



CHAPTER I

INTRODUCTION

The natural environment and its utilisation are the very material foundation of the economy and society of Thailand

Chatthip Nartsupha, Ayutthaya Historical Study Centre, 20 March 1994

We have to develop some means to get at the balance between the environment and development.

Charit Tingsabadh, Symposium on Environment on Culture, 1993

Thailand has changed from a country in which natural resources were abundant to one in which resources are finite, threatened and fragile.

Pasuk Phongpaichit, Good Governance & Environmental Protection Seminar, 2000

1.1 Setting the context

The Mekong region is at an important juncture. The emerging dynamics of regional integration are in the process of being defined. Trade has become the currency of cooperation. Thailand is a key player in the trade and economic growth currently underway in the region. Since 1992, the Asian Development Bank's regional economic cooperation strategy for economic corridors in the Mekong region has served to increase "connectivity and competitiveness." It has increased economic activity, cross border transportation links and stimulated trade. Cooperation on agriculture, energy and environment has also increased. This unprecedented level of coordination in combination with the need to address climate change, sets the stage for implementing a common vision for sustainable development in the Mekong.

The performance of these economic corridors will depend on how the natural resource wealth of the region is managed as economic integration and trade accelerates. Regional trade in the Mekong has been rising annually at a rate of nearly 20% between 1994 and 2007. Trade in agricultural products is significant and rising. The agriculture sector accounts for 50 to 70% of employment in Cambodia, Lao People's Democratic Republic (PDR), Myanmar and Vietnam (known as the CLMV countries). In Thailand, manufactured exports overtook agricultural exports in 1985; they now represent four-fifths of exports. Nevertheless, as in neighbouring Mekong countries, the agricultural sector still employs over 40% of the Thai labour force (World Bank 2009).

Guiding the Mekong towards sustainable development presents numerous challenges and opportunities, especially considering the recent shift to cultivating land for agroenergy crops.

A vigorous international debate brewing over the socio-economic and environmental implications of bioenergy illustrates the difficulties in defining policy and practice at the national level. Mekong countries have recognised that economic competitiveness goes hand-in-hand with sustainable environmental management, individually and collectively. According to a joint ministerial statement of the Greater Mekong Subregion in 2008, the challenge is “to mainstream environmental considerations in land and resource use planning and extraction, production and processing” (GMS 2008). The intention of this research is to contribute to this debate concerning bioenergy.

1.2 Rationale for the study

Although there is a need to promote the use of alternative energy sources in order to reduce dependency on imported oil, ensure greater energy security, revitalise rural economies and address climate change, the cost of producing bioenergy may outweigh the benefits from a socio-economic, and, even, environmental perspective.

A number of reasons underlie this research. First, regional trade is increasing between Thailand and its Mekong neighbours – Cambodia, China (Yunnan and Guangxi Zhuang provinces), Lao PDR, Myanmar and Vietnam. This will change the structure and rate of growth in the region, which in turn, will have social and environmental effects. These effects will not be inconsequential given the potential resource intensity and scale of growth. In this context, there are rapidly increasing demands for agricultural crops (e.g., cassava and sugarcane for ethanol, and palm oil and *Jatropha* for biodiesel) to be used for fuel as a substitute for imported oil, on which the region is dependent.

Another reason for this research is that trade in bioenergy offers significant regional opportunities for Thailand and other countries in the Mekong region. The challenge is to develop this sector in an ecologically sustainable way, particularly given the urgent need to address rising environmental concerns connected to biodiversity, land and water. Investigating the role of bioenergy is a relatively new area of research. The review of the literature at the end of this chapter reveals a gap in the understanding of the potential

challenges and opportunities for trade in bioenergy. The aim is thus to examine more closely the relationship between Thailand's trade in bioenergy in the Mekong region and sustainable development.

Third, trade-led growth in Thailand has occurred at the expense of the environment. Rapid economic growth has been accompanied by accelerating environmental degradation. Thailand needs to undertake its own bioenergy research to assess the implications for sustainable development considering its national context. Current evidence from OECD countries indicates that providing incentives for bioenergy or mandating its blending into existing transportation fuels may be counterproductive. Although the increased use of biofuels in the energy scenario in Thailand may address immediate needs, it could increase food prices and encourage farmers to cultivate environmentally unsustainable areas. If current practices prevail, Thailand is likely to use an unsustainable model of development in its emerging trade relations in the Mekong region. This is why there is a continuous need for governments to harness market forces to ensure socio-ecological sustainability in bioenergy development in Thailand and the Mekong region.

Added to the above is the effect of rising greenhouse gas emissions on climate. Climate change is recognised as a significant global environmental challenge with large-scale implications, particularly for developing countries. Climate change will thus serve to compound existing environmental problems (e.g. air and water pollution, land degradation, deforestation and biodiversity loss). Addressing climate change theoretically requires a transformation towards a low-carbon economy. This involves a switch to alternative energy sources.

The findings of this research are intended to illuminate alternative policy options for Thailand to integrate trade and environment policies in the context of bioenergy development. The study also aims to evaluate the flexibility of Thailand's governance structures at the local, national and regional levels to implement sustainable bioenergy development.

This research encompasses theory, policy and practice within a framework of sustainable development, which is at the heart of the discourse on trade and environment. In considering the links between trade and environment, it is essential to place this relationship in the context of development. In theory, trade can increase economic growth and may contribute to development. However, as most studies on this topic put forward, these linkages

are neither automatic nor guaranteed. Whether trade brings net benefits varies from case to case depending on the context and institutional governance structures in place. This is why practice needs to inform the theory.

This research examines the policy context at the national, regional and multilateral levels. According to the current investigation of modernisation theory, there are a variety of paths to pursue development and define modernity – *multiple modernities*, depending on the particular circumstances in a given country. An enabling policy context for development is an essential element for a country to define its own path towards modernisation. To this end, this research illuminates the pieces of the policy-making puzzle that allow for integration of trade and environment policies in bioenergy in Thailand. It examines policies from the 1990s to 2010. The contribution of this research is to allow practice to inform theory in a way that is reflexive and responsive in each country within the context of globalisation. It contributes to extending the body of knowledge on the links between trade, environment and sustainable development by examining bioenergy in Thailand and the Mekong region.

1.3 Research objectives

The objectives of this research are to assess the implications of Thailand's trade in bioenergy in the Mekong region on sustainable development, specifically:

- 1.C To examine Thailand's status and policies concerning trade, environment and sustainable development through a case study of bioenergy.
- 2.C To determine the implications of these bioenergy policies on sustainable development in Thailand and the Mekong region.
- 3.C To identify Thailand's policy options to integrate trade and environment policies at the local, national and regional levels, in order to achieve sustainable bioenergy development.

1.4 Hypothesis

- 1.C The prospects for Thailand's trade in bioenergy in the Mekong region are favourable; trade is likely to increase.
- 2.C Based on the current policy framework, increased trade in bioenergy is likely to have negative implications for sustainable development in Thailand and the Mekong region.

3.C An alternative set of policy options may be to promote sustainable development for all parties in the Mekong region to address the negative consequences of the expansion of bioenergy, whilst capturing the potential benefits of alternative energy sources.

1.5 Significance, scope and limitations of the research

The significance of this research is the following:

- 1.C To achieve a better understanding of the issues concerning Thailand's prospects for trade in bioenergy in the Mekong region.
- 2.C To develop a model of integrative and interdisciplinary study of sustainable development based on the concept of multiple modernities through a study of Thailand's trade in bioenergy in the Mekong region.
- 3.C To provide research which policymakers can use to enable bioenergy policies to be put in place in a sustainable manner, recognising the socio-economic and environmental challenges and opportunities.

The field work, informant interviews, survey questionnaire and focus group discussions underlying the empirical analysis for this research were undertaken between October 2008 and December 2009 in Thailand and the Mekong region. Comparative interviews were carried out in Brazil from September 2009 to March 2010.

There are three limitations of this research. *First*, this research is limited by the fact that Thailand's bioenergy policies are in the processes of being developed. They are also subject to continued fluctuations in the price of oil, which provides the key economic incentive to switch to alternative energy sources, such as biofuels. Additionally, in the context of the current global economic crisis, the price of oil is expected to continue to fluctuate, but to remain lower than the price of alternative energy sources in the medium term.

Second, the political situation in Thailand continues to be precarious. As a direct result, there may be modifications to the current framework in which bioenergy is being developed. The fifteen-year Alternative Energy Development Plan that was finalised in March 2009 may be revised or, even, abandoned by a new government.

Third, the long, porous, and, in parts, remote borders of the Mekong economies make the task of monitoring and estimating crossborder trade and investment flows in agroenergy crops difficult. Despite ongoing efforts at the regional level to enhance customs procedures

and check points, informal trade that goes unrecorded is still considered to account for a significant share of crossborder trade. Also contributing to the informal trade are poor transportation links, high import duties and other tariff restrictions, as well as a lack of predictable and transparent customs procedures. A recent study based on field surveys undertaken in border provinces in Cambodia, Lao PDR, Vietnam and Thailand estimated that informal trade could account for between 20 and 30% of total regional trade (DAN 2005). Informal trade thrives among small traders in the remoter border areas. This informal exchange between Lao PDR, Cambodia and Thailand is facilitated by the Mekong river, across which traders have moved their goods for generations.

1.6 Literature review

There is fish in the water and rice in the fields.

Famous adage on the 13th century stele of King Ramkhamhaeng

Trade has been a constant feature of Thailand's economic landscape. Since the Bowring Treaty of 1855, trade has been instrumental in changing Thai society and economy. Trade has been a key factor in enabling modernisation and infrastructure development to flourish throughout the country (Reid 1998, 1993; Ingram 1955, 1971). The quote above from King Ramkhamhaeng invoked the bounty of nature at the time of the formation of the new state of Siam in the 13th century. Pasuk (2000) argues that this bounty has been fundamentally altered, transforming Thailand from "a country in which natural resources were abundant to one in which resources are finite, threatened and fragile."

Since the 1970s, trade has acted to completely transform the Thai economy from a predominantly agricultural base into the manufacturing and services sectors. The export-led industrial boom, fuelled by accelerated influxes of foreign direct investment in the mid-1980s, led to a steady rise in manufactured exports to developed countries. There is ample literature that analyses the phenomenal economic growth in Thailand since the launch of the *First National Economic Development Plan* in 1961 through to the financial crisis in 1997 and beyond (Pasuk & Baker 1998, 2002, 2008; Hewison 2001; McCargo & Ukrist 2005).

Over four decades of sustained economic development has been facilitated by government policies to stimulate export-led growth initially in agriculture and then manufacturing. Today, approximately two-thirds of Thailand's gross domestic product (GDP)

depends on exports (World Bank 2009). Assessment of Thailand's trade strategies in general is substantial (Chirathivat & Mallikamas 2004; WTO 2007; Chirathivat & Sabhasri 2008; Sally 2007, 2008).

There is also an extensive body of knowledge on the development process in Thailand and its consequent socio-economic impacts (Narongchai 1975; Seksan 1989; Pasuk & Baker 1998; Dechalert 1999; GSEI 2007). A significant portion of this literature is dedicated to an analysis of the role and transformation of the agricultural sector (Chatthip 1984/1999, 1991; Rigg & Sakunee 2001; Molle & Thippawal 2003) and the socio-economic implications for Thailand's development (Seri 1988; Hirsch 1990, 1995; Chantana 1993; War 1993; Ammar 1999).

Since the mid-1990s, culture has increasingly entered the development dialogue as a way to better understand differing interpretations of contemporary change (Hayami 2001). Jonathan Rigg (2008) brings together three volumes of articles on the development experience in Southeast Asia, including seminal earlier studies of peasant societies and rural change from the 1960s and 1970s that have shaped the debate on the de-agrarianisation of the region's countryside and "the fading away of the peasant world." Caouette and Turner (2009) examine the rural resistance that has resulted from the commercialisation of agriculture in Southeast Asia, noting that the benefits of increasing agricultural productivity have gone hand-in-hand with "upheavals in customary labour patterns and culturally accepted agricultural practices."

There is ample analysis encompassing various aspects of the socio-ecological consequences of development for Thailand (Hirsch 1993, 1997; Tanabe 1994; Rigg 1995; Charit & Suthawan 1996; Sitanon 1996; Apichai 1997, 1998; Hirsch & Warren 1998; Mingsarn 2005). This assessment is also being undertaken for other Mekong region countries, such as Lao PDR (Fullbrook 2008; Rigg 2008) and the Mekong region as a whole (Hirsch 1996; Mingsarn & Dore 2003; ADB & UNEP 2007; IWMI 2009).

There is, however, a knowledge gap in the trade and environment-related aspects of the emerging bioenergy sector in Thailand and the Mekong region. Investigating Thailand's prospects and policy options for trade in bioenergy in the Mekong region, thus, serves as a valuable case study to illustrate the relationship between trade, environment, sustainable development and agroenergy, which have become increasingly linked in a globalising region.

Following a dramatic increase in food prices from 2005 to 2008 combined with record high fuel prices, there has been a vigorous and contentious debate in policy circles at the international level on the contribution of the rapid rise in biofuels to the unfolding global food-fuel crisis. The influence of these higher prices on world food security and the challenges of climate change and bioenergy were discussed at the FAO-convened High Level Conference on World Food Security in June 2008 (FAO 2008). Trade in biofuels only represents 1% of international trade. However, between 2000 and 2007, the production of ethanol tripled, mainly in the US and Brazil. The relative expansion of biodiesel production over the same period was even more pronounced, increasing from under 1 billion litres to nearly 11 billion litres per annum. The growing demand for biofuels is being driven by rising oil prices and policies to shift to renewable energy sources to increase energy security and reduce greenhouse gas emissions. As a result, biofuels production is set to increase by nearly 90% over the next 10 years to reach 192 billion liters by 2018 (FAO 2008).

To stimulate trade-led economic growth, Thailand is heavily dependent on imports of petroleum, which account for approximately 10% of GDP annually. Thailand is a small player in the global biofuels landscape, with 400 million litres of ethanol produced in 2008, representing 1% of the global total (Nipon 2008). Production is predominantly for domestic consumption to meet the domestic blending targets introduced by the government since 2003. Over the past five years, Thailand has commercialised biofuels in the national energy matrix for transportation through these blending mandates.

Biofuel advocates point to the complementary benefits from increased efficiency in the agricultural production process as a whole (Hazel & Pachauri 2006; UNF 2008). Biofuels have received support notably in Brazil, the European Union and the United States on the assumption of their social and environmental benefits. Brazil's success in developing sugarcane ethanol for transport fuel is considered exemplary by developing countries seeking to shift their energy matrix towards renewable energy sources and greater sustainability. Brazil's national commitment to improve labour and environmental conditions in the sugarcane sector illustrates a path forward for sustainable agroenergy development (Brazil 2007).

Critics, however, question the socio-ecological contribution of biofuels. Recent studies of a broad range of countries suggest that there is scant evidence to support a strong social or

environmental rationale for promoting biofuels, particularly in developed countries (Victor 2010; GSI 2008). In fact, most studies reveals that in the EU and US providing incentives and subsidising biofuels may be both economically and environmentally counterproductive (Dornbusch & Steenblik 2007; GSI 2008; Giampietro and Mayumi 2009; Victor 2010). Arguments against the efficiency of biofuels consider that the price of oil remains too low for biofuels to be able to compete from an economic perspective. Second, it may take more energy to produce and process biofuels than the energy they make. This may result in a negative net energy balance for certain biofuels in specific countries (Dornbusch & Steenblik 2007; Howard & Bringezu 2009).

The purpose of this research is to build on the body of knowledge to contribute to an assessment of Thailand's development of bioenergy and potential for agroenergy trade and investment in the Mekong region. There is emerging, but as yet insufficient analysis concerning Thailand's strategies to development renewable energy sources, such as bioenergy (Greachen 2005; Gonsalvez 2006; UNESCAP 2003, 2008; ADB 2009; SNV & WWF 2009). Moreover, there is a need to assess the implications on sustainable development in Thailand as well as the Mekong region.

The unprecedented level of integration currently underway in the Mekong region will transform the economies as well as the environment of its six member countries. The key regional intergovernmental environmental body – the Greater Mekong Subregion (GMS) Working Group on Environment – has recognised the need to address potential environmental stresses from economic development, specifically in the six economic corridors being constructed to crisscross the region over the next few decades (GMS 2002).

In this respect, *good governance* and *effective enforcement* are identified in the literature as key challenges to ensure socio-environmental issues are properly addressed in pace with regional integration (Hirsch & Warren 1998; Öjendal, Mathur & Sithirith 2002; Dore 2003; Myers & Wharton 2005; Tran & Miller 2007; ADB 2008; Kalina 2009).

In a recent compilation of academic research on the Mekong region, Charnvit and Baker (2008) find few articles or books on trade and investment in general, aside from papers by the Asian Development Bank. There are few specifically related to trade and environment or energy related issues. This situation is changing rapidly. While there has been increasing attention to management of shared *water resources* along the Mekong River, as well as other

sectoral environmental topics (e.g., biodiversity, fisheries, forestry and water management), the discussion is increasingly focusing on the linkages between trade and environment (Shaw 2007), including related to agriculture, energy and climate change (IWMI 2009, 2010).

In terms of operationalising sustainable development, for example, Olli Varis (2008) asks whether the priority of water resources policy in the Lower Mekong River Basin should be environmental conservation, economic growth, or reduction of poverty? These “three interlinked facets of development very easily collide in conditions such as those of the Mekong Basin.” Varis examines this relationship in Cambodia and Vietnam and finds economic growth to be an insufficient condition for poverty reduction *if* environmental sustainability is left out of the equation.

The main question that emerges is how to more effectively integrate environmental considerations with development needs? One way to do so is through environmental and strategic impact assessments. Dore (2003) notes that “there is increasing attention being given to the processes of environment and development governance” in the Mekong; however, “as of 2003, formal, transboundary environmental assessment in the Mekong region was still practically non-existent.” Moreover, Dore argues that “much higher quality environmental assessment is needed which takes account of monetary and non-monetary costs, benefits and risks of the options – and specifically who is likely to win or lose.”

This situation is changing rapidly, notably due to work by non-governmental researchers and institutes. The International Water Management Institute (Johnston et al 2009) prepared a scoping study to explore trends and drivers of agricultural production in the Mekong from 1990 to 2050. This research emphasises the socio-environment costs attributable, in large measure, to increased agricultural production and practices. These include displacement of people, erosion of livelihoods, land degradation, high rates of deforestation, soil erosion, declining soil quality and changes in water quantity and quality. The opportunities for the agricultural sector to contribute to sustainable development in the context of food security and climate change are significant. What is required, the report argues, is “a new, longer-term, regionally-oriented planning perspective stemming from international awareness of climate change; and the “breathing space” of 20-30 years that projections suggest may be available to the Mekong region before radical changes in climate occur.”

The Stockholm Environment Institute has prepared a series of papers on various aspects of sustainability in the Mekong through its Sustainable Mekong Research Network (Sumernet) (Tran & Miller 2007; Linkham, Bansa & Noble 2008; Souklaty & Linkham 2009; Muanpong & Winston 2009). These reports provide a critical complement to the work underway by intergovernmental organisation. As a leader in participatory and inclusive decision making, the Mekong River Commission (MRC) has instituted a “living assessment” of the socio-ecological implications of water management strategies (MRC 2010). The Asian Development Bank (ADB) has also undertaken sustainability impact assessments of its Economic Corridors Initiative (ADB 2005). The ADB published the first *Strategic Environment Framework* for the Greater Mekong Subregion, as well as national performance assessments for each of the six member countries (ADB 2008). ESCAP (2009), UNEP (2009) and UNDP (2009) are also actively engaged in assessing the scope for mitigation and adaptation in the agricultural sector in the context of climate change.

The ADB (2005) indicates some trends to illustrate the dependence of productivity in the following sectors on “linked natural systems” in the Mekong region, including a 50% decline in *forests*; increasing effort with decreasing catch in *fisheries*; and increasing *agricultural* production costs due to soil loss, chemical inputs and fluctuating water supply (Box 1). The forecast for environmental sustainability in the Mekong region, thus, is not

Box 1: Economic and biodiversity corridors in the Mekong region

The economy as well as the environment of the Mekong region is being transformed in conjunction with the development of economic corridors. The following trends illustrate the dependence of productivity in the following sectors on “linked natural systems.”

- **Forestry** – increasing forest product demand with increasing cost of production and 50% decline in resource base.
- **Fisheries** – increasing effort but decreasing catch per unit effort (due to the decline of stocks in coastal and freshwater systems).
- **Hydropower** – increasing demand and investment in electricity supply, and increasing real cost per unit of energy (due to a failure to fully account for watershed maintenance and other environmental services).
- **Agriculture** – increasing production costs (due to soil loss, chemical inputs, and fluctuation in water supply).
- **Industry** – increasing cost of water supply and treatment (due to reduced water quality and access).
- **Nature-based tourism** – rapidly increasing demand and investment, leading to diminishing quality of “products.”

Source: ADB, 2005

encouraging. The ABD estimates that the natural capital index for Thailand in 2005 was relatively poor, with Thailand scoring 37.2% compared with 65.7% for Lao PDR, 66.9% for Yunnan and a sub-regional score of 50% (ADB 2007).

Recognising the need to take into account social progress and sustainable development in addition to economic growth, the Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS) between Cambodia, Lao PDR, Myanmar, Thailand and Vietnam has initiated over 40 development projects since 2003 to enhance trade and investment, including in agro-industry and energy.

Despite increasing attention to sustainable resource management and recognition of the concept of *Sufficiency Economy* following the 1997 crisis, Thailand's environment has been significantly degraded by over forty years of trade-led growth. This has occurred despite Thailand's comprehensive institutional and regulatory framework that has been drafted to foster sustainable resource management and environmental protection. Environmental problems are not simply the outcome of economic growth, Mingsarn and Pornpen (2000) assert, "they are due to a lack of proper institutional framework and effective management." However, as is clearly evident in the case of Thailand, "mere reliance on laws, and command and control approaches will not enable the achievement of environmental quality management objectives" (Mingsarn & Pornpen 2000).

Consequently, in the context of Thailand's expanding ties within the Mekong region, a review of the literature reveals that, as economic growth in the Mekong region accelerates over the course of the next decade, trade liberalisation is likely to place a growing pressure on the natural resource base and environmental quality. As a result, there is a strong case to be made for better environmental management and policy reform. The literature reflects a growing concern over the capacity of the region to move towards a more meaningful embrace of environmental sustainability (Rajesh 2005; UNDP 2007; Forsyth & Walker 2008; UNDP 2009). Frequently, however, assessment of potential damages has occurred too late to avoid irreversible environmental consequences. This is the point emphasised by Somrudee Nicro (2008), a leading environmentalist at the Thailand Environment Institute, in her recent reflections on environmental security in Thailand. Avoiding environmental degradation is particularly important in a region where the majority of the population relies on agriculture

and the natural environment for survival (e.g., rivers, forests, biodiversity and land) (Mingsarn & Dore 2003; Surichai 2007; Lebel 2007; Tran & Miller 2007).

There is a proliferation of articles in the international academic and policy community dealing with current theories on how the development debate has eclipsed the neo-liberal economic orthodoxy of the so-called *Washington Consensus* (Williamson 2002, 2008; Rodrik 2007; Stiglitz 2007, 2008; Unger 2007). In the 1990s, the Washington Consensus recommended a standard one-size-fits-all model of economic reform, including market liberalisation, privatisation, and minimal government intervention in the functioning of the economy. According to this perspective, if a country could “get the prices right” for resources and environmental considerations, then in theory the economy would fall into place sustainably. However, “getting the prices right” or “internalising environmental costs” has been difficult to achieve in practice.

As outlined in various articles, the emerging elements of the *Post-Washington Consensus* attempt to overcome the limitations of the neo-liberal policy agenda (Önis & Senses 2003; Stiglitz 2008; Serra & Stiglitz 2008). A key element is the need for active state intervention to correct for market failures, particularly concerning the socio-ecological costs of economic growth that are likely to undermine prosperity (Speth 2007; Halle 2008).

A wealth of literature recognises that it is difficult to “internalise the costs” of environmental damage or fully reflect the value of environmental goods and services in the economic equation without the appropriate incentives in place to *guide* market forces. As emphasised in reports by the World Bank (2008), UNDP (2006, 2009) and other key regional players, government intervention is necessary for trade and environment policies to work together to achieve sustainable development.

The theoretical framework for the relationship between trade, environment and sustainable development, thus, is evolving. Development has become more nuanced and context-driven. The literature makes abundantly clear that trade and environmental policies have *not* gone hand-in-hand with economic growth; policy coordination to enable sustainable development has been insufficient. This has meant that economic growth has been achieved at the expense of the environment. In this respect, Thailand has followed a “grow now, clean up later” approach to environmental concerns raised in the course of trade-led economic growth (Mingsarn 2000). However, there is a growing realisation that business as usual scenarios for

development based on past practice will be insufficient to meet the environmental challenges posed by the current neo-liberal growth model.

This research will develop current theories related to *governance*, *globalisation* and *multiple modernities* as a way forward for ecologically sustainable trade relations in the 21st century. The purpose is to contribute to allowing practice to inform theory in a way that is reflexive and responsive to the context of each country, yet within the overall framework of globalisation. The challenge is to craft trade and environment policies that will navigate the economy towards sustainable development. More specifically, in light of the urgent need to address climate change, this is a critical moment for Thailand and its Mekong neighbours to assess the costs and benefits of bioenergy in a comprehensive manner.

In summary, there are several key elements emerging from the literature. *First*, Thailand has signalled a vigorous role for renewable energy, including bioenergy; this holds opportunities for agricultural trade, rural development and poverty reduction, as well as for mitigating and adapting to climate change. However, there is a growing literature pointing to the lack of economic viability of current biofuel targets in various countries, as well as the potential social costs (e.g. from rising food prices) and environmental risks (e.g. from loss of forests and biodiversity) (UNDP 2009).

The hypotheses developed in this thesis rest on the importance of *contextual diversity* in guiding a country along an appropriate development path; in this respect, innovative ways of viewing particular issues may have a constructive input to make to the way problems are perceived and resolved within a given context. Thailand would benefit from undertaking its own bioenergy research in consideration of its national context and regional potential to put in place sustainable development.

Second, managing regional integration in the Mekong requires consideration of the environmental challenges and opportunities from increased trade and investment flows. This is viewed to be particularly important in the energy sector, which serves as the basis for economic growth. It is also vital to assessing the economic and socio-ecological viability of agroenergy development in a region that is dependent on oil imports and struggling to bring its mainly rural agricultural population out of poverty.

Third, integrating environmental outcomes is an essential component of an evolving development paradigm that is capable of addressing poverty reduction and environmental sustainability. Given that agroenergy is at the core of development, an assessment of its implications for sustainable development is a timely endeavour. The lessons – many of which are still in the process of being understood – have wide relevance not only for countries in the Mekong region, but also for other developing countries tackling rural poverty, financial reforms and seeking to sustain the socio-ecological foundations for prosperity.

These lessons will enable countries in the Mekong region to craft what the UNDP Asia-Pacific *Human Development Report* (2006) refers to as a more “human face” to globalisation. Clearly, the role of trade in determining resource use in the Mekong region will expand as integration increases (Strutt & Lim 2005; Shaw 2007; 2010). In this respect, Thailand has a contribution to make towards a community-based sustainable resource management approach rooted in Thailand’s *Sufficiency Economy* concept (Seri & Hewison 1990; Ampol 1999; Apichai 2007; Calkins 2004).

Both theory and history teach us that limited environmental resources are likely to impose limits to economic growth and hamper development in the not too distant future. Until sustainability concerns are addressed, the evidence emerging on the use of bioenergy in other countries is cause for concern and continuous investigation. From this perspective, bioenergy may address immediate energy priorities in Thailand, but impact on the price and availability of food, as well as accelerate deforestation and land and water degradation in the Mekong region. This is the rationale underlying this research that argues for a regional approach to integrating small-scale farmers in sustainable agroenergy development.

1.7 Structure of the thesis

Following this introduction, **Chapter II** explores the conceptual and theoretical basis for this investigation. It examines the links between trade, environment and sustainable development since the United Nations Earth Summit in 1992. It analyses sustainable development from the perspective of the theories of reflexive modernisation and multiple modernities. **Chapter III** outlines the research methodology for this investigation of Thailand's prospects and policy options for bioenergy trade in the Mekong region.

Chapter IV provides an overview of Thailand's institutional, *policy framework for bioenergy* since the 1990s. In order to situate the prospects for bioenergy trade, this chapter charts the course of the expanding trade, investment and development ties in the Mekong region. Based on these policy trends, **Chapter V** assesses the *implications of Thailand's trade in bioenergy on sustainable development* through six bioenergy case narratives in Thailand and the Mekong region. This assessment is informed by a review of the literature, key informant interviews, focus group discussions, a survey questionnaire and field visits.

Chapter VI brings together theory, policy and practice as described in previous chapters to review Thailand's *policy options* to develop agroenergy. Based on the empirical work, this chapter outlines three policy options for bioenergy development. These options constitute Thailand's *policy space* – its policy flexibility – to implement bioenergy policies to achieve sustainable development. These options touch on various aspects of the debate, notably food and energy security and are also informed by evidence from Brazil.

Chapter VII reflects on the lessons emerging from the case narratives in the previous chapter. It puts forward findings from the empirical research. This concluding chapter weighs the practice in the field to assess whether there is evidence of an emerging paradigm shift towards sustainability in Thailand and the Mekong region. The research supports greater emphasis on deepening the regional foundation for agroenergy development by integrating small-scale farmers. This chapter puts forward recommendations to complement the policy options explored in the previous chapter and revises the theory based on the evidence of practice in the field.