for the conventional social science, the connection between the culture and politics is less explored (Alvarez, et al. 1998: 2). It also reflects the recent move of the political ecology approach: from degradation to construction of nature, from farmer to producer, from chains to networks of explanation (see Robbins 2004: 208-212).

- **The cultural politics of biodiversity**

Before seeing the farmer's agency and the cultural politics of biodiversity, in this part, "biodiversity" is taken into account as the recent political ecology

approach. Based on the post-structuralism political ecologist, I found that Escobar's work (1998: 53) can help me in framing this research around the biodiversity question as he proposes that "Although 'biodiversity' has concrete biophysical referents, it must be seen as a discursive invention of recent origin. This discourse fosters a complex network of actors, from international organizations and Northern NGOs to scientists, prospectors, and local communities and social movements. This network is composed of sites with diverging biocultural perspectives and political stakes." In this sense, to understand the biodiversity network, the biological is not employed alone and divided from the cultural, but they are intertwined as Escobar proposes the idea of biocultural perspectives.

Taking the concept of "network" from the field of science and technology studies (STS), Escobar (1998: 54-63) also asserts his examination of biodiversity as an historically produced discourse in the concern of the loss of biological diversity. For this, it does not mean that there are no such "discrete things" like plants, animals, microorganisms, Homo sapiens and their interaction or destruction. In fact, he modifies the discursive material perspective and the network perspective in order to help him analyze what he sees as the "biodiversity production network" in the articulation of social movements encountering environmental destruction and biodiversity conservation.

Then the production of biodiversity in the actor-network theory, as Escobar proposes, can be explained as the biodiversity narrative that created linkages necessary for the construction of particular discourses. By this, complexity of the world is simplified through the narratives of crises and solutions. This is important because it can stabilize the network that makes possible the flow of objects, resources, knowledge and materials. This point helps us to understand in both the conventional and the countering discourse of biodiversity.

For Escobar, deploying the network approach can make something different from the Marxist production of nature in the political ecology. In his argument of the "death of nature" together with the rise of the environment in the sustainable development discourse (see Escobar 1996: 327), Escobar radically criticizes the

emphasis of progressive history of modernity and Marxist historical progress of capitalization of production condition. This can refer back to the concept of nature as social production, which can be found in Smith's work (1984), *the Uneven Development*. Smith proposes two kinds of nature in the duality of society and nature, *the first nature* and *the second nature*. In order to accumulate, the former has to be transformed or produced as the latter, which can be incorporated into institutions like the market, the state, and money for regulation of commodity exchange (Neumann 2003: 241).

In this research, as I apply the production of nature, agrobiodiversity cannot be the first nature, especially under the context of capitalism. But is there a first and second nature? I may apply the concept of the production of nature in capitalism, but not for seeing it as the progress of history. Also it does not mean that I see it in a dichotomy. Rather, even in Smith's work (1984: 58), he proposes that "[T]he production of first nature within and as a part of second nature makes the production of nature, not first or second nature in themselves, the dominant reality." This occurs as the internal contradiction of capitalism itself, as Smith sees, creates the resource scarcity and environmental degradation in the production process to re-produce the commodity. To make it short, nature becomes the accumulation strategy, Smith argues (Smith 2007).

Castree (2001: 204-205) proposes his evaluation of the production of nature thesis in three points; Practically, for many economists, production of nature is likely to fail in a giving a viable economic solution while offering the unrealistic notion of totally overthrowing capitalism; theoretically, it becomes the productivist approach, overemphasizing production at the expense of other processes which simultaneously socialize nature; ontologically, partly right, it becomes the anthropocentric approach which prioritizes the capital side of capital-nature dialectics – in turn, it therefore fails to appreciate the "agency" of production of nature. In gender perspective, the production of nature becomes masculinist and blind to women's unequal place in capitalist society (Plumwood 1994 cited in Castree 2001: 205).

After tackling Marxism in the production of nature, Escobar (1998) turns to add up the network perspective. It seems to me that he uses the "weak" version of the actor-network theory (ANT). ANT might be attractive for many scholars, but it should be noted "weak" and "strong" ANT. For the "strong" version, it is more criticized because all "actants" are indifferent and the network looks descriptive when completing traces of actor/processes, being unable to tell clearly what forms it takes (Castree and MacMillan 2001: 221-222). Especially for the existence of nonhuman actors, there is still a huge limit because "we simply cannot know what a non-human valuation of nature would look like since we cannot step outside our humanity" (Castree 2001: 205).

The "weak" ANT is seemingly more often taken into account because it remains critical of binarist thinking, asymmetry, of the limited conception of agency and centered conceptions of power (Castree and MacMillan 2001: 221-222). This can explain that in a network, there can be some "social actors" who can influence the network more than others. That's why the "weak" ANT is applicable in Escobar's work, because his emphasis is on the heterogeneous actors in the social movement approach against capitalizing nature. We can see from his deployed concept of translation. In actor-network theory, translation refers to a relation that does not transport causality but induces two mediators into coexisting, thus the existing translations between mediators can indicate the generating associations (Latour 2005: 108). With associations, there is no "society" but just the formation of assemblages as Latour argues.

The discursive formation of biodiversity in the dominant global concerns of biodiversity loss and sustainable development can be seen as "translations" that craft the categories of nature and development through practices of articulation: they speak about nature in new ways and link heterogeneous elements together in new patterns and assemblages (Tsing 1999: 12-14). Tsing proposes a concept of Stuart Hall's articulation that indicates the links and formations of meanings among social groups as the process of coming up with a new way to speak about their common, complementary, or opposed interests. In this sense, the link is unpredictable because the new way of speaking is creative innovation, not an expression of previously

existing forms. When the global discourse of biodiversity and sustainable development are linked to the local, it encounters the articulation of different understandings of nature and human-nonhuman interrelations. The result is the translation, contestation and transformation of meaning in both local and global understanding within the new frames of meaning and new relations of power and authority (Instone 2003: 4).

Thus, I found that Tsing's (1999) work can provide a useful frame in seeing the cultural politics specifically for focusing on my research site, where there were sustainable development projects launched by extension officials, NGOs, and schools, while farmers participated in the production of the hybrid seed market. Based on Tsing, the cultural analysis of natural resource management can be underlined as the "definitional struggles" that make it possible to imagine the "biodiversity management" (Tsing 1999: 2-3). As such, not looking for a deep genealogy of ideas, it pays attention to the cultural claim, especially cultural mobilization in regard to the strategically effective moments of interconnection among negotiating parties that make powerful environmental projects come to life via articulations and collaborations of the "project". Of course, with the notion of links, it cannot be predictable because it can be more than what the individuals expect and calculate.

For the idea of project, according to Tsing, it is more historically specific and socially locatable than the idea of discourse in Foucaultian, as the environmental projects are formulated via semiotic and social articulations. In this sense, these projects are moments of tentative hegemony in which the agendas of particular collaborative partners are taken to be implemented. In turn, it is a challenging moment for the community spokesmen facing the difficulties in the collaborative field dominated by corporations, governments, NGOs. Analysis through cultural politics can indicate both the limitations and the potential of particular collaborative strategies.

From Tsing's work, the idea of project can relate to my research. Not just the practice of national seed banking, the community-based plant breeding and variety

selection in the Farmer Field School program can be questioned for its consequences while it is seen as farmer empowerment through the participatory approach.

For Escobar (1998: 64), the cultural politics can be understood as the process enacted when sets of social actors shaped by and embodying different cultural meanings and practices come into conflict with each other. Culture becomes political because meanings are constitutive of processes that, implicitly or explicitly, attempt to redefine social power. When movements deploy the alternative conceptions of woman, nature, development, economy, democracy, or citizenship that unsettle dominant cultural meanings, they enact cultural politics. Cultural politics are the result of discursive articulations originating in existing cultural practices. These processes are never pure and are always hybrid yet showing significant contrasts in relation to the dominant cultures.

In the production of biodiversity networks, we can see that movements can be associated to the formation of identity, place, history and agency. The production of identities in people's interactions with other people and with objects entails the construction of cultural worlds and this takes place through recursive improvisation in a sedimented historical background and also involves various kinds of mediations (Escobar 2008: 217-219). According to Escobar, local practice mediates between history in person and enduring struggles, so identities and struggles are never finished and always in process – persons and institutions unable to be independent of their encounter. Under the context of post-colonial development in India, Gupta (1998) sees that the farmers' knowledge and the meaning of sustainable development are hybridized and impurified, as he studies the farmers' struggles in the modernization of agriculture. According to him, while the poor farmers make their demands toward the desired modern development from state agencies, they also participate in the NGOs' debate of modern agriculture as unsustainable development. By this, they come up with the reconstructing "indigenous" knowledge which challenges the secured identities of the "West", or modernity on spatial exclusion. The cultural struggles of the Karen ethnic movement in Pinkeaw Laungaramsri's work (2001: 210-211) also shows the hybridization of nature and identity formation in the movement. She sees that the movement can deploy the idealized local knowledge meanwhile they use it as

a tool of resistance for making the strategic position that local people use the representation against the dominant actors.

All demonstrated, based on the recent political ecology and embracing the actor-oriented approach and ANT, we can see the agency of the farmers is not in the clear - cut between resistance, negotiation and engagement toward other actors and processes. Separating the clear types of peasant politics of resistance, though seen in everyday life, might encounter the stereotypes of farmers and their cultural politics (see the debate in Popkin 1978; Scott 1985). For this, Yos Santasombat (2008: 51-52) proposes his concept of flexible peasant in order not to see the peasant without agency, as he asserts that "Contemporary peasant studies must turn from an obsessive concern with the external differentiation of "types of peasants" to the internal differentiation of subject. We must turn from the theory of containment to the theory of emancipation and refocus our research issues from "traditionalism" to ethnicity and from "localism" to globalization".

Based on the livelihood of people at this research site, they have migrated to many provinces and some countries to earn their living as a wage laborer on construction sites, in factories, at shopping malls or on the plantations. Recently, a lot of them have come back home and seen that the global seed companies in their village provide more desirable livelihoods, while the state and NGOs also come and present them with a bright future of sustainable agriculture. In order to see the struggles of these farmers, we should not be totally fix our understanding of power to a certain class, group or space. Whose power and resistance are we seeing? This is still in question for the realistic effects of agrobiodiversity discourse in the farmer's practices. In order to better understand the problem of power and resistance in the subject formation in relation to the neoliberalized agrobiodiversity, the next part takes the concept of governmentality into account.

1.4.3 Governmentality

By drawing on Foucault's concept of governmentality, in this part, I conceptualize the neoliberalization of nature as the neoliberal governmentality in

order to problematize the subject formation in the neoliberal development and agrobiodiversity conservation. Theoretically, the idea of governmentality problematizes the relations of subject and truth that can have an influence on the subject to govern itself and govern the others via something like ethics, freedom and truth. This idea can be traced back to early Foucault's earlier analysis of the power and knowledge nexus (biopower and disciplinary power) for understanding surveillance in the modern state. Both kinds of power, like governmentality, are seen as opposition to sovereign power (O'Farrell 2005: 107). Foucault's analysis of biopower, or biopolitics, is seen as technologies of power to control the populations on life and death. Another analysis is disciplinary power, which is different from sovereign power because the former refers to the way power is exercised, at the micro-level, whereas the latter operates on the macro-level. Based on the idea of disciplinary power, not like in the feudal state, but in the modern state, there are several techniques developed for social controls after the decreased possibility to exercise sovereign power. According to Foucault, discipline can be seen as a "technology" that contributes to possibilities of "how to keep someone under surveillance, how to control his conduct, his behavior, his aptitudes; how to improve his performance, multiply his capacities; how to put him where he is most useful: that is discipline in my sense" (1981:191 quoted in O'Farrell 2005: 102).

Disciplinary power as technologies of controls in the modern state, as O'Farrell (2005: 102-105) summarizes Foucault's analysis, include spatial organization by organizing it in particular ways, thus becoming the social institutions and controls over space; activity and behavior organization by developing timetables in order to set the same activity to be done by everyone at the same time, organizing the forms of group activity and using methods to improve the bodily practices for ensuring to produce the efficient unit which can perform useful activities at minimal time wasted; a technique, by which a "panopticism" (panopticon is an old style of prison in the 1790s with a ring shape designed and established cells around a central tower) is created to achieve the surveillance by inventing an atmosphere of an "inspecting gaze", to which a subject turns against himself in order to not do wrong; normalization that refers to the disciplinary society, in a medical model,

"which sought to cure and rehabilitate 'diseased' and 'abnormal' individuals" in contradiction to the penal societies; and examination that can refer back to both surveillance and normalization, leading to turn people into objects of knowledge and power, as Foucault sees that "[T]hrough the examination, individuals are required to reproduce certain types of knowledge and behavior. Their performance can then be measured and entered into a data bank which compares them with others. The examination allows people to be 'individualised', to become 'cases' which are measured against other cases and are then filed and used by the social sciences (psychology, sociology, psychiatry) to generate further knowledge. All this data can be generalised and statistical 'norms' can be established with the resultant knowledge being used to tighten control over both populations and individuals" (quoted from O'Farrell 2005: 105).

However, before we further explore how the neoliberalized nature becomes the problem of governments of subjects, it is important to note that the concept of governmentality in late Foucault's works has not left his strong analysis from the micro-level of power to the macro-level of power. For this, Dean (1994 cited in Rutherford 2000: 121) notices that in *The History of Sexuality (Vol. 1)*, Foucault seems to pay his attention to the problem of government and the role of state. Although seeing to governmental rationality, as Dean proposes, this work of Foucault still maintains two aspects of his strong analysis in biopolitics. That is the elaboration of the microphysics of power and sorts of biopolitical problems raised by the regulation of the entire population and societies and 2) the concern of the practice of ethics as a form of "government of the self".

How can Foucault's ideas of governmentality be applied for analyzing the exercising of power in the neoliberal state and the problem of environmental governance? Based on the recent translation of Foucault's 1978-79 lecture entitled *The Birth of Biopolitics*, Fletcher (2010: 173) proposes that, in contrary to the explanation of neoliberalist claims, Foucault sees that the free market, in fact, requires pervasive government intervention and regulation. According to Foucault, market is not the natural phenomenon but the artificial construct that must be actively created and constantly maintained through diverse forms of governance with the minimum of

the market interventionism in contrast to the maximum of legal interventionism. This means that when the market logics are taken into account of the environmental governance, the state invention via legal mechanisms will not disappear but still be there. Based on McCarthy and Prudham's work (2004: 208), governmentality is useful because this idea can address neoliberalism not in dichotomies between state and market. This can help to analyze the neoliberal reconfigurations of environmental governance in relation to the class coalitions, interest-based politics, and scale-specific ecological dynamics. However, McCarthy and Prudham argue that it is important to remain focused on the need to identify specific winners and losers in the effects of social and environmental reform in the difference of governance projects.

There are many works that can help in understanding neoliberal governmentality. In relation to long distance control, Higgins's work (2005) shows how neoliberal markets can govern people through producing a calculative subject of the farmer. This happens under the disciplinary power through technologies of calculation that help to hold a distance control, so as to make farmers control themselves in their daily on-farm life according to the computerized program aimed at increasing their dairy productivity. In the realm of conservation, the "green governmentality" can indicate the self-regulation of people in order to behave in eco-friendly ways, but it is still the matter of power, as Agrawal (2005) demonstrates in his notion of environmentality in the decentralized governance of natural conservation and the formation of the self – local people coming to be care of nature and exclude the poor families and women from the resource access.

With various forms of governance in the realm of conservation in the neoliberal era, Fletcher (2010: 176-178) then presents us his notion of "multiple environmentalities". He proposes that there are different governmentalities which are not necessarily mutually exclusive but coexist. For example, community-based conservation might be seen to embody alternate strands of disciplinarity and neoliberalism, depending upon whether a program emphasizes ethics or incentives in its efforts to motivate local participation. Higgins and Lockie (2002) also propose the notion of hybrid governmentality in order to show how the state controls rural people through various measurable capabilities of resource management.

But it is also important to note that there are limits of government, as Li (2007) notes on this point. According to her work, the environmental hegemony cannot dominate all actors in every degree, as Li reminds us to look from the idea of multiplicity of power - "powers that are multiple cannot be totalizing and seamless".

However, humans are not the only ones that can be governed or resist the control of power. In this research, I explore other possible actors, including nonhumans, to better understand the farmers' agency for the possible production of "agrobiodiversities". For this de-centering, I see nonhumans as socialnatures in order to grasp their roles and presence in coproducing the power relations and agency of the small-scale farmers. For the idea of socialnature, it is important to see that there are "things" defined in societies as "natural" but it is impossible to totally capture them without involving socially-specific knowledge and practices (Castree and Braun 2001: 16).

Just like when Foucault discusses the apparatus of sexuality as '[T]he apparatus itself is the system of relations' (Thierman 2010: 90), we cannot look at only nonhumans by separating them the knowledge, and at the same time we cannot look at only knowledge of "things" in order to understand the power relations. This is a way to add up the materiality perspective, not just only for seeing the way that farmers are disciplined but also to better understand the farmers' agency. This effort by scholars is recently seen in the calling for new materialism and re-interpreting the concept of governmentality by proposing notions, such as "government of things" and "the milieu" (see Lemke 2014). This can be useful for better understanding how the cultural turn can benefit from critical analysis of the new materialism. Thus, for me, the cultural politics should take the materiality perspective and the government of things into account for grasping the concept of governmentality and its limits.

1.5 Conceptual framework

It seems the neoliberalization of nature has contradictory governance aspects in relation to the commodification and conservation of nature. This research looks at the neoliberalization of agrobiodiversity and livelihood struggles of small-scale

farmers in Northern Thailand under the context of global seed market integration. Meanwhile, the research mainly questions how the neoliberal policies vis-à-vis agrobiodiversity has led to the simultaneous emergence of global seed production and the local seed conservation in Nan Province; it has a hypothesis that the small-scale farmers, in their livelihood struggles under the integration of the global seed market, can co-produce, in part different agrobiodiversities.

Using the political economy of the seed industry for analyzing Thailand's seed regime is shifted under the integration of the global seed market. The seed regime clarifies material access in relation to the property relations, including commons, state and private governance. The idea of the fictions of autonomous inventors (Prudham 2007) helps in legitimizing the legible claims on legal controls of access to the gene, parts, or the whole organism, like in the seed law. This can be counted as the extra-economic means part of accumulation by dispossession. As the seed sector is re-structured for globalization of the seed industry, the research also takes the seed regime into the light for seeing the neoliberal policies and its effect on the livelihood struggles of small-scale farmers. The neoliberalization of nature is not only investigated at the policy level but also in the research fieldwork where the global seed industry influenced the livelihood struggles of small-scale farmers in the contract farming for the hybrid seed production among the dominant actors, including the seed firms, middlemen and GOs.

Simultaneously, as the researcher applies the political ecology of agrobiodiversity, the research sees that some farmers also produced seeds in the project of agrobiodiversity conservation. Based on the notion of the death of Nature, the (agro)biodiversity discursively emerges in the global development discourse and sustainable development discourse since the 1980s as Escobar (1998) proposes. The research traces the "biodiversity production network" (Escobar 1998) among the heterogeneous actors, including NGOs, GOs and farmers, in order to see the articulation of capitalist production of commercialized seeds and the social movements with cultural politics of (agro)biodiversity conservation. The collaborative programme, called the Farmer Field School (FFS), established in the village observed by the researcher was investigated to understand the assembled meanings of

agrobiodiversity and seed conservation in community seed banking and plant breeding (with Participatory Plant Breeding – PPB, and Participatory Variety Selection - PVS approach).

Through the cultural politics of agrobiodiversity conservation, it can reflect the situated meanings of agrobiodiversity emerged in the farmers' practices. As the farmers are linked to the heterogeneous seed production networks with the dominant actors who have the different knowledge, interests and power, the hybridized knowledge and practices of small-scale farmers will be significant for this research to learn how the farmers co-produced the meanings of agrobiodiversity while they resisted, engaged and negotiated with those actors. This can empirically show whether the neoliberal governmentality has its limits and how the livelihood struggles of farmers will influence the demographical, spatial and biological consequences and their identities assembled with different agrobiodiversities. The figure below illustrates the conceptual framework of this study.

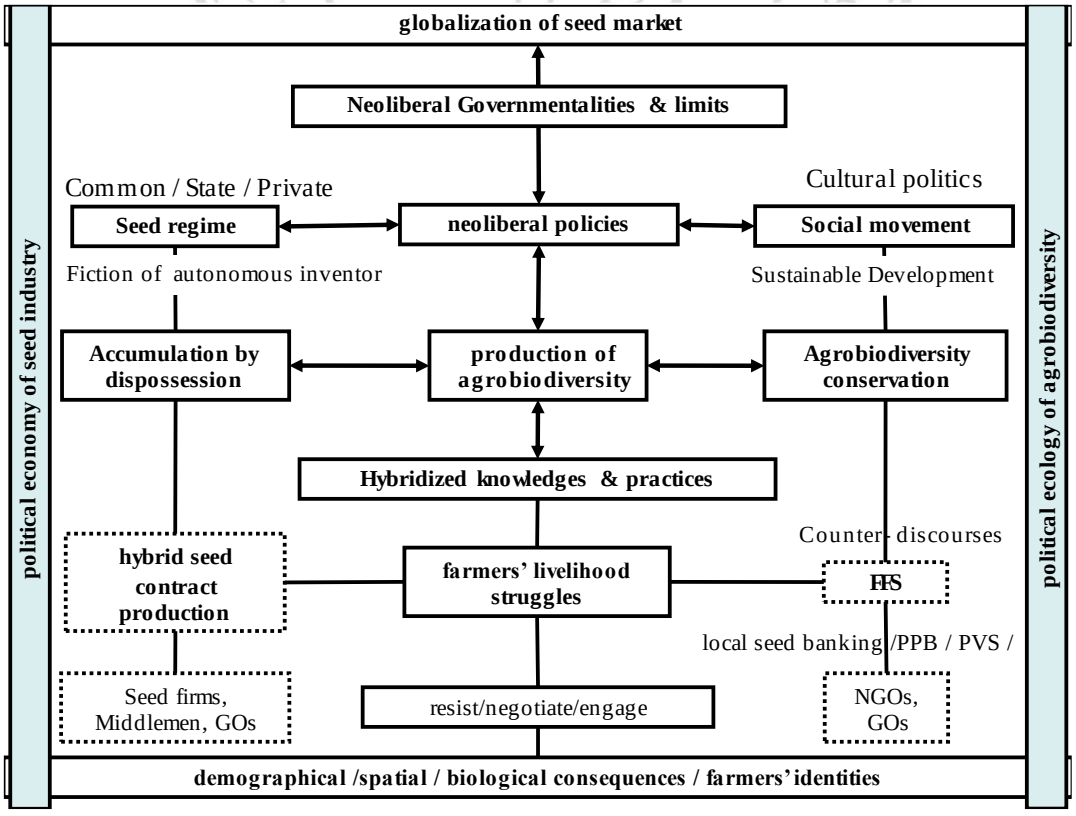

Figure 1.1 Conceptual framework

1.6 Methodologies and ethnography

- **Research approaches, fieldwork and site selection**

The primary research question focuses on the production of agrobiodiversity in conservation and the commoditization of seeds as the contradictory neoliberal environmental governance. In particular, the research explores the neoliberal policies vis-a-vis agrobiodiversity in order to understand the livelihood struggles of small-scale farmers while they were integrated into the global seed market. The approaches and the making of the "fieldwork" are explained below.

Through the post-structuralism and the actor-oriented approaches, I aim to see how the discourse analysis can be employed together with actor-oriented analysis. Discourses can be observed from the situated social practices, as there are actors who "use them, manipulate them and transform them" (Long 2001: 53). In the study village, I focus on how farmers resisted, negotiated and engaged with heterogeneous actors in relation to the discourses of agrobiodiversity and peasantry being (re)constructed by the elites to mobilize resources and re-arrange the spatial relations. The consequences of the politico-ecological practices are then assessed in order to see whether and how small-scale farmers can produce and consume the meaning of the agrobiodiversities among the heterogeneous actors.

Having conducted my fieldwork with a multi-sited approach (Marcus 1995), I had observed the farmers in a village, while I accompanied many key informants (farmer leaders, NGOs staff and government officials) to several places, such as the rice fields, villages, market places and several meetings at local, national and international levels. However, I did not treat all sites in the same degree. Rather, TK Village was treated as the main research site, where I followed and observe the relationships between farmers and other actors. For collecting data in the fieldwork, I employed some research tools such as village survey, structured questionnaires, in-depth interviews and participatory observation, contributing to further understanding of local farmers' livelihood strategies in response to changing environmental, social and politico-economical conditions.

In addition, the de-centering human approach, like ANT and the materiality, is modified to further understand farmers' agency and assemblage of 'Nature' emerging in the interactions between humans and "things", such as seeds, insects, birds, soil quality, water, compost and so on. According to Bennett's (2010) work, *Vibrant Matters: a Political Ecology of Things*, it helps to see that there are nonhumans co-producing the political terrain, or, rightly said, "political ecologies". This means that we cannot rely only on the approach that always centralizes humans at the center of every relation.

Methodologically, as part of the forefront at the encountering frontier ("me" in and of the fieldwork), I try to conduct the "act of walking" (Hitchings and Jones 2004: 9) for understanding the attachment of people to seeds in terms of their knowledge and practices that contribute to the assemblage of agrobiodiversity or to "follow" (Bennett 2010: xiii) people and things in order to see how they mutually co-produce the events - places where I, as a researcher with a post-structuralism perspective, can observe the "government of things" (Lemke 2014) and the limits of government for understanding farmers' agency among heterogeneous actors.

Not just the fieldwork data, secondary sources of data are also collected, such as statistic data, news reports, documentaries, official reports, and meeting handouts. Especially the official documents, including seed trade statistics and national and local government policies, are reviewed in order to further understand whether or not these policies (re)shape the agrobiodiversity and the livelihood struggles of small-scale farmers. These data are useful because they are the empirical evidences, not only for evaluating the limits of neoliberal development but also for seeing the situated knowledge and politico-ecological practices of small scale farmers to engage and negotiate with state power, market forces and socio-environmental movements.

Prior to the fieldwork, I actually started my preliminary research in late of 2009 in order to observe some conditions and context of the farmers' livelihood changes in Nan Province. After a few months, I returned to Chiang Mai Province to develop my research proposal. The context in this research is the globalization of the seed market and the sustainable development in a village located in a valley in Nan

Province, Northern Thailand. A lot of households in this village gain income from the production of hybrid vegetable seed for the seed companies through contract farming. The intensive production occurred at the same time that de-agrarianization was experienced by the farmers in the village. Prior to this period, local NGO organizations launched their development scheme in the village and some farmers, not all, participated in the project.

Since I returned from Canada in 2010 as a visiting scholar for three months in York University, I had a chance to re-visit the village for a few weeks and then returned to Chiang Mai University to re-write and present my PhD proposal, which was approved in late 2010. Then, there were several stages of fieldwork and techniques I employed, such as observation, the household survey and questionnaires, and in-depth interviews, in order to understand the historical context of the village, livelihood strategies and its outcomes that can contribute to different facets of seed management and agrobiodiversity governance in the neoliberal era. For this, the next part explains the four stages of the research.

There are *four main stages* for this research. In the *first stage* for the site selection, I revisited to specify the certain sites where I could conduct my intensive fieldworks during 2011-2013 after my proposal was approved in late 2010. At first, I aimed to select three villages located in three main valleys along the Nan River. But, one condition I needed to study was the farmer organization of the Farmer Field School scheme at the village level. This was found active mostly in the village I at last chose for my main site. I then aimed to see the assemblage of agrobiodiversity in the livelihood struggles of TK villagers among different actors.

In *stage two*, I tried to build a rapport with more people, not just the farmers I already knew in the study village in Tha Wang Pha District in Nan Province, Northern Thailand. After I became recognized as a PhD student who wanted to finish his education by conducting a research about seeds and livelihood struggles of farmers, I tried to find a place to stay in the village. Fortunately, I could stay in a house of an old female farmer whom I already knew, as she was an active farmer who engaged with FFS for years. At her house, she stayed alone because her sons had

already moved to live in other places after getting married. Absolutely, I sometimes stayed in her farmhouse to observe the livelihood of other villagers, especially when they passed through and rested for a while at the farmhouse on the way to their paddy fields or after a day's work.

After stage one in which I conducted a preliminary research, and stage two, in which I built a rapport and engaged with villagers and other actors, in *stage three*, I conducted a village survey, a household survey, and in-depth interviews. These are to better understand not only the physical landscape of the village but also the household conditions and farmers' strategies in relation to seed and other resource management and access to capital. For a household survey, as I asked a local teacher to find some students from a highs school nearby the village to assist me, I used questionnaires in order to collect some baseline data. The simple random sampling was used to select population in order to increase the reliability. In other words, 72% (56 out of 129) households were randomly selected. I then used Microsoft Excel in compiling the data sets for drawing the descriptive statistics and simple cross-tabs. It took a few weeks to conduct the ground survey, but it took months to compile all of the data (both quantitative and qualitative) by myself because of difficulties in interpreting the data. Also, I tried to find a chance when possible to go to the village to other places outside the village to interview key informants, including the state-agronomists, breeders, state-extension officials, NGOs, farmer leaders. Furthermore, as a social science student who never studied plant breeding science, I had visited a plant breeder of a transnational company, who now has become the owner of a local seed company in Nan Province, in order to consult with him about the seed business and the hybrid vegetable seed production. I also returned to see my family in the city of Nan.

For the *last stage* of this research, in late 2013 until early 2014, I brought all data back from Nan to Chiang Mai Province for concluding all sorts of data, such as the compiled statistic data from both my own survey and others sources, the quoted messages taken from conversations and interviews, documentaries, photographs and my field notes written in different periods of time along with my fieldwork. These data are useful as the empirical evidence to be compared to other studies. I also

attended international and national conferences in order to present my research papers. By this, I got useful comments which helped me adjust my research and gear my analysis. All these can help me in situating and evaluating neoliberal development and the politico-ecological possibilities of small scale farmers to contingently engage with state powers, market forces and socio-environmental movements.

- **Research positionality**

Although I relied on data collecting techniques through an ethnographic approach in my fieldwork, this is not to say that the pre-fieldwork as well as post-fieldwork periods are not important (Watson 1999). The former helps to prepare concepts and knowledge necessary for understanding the people and culture encountered in the fields, while the latter, when a load of data combined with ideas and put into a text, is significant for reflecting my interpretation, with my limited experience and understanding. I may say further that the pre-, during and post-fieldwork also reflect my positionality in this study.

For research positionality, learning to use many languages is important for creating the communicative space between "Others" and "me". In the "field", I use my Northern dialect to communicate with local Lue farmers and NGOs who work in the area; I use Central Thai to communicate with Thai officials, NGOs who work in other provinces and staff of seed companies, and English for INGOs in the international meetings.

Actually, I already knew TK Village and some farmers prior to starting my PhD research. In 2005-2006, I was a staff of the NGO organization Joko Learning Center in Nan Province. This can be both opportunity and constraint for me in conducting the research as I found that some farmers were reluctant to talk about how the FFS project failed among conflicts within the farmer groups and to criticize the NGOs in seed conservation and organic farming agenda. This situation is uncomfortable for me, of course, as some farmers still see me as a friend of NGO staff. I then take this issue more seriously by re-positioning my multiple identities: I introduced myself to the government officials and seed companies' staff as a PhD

student from Chiang Mai University; I told some farmers that my father's family is from Pua District, which is nearby the study village in Tha Wang Pha District, and my grand-father used to be a teacher for some elder farmers in the area.

Furthermore, I tried to re-arrange other relations, like distancing from NGO staff as well as governmental officials. In other words, as I tried to participate in many events held both inside and outside the village, I had to find the middle ground for establishing the comfortable research environment between the key informants and me. For example, I tried to travel to the village by my motorcycle and car when the NGO staff offered me a seat in their car. I told the farmers that I had quit from the NGO organization in 2006, although I sometimes accompanied my NGO fellows to several places and participated in many meetings domestically and abroad. Sometimes, I became a "volunteer" of Joko Learning Center when I was asked to be a translator for farmer leaders attending the regional and international conferences. These are my positionality that I needed to re-arrange to establish a comfortable distance to my NGO friends while I agreed with them to support the empowerment of small-scale farmers and agrobiodiversity conservation among heterogeneous actors.

There are not only humans but also things that I had to deal with when conducting fieldwork. While trying to handle things for creating the proper research conditions, some uncertainties are unable to be controlled. During a trip, as I remember, while riding my motorcycle back to the city of Nan on an evening in December 2011, I severely crashed with another motorcycle with two teenagers, so I had to stop my fieldwork for five months for rehabilitation.

Thus, all said, to concern on the postmodern fieldwork, this research cannot be separable from writing of "the truth" which reflects the power relations among actors, including I, myself, who produced a narrative, being part of the power relations for claiming to speak for "the truths" about something that took place in the "field" (Fox 2006: 355). The point to further consider here is that, instead of finding "the truth", it can be better to investigate how things, identities, stories and 'Nature' are (re)made into being in the networks which I, with multiple identities, am also connected to produce the assemblage of neoliberalized nature.

1.7 The organization of the dissertation

There are 7 chapters in this dissertation. **Chapter 1** provides the introduction, research question, methodology and the overview of this dissertation. **Chapter 2** helps in contextualizing this research as it explains about the emergence of the seed regime and the restructuring of agrobiodiversity conservation of Thailand under the context of the global seed market integration. The chapter also shows some brief background information about the global seed companies being observed in this research. In order to better understand the context of what happened when a small village was integrated into the global seed market**, Chapter 3** not only shows the cooptation of GOs and NGOs in the seed-related production and conservation but also describes a village, as a case study, in Tha Wang Pha District, Nan Province, in relation to the demographic, socio-economic, and environmental transitions.

The following chapters, although they might be seen as phenomenological reductionism, are named by using the verb in order to conceptualize the main processes in each different chapter for seeing the specific human and nature relations. **Chapter 4** *Producing the Commodified Nature: the Hybrid Seed Production and the Competition among the Seed Companies* illustrates the intensive hybrid vegetable seed production and the expansion of the global seed industry being promoted as rural economic development by state and seed firms. As it can be described, contract farming as the rural accumulation, the chapter questions the production and labor processes under the government of seed companies emerging in the interaction of extension staffs and contracting farmers. This helps in reflecting the growth of the hybrid seed industry and the uneven economic development in the context of global seed market integration. The example to support my argument is the poor and landless farmers being contingently excluded from this economic sector while the middle-income and well-being households seems to have more choices based on their livelihood strategies.

Chapter 5 *Conserving the Organic Nature: the Assemblage of Agrobiodiversity Conservation and Farmers' Varieties in the Socio-Environmental Movements* investigates the socio-ecological movement so as to see the cultural

politics of agrobiodiversity conservation. This chapter questions about the assemblage of "Nature" and "peasantry" emerged in the socio-environmental movements. The movements were seen that they were calling for "alternatives", "sustainable" or even "democratized" development for small-scale farmers in the neoliberal era. The examples here are the making of "desirable peasantry" and the care of agrobiodiversity, disclosing the emergence of the discursive materials - peasant seeds and farmer varieties (FVs). These socio-environmental subjects are in contrast to the everyday life of many farmers engaging with contract farming for hybrid seed production and commercial crop production with high inputs. This means that the "Nature" and "peasantry" cannot be seen as an essence but the assemblage of the cultural politics of agrobiodiversity conservation.

Chapter 6 *Practicing Seed Selection and Agrobiodiversity Utilization in Everyday Life of Small-scale Farmers* shows the everyday practices of small-scale farmers reshaping the seed-related agrobiodiversity utilization beyond seed commodification and conservation in relation to changes in the livelihood landscape in many aspects. The livelihood strategies are broken down in order to show that farmers are not passively engaging with commodification and conservation of agrobiodiversity. In the everyday life practices, it is clear that farmers still have some room to co-produce the agrobiodiversities under the global seed market integration.

Chapter 7 is the conclusion part of the dissertation. The findings, the theoretical debate, and the policy suggestions are discussed, respectively. This dissertation proposes that there is the articulation of policies and ideologies re-shaping the agrobiodiversity management of small-scale farmers in the neoliberal era.