

**Pre-Industrial Ecological Modernization in Agro-Food and Medicine:
Directing the Commodification of Heritage Culture in Cambodia**

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Hohe Landwirtschaftliche Fakultät
der

Rheinischen Friedrich-Wilhelms-Universität
zu Bonn

**Pre-Industrial Ecological Modernization in Agro-Food and Medicine:
Directing the Commodification of Heritage Culture in Cambodia**

Dissertation

zur

Erlangung des Grades
Doktor der Agrarwissenschaften
(Dr.agr.)

der

Hohen Landwirtschaftlichen Fakultät

der

Rheinischen Friedrich-Wilhelms-Universität
zu Bonn

vorgelegt am 2. Oktober 2012

von

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aus

Vancouver, Washington, USA

Gedruckt mit Unterstützung der Jack Kent Cooke Foundation, USA

Referent:	PD Peter Mollinga
Korreferent:	Prof. Dr. Mathias Becker
Tag der mündlichen Prüfung:	12. April 2013
Erscheinungsjahr:	2013

Abstract

The environmental movement, which picked up steam from the 1960s in many rich countries, is manifested in modern-day green politics, pollution regulation, nature protection, the re-emergence of renewable energy, and organic agriculture. Discursively, this was, and still is, a post-industrial movement that arose out of atavistic notions of ‘returning’ to the land and reversing toxic pollution and human alienation from nature. Since the mid-1990s, this discourse has penetrated into theory and practice for development in pre-industrial countries, presenting new and often contradictory lessons for modernization. In particular, the concept of ‘ecological modernization’, which was used starting in the early 1980s to describe technology-based efforts to clean up the pollution and reconcile industrial development with higher environmental expectations, is turned on its head when applied to developing countries, as the focus shifts from intervention to prevention. In developing countries, however, prevention does not strictly correspond with a transfer of Western protocols for, among others, environmental regulation, organic agricultural production and sustainable wild harvesting. Instead, prevention is more about proactive engagement with contemporary agricultural discourses and adaptation of technical advancements that provides a basis for novel and more culturally-embedded food and medicine systems.

This dissertation looks at the ‘capability’ (following Amartya Sen) of Cambodian society to reflexively interact with the pressures and opportunities presented by the commodification of food and medicine in light of ongoing discursive debates between industrial and alternative agriculture. It looks at assets available to Cambodians, including the ‘agro-social skill’ arising from rural experience that maintains a differentiated appreciation of agricultural products, as well as the role of historical narratives in creating a common basis of understanding agricultural modernization. Specifically, the dissertation explores the experience of three agricultural product types that are undergoing a contested commodification, namely organic/natural rice, sugar palm products, and traditional medicine. This work evaluates how these traditional product forms are socially reconstructed as heritage or ecological products throughout their commodification by analyzing the ways in which they are marketed, integrated into cultural politics and development, and perceived by rural and urban consumers. The primarily qualitative analysis of trends in production and consumption is also informed by economic analyses of farm productivity and marketing dynamics using a unique method of natural experimentation developed for this work.

In conclusion, this dissertation outlines the evolving successes and dilemmas of various initiatives for promoting ecological and heritage products and uncovers mechanisms by which societal ‘capability’ for proactively encountering agricultural modernization and commodification is either eroded or buttressed. The author suggests that the precondition for successful initiatives in the long-term is the preservation and reproduction of agro-social skill, which provides the reflexivity and ideological motivation to consciously direct commodification of heritage culture and, in broader terms, provide agency in managing the encroachment of capitalist relations.

Kurzfassung

Die Umweltbewegung gewinnt seit den 1960er Jahren zunehmend an Bedeutung, was sich in zahlreichen Industrienationen in moderner Grünenpolitik, Entwicklung im Naturschutz, und der Förderung biologischer Landwirtschaft niederschlägt. Diese post-industrielle Bewegung reflektiert eine Rückbesinnung auf die ursprüngliche Nähe zur Natur und den Versuch langwährende Umweltverschmutzung und Entfremdung von der Natur umzukehren. Das Konzept der ‚ökologischen Modernisierung‘ verkörpert seit Anfang der 1980er technologie-orientierte Bestrebungen, industrielle Entwicklung und höhere Umweltqualitätsansprüche in Einklang zu bringen. Dieses Konzept wird auf den Kopf gestellt, wenn man es im Entwicklungsländerkontext betrachtet. Hier verlagert sich das Augenmerk von Intervention hin zur Prävention, wobei westlich geprägte Maßnahmen für Belange wie Umweltschutz, biologische Landwirtschaft, und nachhaltige Wildsammlung nicht direkt transferierbar sind. Prävention bezieht sich hier viel mehr auf eine pro-aktive Einbeziehung regionalspezifischer Entwicklungen im Landwirtschaftssektor und auf eine Anpassung technologischer Neuerungen. Dies kann eine Basis für nachhaltigere Nahrungsmittel- und medizinische Systeme schaffen, die auch in den kulturellen Kontext eingebettet sind.

Angesichts der laufenden Debatten zwischen konventioneller und alternativer Landwirtschaft, untersucht diese Dissertation die ‚Befähigung‘ (nach Amartya Sen’s ‚capability‘ Ansatz) der kambodschanischen Gesellschaft, selbstreflektiert mit den Vor- und Nachteilen der Kommodifizierung von Nahrung und Medizin umzugehen. In diesem Zusammenhang beschäftigt sich die Arbeit insbesondere mit: (1) den Fähigkeiten, Kapitalien und Präferenzen der kambodschanischen Bevölkerung und der damit eng verbundenen ländlichen Prägung gesellschaftlicher Strukturen, und (2) der Rolle historischer Narrative in der Erschaffung eines gemeinschaftlichen Verständnisses von Modernisierung in der Landwirtschaft. Zu den bedeutendsten Kapitalienformen gehören ‚agrar-soziale Fähigkeiten‘ (agro-social skills), die auf Grund von Erfahrung im ländlichen Raum entstehen und unter anderem die differenzierte Wertschätzung landwirtschaftlicher Produkte aufrechterhalten. Untersucht werden drei Erzeugnisse: Bio-Reis, Zuckerpalmprodukte und traditionelle Medizin. Eine genaue Betrachtung von Vermarktung, kultureller und entwicklungsorientierter Produktpassung sowie gesellschaftlicher Wahrnehmung traditioneller Produkte zeigt, wie diese Erzeugnisse als Kulturerbe und ökologische Handelsprodukte sozial rekonstruiert werden. Die vorwiegend qualitative Analyse von Produktion und Konsum wird durch ökonomische Analysen hinsichtlich landwirtschaftlicher Produktivität und Vermarktung, mithilfe eines neu entwickelten experimentellen Verfahrens, ergänzt.

Schließlich werden die Erfolge und Dilemmata aktueller Initiativen zur Förderung ökologischer und kulturell bedeutsamer Produkte dargestellt und es werden Mechanismen identifiziert, welche soziale ‚Befähigung‘ im Sinne selbstreflektierter proaktiver landwirtschaftlicher Modernisierung und Kommerzialisierung untergraben bzw. stärken können. Der Autor sieht die Reproduktion von agrar-sozialen Fähigkeiten als eine der entscheidendsten Voraussetzung für eine erfolgreiche ökologische Modernisierung im Entwicklungsländerkontext an. Sie befähigt die Gesellschaft dazu, sich kritisch mit den Auswirkungen von Industrialisierung auseinander zu setzen und bietet neue kreative Lösungen für eine aktive Bewahrung von Kulturerbe und biologischen Vielfalt.

Acknowledgments

This dissertation was made possible by the care, support and critical feedback of many people in Cambodia, England and Germany from 2007 until 2012. I am most indebted to my advisor, Peter Mollinga, for giving me independence, and to my long-time field assistant, Piseth Som, who was my best informant and great friend. Without him, I would still be wandering around the rice paddies of Takeo province.

In Cambodia, I was cared for with the utmost generosity by the staff of the Cambodian Center for Study and Development in Agriculture (CEDAC) and the National Center for Traditional Medicine (NCTM). At CEDAC, particular thanks go to Vuthy Bao, Seng Suon, Koma Yang Saing, Kimthan Yi, Thy Or, Seng Horn Lang, Sokundarun Lim and the staff of the CEDAC Enterprise rice warehouse. Especial note of thanks to Koma and Seng for reviewing my work and finding those errors that one else could. At the NCTM, I enjoyed the hospitality, critical feedback, and welcome of his Excellency Punley Hieng, Dr. Siwatha Pol, and Dr. Sunna Pen. For putting up with my odd working hours in Phnom Penh, I thank the staff of the Center for Khmer Studies, especially Kethya Kheng and warmest housekeeper I know. For always nursing me back into Cambodian life and being the warmest friends, my heart goes to Sary Seng.

For hosting me graciously in Takeo province, my thanks go to Sister Sokha, Mr. Leak, Uncle Mom, and Aunt Pani. My appreciation goes also to the numerous CEDAC field staff of Zone II for putting up with my constant presence and onerous questioning. For hosting me in the sugar palm orchards of Kandal province and always providing sharp feedback, dear thanks to Reasay Pok Leak of Khmer Natural Enterprises. For welcoming me to Ratanakiri and giving me one of the most adventurous and informative experiences in Cambodia, my gratitude goes to Vincent Calzaroni and the staff of Médecine de la Nature. For playing along with my games, hosting me on Mount Kulen, and always staying honest, dear thanks you to my merchant partners, especially Grandfather Hem, Chin Vanny, and Chan Nieng.

My gratitude also goes out to Julie Taylor, Adeline Seah, and Maria Schwab as well as my family in America, who have heroically edited my messes. And to the staff and colleagues back at the Center for Development Research (ZEF), who never let me get down about my work. Particular thanks go to Rosemarie Zabel and Günther Manske, who could answer almost any question I had.

Last but not least, my heartfelt appreciation goes to the Jack Kent Cooke Foundation for supporting me so comfortably and caringly through these past five years.

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List of Abbreviations

AusAID	Australian Agency for International Development
ANT	Actor-Network Theory
AOC	Appellation d'Origine Contrôlée
ASEAN	Association of Southeast Asian Nations
CAM	Complementary and Alternative Medicine
CARDI	Cambodian Agricultural and Research Development Institute
CaTMO	Cambodian Traditional Medicine Organization
CEDAC	Centre d'Étude et de Développement Agricole Cambodgien Cambodian Center for Research and Development in Agriculture
CCC	Cooperation Committee for Cambodia
CIAP	Cambodia-IRRI-Australia Project
CPP	Cambodian People's Party
DAALI	Department of Agronomy and Agricultural Land Improvement
DATE	Developing Appropriate Technology
DOOR	Database of Origin and Registration
EJF	Environmental Justice Foundation
EU	European Union
FAO	United Nations Food and Agriculture Organization
FiBL	Forschungsinstitut für Biologischen Anbau Research Institute of Organic Agriculture
GDP	Gross Domestic Product
GERES	Groupe Energies Renouvelables, Environnement et Solidarités
GI	Geographic Indication
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit German Agency for Technical Cooperation
HIV	Human Immunodeficiency Virus
IFOAM	International Federation of Organic Agriculture Movements
INGO	International Non-Governmental Organization
IRRI	International Rice Research Institute
NGO	Non-Governmental Organization
HYV	High-Yielding Variety
MAFF	Ministry of Agriculture, Forestry and Fisheries
NCTM	National Center for Traditional Medicine
OLS	Ordinary Least Squares
SCW	Save Cambodia's Wildlife
SRI	System of Rice Intensification
TKM	Traditional Khmer Medicine
TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce
UNEP	United Nations Environmental Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WHO	World Health Organization

1 INTRODUCTION AND BACKGROUND

“Cultures of all types--ethnic, national, regional and the like--that are able to translate their qualities into marketable commodities and spectacles find themselves maintained, experienced, and globalized. Cultures that cannot or do not (re)present themselves in term of marketable qualities, simulated instances, experiences, and products are finding themselves divested of numbers.” – A. Fuat Firat (1995, p. 118)

“[With] every attempt at radical otherness being so quickly commercialised and sold or used to sell [...], one might as well ask what are, and where are, the possibilities for doing things differently?” - Doreen Massey (2000, p. 281)

The cultural politics of international development have always lain beneath the dominant narrative of economic growth and industrialization. As the quotes from Firat and Massey illustrate, globalization and neoliberalism present both opportunities and risks to developing countries trying to sort out effective ways to protect and show off their national patrimony. With the rural sphere often acting as a cradle for national culture, agricultural development and urbanization often become the arenas for this debate (Brot für die Welt et al. 2002; Tiffen and Bunch 2002; UNDP 2006). The hegemonic influences of neoliberalism have pressured many development discourses to increasingly move to market mechanisms for managing such things as cultural politics, environmental sustainability and agrarian change (Castree 2010). Even in underdeveloped countries like Cambodia, the commodification of agriculture is already well under way. What is left to consider is whether the eventual results of the commodification will be markedly different from other contexts. To this, Firat and Massey raise an interesting dilemma: can “radical otherness” be commercialized in the ways suggested by Firat and still retain its distinctiveness? Holloway et al. (2007, p. 15) suggest that, indeed, alternative food economies are expressed in novel contextually-specific ways and are often based on “discourses surrounding being different and doing things differently.” Hybridization or creolization studies have often demonstrated the subtle, yet meaningful ways, in which foreign concepts are melded with local ones

(Cohen 2007). In Cambodia, there are ongoing agricultural initiatives aiming to improve environmental performance and preserve local culture by using contextually-adapted market-mechanisms. Some of these initiatives, which are the focus of this study, are largely spin-offs of well-known international market-based schemes: organic rice, geographically-indicated heritage palm products and modernized traditional medicine. As Firat has suggested, they all entail transforming local culture into commodities with the purpose of environmental protection, protecting cultural patrimony and making products relevant for modern times. The basic research question that emerges from this debate asks how cultural assets and historical experience are leveraged to situate and direct commodification.

The relevance of this question has already been proven by the different outcomes of agricultural systems and environmental stewardship in many developed countries (see Mol et al. 2010). With the historical conditions, cultural affinities and structural constraints so diverse all over the world, it is unsurprising that countries with similar levels of economic development, roughly speaking, have produced divergent agricultural economies and environmental performances. The agro-food systems and initiatives for environmental protection found in different countries are the result of the cumulative decisions made and trends set during economic development and modernization. Particularly ecological modernization, which is a response to the environmental impacts of capitalist industrialization, has played out differently in various countries and regions. In North America, for example, ecological agriculture is politicized, activist oriented and focused on social justice. In the European experience, it is focused on rural development, smallholder viability and adding value to farm outputs (Goodman 2003). This begs the question, What is the basis for these divergent outcomes?

The answer, suggested by the editors of the *Ecological Modernization Reader* (Mol et al. 2010), is that the ecological (and subsequently environmental) narrative of a country/region develops in parallel, and not after, industrialization. Indeed, ecological inclinations of various populations have always passively played counterpoint to industrialization (Spaargaren and Mol 2010). It is therefore the strength and embeddedness of the ecological inclinations in the society that have helped shape the eventual environmental performance of industrial countries and not solely their post-

industrial commitment. In other words, the groundwork for ecological modernization begins as soon as capitalist relations and nature begin to clash. With the benefit of hindsight, such a thing as reflexive pre-industrial ecological modernization becomes a relevant conceptual framework for averting ecological problems in developing countries.

In developed countries, in contrast, it is common to find academics conclude that devising comprehensive and truly sustainable solutions (as opposed to marginally more sustainable ones) is very unlikely in the short and medium term. Byrne et al. (2009), for example, note the willingness of Australian citizens and officials to engage with superficial issues prompted by climate change but find that over-urbanization has meant that Australians cannot abide by necessary structural interventions such as abandoning land or relocating communities. Regulatory capacity also increasingly falls behind as the rate at which new environmental pollutants or food ingredients are created defies the capacity to monitor and control all of them (Castree 2008, p. 149). Systemic change also requires collective willpower, which is often undercut by entrenched business and political interests in advanced economies (Jänicke 2010[1993], pp. 35-36). In general, the path dependency emerging from industrialization curtails the efficacy of ecological modernization, while rendering radical change unmanageable or unthinkable.

In many developing countries, however, the horizons for environmental intervention and planning are wider. In a recent article, Joseph Huber (2008), one of the founders of ecological modernization theory, commented that pioneer countries have an opportunity to demonstrate how comprehensive and embedded environmental interventions, such as regulation and promoting comprehensive eco-innovations, can be. Implicit in this article, and increasingly promoted in multilateral development platforms (e.g., UNEP et al. 2011), is the notion that ecological modernization can more effectively promote sustainable development when engaged early, to wit: with less of the political and social inertia of capitalist industrial relations. In this study, I examine to what extent this applies to efforts to fundamentally shape the manifestation of capitalist economic relations in agricultural development in Cambodia.

This inquiry has three components:

- the historical context of agricultural change
- the tools, assets and skills available for understanding agricultural change

- the awareness and implementation of international experience in agricultural development

After presenting the background of the case studies, I will elaborate on these three components in more detail. I conclude with a clarification of the structure of the work.

1.1 History and Background to Agricultural Development in Cambodia

Cambodia is a small least-developing country located in mainland Southeast Asia, flanked by Vietnam, Laos and Thailand. With a population of approximately 14 million, it is one of the least dense countries in the region (80 people per square kilometer in 2010), although the density is much higher in lowland rice growing areas. The 2010 GDP (constant 2000 USD) is around 8 billion, of which approximately 9% is foreign aid. Agriculture represents 36% of the economic activity, while 80% of the population live in rural areas.¹ In short, it is a predominantly agricultural society with a predominant focus on rice, which it exports.

One of the most notable aspects of Cambodian society is the structure of foreign aid. A report by the Cooperation Committee for Cambodia (2012) estimates that approximately 3,000 local organizations exist, the majority of which are funded by external assistance. While the report admits that many of these are so-called Come-and-go-NGOs (Come-NGOs), the contemporary impact of aid on bringing in foreign ideas of development has been noted by many scholars (for a review, see Curtis 1998). This research focuses on the work of a number of these NGOs as well as social enterprises and private businesses that derive some of their inspiration (and business plans) from foreign concepts.

1.1.1 History of Agriculture and Agro-food

Broadly speaking, agrarian change in Cambodia has largely mirrored historical fluctuations, resulting in periods of centralization and decentralization that have followed the rise and fall of various political regimes. During the height of the Khmer civilization in the 12th to 14th centuries, one of the world's largest urban centers at

¹ Data are for 2010, provided by the World Bank Development Indicators. <http://databank.worldbank.org>

Angkor thrived due to expansive irrigation and centrally coordinated rice cultivation (Groslier 1979; Stone 2009). The decline of Angkor from the 14th century led to the decay of waterworks and planned agricultural development for several centuries, but it proved that the ingenuity of Cambodian management could lead to agricultural achievement (particularly in rice cultivation). Another source of pride concerns the relative abundance of palmyra sugar palms dotting the rural lowlands. In 1901, then King Norodom decreed that all households plant a few palm trees. The campaign was so successful that Cambodia gained the highest density of *Borassus flabellifer* in mainland Southeast Asia; in contrast, regions of Cambodia that were in the dominion of Siam (Thailand) during King Norodom's reign, such as Battambang province, have very few palm trees (Yang Saing 2000). During the French protectorate and on through the limited agricultural modernization of King Norodom Sihanouk's Sangkum regime, few changes in rice agriculture took place (Ear 1995, pp. 35-37; Samphan 1959, pp. 23-25) before the spreading war in Vietnam began to eclipse development goals (Ear 1995, pp. 67-68). In 1975, the Khmer Rouge under Pol Pot came into power; the ensuing upheaval led to the almost complete rearrangement of agricultural infrastructure and labor relations. Urban citizens were forced into the countryside and an agrarian social-economy based on collective agriculture predominated until the Khmer Rouge were deposed by the Vietnamese in 1979 (Chandler 2000[1983]; De Nike et al. 2000, pp. 352-353).

During the 1980s, people were focused on returning to their land and rebuilding communities while the government was focusing on reconstruction rather than assembling coherent agricultural policy. Although sporadic elements of industrial agriculture began filtering into Cambodia during this period, this was not in the framework of a comprehensive agricultural policy. For example, throughout the 1980s, uncontrolled pesticide imports from Vietnam and uptake of subsidized mineral fertilizers became widespread, causing severe health problems and compromising soil quality over the following decades (EJF 2002; McNaughton 2002; Yang Saing et al. 2000). In this same period, the government initially endorsed and then abandoned the promotion of so-called high-yielding varieties (HYVs) of rice (Mak 2001). It was within this context that the first aid-funded projects focusing on agricultural development arrived in Cambodia. The most notable of these, the Cambodia-IRRI-Australia Project

(CIAP), implemented by the International Rice Research Institute (IRRI) and funded by the Australian Agency for International Development (AusAID), began a pilot project in 1989 with government encouragement. The project focused on farmer practices and local soil conditions, and eventually implemented fertilizer banks and promoted HYVs as well as making initial policy recommendations (Nesbitt 2002). After the departure of the Vietnamese and opening up of the country to development aid as a result of the Paris Peace Agreement in 1991, Cambodia was exposed to the less unified international discourse in agricultural development (Ellis and Biggs 2001; Pingali et al. 1995), including aspects that contrasted with the CIAP project, such as those focusing on food sovereignty and ecology (Altieri 1987; Vandermeer 1995).

Ultimately, this had the effect of broadening the range of the development models available for agricultural development and diminishing the CIAP project to one voice among many. And while the lasting physical influences of this project can only be seen in the pilot districts in the southern lowlands, there are two enduring national results of this project: (1) the adoption of HYVs for early and dry-season cropping (around 30% of the cultivation), and (2) the eventual establishment in 1999 of CARDI, the Cambodian Agricultural Research and Development Institute (Nesbitt 2002) under the Ministry of Agriculture, Forestry and Fisheries (MAFF). In the meantime, a contrasting paradigm of agricultural development, embodied in alternative agriculture, found fertile ground in Cambodia. Many farmers were still “organic” by default, and others felt betrayed by the health impacts of pesticides and by the soil degradation resulting from fertilizer use (Sok Siphana in De Launey 2005; Keam 2007). Ecological agriculture was promoted as a more locally appropriate, neo-traditional form of agriculture for peasants in poor countries (Altieri 1987; Clarke et al. 2008; Goodman 1999; Singer 1974). This explains the rise of the main ecology-based rural development organization, the Cambodian Center for Research and Development in Agriculture (CEDAC), founded in 1997 (for a history of CEDAC, see Le Meur 2007). As the largest rural development NGO, its programs have reached more than 140,000 families (approximately 7-10% of Cambodian citizens, according to its reports) by the end of 2010 (CEDAC 2009; Yang Saing 2010). Furthermore, in 2004, CEDAC’s ecological rice farming system became officially integrated into the Department of Agronomy and Agricultural Land Improvement (DAALI) of the MAFF (Feuer 2007).

While the contemporary discourse of agricultural development may be contested, institutional inertia in agricultural research and policy, as well as Cambodia's historical agro-social narrative play an important role. Alternative agriculture has made major inroads in academic, political and social spheres since the 1990s (Beus and Dunlap 1994), but mainstream industrial agriculture nonetheless commands the majority of research funding and is perpetuated internationally by multi-lateral agronomic institutions and private companies. The CIAP rural development project and CARDI are only individual instantiations of 'productivist' (yield-focused) agriculture discourse, which is reproduced by international agronomy research institutions, some development agencies, and the entire agro-business complex. Perhaps more influential than its concrete institutions are the expectations of modernity and hopes for development that are linked with productivist agriculture. Indeed, during the Sangkum Reastr Niyum (Great Society period) between 1955 and 1970, King Norodom Sihanouk exhorted agricultural mechanization, infrastructure and external inputs, representing this as populist advancement toward modernity (Ear 1995, pp. 51-53). This time is often nostalgically remembered by Khmers as the contemporary golden age of Cambodia, although it is also documented for urban bias, unjust land consolidation and rural displacement (Ear 1995, pp. 53-54). Since the decline of Angkorean productivity and the slow collapse of the 14th Century Khmer civilization, the Cambodian narrative contains recurring incidences of massive agrarian change, all of which have promised much, possibly succeeded for a time, but were ultimately unsustainable. The result is an enduring skepticism and conservatism regarding agricultural change, which has provided space for exploring alternative discourses in rural development.

1.1.2 History of Traditional Medicine

Cambodians are the inheritors of the remnants of a "great medical tradition" that fragmented with the decline of Angkor after the 14th century. In *Cambodians and their Doctors*, Ovesen and Trankell (2010, pp. 130-133) argue that the ancient Angkorean tradition was, at its time, perhaps on par with Ayurveda but did not survive in unified form into the modern era. Starting slowly and unevenly with the establishment of the French protectorate in 1863 (for an historical account, see Au 2011) and picking up speed with the signing of the Paris Peace Accords in 1991, biomedicine became the

officially-sanctioned health system while the Cambodian traditional health system receded into local areas. In comparison, neighboring countries such as Myanmar, Thailand, Laos, and Vietnam have had continually active national support systems for traditional medicine, often including national research and training institutions. Despite this state of affairs, within a decade of the Paris Peace Accords, public and private support for traditional medicine in Cambodia began shifting dramatically.

Changes in Cambodia paralleled those in international discourse on traditional medicine as well. After decades being disregarded in multilateral forums, the utility of traditional medicine was officially acknowledged by the World Health Organization (WHO) in the 1990s and gained institutional power in 2002 (WHO 2002). This echoed the larger discursive shift in the late 1990s favoring sustainability and the value of indigenous practices, of which traditional medicine was one. Articulated primarily as a post-industrial² vision of ecological production (Clarke et al. 2008; Singer 1974), international aid also began to pick up on the utility of traditional medicine for a comprehensive health system. As a result, the provision of botanical medicine and its respective embeddedness in Cambodian health cosmology have emerged as both complementary and competitive movements in the national health sector.

Institutionalizing traditional health care, however, is a contested process. Traditional healers (*kru khmer*) in Cambodia have not been unified in any particular health structures since Angkor, and their activities are viewed less as a profession than a social role in society. This includes, for example, practitioners who deal primarily with spiritual, karmic, and psychological aspects of healing, such as monks, lay Buddhist functionaries (*achaa*), spiritual mediums (*chol rup*), love advisers (*kru sneh*) and sorcerers (*thmup*). There are also those who provide botanical medicines (*kru phsom thnam*) and bone-setting (*kru bakbeg*), as well as midwives (*chhmob*). While it might be said that equivalent specialists within the Western tradition exist (including those for spiritual guidance), the difference lies in how they cater to Cambodian health cosmology and cultural sensibilities within their social role. More simply said, there is a comforting familiarity about the way in which traditional healers operate that belongs in

² Post-industrial, as it is used here, refers to the values and systems (for agricultural production and consumption) that are commonly associated with the orientation on environment and health found in many industrialized countries in the North. Post-industrial ideals are not exclusive to those living in post-industrial societies, especially considering that many of these ideals are a harkening back to pre-modern values and systems that are often shared by members of developing countries.

the field of ‘doxa’ – or unquestioned utility (Ovesen and Trankell 2010, p. 262). As efforts to modernize traditional medicine through regulation, training, testing and advancement of botanical medicines get underway, this comforting familiarity is one aspect that must be re-imagined.

1.1.3 Contemporary Trends in Alternative Agriculture

On the production side, aggregate figures and anecdotal evidence demonstrate rapid developments in various alternative agriculture initiatives. Certified organic rice production has increased on average 34% per year since 2004 (roughly a doubling of market size every two years) (IFOAM and FiBL 2010), while the number of farmers engaged in the (primarily ecological) System of Rice Intensification (SRI) has expanded to roughly 7-10% of all rice growers since 2000 (CEDAC 2009; Yang Saing 2010). The palm sap-based product line has grown from paste, crystallized sugar and wild-fermented tonic to include granulated sugar (including coffee sugar packets), beer, liquors, and vinegar. The companies and agencies involved in natural production also promote energy efficient, integrated farming and chemical free, local products (Him and Tong 2008; Khiu 1996). In 2010, Kompong Speu palm sugar received one of the first geographical indications (GI) for the protection of heritage products (Sereyvath 2010; Soeun 2010). The traditional medicine industry has witnessed the establishment of the first ever training center and research institute at the National Center for Traditional Medicine (NCTM), drafted first-ever regulations and experienced rapid growth in advanced hygienic and professionalized product forms (Kounila 2010; Tharp 2010). Institutional advancement has been so rapid since 2008 that an article published in 2010 in the *Journal of Complementary and Integrative Medicine* was out-of-date by the time it was published (Richman et al. 2010). In Chapter 5, I scrutinize these initiatives to determine if the quantitative growth is matched by qualitative utility in society.

1.1.4 Skills and Tools for Embedding Agricultural Development

In Cambodia, as in a few other developing countries that have garnered focus based on the uniqueness of their ecological agricultural movements (most notably Uganda, Cuba, Bhutan, and the Falkland Islands) there is a convergence of historical and contemporary conditions that precondition people’s ideological standards and structure the

agroecological system. As a basis, there are historical and contemporary narratives regarding agriculture to which Cambodians often refer for guidance and comparison. The “Angkor narrative”, which I outline in Chapter 4, is focused on how regular people as well as politicians use the ups and downs of the Angkor period as a benchmark for evaluating contemporary changes in agriculture development. Drawing on past agricultural narratives, individuals and society collectively also have a relationship to nature mediated by their experience in agriculture. This “agro-social skill”, which I introduce in Chapter 3, enables people to develop deep preferences about food and agriculture and leads to diverse tastes and appreciation of the utility of agricultural products (see Oude Ophuis and Van Trijp 1995). Urbanization, technologies, marketing and other distractions can diminish agro-social skill, thereby making it easier for simplified commodities to become dominant. However, as experiences in various developed countries show, the outcomes of this process are not monolithic—they can be shaped and directed by demand based in the *longue durée* of historical agricultural narratives. As Marsden (2004, p. 138) has commented,

“While considerably more emphasis has been placed upon understanding the relationships between production and consumption, and particularly the ways in which the very fabric of food fuses both natural and social hybridities, there needs to be more attention given to the ways in which the hybrid social and natural relations surrounding food are governed, empowered and used.”

In this work, I explore the precedents and experiences that inform new evolving systems for production, marketing, and consumption of organic rice, traditional medicine, and heritage palm products. For all of these products, a transition is occurring from a pre-modern product with their respective traditional marketing and consumption patterns, to a “socionatural” product that receives its evolutionary cues from parallel discourses in sustainable development. Global schemes such as organic and geographic indication (GI) are merged with local priorities and conceptions of heritage, ecology and tradition. Often the result is a product or process that is both old and new, or familiar and yet modern. For example, palm sap, which is typically wild-fermented into *tnot chu* (sour palm wine) is now fermented with laboratory yeast, pasteurized and marketed in beer bottles. Organic rice, which is often viewed by development agents as an export

opportunity, is instead certified with low-cost participatory guarantee systems and primarily sold domestically. Government planning documents and speeches promote the organic sector as modern and productive, while viewing agricultural chemicals as traditional and unproductive (MAFF 2006; Ministry of Commerce 2006). As I explore in more detail in Section 2.1, agricultural narratives and agro-social skill are the basis for Cambodians' capability to proactively engage with and shape agricultural development.

1.2 Awareness and Implementation of Agricultural Discourses

As already prefaced, after the departure of the Vietnamese and opening up of the country to development aid as a result of the Paris Peace Agreement in 1991, Cambodia was exposed to the prevailing discourse in agricultural development at that time. By the 1990s, the field of agricultural development had broadened and become more competitive, with green revolution and alternative agriculture vying for attention by development projects. The so-called Green Revolution was a modernist paradigm for rural and agricultural development that refashioned agriculture along industrial lines in certain regions in the Global South (Fairbairn 1995; Kaosa-ard and Rerkasem 2000). Land consolidation, HYVs, irrigation infrastructure and agricultural chemicals rounded out a technological package that was adopted most extensively by governments and farmers in India, Indonesia and the Philippines. Whilst prescriptive criticism of green revolution measures existed very early on, declining yields, soil salination, the volatility of agricultural input prices and the long-term effects of social fragmentation eventually drew criticism and gave alternative theories an opening (Fairbairn 1995; Pingali et al. 1995). Many of the competing models for agricultural development were a response to green revolution agriculture, focusing on things such as food sovereignty and ecology (Altieri 1987; Ellis and Biggs 2001; Fairbairn 1995; Pingali et al. 1995; Vandermeer 1995). In the 1990s, this discursive shift encountered congruent structural dynamics in Cambodia, notably that many farmers continued to be “organic” by default (Sok Siphana in De Launey 2005; Keam 2007).³ This structural characteristic has been

³ Default organic is a term to describe farmers who minimally do not use (or have never used) agricultural chemicals such as inorganic fertilizer or pesticides. It can also include farmers who practice soil erosion control, crop rotation, use of natural fertilizers and manures, and mulching. Often it refers to farmers who do not intentionally practice natural agriculture, but lack resources (cash, credit, etc.) to purchase inputs (see the case study of Uganda in Källander and Rundgren 2008, pp. 167-174).

viewed as an opportunity for scaling up ecological agriculture in Cambodia and other emerging markets (UNESCAP 2002). The typical international aid variation focuses on the role of privileged export markets such as Fairtrade and organic, improvements in eco-efficiency (D'Souza and Gebremhedhin 1998) and their undergirding by decentralized governance, empowerment and market-based mechanisms (Pretty 2005; World Bank 2008). Generally, these ideas are based on schemes developed as part of ecological modernization in rich countries, which are adapted normatively to development. Organic agriculture, for example, embodies this tendency. In rich countries, organic agriculture is a social movement that leverages technical expertise to change the incentive basis of agricultural production, whereas, for poor countries, it is envisioned as a way of increasing high-value agricultural exports.

In Cambodia, many of these competing discourses were adopted at one time and began being adapted by local initiatives. CEDAC, which I introduced above, is a Cambodian NGO that has grown rapidly due to its success adapting international alternative agriculture discourses to Cambodia. Its programs in farmer-to-farmer extension with SRI and other environmentally-oriented cultivation and animal husbandry practices gained it national attention and institutionalization in the MAFF. After years of very rapid institutional growth under these conditions, CEDAC highlighted at their 10th Year Anniversary celebration in Phnom Penh on 1 August 2007 that it was moving toward a market-oriented approach to sustainable agricultural promotion (Yang Saing 2007). This approach became popular with many other development agents and social enterprises. For example, a small sector for preserving palmyra sugar palm trees and palm products through commodification arose starting in 2001, including private businesses and rural development organizations. Collectively, this sector has focused on issues such as advancing peasant production, developing new products from palm sap, developing manufacturing capacity, improving environmental performance and gaining organic export certification. Similar changes to botanical medicines have been spurred by private sector actors and supported by national institutions. In Chapter 5, I investigate the performance of these commodification initiatives in terms of the response by consumers and the results of efforts to adapt and situate these products in Cambodian culture.

1.3 Structure of this Work

This study is made up of three empirical chapters that cover agro-social skill, historical agricultural narrative and the performance of agro-food and medicine initiatives. The theoretical and conceptual framework, which undergirds the empirical evidence and lays out the concepts that are used throughout the body of this work, is presented in Chapter 2. It is followed by the empirical work in Chapters 3 through 5. Chapter 6 summarizes the main arguments and concludes. To avoid shifting so far from the content and subjects of this work, the methodology used in field research and the collection of non-field data is elaborated in Appendix 1.

Informants

Interviews, which make up a large part of the empirical data, are referenced in a simplified format to avoid obstructing the flow of text. Field codes found in brackets, such as [PP-YSK], can be cross-referenced with the list in Appendix 6. Certain fields in Appendix 6 are deliberately incomplete to respect the anonymity and privacy concerns of informants. Additionally, if the text includes the name of an informant, in almost all cases it will be a pseudonym (and will be indicated as such the first time it is used.)

2 THEORETICAL AND CONCEPTUAL FRAMEWORK

“The gardener cultivates wildness, but he does so carefully and respectfully, in full recognition of its mystery” – Michael Pollan (1991, p. 192)

The development of agriculture roughly 10,000 years ago marked a transformation in the human relationship with nature. The domestication of nature drew agriculture into human society, becoming the defining feature of settled human civilization. As humans shaped nature to provide for them, nature, in turn, shaped human culture. Cuisine, one of the most prominent expressions of human culture, was historically produced through the co-evolution of local agroecosystems and human dietary preferences. National mythologies often contain a primordial concept of mutual interaction between the produce of the land and the culture of its people—hence *agriculture*. The imagined primordial connection of a people to a spatially-constrained area of land (see Anderson 1983), however, is not sustained by the dynamics of human development. Due to displacement, exploration and trade, among others, agriculture and food have increasingly become interdependent with global processes. This is how the potato, which only arrived in Spain and England around 400 years ago, can become a staple crop all over the Eurasian continent. As with the migration of the potato to Europe, external influences are perhaps the most significant drivers of change to agro-food culture in developing countries. This process is not only driven by new plant varieties but also by changes in cultivation, processing, trade relations and consumption habits. This work examines this dynamic in Cambodia, focusing on the mechanisms by which agro-food and botanical medicine are reinvented.

Foremost, I introduce Amartya Sen’s theory of capabilities as the framework for studying the determinants of agricultural change. Next, I introduce ecological modernization theory and adapt it for the developing country context. I then review the debates in rural sociology and alternative agriculture, which inform many of the initiatives currently undertaken in Cambodia. Thereafter, I introduce Holloway et al.’s (2007) conceptual-methodological framework for exploring novel change in agricultural economies. I close by discussing the agency of nature in preserving itself through human experience.

2.1 Amartya Sen's Capability Approach

The overarching theoretical framework guiding this work is Sen's (1999) concept of *capabilities* elaborated in *Development as Freedom*. This well-worn approach is useful for describing agricultural change because it refrains from imposing the normative views that have polarized debates on agricultural development. Instead, it assumes that change is inevitable and ongoing, and that development ought to be concerned with the extent to which people have 'capability' to participate in the process of change. Capabilities, in Sen's formulation, have two aspects: *opportunity freedom*, or what one is free to do; and *functionings*, or what one has the ability to do. Having one without the other pre-empts individual agency, or the capacity to effect change aligned with one's own values and preferences. Because these preferences are individually constructed or, as Sen says, heterogeneous, they can only be fulfilled with a democratic form of governance that enables individual expression to translate into collective action. In this research, I look at two capabilities that are important in agricultural change:

- having the food you like
- getting the medicine you are comfortable with

Keeping these capabilities in mind, the goal of this work is to explore the aspects of agricultural change in Cambodia that affect peoples' opportunity freedom and functionings.

Freedoms such as access and availability of food and medicine are perhaps the easiest to conceptualize. For example, if my favorite rice variety is replaced by one I like less or becomes too expensive, my welfare decreases and my capability to eat the food I like is undermined. This extends to an unknowable set of characteristics that people value in food and medicine, such as its place of origin, embeddedness in local culture, presentation in the market, purity, professional appearance/hygiene, etc. In Section 3.2.2, I conceptualize the set of characteristics that one would choose if free to do so as one's "ideological standards" and I contrast these with "technical standards", which are set along normative lines (i.e., what external parties consider good quality should be).

More difficult to conceptualize, however, are factors that affect peoples' functionings. Because knowing what food you like and what sort of health care you want to receive are dependent on your ability to assess the desired characteristics, phenomena that undermine one's ability to judge and evaluate quality can be classified as unfreedoms. For example, if my favorite traditional medicine is suddenly sold in tablet form, I can no longer inspect the raw ingredients to see if they are fresh. Likewise, if the color of my favorite palm sugar is distorted by artificial whiteners, I may not be able to recognize it. Or if I currently produce barely enough each year to subsist, I cannot afford to experiment with new agricultural initiatives that I may be interested in. Chapter 3 conceptualizes the functionings that affect agricultural change as "agro-social skill", or knowledge, skills and values that are developed through life experience with agriculture that can be leveraged to evaluate—and to some degree shape—development.

2.2 Ecological Modernization Turned On Its Head

"...in keeping with his preference for experience over abstraction, [the green thumb] approaches nature more like an artist than a scientist or engineer." – Michael Pollan (1991, p. 129)

The quote above captures a main strand of the debate regarding the prospect for ecological modernization in developing countries—whether embedded solutions to modernization can complement the technological ones dominant in ecological modernization theory. Based on the experience of advanced European societies, ecological modernization has always had a strong focus on industrialized countries (Marsden 2004). Jänicke (2010[1993]) and other commentators (e.g., Christoff 2010) have suggested a radical element of ecological modernization, in which it is deployed against industrialization itself, or in which anticipatory strategies are applied. However, this has not been extensively conceptualized and even the anticipatory strategies refer to the management of well-known problems in post-industrial societies, such as automobile traffic. Even Frijns et al.'s (2000) study of the prospects for ecological modernization in a developing country (Vietnam) focuses primarily on industrial pollution control, so it is not much of a departure from the typical view. The phrasing

“ecological *modernization*” is then perhaps unfortunate, as it tends to exclude innovative solutions to environmental problems developed by developing countries, particularly those that are not grounded in high technology. Placing these solutions under the framework of sustainable development often further relegates them to the periphery or delegitimizes them. I view this as an oversight and, below, outline at least three ways in which developing countries can “teach the First World a lesson”.

- *Reinventing Solutions from Rich Countries.* Organic certification is a system developed in rich countries to provide transparency and assurance to consumers, while creating incentives for producers to engage in more environmentally friendly agriculture. In the 1990s, Cuba took organic cultivation in new directions—integrating systems for urban agriculture and innovating biological crop protection (Kilcher 2009).
- *Developing New Solutions.* Agroecology is a system of cultivation developed primarily in Latin America that leverages the strengths of ecosystems and yield potential of indigenous varieties to improve productivity. The UN Special Rapporteur on the right to food (de Schutter 2010) fully endorsed agroecology. In his report to the United Nations General Assembly, he laments, however, that agroecology is not taken seriously in public policy. In trying to gain legitimacy for the idea of agroecology by tying it to science (as opposed to indigenous experience), one of the seminal works was titled *Agroecology: the Scientific Basis of Alternative Agriculture* (Altieri 1987).
- *Building on Scale and Anticipatory Utility of Existing Solutions.* Rejecting the prevailing niche-like scale of organic agriculture, Bhutan is positioning to become a 100% organic country by 2020; China has demonstrated that traditional medicine can play as important of a role in modern health systems as biomedicine if developed to scale; Israel demonstrated the widespread application of water-saving drop irrigation technology as they were developing in the 1950s.

While these examples suggest that developing countries can play a role in driving the leading edge of innovation in agriculture globally, they would also be in a position to employ ecological modernization for domestic development.

Environmentally-oriented observers often suggest that the Global South could “leapfrog” the unsustainable path taken by the industrialized countries (Judie Thorpe, quoted in Elkington and Lee 2006). The view I take, following Amartya Sen, however, is that there is no monolithic unsustainable path to avoid nor should there be normative prescriptions for “leapfrogging”. Rather, the experience of developing countries will be heterogeneous and include elements developed endogenously to global discourse and practice in agricultural development.

2.3 Populist Ecological Agriculture for Development

As Cambodia was emerging from political and economic isolation in the 1990s, the discourse of agricultural development, which had been dominated by green revolution agriculture since the 1960s, was joined by various populist ecological discourses. Two of the most important were *Farmer First* in rural sociology and agroecology in agronomy. As counter-hegemonic discourses, they not only complemented each other but were soon merged into development discourse along with concepts such as local empowerment and participatory development. These discourses informed the activities of many development programs in Cambodia and supported the legitimacy of populist spin-off initiatives. The normative imprints of the *Farmer First* school and agroecology are found in rural development initiatives such as: ecological farm extension; farmer unions and cooperatives; alternative food initiatives such as GI, organic certification; promotion of heritage products such as traditional medicine and One-Village-One-Product events. Because the implementation and adaptation of many of these initiatives in Cambodia is the focus of this work, it is important to know what “discursive baggage” they come with.

The *Farmer First* school and agroecology shared a premise that the ‘transfer of technology’ methods by which agricultural development had previously been spread were too normative, oversimplified and misunderstood that agriculture is a lifestyle as well as an occupation (Bawden 1991, pp. 2363-2364; Chambers et al. 1989, pp. xvii-xx). Agriculture is viewed as a type of “performance” for which many objectives are conceived, such as balancing nutrition, earning pride, structuring the flow of the year and, of course, producing a good yield (Richards 1989). Improving livelihoods and ameliorating poverty must cater to these various needs in addition to improving raw

output and productivity (Dlamini and Simelane 1990). This is where agroecology fits in. First formally introduced by Miguel Altieri (1987),⁴ agroecology has increasingly come to symbolize resistance (against the strict scientific rationality of agronomy) and cooptation (of scientific methods for radical purposes). As such, it is a science that is fairly reactionary in nature and often bundled with methodological considerations, such as local participation and grassroots organizing (see Byerlee and Tripp 1988; Cornwall et al. 1994; Haverkort et al. 1991; Norman and Collinson 1986). Yet, agroecology is also presented as a robust scientifically-rooted discipline. Agroecological terminology has appropriated many conceptual elements from economics and agronomy in order to avoid being marginalized. Agroecology is also premised on reconciling populist views of rural development (such as *Farmer First*) with those of the historical mainstream of agricultural research and extension (Kaosa-ard and Rerkasem 2000, p. 11; Uphoff 2002, pp. xv-xvi).

The *Farmer First* school, which, in its first formulation,⁵ represented a radical populist take on rural transformation, has also become more pragmatic over time. While *Farmer First* (Chambers et al. 1989) privileged resilience and efficacy of indigenous knowledge, *Beyond Farmer First* (Scoones and Thompson 1994) reflected new shifts in development thinking that focused more on the reflexive navigation of ‘power’ and agency in rural development. The *Farmer First* view saw peasants in the Global South as “situated agents” who critically evaluate new cultivation practices and structures for rural social organization so as to ensure their contextual appropriateness. *Beyond Farmer First* authors argue that the ability to critically assess the value of various agricultural techniques and inputs depends upon having the information, awareness and capability to do so (cf. Scoones and Thompson 1994). As Bebbington (1994, p. 89) argues,

“The emphasis on what knowers know about technology and ecology has diverted attention away from the myriad things they do not know about markets, politics and the machinations of a world beyond the farm gate that

⁴ Although extant long before in the works of K.H.W. Klages (1928), the contemporary support for agroecology grew out of dissatisfaction with green revolution systems of cultivation and land tenure (Bebbington 1994; Fernandes et al. 2002).

⁵ Although not the only example of populist, farmer-oriented literature of its time, the book *Farmer First*, published in 1989, is widely seen as the central unit around which similar literature has clustered.

have long since pushed that gate open and irrecoverably influenced the farm's future."

The *Beyond Farmer First* view suggests that rural people are often insulated from the capitalist and technologically-advanced world around them and can benefit from the experience of post-industrial alternative agriculture movements (Long and Villareal 1994, pp. 50-51). In a sense, this work starts where *Beyond Farmer First* left off, although I take a less normative approach. I view foreign ideas about agricultural development as starting points from which novel innovations or entire agricultural economies may or may not emerge.

2.4 Conceptual-Methodological Framework for Studying Agri-Economies

For interdisciplinary research of the nature outlined in this work, there are few examples and models for framing fieldwork and analysis. This work both uses and goes beyond studies of agrarian change, advance of capitalism, or the history of technological change, it falls between the cracks of many methodological frameworks. In the end, I adapted the conceptual ideas from two frameworks to develop the portfolio of methods used in this research. The first came from Holloway et al.'s (2007) study entitled *Possible Food Economies*, which developed a set of conceptual and methodological suggestions for studying the plethora of new alternative food networks. They developed a set of analytical fields based on common threads in food production-consumption projects (mostly from developed countries). The second set of conceptual ideas was adapted from actor-network theory (ANT), particularly the aspects dealing with the defining of societal goals and the differentiation/growth dynamic of networks of narratives and ideas.

The Holloway et al. (2007) paper lays out concretely where and what to look for in search of trends in alternative agricultural initiatives. The "heuristic analytical fields" they suggest to investigate are, however, adapted (see Table 2.1) to the research question and context of this work. Holloway et al. (2007) suggest that, because agriculture tends to manifest in contextually-specific ways, the relevance of the analytical fields they list may differ from case to case. Nevertheless, they argue that, despite the diversity in alternative food initiatives, there are

“...at least some commonalities in the discourses and visions for a better food system which are drawn upon by those involved in projects as producers and consumers, although there are clearly variations in feelings towards and practical responses to those discourses and visions. Although we can suggest as a result of our approach that there is no such thing as a singular alternative food economy, there are important discourses surrounding being different and doing things differently.” (Holloway et al. 2007, p. 15)

They make the distinction that alternative initiatives can be heterogeneous while the drivers and discourses underlying them can be more broadly shared. These shared discourses (called narratives in this work) about “being different” is taken up in Chapter 4, where I discuss the impact of national history on perceptions of development. These narratives are, however, constantly in flux and their impact can only be indirectly observed through the expressions of “alternativity” that arise from evolving agro-food and medicine initiatives.

Table 2.1 Analytical fields for agro-food and medicine research, adapted from Holloway et al. (2007, p. 8)

Heuristic ‘analytical field’	Description
Site of production	Rice farms; palm sugar homesteads; healers’ warehouses; rural factories; urban factories
Production methods	Traditional farming; SRI; sugar tapping; mixing medicine; milling; reducing; tableting; extracting
Supply chain	Farmgate trading; dispensaries; supermarkets; consignment traders
Producer-consumer interaction	Consultation and direct sale of medicine; familiarity through reputation or certification; phone calls
Motivations for producing/buying	Profit; preservation of palm trees; guaranteed sale price; support Khmer products; protect family from agricultural chemicals; pride
Constitution of individual and group identities	Communication through purchase behaviour and demand; producer groups; NGOs; social enterprises; private businesses; individual healers; state

Long term narratives
referenced

regulatory/research institutes; certification bodies
Angkor; revolutionary agriculture experiences;
nationalism; exceptionalism; tradition

These initiatives are studied more closely using the concept of *translation* and group behavior from ANT. Translation, which is often called adaptation in the text for grammatical reasons, is the process of integrating and accommodating information, people and objects into existing frameworks. *Interessement* is one of the primary translation exercises, in which organizations or leaders create practical or ideological incentives for joining concrete projects or activities that draw on the moral resources of ideas such as ‘sustainable development’ or ‘Cambodian heritage’ as well as on the practical (i.e., financial) resources. Issues such as “modernizing traditional agriculture” are *problematized* (another ANT term) in such a way as to create a host of initiatives and concepts (e.g., development projects, technological innovations, environmental awareness, business plans, etc.) that are able to attract, retain and put to use a variety of human and non-human actors. The ‘groups’ that formed in translation are the conceptual units most closely aligned with the agro-food initiatives studied in this work, such as farmer groups, consumers with certain preferences and private businesses. Groups in ANT, however, are not as discrete or unitary as one might expect, often including actors on the periphery, extensions to other groups and temporary actor-members. As Latour famously wrote, there is “no group, only group formation” (Latour 2005, p. 27). This is not to say that membership is fleeting, but that group goals and make-up constantly evolve with enrolment of new ideas and new members and the evolving displacement of functional roles. Groups constantly reaffirm their existence, draw boundaries around themselves and other groups, or even create *anti-groups*, which provide a competitive basis for functioning (Latour 2005, pp. 31-33). Groups also define themselves by their engagement with various ‘matters of concern’ (controversies or discussions on which the group has taken a side). In the end, however, it is member-actors who determine the group’s ideological and functional evolution. These actors include the leadership and general membership, but are also set to a degree by the non-human objects involved in the group functioning. The agency of non-human actors cannot be underestimated in this context—indeed just as hammers ‘hit’ nails, and

baskets ‘hold’ fruit (Latour 2005, p. 71), SRI ‘provides’ rice for rural farmers and machines advance traditional medicine. ANT theory thus points to the dynamics of actor behavior and group formation as potential keyholes through which the ‘practical metaphysics’ of *translation* can be unpacked and analyzed.

2.5 The Agency of Nature

By their suggestion in 1978 that nature presents a barrier to the extension of capitalist relations into agriculture, Susan Mann and James Dickinson set off a debate (and something of a competition) about the role of natural capital in influencing the extension of capitalist relations to agriculture. Their suggestion stemmed from apparent stubbornness of the “family farm” to conform to wage labor. After the issue was debated for more than a decade, the idea was left hanging as the “Mann-Dickinson Thesis”. In 1998, George Henderson (1998) picked up where the debate left off, using an historical account of the development of agriculture in California at the turn of the century to suggest that nature can be both an obstacle for, as well as an invitation to, capitalism in agriculture. In this work, I suggest that, in addition to any direct effect of natural capital on the spread of capitalism (the Mann-Dickinson Thesis), nature also acts through humans to shape the pace and scope of capitalist circulation. In other words, nature has both direct and indirect agency in shaping capitalism.

Due to the limited subjects of this work, I focus on only one the processes inherent to capitalism: the commodification of agricultural goods and services. Scholars have already noted that the commodification of nature often ends in fictitious commodities because many nature-based products draw value from things other than labor and capital (Castree 2010), such as heritage, tastes and symbolism (Guthman 2002). The cases presented are agri-products that are currently being rendered in the market sphere through commodification. As presented in Section 2.1, this commodification is ongoing (and inevitable) but the eventual equilibria reached by various commodities can be directed and guided by people. Socially significant agri-products are typically enmeshed in a matrix of human values which includes appreciation of taste, role in nutrition and health giving, and relevance to national culture. The degradation of these values that may occur through commodification often stimulates people to respond through acts such as preservation, certification and even

modernization (i.e. protect it by keeping it relevant). Often this is carried out through the routine daily practices of producing what wants and needs and consuming the things one likes. As DuPuis points out, “a reflexive consumer is not a social activist, nor is he or she necessarily committed to a particular political point of view” (DuPuis 2000, cited in Guthman 2002). If producers and consumers maintain the functionings that enable them to judge and appreciate quality and symbolic value, the simple acts of shopping and farming and collecting will create demand that drives the market. As discussed at the end of Section 2.1, these functionings are referred to as “agro-social skill” in this work. The idea of agro-social skill draws on Stephen Ingold’s (2011[2000], pp. 289-290) more generalized concept of skill vs. technology, in which skills

“...must be understood as links in chains of personal rather than mechanical causation, serving to draw components of the environment into the sphere of social relations rather than to emancipate human society from the constraints of nature.”

Agro-social skills, more specifically, are embedded in the human experience with nature that is mediated through agriculture. Because agriculture is as much of a lifestyle (i.e. embedded in rural culture) as a job, the products of agriculture (medicine, food, ornamental plants, etc.) readily enter the social matrix of human values. Exposure to, and participation in, agriculture is fundamental to maintaining agro-social skill, which in turn facilitates appreciation of agri-products and agro-biodiversity. This functioning supports to shape one’s agricultural system according to one’s own preferences.

3 AGRO-SOCIAL SKILL: ECOLOGICAL REFLECTION WITH CRITICAL AWARENESS

Agriculture, being embodied in nature and embedded in human sociality, has always proven stubborn to change. The daily practices and routines of cultivation are, inherently, an act of survival (of the farmer and the community s/he provides for) and are therefore often conservatively evolved. Rural societies also establish their culture around the rhythms, cycles, and knowledge systems embedded in the production of food and—in many cases—medicine (Ingold 2011[2000], pp. 313-314). Changes in agriculture, affecting cuisine, ceremony, and rural livelihoods, are changes in culture in general. While agriculture implies a dependence on nature, it also engenders a form of opposition to her. Human advancement of cultivation has always faced nature's defenses: pests, fungi, weeds, and now climate change. Plant breeders prior to the hybrid seed era of the 1930s, most of whom were farmers themselves, had to patiently think in generational time, consider complicated ecosystem factors, and align their criteria with those of farmers and consumers (Fitzgerald 1993). For a good yield, resistance breeding (to encourage general plant hardiness in combination with taste and yield) had to be complemented by the farmer's integrated knowledge of ecosystems and adaptive cultivation. Additional knowledge and skill on the part of the farmer and his or her family was necessary if they also integrated multi-purpose elements such as trees, hedges, or gardens to produce sweets, spices, and medicines. With every farm functioning along the preferences and experience of the individual family, diversity and heterogeneity of farming systems and plant species was the rule (and still is the rule, see Van der Ploeg 1996). Fitzgerald (1993, p. 342) writes of corn farmers in the USA Midwest that,

“Farmers in the 1920s and 1930s performed hard manual labor; they owned their own tools and other means of production; they worked without supervision, making all decisions according to their own particular standards and desires. They were in many ways more like skilled artisans than industrial workers.”

With capitalist specialization in agriculture and increasing urbanization, however, the value of the agro-social knowledge and skills undergirding rural communities and livelihoods declines rapidly. Fitzgerald (1993) follows how, in 30 years, farmer-selected traits on a corn scorecard, including aesthetics, yield and taste, are continually replaced by agronomist-selected productivity characteristics until the point that commercially-bred hybrid corn completely excludes farmers from breeding and selection. In this case, only one generation was necessary for fundamental change whereas, in most cases, the transformation of agriculture is more protracted. In an historical test of the Mann-Dickinson thesis, Henderson (1998, p. xii) observes that the eventual industrialization of Californian agriculture followed only after almost all other economic sectors had become capitalized. Part of this delay concerns the fundamental rootedness of agriculture in natural processes, which places some initial barriers to the conventional circulation of capital found in commodity production (Henderson 1998, pp. 30-33). And after apparently ‘overcoming’ barriers placed by nature through deployment of herbicides, fungicides, pesticides, fertilizer and irrigation, full-scale industrialization of agriculture inevitably faces one additional barrier: humans. The debate concerning genetically modified crops, and the growth of slow food, organic, community-supported agriculture, has demonstrated that it is the “-culture” part of agriculture that proves the most stubborn to change. This cultural barrier has gradually been overcome in many places by the alienation of humans from nature through various processes of urbanization and commodification that parallel industrialization. What Fitzgerald (1993) calls the “de-skilling” of farmers and rural people proceeds faster and more completely as new technologies increasingly draw nature out of social relations (Ingold 2011[2000], pp. 289-290).

De-skilling is inherently bundled with the industrialization of agriculture, as it encourages two processes that diminish agro-social skill: urbanization and the narrowing of agro-biodiversity. Urbanization decreases human interaction with the land and nature and renders city dwellers less able to identify and appreciate the diversity of agricultural products. For urbanization to persistently undermine agro-social skill, however, it must also be complemented by a concomitant decline in agro-biodiversity, such that urban citizens are decreasingly exposed to food diversity in their marketplaces and “lose touch” with agriculture. This reduction in agro-biodiversity is typically

advanced by the consolidation of the agricultural sector and the development of political power based on scale operation, which tends to lead to monocrops and the commoditization of the food for urban markets. In cases such as the USA, where 18% of citizens live in rural areas and less than 1% of the labor force farms, this combination of urbanization and narrowing agro-biodiversity would appear to be enough to wipe out agro-social skill. However, the stabilization points of rural settlement and agricultural labor allocation differ across regions and countries, even in highly capitalized agriculture landscapes, which points to differing outcomes from agricultural industrialization. In Australia, 11% of the population is rural, yet agriculture employs 3.3% of the workforce, while in Europe-27,⁶ the rural population comprises 23% and employs 5% of the labor force.⁷ Although there is room for somewhat different outcomes even in industrialized countries, the loss of agro-social skill and bio-diversity with such high levels of urbanization often limit the scope of interventions and counter-movements (e.g., ecological agriculture, geographic indication, rural subsidies, etc.) to niche levels and pre-empt any major challenge to the underlying economic system (Marsden and Smith 2005).

The importance of agro-social skill, in reflection on the experiences of developed countries, lies in maintaining the capacity of everyday citizens throughout industrialization to gain control over processes of urbanization and the stocks of agro-biodiversity so as to forge distinct orientations on agricultural development. Preserving agro-social skill is not about urging a specific (ecological) worldview but rather, as Amartya Sen (1999) has conceptualized, about maintaining freedom of choice as well as the functionings required to be able to take advantage of that freedom (see Section 2.1). Agro-skill allows people to encounter and shape their experience of urbanization and agricultural development in ways that match lifestyle choices and preferences instead of allowing industrialization to necessarily bring about alienation from nature and food ecosystems. Expanded to a societal level, aggregate agro-social skill upholds the

⁶ Europe-27 includes the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. Admittedly, Europe-27 is more rural than core Western European countries but even the core countries are, in aggregate, more rural than the USA or Australia.

⁷ Rural population, total labor force, and agricultural labor allocation (to farming, hunting, and fishing) compiled by the following on-line databases, respectively: the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2007); the International Labor Organization's LABORSTA (2008); and the European Union's EUROSTAT (2007).

capability functionings of a nation to (more) actively direct the dynamics of urbanization and the stocks of agro-biodiversity. What becomes important is not necessarily preventing urbanization or the reduction in species diversity, but influencing the quality of these processes. As Linda Saphan (2011) describes in the case of Phnom Penh's resettlement after the forced ruralization of the Khmer Rouge, the city was settled with a rural character and, like many newer metropolises, has an urban culture that is intimately tied to rural culture. This rural characteristic is ultimately easier to maintain than to recreate. While environmental movements, slow food, organic agriculture and other initiatives in industrialized societies have demonstrated that it is "never too late" to pick-up agro-social skill, learning it generationally in a reinforcing context (i.e., during childhood in a country with a broad base of agro-social skill) is more effective, much as it is for language acquisition. Least-developed countries such as Cambodia, with primarily agrarian societies, are better positioned to maintain and leverage agro-social skill than post-industrial societies, for which doing so is akin to reviving a dead language such as Latin.⁸

In the following sections, I will describe how agro-social skill is created, maintained and leveraged to reproduce awareness and appreciation of food, healing and natural systems. The basis of agro-social skill in society is the participation in producing food and medicine, which provides background into the functioning of natural ecosystems and creates awareness of the basis for quality and diversity in agriculture. Maintaining the capability to appreciate the taste of food and the functional form of medicine is derived from this participation in agriculture and, for city dwellers, it is reproduced by continuous exposure to rural culture. The countryside is also the source of genetic diversity in plants and livestock which, when linked to the cities, transmits agro-biodiversity in a modified form to urban people. This maintains exposure to and appreciation for diverse food and medicinal culture. Agro-social skill, in sum, is the accumulation of knowledge about, and experience in, agriculture that increase the capability of citizens to affect the quality of urbanization and critically engage with rural and urban development.

⁸ Interestingly, in the case of Hebrew, a language out of common parlance was revived alongside agriculture livelihoods using the Kibbutz settlement model of the modern state of Israel.

3.1 Technique in Food and Medicine

Intrinsic to the ability to grow food, raise livestock and forage, which are the hallmarks of subsistence livelihoods, is the capacity for ecological understanding of nutrition and environmental health. The intimacy of eating and healing, which is central to our existence as human beings, is mediated through agriculture. Human preferences, then, are continually reproduced in the natural domain. This domain, broadly termed ‘agro-biodiversity’, represents generations of attempts to match natural systems and human needs. This does not imply that agricultural sustainability is inherent to traditional farming systems, merely that, despite the modality of extraction from nature, the techniques of farming and rural living tend to continually bring nature into social relations, and humanize them (Ingold 2011[2000], p. 314). The technologies of agriculture, from mineral fertilizers to tractors, in contrast, provide a means for creating distance and detachment to nature (Ingold 2011[2000], p. 302). Capitalism, conversely, tends to “transform all production as much as possible into commodity production [...and] with it also the transformation of all direct producers into wage-laborers” (Marx 1909, p. 110). In turn, not only are plants themselves transformed so as to become a socially distant technology, but the human is increasingly distanced from aspects of its cultivation by wage-labor and technology. Capitalism, by intervening in the agro-social relationship between the human and plant, limits the potential for the human to empathize with, and potentially safeguard nature.

In the following, I illustrate how the techniques and day-to-day tasks of living rurally, particularly farming, cottage industry, and foraging generate the agro-social skills that facilitate ecological understanding.

3.1.1 Foraging

The acts of identifying and learning how to extract useful materials from nature predate agriculture but they continue to be a potent source of complementary sustenance and enjoyment. In Cambodian forests, the collection and sale of lingzhi forest mushrooms (*Ganoderma lucidum*) continues reinforce a narrative of the power of raw nature, natural medicine, and the importance of conservation. Unlike many other agricultural products, forest mushrooms improve in potency with age in generational time (usually decades) and their idiosyncratic growth patterns also require highly-skilled mushroom

gathers for proper identification and harvesting. Harvesting an area “profitably” often calls for discerned discipline—some mushrooms must be left to ripen while others that will not gain much potency can be harvested in the short-term [KR-SL]. The decision, much like the decision to age a wine, is not explicable to the uninitiated public. As a result, lingzhi forest mushrooms do not lend themselves to industrial production, instead they remain as rare and mysterious artifacts. In fact, while the *Ganoderma lucidum* has been intensively used and studied in East Asia (for more than 1,500 years) and North America (see Jones 1992), it is still not heavily domesticated. In describing her profession, Luong (pseudonym), a mushroom gatherer in Phnom Kirirom National Park, relates the utility of the lingzhi for modern society:

“The lingzhi only grows in old forests like this where firewood collection is not too heavy. Because it is difficult to find good quality mushrooms, city people often have to come all the way to these mountains to ensure that they find proper mushrooms. I have shared [lingzhi] tea with very rich politicians and very poor city people. I sell to them at a different price. [...] Most people usually have the same problem. First, they want to remove poisons from their body [detox] that you get exposed to in the city. Second, if they have a mysterious and stubborn disease, the lingzhi can help. It can cure 100 diseases.” [KR-SL]

Luong’s mother, at age 88, is the longest lived woman on the mountain and continues to forage for forest mushroom. I observed that when Luong mentions or introduces her mother, customers become considerably more willing to part with their money. They associate experience and wisdom of the gatherer, as well as the old age of the forest, with the potency of the mushrooms. Where the lingzhi is found, it often sanctifies the forest, creating an incentive not only for preservation of certain tracts but also for active enforcement of ecological rules so as to maintain proper growing conditions. In addition to its influence on wild area conservation, the lingzhi functions as a counterpoint to Western pharmaceuticals as well as the polluted conditions of the city.

The complexity of collecting medicinal plants ranges from that of the rare lingzhi to easily-identified wayside plants that function as medicinal foods. Rural families, including the children, can often identify many useful leaves, fruits, berries,

and roots that can be integrated into food, boiled into tea, or fermented into alcohol. Based on my experience with informants' children in rural lowland Cambodia, I found that their ability to forage is often well-developed by age five. Indeed, children perhaps more than adults are keenly aware of the changes in season (by season, I mean the patterns of flowering, fruiting, blossoming, and migration of various edible things in the countryside). While on the way to school or friends, tending the cow, exploring, or helping in the fields, children are actively mindful of the plants and animals in their vicinity. A child [grandchild of KS-OC] of seven years encountered me one morning picking blue leaves for tea in Kompong Speu province and, after some encouragement, emptied his pockets for me. While walking only 500 meters, he had picked and found a medium palm fruit, a toad, a fish, a freshwater crab, two green spices, and some betel leaves for his grandmother. Curiously, he asked me why I was picking this blue leaf, because I did not appear to have the rash it was meant to cure. He boasted that the evening before, he had found ten big toads while hunting with his flashlight. When I inquired how he obtained the palm fruit, he informed me that the palm tree he climbed was only ten meters tall. Having climbed a 10-meter sugar palm with the help of a ladder, I understood this was no small feat from a seven-year-old. Developed into adulthood, the foraging skills of this child will translate into intimate knowledge of not only edible and useful plants and animals, but of ecosystem functioning and provision in general.

The boy's grandfather, Om Channa [KS-OC], whom I ended up interviewing, was a well-known traditional healer in Udong district who also grew ecological (but not organic) rice and sold palm sap to the nearby palm beer and vinegar company. Until his retirement, he had been a scout for porpehl (*Shorea cochinchinensis*), an important but increasingly difficult to find woody species used in preventing early fermentation in palm sap. On his scouting trips, which could last a few nights in the forest, he often would collect medicinal species to prepare medicine for local children and nursing mothers. Even porpehl itself was a medicine, primarily used as a cure for dysentery. Chheng's rather informal attitude toward traditional medicine differs from that of the more focused traditional healers. These established healers, for whom traditional medicine is a primary or secondary profession, often live near to forest tracts, in national parks, or make long forays for wild collection. While they have typically

ignored loggers, squatters and other illegal activities in the forest, a few NGO-led initiatives in the south and northeast have demonstrated that healers are motivated to preserve and protect the forests from which they collect. One particularly successful initiative along the southern edge of Bokor Mountain in Kampot province encouraged by the organization Save Cambodia's Wildlife, includes a traditional healers association that sets standards for wild collection and patrols the forest. In the northeastern province of Ratanakiri, a small NGO has helped healers from minority groups to convert tracts of jungle into medicinal plantations that do not require clearing [NGO-VC]. Duon [RK-KD], a healer in Ta Veng district of Ratanakiri, explained the logic to me.

“We need to make medicinal gardens to remove pressure from the forest nearby and make it easier to collect medicine. Even without vines, mushrooms, and tree products from old forests, one can make good medicine. But having some old forest nearby for rare medicines is an advantage. And if we harvest carefully, then this shouldn't be a problem. But, now that I have seen the progress from the long-term medicinal gardens, I think you can also grow vines and big trees.” [RK-KD]

Duon also related that traditional healers tend to have more status in the region and knowledge of the forests, which makes them useful partners in forest preservation. Vireak (pseudonym), a younger traditional healer from Mount Kulen National Park, insists that wild collection (perhaps including wild agroforestry) is a very important characteristic of traditional medicine:

“People associate the forest, which is wild and pure, with more effective medicine. Many people also believe that plants from holy places, like Mount Kulen here, have more efficacy. Especially for low-quality botanicals that are imported from China and Vietnam, we should have a better product here that is wild. Maybe some kinds of simple medicine can be grown in a garden but an old forest will always be the best source.” [PK-CV]

Foraging in the wild resonates particularly strongly with healers and their patient, creating an ecological consciousness by tying together spiritual and ecological motivations. The artifact of the medicine itself also provides an indirect link of

conservation to those who live distant from forests or in cities. Other types of foraging, such as in lowland areas or along forest peripheries, provide direct contact with the gifts of nature and allow children and adults to encounter the larger ecosystems in which their farms exist. And particularly for children, foraging provides an avenue to bypass inter-generational knowledge transfer through direct ecological encounters the ecosystem. In the conventional model of social learning, a child observing adults “absorbs and assimilates the ‘intrinsic rules’ of the craft”, which allows for a degree of cultural conformity to transfer (MacKenzie 1991, p. 100, as interpreted by Ingold 2011[2000]: 357). For children who forage, however, they often first encounter edible or useful things by themselves or in the company of peers, which allows for ecological bonds to form prior to the socialized intervention of adults or older peers. Even after leaving home to work in the city, many children remain strongly connected to the land less by virtue of their family as by their connection to the agro-ecosystem. My assistant of three years, Piseth Som [PP-SP], himself an adult version of a palm tree-climbing, frog-hunting and fish-netting youth, ultimately wishes to re-settle a farm in his home province despite having an excellent education, English-speaking skills, and adequate job opportunities. For Piseth and many in his generation, the capital of Phnom Penh is merely a large bustling village without the natural beauty, serenity, and fulfillment of farming. Similarly, a farmer quoted in Section 4.2.2 (see [RE-TB]) relates how his son immediately reverts to rural lifestyle habits upon returning to the farmstead from his professional job in the city. In general, of six interviews with young urbanites, five expressed alienation from the city, viewing it as a place only to find a job and make money. The sixth interviewee (see the quote from [PP-MS] in Section 5.3.2) expressed a strong affinity with her home province and agricultural lifestyle but was also satisfied with her improved social status and her friends in the city.

3.1.2 Cottage Industry

Self-employment in traditional industries constitutes both a set of tasks that encourage ecological skill development as well as an avenue for rediscovering heritage production. Heritage production in the context of developing countries is the purposeful promotion of traditional or regional products, much like GI, except primarily intended for the domestic market. Very often, heritage production simply valorizes and institutionalizes

existing, but informally held, perceptions of quality and uniqueness in cottage industry. In Cambodia, regional indications such as Kampot pepper, Siem Reap prahok (fish paste), or Kompong Speu palm sugar now complement national traditional specialties such as Khmer silk, medicinal cosmetics and organic palm drinks. As discussions in the European Union (EU) demonstrate, the canonizing of heritage products has the potential to become a considerable preoccupation of nation-states. Already more than 1,000 GIs and traditional specialties have been registered with the EU and an additional 300 are being processed as of December 2011, including specialties from China, India and other nations outside Europe.⁹

In comparison with the formal institutionalization in the EU, heritage production in developing countries can have different means and ends due to development and conservation goals as well as the different scope of consumer awareness and distribution of cottage industry know-how among the population. Specifying heritage status to Kompong Speu provincial palm sugar, for example, does not necessarily facilitate the promotion of the craft of palm sugar production more generally in Cambodia—in fact, it can discourage it. Many tappers outside Kompong Speu (particularly those just outside the borders of the GI) regard the GI as unfair because it implies that there is only a hierarchy of sugar-producing areas and not a hierarchy of skilled tappers. As one tapper commented, “people should judge quality with their eyes, nose, and lips, not a certificate!” [AS-CY]. For promoting the palm sugar cottage industry and alleviating poverty, this is not a desirable outcome of heritage production. For this reason, CEDAC and other private enterprises and rural development organizations have encouraged production of chemical-free palm sugar irrespective of geography that conforms to proletarian “house wife” expectations, such as being in the form of thickened palm syrup or hardened chunks, as opposed to the relatively fancy granulated palm sugar. This intention is echoed by other actors in the palm sector, such as the general manager of Khmer Natural Enterprise [PP-LRS], who intentionally focuses on producing palm beer, juice and vinegar at prices affordable to working class city dwellers in order to promote palm culture in urban areas and channel profit to small

⁹ These figures do not include the state-level indications, such as appellation d'origine controllee (AOC) and others, which would inflate the numbers considerably. These data are drawn from the EU's database on GI and traditional specialties, called DOOR, accessible under: <<http://ec.europa.eu/agriculture/quality/door/>>

producers and his company. Confirel, somewhat similarly, have segmented their palm product line so as to have working-class variations of their tourist and export-oriented products that generally have the same quality, according to the marketing manager [PP-CHR]. Another reason cited by the managers of all of the palm-related initiatives in Cambodia for the focus on the domestic market is to urgently promote the non-timber products of palmyras so as to stem illegal logging of the palms [PP-CHR; PP-LRS; PP-YSK; KC-SY]. In other words, palm products are an advocacy tool for conservation of sugar palms, which are not easily replaced because they require 10-15 years to begin producing sap.

An additional element, often captured in advertisements for palm products, is that Cambodian consumers are not only familiar with the unique taste of palm products, they also appreciate the symbolic value of the palm product they consume (Bryant and Goodman 2004). This inward orientation, or domestic consumption orientation (Vida and Reardon 2008), contrasts with the common expectation of heritage products in development discourse, particularly organic and Fairtrade, which target export because of the supposed higher returns and advocacy of national products. This is clearly the goal of GIs registered with the EU on behalf of China and India (there are only a handful). However, promoting a heritage product for export typically demands considerable marketing capacity, financial risk, and still often only reaches niche markets in destination countries (Lecoent et al. 2010). While GIs increase the potential for export, domestic production capacity is not large, and many traders and producer groups tend to view exports as a symbolic measure for exhibiting Cambodia's culinary heritage internationally.¹⁰ Furthermore, as noted by the president of CEDAC [PP-YSK], keeping (the earliest-produced) ecological and heritage products in the domestic market helps make the environmental movement more visible in Cambodia.

Particularly in developing countries, where know-how is widespread and not concentrated among sub-populations, the transformation of a mundane cottage industry can lend rural people's everyday activities legitimacy (Lecoent et al. 2010) and draw attention to the ecological dimensions of production. The instructions for obtaining GI-

¹⁰ The primary exception is the export-program of the Cambodian Sugar Association. Already active in cane sugar, it has quickly sought to increase palm sugar exports in response to the establishment of the Kompong Speu GI (Soeun 2010). However, most ecological and heritage initiatives have either not sought export or have tried and largely given up (e.g., CEDAC's organic rice).

status for Kompong Speu palm sugar, for example, stipulate not only the precise geographic location and traditional process (such as using bamboo collectors instead of plastic), but also the proscription of chemical additives such as sodium hydrosulfite (Sereyvath 2010). Additional direct environmental improvements in the context of promoting heritage palm sugar production have been encouraged as a result of the private and NGO-led initiatives mentioned above. First, the energy intensiveness resulting primarily from burning fuelwood to condense palm sap is continually being reduced due to more efficient cookstoves and the direct processing of palm sap.¹¹ Second, in combination with rice farming, palm sugar production diversifies farm activities, brings in consistent cash income, and reduces the pressure in the dry season for a third rice cropping, which is usually water and chemically-intensive as well as requiring cultivation of non-landrace rice varieties (Koh Santepheap 2004, 2008). Third, throughout areas with formal heritage palm production, villagers report that logging of palm trees has decreased or stopped [KS-CE; RE-SS; RE-TB; AS-CC], though sources of porpehl wood (used to prevent wild fermentation) are more readily being exhausted. Fourth, heritage production can promote a degree of sectoral solidarity among individual palm tappers, often in the form of trading collectives, which represent the initial steps in creating national professional associations [RE-TB; KC-SY].

Most trading collectives (or producer groups as they are called by CEDAC and farmers) formed between 2007 and 2010, however, have had mixed success. The reasons, as I have documented in one palm tapping region, appears to be limited capacity to manage complicated accounting, evolving investments, and the predatory tactics of middlemen, rather than a lack of willingness [RE-KS; RE-SS]. Bao [RE-TB], the leader of a surviving trading collective in Kompong Chhnang province, explained it this way:

“Palm sugar producers are used to being taken advantage of by middlemen. It is quite sad. People know exactly how the middleman does this and they often say, ‘it’s so easy to be a trader, I could do it myself’. This is why a lot of members joined producer groups a few years ago. We had up to seven groups

¹¹ While the energy intensiveness of individual production continues to decrease with the diffusion of cookstoves, increased interest in palm tapping mean more absolute demand for the scarce fuelwood remaining in the lowlands. It is unclear at this point whether rising demand will increase prices enough to compensate for higher fuelwood costs or if sugar palms will come out of production to drive down costs.

in this commune. But now we only have two, including mine. I will tell you why. Farmers understand only the basic part of doing business but not all of the details. The first problems were about accounting. Everyone had a different idea about how to keep records and we fought a lot. People are also not used to investing and they always get impatient about when they will make a profit. They think middlemen buy low and sell high on the same day, but this is not true. They also underestimated the middlemen who come to our village. They saw our groups as competition and they had special ways of breaking us. Mostly, they brought sugar at a high price from farmers and lost money so they could keep their market here. The traders usually live nearby so it is hard for them to go somewhere else. That is why they work hard to keep their business here.” [RE-TB]

Palm tappers in other provinces who have attempted to organize faced similar challenges and opposition from local middlemen. In contrast, middlemen largely avoid the parts of Kompong Speu and Kandal provinces where formal palm product companies such as Confirel and Khmer Natural operate. Instead, they only come to do business when explicitly called to buy surplus production. Nonetheless, it appears that without support, business acumen, and larger scale, farmers will largely remain subordinate to local middlemen despite their increasing entrepreneurial tendencies.

Cottage industries, however, are more than opportunities to valorize traditional production (Vida and Reardon 2008), address environmental problems, and promote entrepreneurship, they also present an opportunity to support and encourage the techniques underlying these industries. Palm tapping, like foraging, is constitutive of many rural skills with ecological value that would otherwise be ignored or receive less focus. First of all, palm production is inherently a long-term process. Palm trees require at least 10-15 years before the flowers produce sufficient and good-quality sap, although non-timber products such as fronds and traditional medicines can be extracted earlier. The palms must also be strategically planted with functionality of rice paddy dikes and homesteads in mind. Planting thus necessitates forward-looking spatial planning and a holistic conception of land management, both of which facilitate integrated multi-purpose farming. In the medium-term, the farmer has to consider the future needs of

palm sugar production, primarily renting additional palm trees, constructing or repairing the cookstove(s), and obtaining sufficient fuelwood and adequate equipment. Insofar as items such as pots, collectors, ladders, bricks cost money, the farmer must prepare for at least a six-month investment cycle through saving or credit. During the year, the farmer must also determine how much the palm can be safely pruned to obtain palm fronds, which are useful in the farming system and other cottage industries. The fronds, for example can be used as shelter material for humans or animals, shade and protection for newly-seeded fields, and as raw material for various handicrafts and household items. In the short-term, when the tapping season begins, the farmer must refresh his skills in climbing trees, preparing flowers for tapping, and regimenting his workday. For five or six months, he will wake around 3am to begin climbing and carry out a second climbing in the late afternoon. A typical tapper with 25 trees under production will climb up and down with laden collectors around 8,000 times in a season. Considerable discipline will be necessary to reliably prepare the palm flowers while avoiding falls and spoilage. Fortunately, falls are very rare—I heard of only two non-fatal incidents in the past ten years among hundreds of tappers. The discipline and care underlying the techniques of palm production are quite comprehensive.

Heritage production supports palm production by encouraging improvements in productivity and providing financial, health and symbolic incentives to continue or expand ecological palm production, which has secondary positive effects on the coherence of the farming system and conservation of trees. The agro-social skill obtained through palm tapping and through heritage production develops along a number of directions. On the farmer family's side, capabilities evolve in at least the following techniques: long-term management, land planning, fiscal responsibility and investment, handicraft and household goods creation, house and cookstove construction, dike maintenance, and discipline. Furthermore, by remaining busy with palm production during the seasonal migration [RE-SS], some members of the family remain at home to manage and prepare land, take care of livestock, cultivate nitrogen-fixing crops to improve soil fertility, grow vegetables and fruits, take part in ceremonies, pass on techniques of palm tapping to children, and maintain the house. Maintaining the coherence of the farm system helps provide a more balanced assessment of farm productivity and thereby furthers a more complete impression of the evolving viability

of farming vis-à-vis migration. On the consumer's side, through heritage production, urbanites achieve access to a traditional and ecological product that is healthy and yet still fulfils the working-class expectations about price and familiar tastes. Heritage producers effectively facilitate the movement of rural culture into the cities, such that cities feel like large traditional villages rather than distinct entities. Indeed, palm products in the city encourage the maintenance of culinary traditions surrounding palm sugar and vinegar, help reinvent the social dimension of drinking palm alcohol, and contribute to awareness of the changing agricultural season and natural rhythms within the “big village”.

3.1.3 Farming

Farming techniques are the personal interface with nature and form a platform on which fear of, gratitude for, and sympathy with nature arise individually and socially. On a very basic level, the irregularities of the micro-climate and the vagaries of the land and crops demand that every farmer, irrespective of his or her level of farm capitalization, farm somewhat differently than one another. This dynamic, compounded by market idiosyncrasies, farmer ideology, and conservatism, among others, led van der Ploeg (1996) to conclude that heterogeneity in farming is inherent to agriculture in spite of capitalization (in the Dutch countryside). Following Bernstein (1979), van der Ploeg (1996, p. 273) comments that a failure to acknowledge individual differentiation in farming has been partially responsible for the bias in international development viewing farm diversity as a “backward” characteristic resulting from incomplete commoditization. With the recent rise in sustainable and community-supported agriculture worldwide, however, it is increasingly evident that farm diversity is instead considered “forward”, advanced, and modern. Kunthea [TK-PM], an ecological rice farmer and village chief in Takeo province, summarized this succinctly:

“I saw a television show about organic agriculture in France. I don't know much about wheat, but it looked very advanced...until I realized that they did the same things as me, just with tractors instead of cattle!” [TK-PM]

In a follow-up discussion, it became clear that Kunthea was referring to farming techniques employed by the French organic farmers that are generally logical to, and

typical of, smallholders in Cambodia, such as livestock integration, nutrient cycling, composting, erosion prevention, cover cropping, and fallowing. Kunthea also had some critiques of the farming system. First, the French system depended on piped irrigation water, which, he said, is not only too easy, it also does not encourage farmers from building water features that can support migratory birds, fish, and other crabs. Second, Kunthea questioned whether they were using traditional varieties. For him, landraces are an indicator that the farmer intends to consume his or her own produce (this amounts to an unofficial quality assurance). Ovun [TK-BO], a farmer from a neighboring district in Takeo, described the importance of consuming one's own produce in another way:

“People should always choose to grow the rice they like to eat. Eating is the most profitable use for rice. When I share rice with family, I give them my personal favorite variety. If I sell to another person, I would sell Pkah Malis or another well-known variety so they won't be surprised. This is why I do not sell modern varieties to other people. They only produce a good yield in the first year and then one has to buy more seed from the company but the rice changes every year so you never know if you will like it. For early-season [modern varieties] rice, I sell only to Vietnamese traders and to the government [prisons]. Or I feed it to my pigs.” [TK-BO]

Agricultural technology evokes a certain skepticism from Kunthea and Ovun, precisely because it appears to erode agro-social skill. Both farmers fear that when various agricultural techniques, such as rain water management and seed selection, become redundant through modernization, they might lose corresponding agro-social skills such as fish raising, canal digging, and rice varietal evaluation. That being said, Kunthea, who profits handsomely from eating and selling his pond fish, would likely build water features even if he had perennially piped water like the French farmer. And Ovun, if forced to use a modern rice variety for his wet-season crop, would likely begin breeding it immediately to suit his tastes. Organic production has faced a similar type of scrutiny from rice farmers. Unlike ecological rice production, which primarily requires rearranging of existing farming techniques, organic production is slated for sale and therefore restricts which varieties can be grown and how they should be processed. Like

the Illinois corn farmers described in Fitzgerald (1993), these Cambodian farmers are independent-minded and enjoy cultivating after their tastes and desires. They view the market as an outlet, not a structuring principle for basing their production decisions (Van der Ploeg 1996, p. 17).

Why is agro-social skill protected and valued so highly by farmers? An answer likely found in the many annals of government extension would point to farmers' seeming intractable conservative personalities. Such an answer might be complemented by data highlighting farmers' low levels of formal education. My answer, which is certainly no valorization of local knowledge, instead concerns the dynamic between the farmers' agro-social skills and the constraints or demands of the natural ecosystem. Farmers' agro-social skills have developed to match ecosystem functioning and therefore doing away with or losing a skill is tantamount to short-circuiting the ecosystem in which he or she lives (a similar argument is made by Mak 2001). Van der Ploeg (1996, p. 27) explains this as follows:

“If one puts together all the stages identifiable in a particular labor process, an extremely complex matrix containing a complex whole of interlinking tasks emerges, each with its own degree of flexibility and particular procedure. [...] Therein lies the craftsmanship of farm labor: the interaction between direct producer and labor object, i.e., the continual observation, interpretation and evaluation of one's own labor in order to be able to re-adapt it.”

Because farm systems are built upon cycles of adaptation to ecosystem constraints and human preferences and abilities, they are both resilient (to shocks typical of the local markets and ecosystem) and vulnerable (to radically different mechanisms, such as technology). In Fig. 3.1, I adapt this to Cambodia with a somewhat contrived demonstration of farmer reasoning that illustrates the dependencies that evolve in farming systems.

A farmer cannot grow rice without soil fertility.
Soil fertility requires the ability to grow nitrogen fixing crops and make compost.
Making compost requires not only crop residues but also animal manure.
Raising livestock for manure requires leguminous nitrogen-fixing crops and straw.
Obtaining adequate straw on small plots demands long-stemmed (traditional) varieties.
Maintaining well-performing traditional varieties requires seed selection and saving.
Seed saving requires good storage facilities.
Good storage facilities require building expertise and local materials.
Local materials are obtained partially from palms planted 15 years prior.
Palm tree climbing is learned in childhood.

Figure 3.1 Example of the dependency and interlinkage of farm activities

The balance of human interaction and ecosystem response is more-or-less balanced in the example in Figure 3.1. However, if an external skill-eroding element is introduced, such as a modern dwarf variety, the ecosystem-human interface can lose coherence. To illustrate using the above example, a purchased variety would decrease motivation and necessity to maintain skills for seed selection, seed storage and, by extension, for palm tree climbing. Additionally, the new dwarf variety might not produce adequate straw, reducing the capacity to feed cattle and produce manure, which would diminish soil fertility and potentially necessitate purchasing external fertilizer. I could continue this reasoning with additional steps, for example, by suggesting that a monocrop of a modern variety could place the farmer at increase risk of pests and diseases or that the new variety simply upsets subsistence strategies because it is not tasty.

It is therefore unsurprising that modern varieties have largely not been taken up for the main wet-season rice cultivation in Cambodia. They threaten to replace farmer agro-social skill with agricultural technologies, effectively distancing them from the agro-ecosystem, disrupting farm system arrangements and, as one farmer quipped, “making farming boring” [RE-AC]. Even activities, which do not outwardly appear to disrupt the organization of the farm system, can impact parallel systems. Applying pesticides, for example, can kill soil bacteria and make nutrients in the fertile soils less bio-available. They can also poison aquatic life such as toads, fish, and crabs, which are

a source of nutrition and culinary enjoyment during the lean season. Another reason for poor adoption of modern varieties relates to the farmers awareness of the long-term systemic outcome of modern agriculture. Through media portrayals, stories, and observation from near and abroad, farmers can largely envision what ‘complete’ modern agriculture would look like and are concerned by many aspects of it (see Section 5.1). Sophea [RE-LS], an elderly rice farmer in Kompong Chhnang province described this situation from her experience:

“People who settled in this village after Pol Pot used a lot of fertilizer and pesticides, which were sold cheaply by the Yuon [Vietnamese]. We did not know that fertilizer can lower soil quality until people started getting lower yields after 10 years. They told us our varieties were not good for fertilizer so we changed to new varieties and ate our old seeds. Now people know clearly about the problems with fertilizer and they say it on the radio too. Now, people here use less fertilizer and raise more cows and make compost. But we lost many traditional rice varieties from this area and now we grow others varieties from Battambang.” [RE-LS]

Sophea illustrates very neatly how one disruption (in soil fertility caused by misuse of agrichemicals) led to a second disruption (a modern variety), which was later rectified by reinventing their agro-social skill and seeking out replacement traditional varieties. The danger in tampering with their farming techniques is that even slightly decreased interaction in the differentiated agro-ecosystem can cause farming systems to rapidly lose coherence. The impacts, in cases such as losing landraces or cutting down sugar palms, can be permanent or at least very long-term. The apparent conservatism of the farmer is then not derived from irrationality or low education levels, but rather from *unwillingness on the part of the farmer to make his or her skills redundant and simultaneously short-circuit interrelated ecosystem interactions.*

Even ecological alternatives, such as the ecological System of Rice Intensification or organic cultivation must consider the significance placed on maintaining agro-social skill. After encountering many farmers who struggled to adopt SRI, promoters such as CEDAC changed tactics to highlight the continued role and importance of agro-social skills. In a training video produced in 2007 called “Do you

speak SRI?”, a fictional young farmer’s rings the mobile phones of fellow farmers to gloat about his high rice yield, only to find out that their yields are higher than his and required less seed. As the video progresses, wizened elderly farmers assist the main character to improve his cultivation using SRI, which is depicted as modern, but yet also portrayed as deriving from traditional know-how and flexibly integrated into existing practices. SRI is presented as a way of leveraging, rather than replacing, farmer knowledge and promoting the viability of traditional varieties. However, problems realizing suitable water management, which affects the timing of the transplanting and spacing, continues to hinder uptake of SRI because of ecosystem restrictions or poor pre-existing agro-social skill in hydrological management. The uptake of organic production, which would appear to be a simple extension of ecological intensification, has also faced challenges because it contradicts farmers’ principle of self-sufficiency by mandating cooperatives, the cultivation of specific rice varieties, post-harvest processing and the timing of sales. As a result of this, the director of the major promoter of organic rice, the CEDAC Enterprise, now plans to simply establish organic rice plantations instead of putting more effort into recruiting individual farmers [PP-LSH].

3.2 Taste and Functional Form

Understanding how to cultivate, collect and process agricultural products support a second category of agro-social skill, namely the ability to appreciate the culinary, aesthetic, medicinal, and symbolic qualities of one’s production. This skill, in turn, facilitates evaluation of quality for similar products. Simply expressed, the knowledge and skill applied to production equates with capacity to determine quality and utility. Involvement in the cultivation, harvesting, drying, sorting, threshing and milling of rice illuminates the quality of rice for farmers in ways that the consumer can only indirectly and partially investigate. Because consumers are often farmers themselves or come from a farming background, they range in terms of ability to evaluate and judge milled rice from the market but, more importantly, their place in life leads them to apply different basic criteria to this process. Even a university-trained rice agronomist, who can augment his or her elementary evaluation skills with tools and instruments, will apply certain combination of criteria to her analysis of quality. In general, the demands of a particular audience orient their criteria of quality and bracket what kind of evaluative

capabilities are useful. This process functions similarly for palm products and traditional medicine; indeed it can be extended to industrial goods, in which the manufacturer, trader, regulator, and consumer have access to and privilege certain types of information that affect their judgments. In this section, however, I will focus on the appreciation of taste and the functional form of agricultural products. More specifically, I investigate how the ebb and flow of consumer knowledge evolves over time with increasing distance from the field, forest, or orchard. The story of a product begins with the farmer, healer and tapper, the initial arbiters of taste and functional form.

3.2.1 The Healer: guiding collection, upholding reputation and transparency

While even foraging children in the countryside have some capacity to recognize medicinal plants and many of their uses, or cross-reference their information with elders, the traditional healers (Kru Khmer) and shop owners are the primary brokers of quality and safety. Even if external entry points exist, such as imported botanical ingredients, healers and shopkeepers are not held captive by these standards and often selects among a range of methods for sourcing materials. For example, based on the sensitivity, economic value and importance of an ingredient in a specific medicine,¹² a healer will choose to collect or grow the ingredient him or herself, contract from a forager or buy from the open (and uncontrolled) market. According to Ta Huon (pseudonym), an elderly and well-known healer on Kulen Mountain in Siem Reap province,

“When I first came to Phnom Kulen, I was younger and I could gather most medicines I needed within a few kilometers. Anyway, there were mines further out so I dared not go there. Now I hire local foragers to do the heavy work for me. I go with them only if I need to monitor them or control how he takes from the forest. For example, some materials can only be collected at certain cycles of the moon or they should be packed in soil for transport. I make sure the foragers follow these rules. But actually many ingredients do not spoil fast, so I find any source for that.” [PK-TH]

¹² A healer will also consider certain constraints as well, such as his or her ability to collect an ingredient, considering advancing age, distance to nearest source, amount of climbing required, risk of encountering dangerous illegal activity or presence of malaria.

In protecting his reputation while advancing in age, Ta Huon has established a reliable and controlled supply chain that leverages his skill in preserving active agents. With regulations and standards a distant prospect, Ta Huon chooses among different degrees of intervention to ensure that the quality of his medicine does not decline. The strategies for maintaining quality vary with the skills cultivated for a certain model of production. Some still carry out their own collection (e.g., [PK-CV; PB-KN; TC-YK]), others grow medicines under controlled environments (e.g., the NCTM and [KR-TP; RK-ST; NGO-VC]), while others buy on the open market (e.g., [PP-LSHe]). Son Hon Lon (pseudonym), the owner of a traditional medicine company, has more than 100 vendors and purchases from the open market and reliable suppliers, after which he inspects and tests the ingredients [PP-LSHe]. Given his scale of operations, Mr. Lon could process his medicines further (into powders, tonics, pills, etc.) but he chooses not to for the sake of transparency.

“Some city healers can sell processed traditional medicine, but you have to be careful and check their reputation and certification. Because I sell in the countryside and small towns, people are more suspicious so I do not grind the plants or make tonics. If I did that, no one could examine the product for fungi, impurities or additions of western medicine.” [PP-LSHe]

Awareness of his rural market has led Mr. Lon to focus his botanical skill on post-harvest inspection and identification (rather than in-situ identification and harvesting like rural healers), which allows him the scale to market his product all over Cambodia. In order to maintain his reputation in the countryside, he intentionally leaves his medicinal mixtures unprocessed with only a seal of purity on the package. This allows rural people who have some acquaintance with botanical medicine to inspect his product for themselves. This contrasts with the city-orientation of healers Chea Chaing and Ly Bunnarith, who produce processed traditional medicines for sale to urbanites using aggressive radio marketing. Made famous through their radio presence, these businessmen are now being investigated by the Ministry of Health for false advertising after suspicion was raised that they fortify their medicine with pharmaceutical products (Mom and Di Certo 2011). This conflicts to some degree with the stereotype that traditional healers are benevolent and that it is the biomedical doctors who unfairly

extract fees for more services and medicines than necessary. One Cambodian proverb follows, “doctors feed the disease so they can feed themselves” [PP-UMG].

In order to facilitate the transparency that Son Hon Lon creates, many healers of processed traditional medicines seek ways to invite the consumer to apply his or her skill to the determination of quality or purity. In many cases, even establishments offering highly-processed medicines in tablet, dropper or powdered form have the equivalent medicine in raw botanical form so as to demonstrate their traditional roots and provide a sample of their quality ingredients. This is true of healers and merchants in the countryside as well the city (see Figures 3.2 and 3.3). The price difference for raw vs. processed products at Mangorow Traditional Medicine, for example, is just enough to cover processing and packaging costs (i.e., not enough to cover fortification with pharmaceutical medicine) [PP-BP]. Transparency is also created through the social experience of treatment, in which patients can use their own botanical knowledge to test that of the healer and leverage the social networks in the village to evaluate him or her. This is in contrast with the largely anonymous experience of receiving medical treatment in a clinic or hospital, as Au (2011, p. 186) describes,

“If we examine the economic premise for the authority of biomedicine, it assumes a provider monopoly, doctor-patient contractualism, and a capitalist economy. The Western doctor has a professional social distance from his patient. The patient does not need personal knowledge of the doctor, because the doctor’s professional network enforces his legitimacy and generates his authority. However, the doctor never had such a monopoly in the Cambodian context. A village doctor could not just serve in any impersonal contractual role, relying solely on his medical talents for income.”

Establishments such as those of Chea Chaing and Ly Bunarith, in particular, take advantage of the new urban biomedical expectations by erecting storefronts with packaged wares hawked by salespeople rather than trained healers.



Figure 3.2 A countryside traditional medicine pharmacy and consultation table in Phnom Kulen, Siem Reap Province



Figure 3.3 An urban traditional medicine pharmacy and consultation area in Phnom Penh

3.2.2 The Farmer: ideological standards meet technical needs

Although any individual can comment roughly on the likability or taste of rice, farmers themselves are consumers and their evaluative skills are not only based on familiarity with rice, but also enhanced through involvement in seed selection, cultivation, processing (Fitzgerald 1993). This is particularly the case for smallholders, for whom much or all of their produce is consumed by their family. Through migration, countryside preferences can penetrate urban areas, but urban eating habits and tastes also evolve with the cultural economy of the city and form distinct consumption patterns (Zader 2011). Governments, research bodies, and private companies also organize these patterns by issuing or encouraging the development of standards. However, with more than 75% of Cambodians living in the countryside¹³ and primarily engaged in rice agriculture, most production (and consumption) decisions are oriented towards supporting the family (including urban-based members) and the farm, and not anonymous consumers in the market. The farming family calculates the value of the rice produced based on the utility it provides within the entire farming system, which includes human consumption, but also livestock and ecosystem needs. Although farmers' material interactions with rice are practical in nature, they also value abstract ideals such as purity, cultural value and heritage, locality, diversity, and taste.

Indeed, the persistence of “folk varieties” indicates that fulfilling farming system and social characteristics reinforces diversity and a broader concept of utility (Cleveland et al. 1994; Fitzgerald 1993). As Michael Pollan (1991, p. 221) writes, “varieties have been kept alive over the years by individual gardeners, who selected and saved the seeds of particular plants that possessed traits they prized: fitness for particular local condition [...], resistance to disease, and, most important of all, flavor.” However, consumers in general, which includes farmers, will always be a diverse audience and their tastes and preferences must be disaggregated more intentionally.¹⁴ In a sample of 70 rice farmers

¹³ World Bank. World Development Indicators, 2008. Web: <http://data.worldbank.org>

¹⁴ I conducted a double-blind taste test with farmer families in 2009, in which I brought premium grade supermarket rice from the United Kingdom to Cambodia for farmers to evaluate alongside a high-yielding variety (IR66), one middle-grade and one high-grade aromatic Cambodian variety. All were jasmine family varieties and not obviously distinguishable. Six farmer couples received access to the dry grain and four wives steamed the four samples using the same water-grain ratio and pot. Along multiple dimensions (including fragrance, aroma, and cooking quality), the six farmer couples anonymously rated the Cambodian varieties the highest, followed by IR66 and the premium British supermarket rice.

in the lowlands,¹⁵ I found that high water absorption¹⁶ and yield (in 97% of cases) as well as taste (44%) were the most important characteristics of rice varietal quality. Of the taste characteristics, farmers preferred a “simple taste” (27%) higher than soft texture (17%) or aromatic (7%). Strongly aromatic, soft varieties are grown primarily for sale, festivals, visitors, and special events. In contrast, the city markets are more oriented toward selling aromatic varieties. Part of the reason here has nothing to do with taste, but marketing logistics. Aromatic varieties are relatively well-known, few in number and return a larger profit margin; traditional varieties have a lower return and are often so numerous and region-specific (I counted 28 discrete varieties from 70 farmers) that they are difficult to sort, store, transport. Sometimes they are simply mixed together and sold under the name of a well-known traditional variety (usually Neang Malis—the primary “commodity rice” of city markets).

The question of preferences and tastes is complicated further by the broad array of quality criteria eventually applied to evaluating rice quality and suitability, including formal and informal standards. While certain trade characteristics of rice quality, such as breakage, foreign matter, or fragrance (Webb 1991), generate defined quality brackets for urban customers, preferences for other criteria, such as variety, origin, and texture are based on personal background and individual taste (Kloppenburger et al. 2000; Ovesen and Trankell 2010). By far the most important determinant of these preferences among urban Cambodians is their strong relationship with rural farming communities. This dynamic is particularly salient in Cambodia, a country in which, in 1975, most urban citizens were marched into the countryside by the Khmer Rouge to take part in an agrarian social-economy based on rice farming. The population of former urbanites was decimated (Chandler 2000[1983]) and the cities were largely repopulated by people with a countryside after the Khmer Rouge were deposed in 1979 (Saphan 2011). Most urban Cambodians today still are either directly connected to the countryside through land or close relatives, or have—at most—one generation

¹⁵ These results come from randomly sampled farmers in six villages, representing the districts of Tramkok and Samraung, Takeo province.

¹⁶ In this case, high water absorption is considered a useful characteristic because small amounts of dry rice produce a higher volume of cooked rice, which, while not nutritionally superior, facilitates in daily satiation and avoids over-eating.

separating them from rural life.¹⁷ As a result, urban family members often consume rice directly obtained from their rural-based kin or, if they do purchase rice in an urban market, their preferences and knowledge about rice are informed by their rural upbringing (Janz et al. 2003; Saphan 2011). Because rural backgrounds are connected with a concomitant agro-social skill in holistically evaluating the quality of rice, even marketed rice in the city can often be critically scrutinized by the average consumer. Nonetheless, difficult-to-ascertain dimensions of market rice, such as the farming system used for cultivation, the place of origin, or the variety present a problem of transparency that is commonly remedied via standards. Technical standards, on the one hand, are a codification of certain material aspects of rice that the private and public sectors deem are worthy of institutionalization and regulation (see for example Hill 1990; Thévenot 2009). Ideological standards (my own terminology), on the other hand, are informal, relational and flexible guidelines for quality assessment rooted in experience that often overlap with technical standards but are defined in different terms and experienced in different ways (e.g., sensory perception, in negotiation, through measurement).¹⁸ A relevant example is the technical standard “organic” and the ideological standard “natural”. The former requires specific guidelines to be fulfilled; the latter is broadly agreed upon in society but ultimately settled individually. In a general sense, ideological standards are the antecedents of technical standards, though the former has a much broader purview and can encompass characteristics that are not easily universalized or are symbolic in value (Appadurai 1986), such as tastiness, fragrance, texture, and heritage. Ideological standards are also relational and fluid, which is to say that they do not judge one characteristic to the exclusion of others and that they are configured individually and in relation to group preferences. Technical standards, on the contrary, are fixed and derive from a limited participant base (often international standards), which can result in, for example, a rice variety with excellent growth characteristics but miserable flavor (Khush and Juliano 1985).

With a relatively aware consumer base such as one finds in Cambodia, technical standards often simply become points of reference from which consumers configure

¹⁷ Anecdotal evidence of this phenomenon emerges annually during the extended holiday of Khmer New Year, in which consistently around half of the urban population returns to their homesteads in the countryside.

¹⁸ This conception of ideological standards is broadly consistent with French convention theory (notably from Boltanski and Thévenot 2006); differences are clarified further in the text.

their own preferences. Technical standards range in degree of intervention from defining suitable grain moisture level for storage or safe levels of bacterial contamination to defining what amylose/amylopectin ratio makes for tasty cooked rice (Singhal et al. 1997, pp. 57-58; Vanaja and Babu 2003). It is in their nature for technical standards to oversimplify: to privilege one characteristic, such as short growing season or sugar content, to the exclusion of others, such as resilience or taste. Feuer (2011) documents how even organic certification, a technical standard one might expect to be more sensitive to local demands, often fixates on the characteristic of natural production at the cost of many others in Cambodia, including varietal diversity, place of origin, cooking quality, and storability. Buyers do often consider the characteristics that are traditionally standardized (such as milling quality, polish, moisture content, etc.), but they prioritize these and other characteristics without a consistent hierarchy in society (Straughan and Roberts 1999). Price is perhaps the only characteristic that has a linear (negative) relationship with desirability.¹⁹ For multi-generational city dwellers, reputation, rumor, marketing and certification play an increasing role as distance and familiarity with agriculture decreases (cf. Zader 2011). But in general, the mental calculus that leads to an eventual purchase comprises a complicated series of trade-offs that pre-empt the potentiality of one universally desirable product. Indeed, fulfilling a technical standard, such as organic, does not only add an organic characteristic to an existing product—it invokes an ideological standard of natural rice that reshuffles valuation of other dimensions of preference (Guthman 2002, p. 256; Murdoch and Miele 1999). Urban consumers of palm sugar paste in Phnom Penh, for example, generally prefer whiter color because it is indicative of higher quality (i.e., higher sugar content) palm sap but, insofar as whiteness might be derived from artificial chemicals, they might prefer darker shades of sugar.

3.2.3 The Tapper: skill, landscape, and the role of quality

The story of the palm tapper is the story of balancing skill, the constraints of the landscape, and the needs of the consumers. Instead of starting with palm sugar, however, I will start with a similar product: maple syrup. Like traditional palm sugar, maple syrup is created by condensing the sap of a tree to a desired viscosity and level of

¹⁹ At the expensive end of this spectrum price may, of course, become positively associated with desirability but that is rarely the case for food, especially staples like rice or sugar.

sugar. This prevents mold and creates a sweet product that can be used in a variety of ways for cooking, baking, and flavoring. Since the early 1900s, food chemists have largely unsuccessfully attempted to isolate the unique character of the maple flavor (Arctander 1960). Despite representing less than a quarter of combined artificial and genuine syrup sales worldwide, its immutability and natural origin have made it an expensive and sought-after product. And despite its relative unprofitability, farmers in the United States and Canada continue to produce it. Hinrichs (2011) stresses that its role in the overall livelihood, cultural identity, and lifestyle of farmers has facilitated the survival of maple syrup production. Like maple syrup, palm sugar production is embedded in the culinary, aesthetic, economic and symbolic landscape of Cambodia, a topic I will cover more thoroughly in Section 4.2.4. Based on different estimations, between one and two million palmyra palms (*Borassus flabellifer*) are distributed throughout Cambodia, primarily scattered within the lowland rice-growing areas (Romera 1968; Yang Saing 2000). The trees are used for building and shade materials, dike stabilization, and for exploiting palm sap. The sap, which is only supplied by mature trees of 10 year or older, is tapped primarily in the dry season (December to May) and can be drunk directly or converted into a variety of products. Palm sugar and vinegar have played a major role in Khmer cuisine while palm wine becomes particularly important during Khmer New Year, when it is enjoyed as part of the weeks-long festivities. More recently, palm sap has been converted into organic liqueurs, palm beer, and even used as livestock feed (Borin 1996). The diversity of its uses means that palm sap quality is not monolithic, but rather determined by application and expectations.

Rather than referring to “quality”, instead I refer to the various characteristics of palm products that are shaped by the landscape, tapping practices, processing and marketing. The landscape, loosely understood as the soil quality and micro-climate set the basis for the variation in palm sap characteristics. Although it is mysterious exactly what landscape conditions are ideal, certain districts in Kompong Speu province are well-known for producing the most aromatic and distinct palm sugar. In practice, this is a very rough criterion as climate variation, the precise locations of individual exploited trees, and the skill of the tapper can overshadow the effect of regional location. Indeed, the qualities of the palm sugar are ultimately determined by the combination of

landscape and human practices. Borin and Preston's (1995) scientific and rather unsubtle description of palm sap harvesting provides an idea as to the farmers' influence:

“The tapping process consists of beating the inflorescence with a wooden mallet or tongs and then slicing the tip during 5 to 8 consecutive days until the juice began to flow. The beating and slicing process is continued until the complete inflorescence is exhausted.”

In addition to care taken during the “beating and slicing” for approximately six months, the qualities of the sap are affected by the individual location of the tree: some are found in rice fields, others on residential land; of these, some are clumped together while others are isolated. In the case of trees in the field, the nutrients available to the rice paddy (including any chemical fertilizer) are also available to the adjacent palm tree. On residential land, various animal and human residues are often the primary source of plant nutrients. Rainfall patterns play a role as well: too much and the palm sap will flow readily but be diluted; too little and the flow may be reduced. During the tapping period, the palm sap is affected by the timing of collections, hygiene of the collectors, and usage of any fermentation inhibitors (natural or chemical). Subsequently, the methods applied for condensing play a crucial role in the color and aroma. Cooking pots are often subjected to variation in heat while the sap itself can be exposed to ash particulates from the smoke, dust from the air, or insect fragments. Artificial whiteners such as sodium hydrosulfite might be added at this juncture. If additional uncooked sap is added during cooking, increased caramelization and darkening can result. The duration of evaporation, which determines the thickness of the sugar and its eventual viscosity, is gauged subjectively. Following condensation, aeration is usually performed manually or with a mixing apparatus—similarly, the amount of aeration is subjective. The resulting sugar is a unique combination of landscape, climate, human skill, and variation in processing. The different demands for it—lighter sugar for dipping, aromatic and intensely flavored sugar for sweets, darker sugar for curries, granulated sugar for coffee, etc.—ensures that the resulting product will find a use.

3.3 **Knowing to Value Diversity**

“Seeds have the power to preserve species, to enhance cultural as well as genetic diversity, to counter economic monopoly and to check the advance of conformity on all its many fronts.” (Pollan 1991, p. 224)

As Michael Pollan argues, the influence of agriculture is not bound to the farm or the dinner table but extends to the diversity of human experience. The way we cultivate plants is a reflection social, economic and spiritual organization, and the way we eat is constitutive of our culture. American farmer-poet Wendell Berry’s now famous phrase, “eating is an agricultural act”, is a reminder that, in spite of differences in awareness about agriculture, the daily activity of cooking and eating still connects us with the farm. And yet, this phrase was written primarily as a critique of the industrial eater, a product of the modern food system who no longer necessarily sees the connection between food and farming. The industrial eater lies on the lower extreme of a spectrum of awareness, on which the number of food, fodder, medicinal and livestock species one knows increases with proximity to the farm and rural life. The agro-social skill that allows a farmer to identify and use many species also allows him or her to enjoy them and, by extension, understand the need for their continued diversity. Following the typical model of industrialization in agriculture, urbanization proceeds, farm sizes increase, and agro-biodiversity declines, which is reflected in the reduced diversity of food in urban marketplaces and the corresponding reduction in food knowledge of the urban consumer. While inevitable to some degree, agro-social skill maintains the imperative of diversity, which serves to undermine the cycle of industrialization. The different configurations of rural/urban settlement and agricultural employment in the USA, Australia and Europe demonstrate that, even in developed countries, there are divergent outcomes of industrialization. In Nigeria, urban consumers can still distinguish organic from conventional produce based on shape, turgidity, and color, and they value many indigenous varieties for their taste, nutrition, and dietary role in fighting non-communicable disease (Johnson 2011). Cambodia faces a similar situation, in which high stocks of agro-social skill pre-empt the rapid industrialization of agriculture by drawing on demand for diversity and, in turn, provide time for society and government to reflect and manage their individual industrialization.

Because industrialization relies on continuous commoditization of agriculture, it is interrupted by processes that encourage diversification in the marketplace and on the farm. In the marketplace, diversity is associated with demand for a wide variety of products and capability to individually determine quality. Even the smallest petty rice trader in Phnom Penh offers at least six combinations of variety and quality of rice, while larger traders commonly sell six or seven varieties which can be further differentiated along lines of quality, place of origin, and year of harvest. At least three traders in Phnom Penh market around 40 different combinations of rice variety and quality. The situation is similar for palm sugar, for which place of origin, functional form (liquid, paste, caked, or granulated), and quality create a wide market for what might otherwise become a simple commodity. Confirel, a company established to support the preservation of sugar palms in Cambodia, continually faces the dilemma of industrialization in this context. The marketing manager [PP-CHR] explained that the company faced a technical challenge of standardizing their palm products because of the diversity in production and in demand. On the production side, the skill range of the palm tapper and the vagaries of the individual trees produce inconsistent sap, which complicates producing a uniform manufactured product. On the consumption side, producing uniform products does not appear to satisfy demand because the domestic market has varied and often contradictory expectations about price, taste, and product form. In contrast, the manager seemed more optimistic about the export and tourist markets, in which consumers' lack of allowed space for marketing to achieve a more consistent demand. The other player in the palm drinks market, Khmer Natural Enterprises, has a different strategy for dealing with the complexity of the demand structure: they simply produce outside of it. According to general manager, Khmer Natural markets only three products, which aim to either serve markets with low inherent diversity (such as palm vinegar) or create new niche markets [PP-LRS]. One product, the equivalent of sour palm wine (*tuk tnot choo*), is marketed as low-cost but hygienic "palm beer", which ordinarily has no urban presence. Another product, sweet palm juice, is aromatized and sold as a Cambodian competitor to international juice brands. His marketing is purposeful; he avoids demand structures that are overly differentiated. Rice traders, in contrast, are forced to operate within markets with diverse demand, and their long product lists reflects this.

Based on my experiences with a number of medium and large rice traders in the city, success requires that the shop owner provides enough configurations of rice (based on variety, quality, place of origin, year of harvest, organic, etc.) to capture the diverse demand while the buyer must continually police the trader to ensure a good match between quality and desired characteristics [PP-DH; PP-US; PP-PSC; PP-CN; PP-CT; PP-OCN]. Traders are locked into a similar relationship with farmers: the trader can only buy what farmers sell and the farmer will only bother selling rice configurations for which consumers will eventually pay an adequate price. As long as the farmer continues growing many varieties and the consumers continue demanding them, the trader will arrange the marketing. The following represent everyday supply relationship between farmers and traders:

“The Cambodian middlemen who come here are usually the same every year. They have a shop or a few big customers in Angtasaom or Phnom Penh. They specialize in selling varieties from this area like S'ma Prum so they come here where we always grow it. I think they have customers from Takeo.” [TK-PM]

“You see my shop, it is quite small. How many varieties do I have ... maybe six? [Researcher: was it always like this?] Two years ago I had much more, [listing provinces and varietal names], so that if a new customer came, she would find something she likes. But still many customers did not find and went to another shop. Now I just focus on a few varieties from Battambang and Kompong Cham for my regular customers.” [PP-DKH]

This highly differentiated aspect of the rice market hinders efforts by various agronomic research agencies and organic rice promoters to elevate their products above the rest. Feuer (2011) demonstrates that products promoted on the basis of singular quality characteristics, such as organic rice, are overshadowed in markets where consumers value many diverse characteristics (see also Brunsø et al. 2002). The agronomic research agencies working in Cambodia have faced similar challenges creating desirable modern varieties. Between 1990 and 2009, the main local agronomy research station (CARDI) bred or promoted 38 rice varieties with different growth, resistance and taste combinations, but has met with limited success with one partial exception. The early-

season cropping cycle, for which there are no traditional varieties, is planted almost exclusively with modern varieties, which represents around 25% of the total annual rice production. Yet, due to their poor taste, it is difficult to find these varieties in the household consumer market in Cambodia; most of the produce is exported informally to Vietnam, sold to the government as soldier rations, employed as feedstock and used as famine relief. Low desirability is a well-known problem with many such short-duration dwarf varieties despite an increasing focus since the 1980's on improving grain quality (International Rice Research Institute 2010; Khush and Juliano 1985). What agronomists consider good grain quality corresponds poorly with the constellations of characteristics desired by differentiated rice markets such as the market in Cambodia.

This complex demand structure, however, depends on buyers to not only continue demanding a wide variety of rice, but also be able to enforce this. As long as the buyer's agro-social skill remains high, her ability to evaluate rice quality and differentiate between additional characteristics deters traders from simplifying their selection. Instead of becoming dependent on grading, reputation, brand name, certification, or food labels, the consumer is able apply her individual skill and criteria to purchases. This, combined with diversity among market-goers and translates to diversified demand in the marketplace, mirroring what Miguel Altieri (2011) has said: "we cannot maintain genetic diversity without the cultural diversity". Because the task of catering to the diverse tastes of consumers demands maintaining such an extensive stock, most wet markets in Phnom Penh are stratified so as to distribute the selection between many traders. In the palm sugar market, the product range is typically stratification by regional or by product form. Traders representing well-known palm sugar regions like Kompong Speu, which now has a GI, often have an entire stand displaying various products as well as quality levels. Other stands might sell caked sugar and light syrup, while yet others provide formally-packaged cakes or granulated sugar as gifts or souvenirs. Because the demand ranges from cakes to curry, steamed buns to coffee sweetener, working-class to high-end, diversity of functional form, quality and flavor is continually reproduced. A similar dynamic is characteristic of the rice market, in which regional background continues to play a significant role in determining traders' stocks, while varied selection of variety further segmentation the

marketplace. In a survey of medium and large wet markets in Phnom Penh,²⁰ I found between 35 and 120 combinations of rice based on region, quality, and variety.

If the urban marketplace is the setting in which agro-social skill is tested and diversity exhibited, the Cambodian countryside is the reservoir from which the knowledge and genetic basis for diversity are reproduced. Still largely smallholder in nature, the lowlands are home to a wide range of individual farming systems with correspondingly complex biodiversity, which is maintained to lower pest and disease risks and to match the agro-ecosystem and tastes of each family. As reported above, I counted 28 distinctly known rice varieties from 70 farming families spanning two districts in Takeo province. From these, eight varieties overlap in similar lowland farming communities in Kompong Chhnang province (based on 15 farmers in two districts), representing an overlap of approximately 30%.²¹ In addition to genetic variation, diversity is also reproduced by the distinctiveness of agro-ecosystems at different scales. At a regional level Battambang province, referred to as the rice bowl of Cambodia, is commonly judged to have superior rice, while Kompong Speu is known for the best palm sugar.

Locally, however, the quality of rice and palm sugar can differ dramatically from farm to farm due to soil, farming/tapping ability, and micro-climate. Some of these differences, however, are hard uncover because distinctiveness can be lost in post-harvest processes of drying, milling, sorting, packaging, transport and storage. Many farmers also keep most or all of their rice crop for subsistence or they cultivate different varieties in different ways (e.g., organic) for home consumption. For example, Mr. Chan (pseudonym), a partial organic farmer in Tramkok district, Takeo province, organizes his production in the following way:

“If I walk to all of my fields, it will take around one hour. The paddies near my house I grow naturally with T’num, G’chao Chop, Red Rice, and Domnaup. This rice we eat ourselves. I have around [one-third hectare] not so far over there, where I grow Pkah Malis naturally for CEDAC. And I have around

²⁰ The following markets were included in this study: O-Wake-Om, O’Russey, Samaki, Takhmao Thmei, Takhmao Chas, Boeung Keng Kang, Toul Tompong, Toul Kork, Boeung Chouk, Kilo Lek Buon, Somnong 12.

²¹ As I discovered in two cases, some rice varieties are morphologically similar but known by a different name in a distant region.

[one-sixth hectare] about 25 minutes walking where I do No-Name rice – I use some chemical fertilizer. I sell that mostly to Vietnamese traders.” [TK-CL]

Farming system and varietal diversity, as exhibited by Mr. Chan, are often based on the inherent variation of the landscape, a patchwork of fragmented farm houses and paddies, each of which has its own agro-ecosystem and receives differential treatment from the farmer. In a similar manner, the distribution of sugar palms in the lowlands is scattered and each tree, based on its age, location, and access to the water table has different requirements of the tapper and delivers sap with differing chemical compositions. All palm tappers that I have interviewed in three provinces have easements arranged with neighbors, by which they are allowed to tap the sugar palms on their neighbors' land in exchange for a yearly contribution of between 3-5 kg of palm sugar paste per tree. Whether palm trees or paddies, the diversity of the landscape reinforces the diversity of farming/tapping systems, which, in reflection upon differentiated urban tastes, creates the framework by which part of this diversity is transported to urban areas.

3.4 Limits to Agro-social Skill

In many ways, the narrative of agro-social skill in the context of development is the story of the decline of agro-social skill. Fitzgerald's (1993) account of the “de-skilling” of farmers, unlike this one, is an account of past skill and its rapid degeneration in the face of the changing agricultural landscape in the U.S. Corn Belt. In her account, farmers' role in corn breeding and establishing quality parameters shifted to commercial breeders and seed companies during the 1930s and was finally eclipsed by hybrid corn varieties in the mid 1940s. If, as I have argued in the cases above, agro-social skill is often embedded in, and reproduced through, so many biotic and societal structures, such as the landscape, farming systems, tastes, childhood, and urban demand, why is it so vulnerable to decline? Fitzgerald (1993, p. 342) argues that it is primarily the hybrid corn, as opposed to the tractors and agro-chemicals, which eventually “locked farmers out from an understanding of their own operations” and led to their dramatic de-skilling. In this chapter, I have argued that agro-social skill is not necessarily threatened by many technology if it is mutually and continuously maintained at a societal level, especially

between farmers and consumers. The hybrid corn would not have caught on if consumers (and thereby, retailers, processors, traders, etc.) did not want to eat it. Rather, hybrid corn caught on because proximate causes, like drought, poor seed availability for open-pollinated varieties, and lack of farmer coordination met with long-term causes, like the indifference of processors to corn quality (especially in syrup, flour, oil, etc.), the growing use of corn in feedstock, and the decline in urban agro-social skill. This chain of events is, to some extent, distinctive of corn but it is also indicative of that time period and socio-cultural context. As I have outlined in Section 2.3, the discursive space for alternative agriculture, rise of post-development theory, and the international environmental movement have changed the context of agricultural development since the 1960s. While many of the contemporary discourses are broadly more supportive of maintaining or recreating agro-social skill than previously, there are still many potential risks to agro-social skill in Cambodia, which I will outline below.

3.4.1 Tricking the Consumer and the Producer

As one third generation palm sugar trader observed, when sodium hydrosulfite became widespread in sugar processing in Kompong Chhnang province in 2005, it “changed everything” [RE-TCS]. Soun, the eldest daughter in a palm sugar trading family, collects sugar throughout Roleab Ear district for distribution in Depo Market in Phnom Penh. In her family’s collective experience, sugar quality was associated with sap purity, sugar content, and care in condensing. Using good sap, filtering impurities, venting the smoke correctly, and condensing one pot at a time were the keys to whiter, higher-quality sugar. Traders could determine quality by visual inspection and would pay accordingly. Consumers just had to compare the color of the sugar in the marketplace. As one trader relates, sodium hydrosulfite disrupted this state of affairs:

“In my childhood, it was always like this but since 2005 we have this powder that can change the color. This has changed everything. Even impurities, like dust, insect bits, and over-caramelized sugar seem to become white.” [RE-TCS]

The awe at how dramatically a new technology can render agro-social skill redundant makes it seem improbable that ideological standards for palm sugar quality will recover.

Indeed, a similar experiment I conducted with artificially aromatized jasmine rice from Thailand yielded similar results: farmers and consumers seemed unable to tell the difference or they even praised the aromatized rice. Consumers of traditional medicine are similarly tricked by unscrupulous salespeople who mix strong pharmaceuticals into powdered medicine or tonics. In a similar way, Fitzgerald's (1993, p. 338) corn farmers, by the late 1930s, were unable to distinguish between different strains of hybrid corn. At first blush, whiteners, artificial aromas and other tricks would seem to be a fatal blow to applying agro-social skill to differentiate quality and distinctiveness in the marketplace.

The response to these tricks, however, often demonstrates the depth at which agro-social skill is embedded. By 2010, when I conducted my research into palm sugar, artificially whitened palm sugar represented less than half of the urban market and was in decline—quite in contrary to dramatic changes expected by tappers and traders at that time [RE-TCS; KS-RT; KC-SY; RE-TB]. I can imagine that the first few years after sodium hydrosulfite became widespread created a seeming bonanza for traders and consumers: low-quality sugar could be sold at a higher price and consumers likely received apparently higher quality sugar for lower prices. Indeed, a field report compiled by CEDAC in 2008 observes that consumers are unaware of the addition of sodium hydrosulfite (Him and Tong 2008). By 2010, awareness had increased enough that consumers and petty traders in urban marketplaces could discuss the topic knowledgeably. A number of things happened to create this awareness. Firstly, tappers and traders who traditionally dealt in high-quality, whiter palm sugars were suddenly faced with a market flooded with white sugar. They began hawking their products as traditional, and chemical-free. Secondly, farmers discovered that cooking with and handling the chemical was hazardous, particularly for pregnant women who would spend six months boiling palm sugar per year. Thirdly, a few NGOs began to advocate against whiteners and created markets for chemical-free sugar while successfully lobbying to ban sodium hydrosulfite. And lastly, the secondary layers of agro-social skill emerged, namely taste, reputation, and rural relationships.

It turns out that determining palm sugar quality was never simply a matter of examining the color, but of locating a reliable supplier (perhaps a relative in the countryside), continuing to check quality, and agitating for traders to reconsider

applying whiteners. Once whiteness became a less consistent indicator of quality, and awareness about chemical additives was raised, consumers found ways to shop more conservatively. A trader of agro-chemicals outside Kompong Chhnang provincial town, noted that,

“I have had to change my business in palm sugar since last year [2009]. The whitener did not sell as well; farmers said they did not want to use it anymore. So I had two bags left for the whole year and having them in my shop made me very ill. [...] Since then I have heard that palm sugar traders are using less all over Cambodia because buyers do not believe when the sugar is so white; traders are worried. Me too! I buy palm sugar now from one guy who used to buy chemicals from me in 2008.” [KC-OS]

Not all consumers will be aware or care that their sugar has been artificially whitened but the uncertainty created by consumer unease unnerves traders and complicates agro-social skill-based quality-value determinations. This occurred in a more widespread manner in Cambodia between 2009-2010, when rumors began circulating that two well-known producers of traditional medicine in Phnom Penh were fortifying their treatments with pharmaceuticals. Salespeople and healers all over the city (and country, to some extent) began receiving more critical questions from consumers about their ingredients and quality assurance mechanism [PP-LSHe; PP-HP; PK-CV]. This demonstrates one weakness of relational systems of quality determination. While individual quality determination and cross-checking with one's relatives and associates can pre-empt some trickery, agro-social skill cannot readily adapt to new technologies without outside sources of information. This information is usually demanded in the form of regulations and oversight, which are ultimately admissions that individuals can no longer entirely control quality by themselves or by leveraging their social networks.

3.4.2 Devaluing the Inherent Product

Evaluating the inherent quality of an agricultural product has two prerequisites: (1) the consumer has direct access to the product so she can touch, taste, smell, and feel it; (2), she is motivated or cares about quality. Packaging, in this context, is disempowering to the consumer for she is unable to interact with the product (except visually) and thus

shifts her focus to characteristics like price, brand name, and nutrition labels. While the product can be tested at home at some cost, it is, as with much agricultural production, unlikely that the quality will be identical the next time she purchases it. This explains the seemingly unhygienic atmosphere of many wet markets, where the fresh products are laid out in the open for customers (as well as dust, flies, and small animals) to access. Buckets of palm sugar are open to allow passersby to quickly view color, texture, and smell. Rice bags are propped open, inviting market-goers to inspect a handful as they choose. Botanical medicines are laid out for customers to identify and inspect freshness. Driven by standards, regulations, hygiene measures, and processing, the task of determining inherent quality is increasingly shifted to the government, handlers, and retailers. As discussed above, however, technocratic measures of quality are too focused on certain characteristics to the exclusion of others. As long as the consumer has access to the raw product and motivation to do so, she can complement the information provided by handlers with her own experience. The organic rice provided by CEDAC here is a case-in-point. The two and five-kg bags are sold in mostly opaque plastic that provides a clear window for viewing the rice grain while the 20 and 50kg bags are made of woven plastic that can be penetrated by the rice probe. The smaller amounts, for which quality determination is less imperative, are sold on the basis of reputation and visible observation while the larger amounts, which are a bigger investment, can additionally be touched, smelled, and tasted.²² While artificial chemicals can be used to preserve, aromatize, fortify, or color certain products, packaging further decreases the chances that this will be discovered.

While processing and packaging create external barriers to quality determination, motivation to evaluate and produce good quality products acts as an internal barrier. For example, most lowland farmers in the south of Cambodia knowingly cultivate rice for sale to Vietnamese traders and/or the government. Because much of this rice is slated for quality-indifferent uses, such as military rations, prison food, feedstock, famine reserves, and processing into flour, farmers are not motivated to produce anything other than high yield. This is largely the case with early-season

²² Critics might argue that consumers could probe larger rice bags to check grain quality but subsequently purchase a smaller bag of the same variety. However, the processes of transport, milling, storage, and packaging do not homogenize the rice, which makes it possible that one of the bags is filled with rice from a different batch (perhaps a different region or different farmer).

cropping using modern varieties. In the case of sale to Vietnamese traders, farmers are often indifferent to quality for nationalistic reasons. Salespeople of traditional medicine in the urban and rural areas also must cater closely to the motivations and agro-social skills of individual customers [KR-WF1; RK-KD; AS-YC]. In Mangorow Traditional Medicine, like in many shops, the healer/pharmacist often provides the same medicine in raw cut, powdered, or tonic form. This allows the shop to segment the market by price but also, in the case of raw cut ingredients, to provide more discerning customers with the opportunity to inspect the raw materials. Casual shoppers or those unfamiliar with botanical medicine will rely on reputation, certifications. For these customers, the co-founder of Mangorow, Mr. Pheng Bun, has sought out formal training and government accreditation in order to improve his credibility. From the curious to the goal-oriented, customers of traditional medicine (similar to rice) are diverse enough in background, preferences and motivations, that retail settings must be prepared for a full range of inquiries. For those that do not know very much, shops promote standardized packaged medicines. However, because agro-social skill is primarily leveraged to evaluate the inherent quality/utility of a traditional product, but it can be engaged only when people are motivated to and have direct access to that product.

3.4.3 Agriculture Does Not Function in Isolation

Beyond the vulnerabilities of agro-social skill to trickery and changing product form, it is also increasingly influenced by factors external to the agricultural sector. From demographic changes in society, to global trade and consumer lifestyles, the role of agro-social skill is increasingly marginalized to areas such as food, medicine, and traditional products. The personal interaction with food and medicine is often dwarfed by new interactions with consumer lifestyles, technology, and new types of urban culture. While I have argued that agro-social skill has avenues of reproducing itself and adapting, many of the new technologies embedded in the commodification of agricultural products present challenges that often call for changes to the nature of agro-social skill itself. In the countryside, land fragmentation and mobility both threaten the coherence of rural communities and offer opportunities for structural transition to hybrid models of rural life. New technologies, such as television, play both a relatively benign role, such as by delivering weather forecasts and informing about pest outbreaks,

and a more potent role, for example, by engendering unrealistic urban expectations through nightly Korean soap operas (Ryoo 2009) or through advertising agricultural products and implements. Supermarkets teach a lesson about increasing hygiene and offer an opportunity for commercialization of Cambodian products, but they also diminish agro-social skill through packaging, processing, and pre-sorting vegetables. Global trade provides comparison and competition, but also creates commodity markets that both challenge and offer new conceptions of quality and utility. Pharmaceutical drugs play a critical role in the development of the health system and provide a partial model for traditional medicine, but they also interact with local health cosmologies and the socialization of health care. Near-substitutes to heritage products, such as granulated cane sugar, offer ideas on how to improve energy efficiency and hygiene of palm sugar production, but also destabilize the sugar market with commodity market relations. And more broadly, industrialization in other economic sectors, such as textiles and goods manufacturing create pressure to apply capitalist relations to agricultural development. In general, modernity and development provides both risks and opportunities to agriculture and the “moral economy” (Sayer 2000) of Cambodian society.

3.5 Conclusion

In the introduction to this chapter, I highlighted how the eventual stabilization points of rural settlement and farm labor differ between the highly-capitalized cases of the USA, Australia, and Europe, which is an initial indicator that the eventual outcomes of industrialization in agriculture have the potential to vary. While Chapter 1 explores the historical and physical context as explanatory variables for this variation in Cambodia, this chapter focuses on the social-cultural assets that evolve with and influence agricultural development in an endogenous manner. The macro asset discussed in this chapter, called agro-social skill, affects both how Cambodians encounter and understand agricultural change as well as their capacity to influence and direct it. Throughout this chapter, I highlight how agro-social skill is generated, maintained, evolved and ultimately leveraged by individuals in their daily life and, in aggregate by Cambodian society, to make sense of and shape the implementation of various discourses of agricultural development. This applies not only to affecting change in typical development schemes, such as green revolution agriculture, ecological intensification,

certification, and value-added activities, but also in related social processes of urbanization and commodification. This goes toward overcoming the axiom that industrialization is monolithic in its affect on agriculture, and moving toward a notion of endogenous agricultural change and heterogeneity (Van der Ploeg 1996; Van der Ploeg and Saccomandi 1995) that reflects individual countries' capability sets (see a discussion of Sen 1999 in Section 2.1). Following Mitcham (1979), I argue that agro-social skill, which involves training the human body and mind to carry out activities, such as evaluating and appreciating food, medicine and cultivation practices, fosters the cultural and technical reflexivity that helps people proactively manage the processes of urbanization and commodification. Some new technologies, commodities, and practices I have described above can lead to a manner of "de-skilling" (Fitzgerald 1993) while others (see more detail in Chapter 5) can reinforce patterns of local knowledge and preferences—or lead to "re-skilling".

The generational reproduction of agro-social skill through childhood and the direct or indirect experiences of foraging, farming, and cottage industry provide a framework for critically evaluating the effects of industrialization on food and healing. As Ingold (2011[2000], p. 386) describes of childhood-learned skills, "what is passed on, in learning, is a context-independent specification for behavior, and that such a specification is available for transmission, in coded form, outside the situations of its application." In other words, skills learned on the farm cannot only be applied in urban contexts, they can be leveraged more generally for understanding processes of rural change and agricultural commodification. As rural arbiters of taste and functional form, the traditional healer, farmer, and palm tapper can parlay their skills and knowledge into generalized preferences and perspectives that migrate to cities with them and facilitate a diversified urban demand. In order to capture this demand structure, middlemen are compelled to provide a wide variety of products in the marketplace. Their role is to transfer the reservoirs of agro-biodiversity to the city, simplifying it in a way circumscribed by farmers and the evolving urban tastes. Even as formal standards and regulations to control quality are introduced, aware consumers (i.e., those with corresponding agro-social skill) apply their own differentiated set of ideological standards to evaluate their purchases. Beyond direct contact with the food, botanical medicine or traditional product in question, the social experience of consumption

continues to be tied up with providing transparency: establishing reputation, consummating buyer-seller relations, and presenting otherwise inaccessible information about the product, such as place of origin and production method. In short, the agro-biodiversity, farming landscape, and medicinal culture of the countryside are mirrored in a simplified form in the cities like Phnom Penh.

The extent of simplification, however, is informed by the decline in agro-social skill and by efforts to delimit the utility of agro-social skill in urban transactions. Through urbanization and commodification nature tends to become disembodied from social relations (Ingold 2011[2000], p. 314) and the value and utility of agro-social skill declines. Urban handlers and retailers, for example, can attempt to take control of the demand structure by tricking consumers and producers with technologies and methods that confuse or pre-empt informal quality evaluation protocols. They can also devalue the inherent agricultural product in favor of external things like packaging, processing and marketing, which appeal to consumer desires while preventing the direct access to the raw product needed for evaluation. Trade and globalization put additional pressure on agriculture and medicine to adapt quickly to externally-defined standards and product forms, many of which simplify dimensions of quality (or safety and hygiene) to the exclusion of other characteristics appreciated in ideological standards. Export of agricultural products, whether palm sugar, rice, or botanicals, further leads to commodification as bureaucracies privilege grades and standards over anecdotal quality measurements. Notwithstanding, consumers on the receiving side of exports, even if they are familiar with rice, have no comparative basis upon which to differentiate between the range of quality characteristics of Cambodian rice, nor are they likely to have the motivation to do so. Therefore, maintaining diversity in agriculture and consumption is primarily a domestic concern that is sustained through the continued embeddedness of social relations (with an agriculture basis) in economic relations.

Indeed, with contemporary development discourses promoting rural heritage and the heightened awareness about the problems of industrial agriculture, agro-social skill becomes a strategic asset for modeling and envisioning agrarian change and commodity relations. Looking in hindsight, post-industrial conceptions of sustainable agriculture recognize this, often valorizing the knowledge systems of peasant farmers (Goodman 1999) and deliberately try to (re)assemble farming systems based on pre-industrial

lessons (Clarke et al. 2008; Singer 1974). However, institutionalizing alternative agriculture in development is often antithetical to agro-social skill as it displaces decision-making from the common culture into the formal culture, as exemplified below in the case of organic rice.

In Cambodia, organic rice appeared to be a practical bridge between international agricultural development goals and the informal aspirations in Cambodia for food sovereignty and viable smallholder farming. However, the misunderstanding about the role of organic agriculture was already demonstrated when, as the director of CEDAC observed, “The [German development agency] people didn’t think there was an organic market or a point for it in Cambodia. They were wrong” [PP-YSK]. Although the domestic organic rice market blossomed unexpectedly for a poor country, by focusing on the middle-class market, the director admits that CEDAC misunderstood the aspirations and views of farmers and the majority lower-middle class consumers for diversity in tastes and farming techniques. In my most recent interview with him, he expressed his intention to begin promoting organic local varieties in the cities and focusing on food diversity, seeds and farmer-implemented plant breeding. Good intentions in agricultural development, such as organic agriculture, are indicative of the view that formalization along capitalist lines (i.e., standardization) by economic, civil society and state actors is inevitable (e.g., Kaplinsky 2000; Ponte 2002). This study takes this view as a point of departure, but aims to fill some of the gap in the academic literature about exploring the diversity or heterogeneity found in processes of commodification. This is particularly relevant in Cambodia, a largely subsistence economy undergoing rapid shift to capitalist relations, in which agro-social skill plays a fundamental role in the production and consumption of natural and heritage production. According to a CEDAC organic farmer who informally sells his natural rice in a nearby local market, “we also deserve to have organic markets here with our prices, our local varieties of rice” [RE-AC]. He is suggesting that, in the proper context, agro-social skill should continue to be used to constitute the economic basis of the marketplace and keep costs down. To some degree, forms of this already exist; for example, farmers in the lowlands report that, with their regular traders, they can often get a bonus for non-certified organic rice, especially if the trader plans to consume the rice himself or distribute that rice to family and friends [RE-AC; TK-CL; TK-BO; TK-CS]. But this

does not always work. For example, large rice handlers, such as the Angkor Kasekam Rung Reung rice mill, which have attempted to centralize the purchase of chemical-free rice using informal monitoring, face intractable problems with compliance (Chiu 2001). In contrast, Van der Ploeg's (2011) recent research on "nested market" illustrates that decentralized systems of quality assurance, based primarily on agro-social skill, can reach large scales even in highly capitalized societies. The precondition for such initiatives in the long-term is the preservation and reproduction of agro-social skill.

4 **MANAGING *TECHNIQUE* IN AGRICULTURE: LESSONS FROM ANTIQUITY FOR MODERN SOCIETY**

“To the Khmers, Cambodia is Angkor, and their Angkorian Heritage is their future.” (Stark and Griffin 2004)

A common theme in Cambodian national identity is the notion that Khmer civilization reached its epitome during the Angkorean period (9th to 15th century CE) and that current society is a contemporary reflection of that fundamental period (Öjendal and Kim 2007; Ovesen and Trankell 2004; Stark and Griffin 2004). This includes, on the one hand, a sense of awe directed at the engineering prowess and social control of their ancestors as well as, on the other hand, an awareness of the eventual decline of this grand civilization. The actual reasons for this decline are, in the face of conflicting archaeological accounts, largely wrapped in mystery while the imagined (or assumed) narrative continues to play an important role in society; indeed, Angkor remains a benchmark of contemporary progress for many politicians, businesspeople, bureaucrats, and farmers. The Germanic prefix “ur-” perhaps best translates this Cambodian sentiment for European readers. On the one hand, it bears connotations such as original, authentic, and antique that hearken back to a mystical period of ancient civilization, as in the sense of *Urgetreide* (ancient grain varieties). On the other hand, “ur-” also tends to signify loss or displacement by contemporary culture even as it symbolizes valorization of the ‘old’, as in the adjective *urdeutsch* (ancient and distinctively German). For modern Cambodians, Angkorean civilization is often viewed both as a source of inspiration and pride as well as a cautionary tale about the risks of technological optimism and the alienation from nature caused by urban life. These lessons about Angkor are reframed and reinforced by recent events, such as the Khmer Rouge’s grand but disastrous irrigation campaigns (see Mak 2001) and current fears about the hydrological effects of upstream dam projects on the Mekong-Tonle Sap fishery corridor. This chapter, however, focuses more particularly on the influence of this so-called “Angkor narrative” on contemporary conceptions of heritage and environmental performance. In the following, I will trace a line between the narrative of agriculture in the Angkorean civilization and some aspects of the current development interventions and practices in (sustainable) agriculture.

Since the Angkor period, various aspects of routine life, ceremonies and material culture were maintained informally, abandoned, evolved or reified and made sacred. In the history of what we now call developed countries, these processes were dramatically intensified by the processes of industrialization and, subsequently, globalization. The benefit of hindsight now tells us that environmental problems intersecting with alienation from nature and agriculture spawned a backlash in the 20th century, which coalesced into a tangible social movement by the 1960s (Hajer 2010). By the time Cambodia emerged from civil war in the 1990s, "ecologism" had noticeably supplanted industrialism in a few domains, one of which was agricultural development. The implication of this for a developing country like Cambodia was that there were simply more models for agriculture available from which to choose. In this chapter, I illustrate how some of the characteristics of various models are often viewed by politicians and farmers with an historical lens that backgrounds these current agricultural with popular lessons from the Angkor civilization. In this, I aim to show how the *Urgeschichte* (ancient history) of Cambodia plays a role in evolving perceptions about rural change, and how it affects contemporary decisions about agricultural development.

A stepping-off point of this chapter is that the agricultural narrative of Angkor is still socially relevant and politically potent in Cambodian society, despite uncertainties about the factual account. The only suitable expository account of Angkor life and agriculture comes from a travel diary written by Zhou Daguan (2007[1297]), a Chinese visitor to Angkor in the 13th century that nonetheless remains disputed by both archaeological evidence and informal storytelling. As a result, modern Cambodians cobble together their own accounts from various sources from which they can draw meaningful lessons about their primordial past (cf. Ledgerwood 1997). Based on rural fieldwork spanning nearly two years, Angkor is one of the subjects that nearly all rural informants with whom I have spoken have an opinion about. The rapid change to agriculture and food consumption patterns is one area towards which these discussions about Angkor often gravitate. As for why, Goodman (1999, p. 20) suggests that, "pre-industrial production processes and agricultural products remain as enduring sources of competition, benchmarks of quality, and as culturally potent alternatives to the industrial paradigm." As a city, perhaps the largest in the world during its peak, the capital of Angkor invariably demanded agricultural products, medicine and the

associated commercialization suited to the scale, diversity and tastes of a large urban center. Seen another way, ancient Khmers were faced with many of the same dilemmas as modern Cambodians concerning how to structure food production, marketing, and health delivery for an urbanizing society. As described by Zhou Daguan, new ideas and products in food and medicine (e.g., recipes, advanced medical practice, fancy drinks, imported flavors, etc.) were also brought to the city (primarily for elites) while pre-existing health and food systems were stewarded by the middle class, migrants in the rural-urban nexus, and rural Khmers. A modernized narrative of Angkorean food and botanical medicine can figuratively be "consumed" (Bryant and Goodman 2004) by producing and consuming traditional rice varieties, using ancient remedies, and cooking with traditional ingredients. For many modern Cambodians, the organization of food production and health services in Angkor provides an historically-potent context for understanding how to evaluate and judge modern processes of commoditization and agricultural development.

4.1 National Mythology and the Babylon-Angkor Narrative

For contemporary Cambodians, the grand archaeological sites of Angkor are a testament to the greatness of their ancestors and their cultural pedigree but their ruinous state implies a more complicated narrative. There are competing theories about the fall of Angkor, each proposing the primacy of various hypotheses, including hydrological decline, political instability, external wars, and climate change.²³ Modern Cambodians, who receive most of their knowledge regarding Angkor from stories and media, largely follow this path. They are unlikely to be fully aware of the academic debates about the decline of Angkor, nor would they choose to put much stock in any particular explanation. By keeping their distance, they naturally fall in line with "synthesizers" such as Jared Diamond, author of the *Collapse: How Societies Choose to Fail or Succeed*, who points out that there is no "single factor explanation for societal collapse" (2003[2008]). Furthermore, archaeological findings were never really directed at the

²³ Angkorean hydrological development has been studied by a series of researchers, most notably Bernard-Philippe Groslier, Christophe Pottier, and the team of the University of Sydney's Greater Angkor Project. See: <http://acl.arts.usyd.edu.au/angkor/gap>. Findings until 2009 were summarized in the National Geographic magazine by Stone (2009). Accounts of political instability and military decline are covered in Zhou Daguan first-hand account and by numerous of historians, particularly Michael Vickery (1986; 1992; 1993; 2011), Charles Higham (1989) and David Chandler (2000[1983]).

Cambodian population but were rather for colonial and, subsequently, strictly archaeological audiences (Stark 1998). In the end, Cambodians typically assemble heterogeneous and detailed narratives from information sources of their choosing, which provide utility and meaning in their current situation. In other words, modern Cambodians are seeking not only a sanitized explanation of the past but continued relevance in contemporary life. Jacques Ellul, the late philosopher, sociologist and theologian, made famous an explanation for the decline of civilization that goes toward fulfilling this hybrid need. He suggested that *technique*, or technology and its concomitant organizational and psychological dependencies, accumulate and ultimately corrupt urban places, both functionally and spiritually, which ultimately leads to decline (Ellul 1964, 1970). Ellul regarded Babylon as the quintessential symbol of the city (i.e., of all cities)—an intense concentration of *technique* that has the potential to create hope, freedom and creativity, but becomes a political prison vulnerable to self-implosion due to immorality, technological dependency, and war (see Dunham 2002, pp. 74-97). According to Ellul, the fall of the city, whether due to climate change, a string of unsuccessful wars or political upheaval, is somewhat predestined if *technique* is not brought under control. Indeed, a variation of this Babylon narrative of technique, as it is understood in the Cambodian context, is commonplace among observers of Cambodia:

“Whether we look at historians emphasising the roots and longevity of this culture, sociologists arguing its embeddedness, or anthropologists ethnographically observing its micro-processes, among the recurring features are: exercise of power, social hierarchies, relational rigidity, patriarchal dominance, peasant docility, distance between the state and the people, a lack of general trust and social fragmentation. Cambodia’s modern disasters could thus be understood as a ‘natural’ consequence of this culturally defined history. Development practitioners follow suit and design projects in line with, or in response to, this assumed culture.” (Öjendal and Kim 2007, pp. 507-508)

By many accounts, including those of Cambodians themselves, the fall of Angkor is still ongoing, despite the changing circumstances over the past seven centuries and the development progress made since 1993. Indeed, unlike many

examples of other ancient capitals that have fallen (and could be viewed through the lens of Babylon), a direct line of descendents of the Angkorean Empire continue to live in the shadow of their ancestor's creation and feel a lingering connection to this primordial past. This connection, however, is not without its contradictions. Because the past is both a source of pride and shame, it is perhaps unsurprising that Khmers have perennially struggled to disentangle the accomplishments from the self-destructive practices—a modern-day list of which is highlighted by Cambodian commentators in the quote above. The modern Cambodian flag, which exhibits the façade of Angkor Wat, is a typical example of this phenomenon in practice. For politicians and the outside world, it is presented as a symbol of unity (Stark and Griffin 2004) but domestically, memorializing Angkor on the flag is viewed with some misgivings. Angkor Wat is simultaneously an ideational creation and a stern, even tragic, reminder of the mistakes made by their ancestors. In other words, its place on the flag is not exclusively about pride and heritage, but also about caution.

I have encountered the metaphor of “rebuilding Angkor” in many interviews and Cambodians are always quick to point out that they do not mean the restoration efforts to the temple ruins, but rather the attempt to assemble a grand and productive society that is spiritually rooted and in harmony with nature (using Angkorean precepts). Stephen Ingold (2011[2000], pp. 314-316) comments that technology (or, for Cambodians, this may refer to processes of industrialization, globalization, urbanization, etc.) can be understood to fit within the narrative that humans tend to seek to achieve mastery over nature at the cost of distancing themselves from nature. Reflecting on Angkor to understand modern challenges, interviewees have often expressed this dilemma in a very practical manner. Perhaps the most common theme among farmers is that pesticide application in rice paddies eradicates not only the harmful pests but also damages the edible diversity of the paddies, such as frogs, crabs, ducks, and fish. This theme also emerges in analyses of many modern changes. For example, a neighbor of a rice farmer Ovun [TK-BO] whom I interviewed chided that if the canals in Siem Reap (modern day Angkor) were so good, why have modern day engineers not suggested rebuilding them in the same way? Another rice farmer asserted that modern Khmers cannot rebuild Angkor because they do not wish to be enslaved [TK-CS]. Also reservedly critical, a young female traditional healer acknowledged that,

“Our people from the past survived well 1,000 years ago with traditional medicine but we have a higher standard now that we have seen Western medicine.” [KR-SL]

While the symbolic importance of Angkor is clearly relevant for modern-day Cambodians, these symbols are not straightforward. Modern Cambodians constantly reinvent what Angkor means to their current lives in light of new societal and individual challenges. In the following sections, I will develop this argument with evidence concerning the lingering physical and psychological influences of Angkor and various modern understandings of agricultural development that reflect these influences.

4.2 Angkor as the Functional Model of Society

The urban civilization of Angkor, at its peak during the 13th and 14th centuries, is more than a symbol of the achievements of the Khmer empire; for modern Cambodians, Angkor is also a practical template for the creation of a modern society. Contemporary manifestations of Angkorean society, however, do not necessarily mimic the archaeological and anthropological reality of the ancient city, but rather echo the popular interpretations. Modern Khmers naturally use the archaeological sites of the Angkorean period as a point of departure but they commonly fill in the missing narrative with idealized visions of what that time was like. The longstanding Prime Minister, Hun Sen, remarked in 2006 that,

“Cambodia used to be at her peak during the Angkorian period. Our ancestors were not only the builders of famous architectures such as Angkor Temple which is one of the wonder in the world and other thousand temples, but they were able to build irrigation system and use effective technology in agriculture as well as involve in international trade while people's livelihood was warily taken care of. Thus, our country enjoyed prosperity and great notoriety as one of the most civilized nations during that period. There still remain lots of evidence today such as the west reservoir in Siem Reap-Angkor, canals around temples, lakes and waterways across the country. Indeed, we have to link ourselves to the history of our ancestors. In this sense, we still believe that agriculture is the leading sector, the driving force and the blood

vein for the development in other sectors and for the development of the economy as a whole.” (Hun 2006)

However, behind even the most optimistic imaginations of Angkor is the fact that the Empire eventually declined. Cambodians are quick to attribute this in part to their age-old enemies on the east and west, the Siamese and the Cham, who are manifest now in the Thai and Vietnamese, with whom they have continuing conflicts. But structural dimensions of the hydraulic system, declines in soil fertility, and political problems are also mentioned by people and highlighted in the media as reasons for the deterioration of the Angkorean civilization. The overarching narrative is that Angkor broadly fixed a roughly desirable model for Khmer society, as portrayed so concretely by Hun Sen in the quote above, but that flaws in the system, which can be corrected, led to its downfall. The relevance for development is how perspectives and ideals about Angkor, as inscribed in archaeology but interpreted socially, are integrated into and influence the lifeworld of Khmers. Although archaeological debates continually refine and adjust the evidence from sites around Siem Reap and farther afield, Cambodians have their own conceptions of what relevant information can be gleaned from Angkorean history for their modern development. Angkor can at the same time be a mystical society towering over Southeast Asian history and a material object as close-to-home as the family’s age-old recipe for fermented fish paste. In this section, I focus on aspects of Angkor, archaeological and otherwise, that are considered important to average Cambodians and that are often used to justify or explain aspects of their current culture. These aspects, in turn, are excavated further to understand their practical influence on the socio-technical systems for agriculture and medicine.

4.2.1 The Temple of Angkor Wat

The compound of Angkor Wat, the foremost symbol at Angkor, is deeply ingrained into Khmer national consciousness. The temple itself is indicative of the spiritual fastidiousness of the culture and of their distinct architectural style, which, importantly, differs from the aesthetics of their historic neighbors (i.e., historic enemies). It is also symbolic of Cambodian independence, not only because it is exhibited on the national flag, but because its grandeur provides worldwide legitimacy to the Khmer nation.

Angkor Wat is now ubiquitous in marketing for local products, particularly those with heritage character, such as palm products and traditional medicine. For a people as downtrodden as the Khmers after war, revolution and occupation, Angkor is symbol of national pride that props up the legitimacy of Cambodia in the neighborhood of mainland Southeast Asia and is an important tool for promoting popular sentiment and nationalism. This was widely illustrated by national outrage and rioting in Phnom Penh in 2003 after a Cambodian newspaper published an alleged (and now discredited) statement from Suwanan Kongying, a Thai pop star, suggesting that Angkor Wat be “returned to Thailand” (Ünaldi 2008). From the perspective of the Khmers, 600 years of occupation and political control by foreign powers (following the fall of Angkor) would not unravel the nation as long as Angkor stands. The first western explorers of Angkor refused to believe that the ‘docile’ Khmers were capable of building the structures they uncovered (see survey by Lustig 2009, p. 18) but these feelings have quickly evolved into grudging respect. As a Thai friend studying with me at Oxford University once told me, “everyone wishes they built Angkor Wat.” The grandeur and immortality of Angkor is then often used as a rallying call for all things Khmer and as a (reactionary) bulwark against foreign influences.

Valorizing locality involves creating, on the one hand, intention to “consume” local culture in its manifest forms and, on the other hand, discouraging consumption of foreign products based on what they are not (i.e., not Cambodian or not from a famous province). In the absence of transparency about product origin in early stages of promoting domestic consumption, agro-social skill (see Chapter 3) and retail relationships play an important role in differentiating products from certain regions or countries (Vida and Reardon 2008). Sometimes this is done very discretely, such as for well-known earthenware from the province of Kompong Chhnang (Port of Pottery) and jewelry from the province of Ratanakiri (Mountain of Treasure). Most of the time, it is carried out by reputation (of the trader or of the region he or she sources from) and by direct assessment of quality at the time of purchase. Eventually, prescribed forms of GI arise, with certifications and branding leading to a partial displacement of agro-social skill, reputation and market relations. The French geographic designation known as *appellation d’origine contrôlée* (AOC), which formally began in 1919, is perhaps the most well-known example of system designed to institutionalize locality or *terroir*. The

AOC was meant to protect markets, suggest exclusivity and increase margins. What started largely as domestic protectionism quickly developed a patriotic character, such that AOC designations abroad generally denote high quality French products (Boisvert 2006). Compared to the Northern European and Anglo-Saxon systems of protection, which rely on brand and intellectual property (see Footnote 32 in Raikes et al. 2000), the AOC model has garnered more attention in developing countries because it has the potential to reward rural areas, small farmers, and unique foods irrespective of sales volume (Barham 2002). While many brand names have attempted to tap into domestic consumer sentiment by naming themselves after national symbols such as Angkor, location-specific GIs have emerged more recently in Cambodia for rice (Battambang), palm sugar (Kompong Speu), and pepper (Kampot). Relatively speaking, these GIs they have come early in the process of economic development in Cambodia. This is indicative of the relatively lower threshold of acceptability for the loss of natural heritage, as well as the elevated awareness regarding the negative impacts of globalization, trade, and agricultural technology on agriculture discussed in Chapter 3. This trend has been reinforced by development agents, who include GIs and small-scale productivity in development platforms to mitigate the effects of globalization on vulnerable indigenous markets.

However, promoting food sovereignty and managing cultural globalization through bureaucratic measures such as geographical indications risks replacing the problem of heritage protection with one of polarizing food politics. This has already been observed within the French AOC, which has attracted criticism for preventing innovation, artificially reifying culture and drawing contested geographical boundaries in its judgments (Barham 2002). Vintners are sometimes compelled to grow certain grapes due to their location or they are denied a label because they are just outside an AOC border. The system is also open to exploitation, as in cases where industrial concerns strategically locate facilities in historic AOC towns to receive the label. Or the system itself responds to demand, as in the case of the ever-expanding borders of the Champagne AOC in light of growing demand for in the BRICs. The irony, which would not be lost on Jacques Ellul, is that the AOC and other measures to temporally and spatially fix sacred food culture become demonstrative of *technique*, or the growing discontent with the style of administration and formalization of rural cultural heritage.

This often begins rather harmlessly, such as with brand names, product packaging and marketing that bear the symbol of Angkor Wat without any relationship to the temples, religion, or even the locality (Angkor beer, for example is brewed far away on the coastline in Sihanoukville and is even 50% owned by Carlsberg Group of Denmark). And it can continue with GIs, which can be undermined by corruption, predatory practices, degradation of quality, and exclusion of other notable zones of production. Even in the short period since the inception of the first GIs, Cambodian farmers and consumers have grown aware of the potential for abuse from within and the over-commoditization that can result.

“In general, Kampot pepper will always be the best, but I buy mostly from Svay Rieng now because the prices are more reasonable; you see, the recipe will always be called “Kampot pepper-steamed crab” even if I don’t use pepper from Kampot.” [KP-SR]

“I am proud of our [Kompong Speu] palm sugar, which is famous all over the world. But the price is so high this year that no one in the village is keeping any to eat for themselves. It would be non-traditional if they made num khoh [sticky rice pastry with palm sugar] with white [cane] sugar this year.” [KS-LR]

“This new geographic thing for Battambang rice will just give more money to big land owners, rice traders and dishonest people who can send their rice to be milled in Battambang province. Will they say IR [hybrid] rice²⁴ is a Battambang specialty too? They should give the label to good farmers instead!” [KC-TSB]

The contradictions with promoting bureaucratic transparency measures are not limited to GIs or ecological certification. In general, for artifacts or processes valued for local variation, standards are inherently difficult to fairly and justly apply (Bérard and Marchenay 1996). For example, the ideal of locality can easily become uncoupled from

²⁴ As noted in Section 3.1.3 (see quote by [TK-BO]), high-yielding, short-season dwarf varieties are associated with very poor eating quality and are used for military and prison rations, animal feed and illegal export.

production skill (and therefore quality) even under organic certification or GI. In the natural foods store run by a social enterprise in Phnom Penh, I discovered a Cambodian Coca-Cola substitute and packages of instant ramen noodles sharing shelf space with heritage foods such as organic rice, fermented fish paste, and Kampot pepper. In a 2006 review of AOC for the UN Food and Agriculture Organization (FAO), the author suggested that it would be more effective “to build on local perceptions of foodstuff production and associated knowledge [...and] stress the importance of a given know-how in the processing of products from genetically diversified or highly specific resources, than to isolate indigenous or local contributions” (Boisvert 2006). So while GIs may potentially facilitate transparency, create commercial symbols of Cambodian culture, and protect certain markets if organized well, it may also lead to perverse incentives in the rural production landscape, constrain skill-based assessments of quality and disadvantage competing (and equally impoverished) producers.

4.2.2 The Irrigation Canals of Angkor

Similar to the first Neolithic civilizations, the grand scale of the city of Angkor was enabled by grain agriculture—foremost irrigated rice agriculture. In his travel diaries, Zhou Daguan relates that the Khmers of the 13th century were able to harvest rice 3-4 times each year. Archaeological and ethnographic evidence is dubious of this claim (see overview in Lustig 2009, pp. 66-68), but it is clear that the irrigation system was instrumental in creating food security and some degree of independence from the provinces. But despite its effectiveness in enabling an urban area, the canals of Angkor may have eventually contributed to its decline—a stance often argued in popular literature (Diamond 2005; Stone 2009), academic debate (Buckley et al. 2010; Groslier 1979), as well as dinner-table conversations in Cambodia. A central feature of this debate is the question of the administrative capacity to coordinate the canal and urban agriculture systems for a city the size of Angkor (500,000-1,000,000 inhabitants). The academic debate on this point has focused more generally on the scope, character and necessity of centralization (for a critical review, see Hunt 1988). For Angkor specifically, the debate began with Groslier’s (1979) assertion that Angkor represents a “hydraulic city”, in which state power is buttressed by control of water features and water delivery. Molle et al. (2009) have summarized this debate with the provocative

assertion that Groslier's thesis "is now increasingly seen as owing much to imagination". Because this study is more interested in popular understandings of the Angkorean canal systems and their perceived role in the decline of Angkor, Groslier's "imagination" makes an interesting point of departure. Indeed, the more generalized conclusion that can be drawn from Groslier, and which is popular among modern Cambodians, is that projects of grand proportions, such as irrigation or other agricultural schemes, often lead to equally grand disasters.

The contemporary Cambodian experience of revolution, reconstruction and development is dotted with reminders about the consequences of such grand projects. From Sihanouk's "Great Society" period to Pol Pot's failed agrarian utopia to Vietnam's K-5 Plan (the so-called "Bamboo Curtain") and to some of the post-1993 initiatives, such as the proposed Xayaburi mega-dam on the Mekong, it is unsurprising that Cambodians often highlight a tragic and recurring narrative of the human costs of these grand experiments. Naturally, they are not entirely opposed of these projects, but they do differentiate between the scope of different projects, such as one lowland farmer who said, "the local irrigation built by Pol Pot is very useful to us now but his big idea was very bad" [TK-NN]. This type of skepticism is now applied, among other things, to the prospect of green revolution agriculture in Cambodia, which is, at its core, another grand project. Over the past 40 years, the Green Revolution in Asia has demonstrated the potential yields and the potential cost to nature, health and society if care is not taken. Although the average Cambodian farmer is not aware of the many of the systemic problems encountered in other regions, such as soil salination, inequitable land consolidation, and loss of biodiversity, Cambodian agriculture has already experienced many of the short to middle-term complications (see Chapter 1). Furthermore, and more relevant for this section, there is a hesitancy surrounding the introduction of another paradigmatic project.

Furthermore, and more relevant for this section, I argue that Cambodian farmers are aware and critical of this state of affairs, examining the viability of new agricultural models in light of rumors and media (from abroad) and in light of the risk posed by a new grand project (this is similar to the characterization of Malaysian peasants by James Scott 1976). Based on interviews with organic and non-organic rice farmers, traders, as well as observers of Cambodian farming, criticism often centers around the contention

that farming is a separate cultural sphere that should not be “drawn into the city” [TK-ST], which is to say drawn into commodification. As a middle-aged farmer in the southern lowlands related to me,

“If you can, please bring me a canal to help irrigate my fields and I will grow rice for Phnom Penh and send it there. But Phnom Penh cannot grow enough rice for itself. That is a bad idea. Rice does not only need water, it needs farmers and their families and their villages; it needs cows to plow and make manure; needs ducks to eat pests; it is dirty for a city. [...] Rice also needs a clean environment. I know they grow water convolvulus in sewage in Phnom Penh for eating, but you cannot do that for rice.” [TK-ST]

Out of 90 relevant interviews with rice farmers, 60 farmers gave the impression that “the city” (or the influences thereof) is the metaphysical source of self-defeating farming practices of some kind. The prospect that city dwellers would grow vegetables in raw sewage or that they would not rely on the entire countryside for good food is disquieting to rural farmers. This follows with the Mann-Dickinson theory that farming is not simply an inconsistently remunerated job in the countryside, but a lifestyle embedded in the rural ecosystem and community that is not easily absorbed into capitalist relations (for a discussion, see Henderson 1998). Whereas the city is viewed as a hub for diverse people, dynamic industry and other artistic and political engagements, the countryside is understood as the stewards of heritage, tradition, and food culture.

“I remember Phnom Penh after the revolution. It was a big village with people growing pigs and gardening a bit. Now it is a real city. Now they do everything that is not agriculture. [...] But people still need to go to the countryside. They come at Khmer New Year and visit their families and their ancestors and go to the pagoda. And they eat fresh food and drink fresh palm wine. [...] When my son comes home from Phnom Penh he always takes off his collared shirt and puts on a kromah to relax. I wonder if his children will be like this too.” [RE-TB]

Angkor, in the background to the urbanization brought on by economic development, is a tale about the dangers of commodification of agriculture and the progressive alienation of city dwellers from their rural background. This follows Henderson's (1998, pp. 32-38) argument that, despite natural barriers to the entrance of capitalist relations into farming areas, many efforts to "save" or valorize smallholder agriculture actually encourage the entrance of capitalism. This concern is illustrated by the dilemmas facing the promotion of organic rice agriculture in Cambodia.

Organic rice is largely a compromise with industrial rice production and logistics that creates transparency around the idea of "natural production" (mostly for city dwellers) at the risk of drawing farmers into formerly untouched terrain of capitalist farming. Organic rice is typically contractually arranged and only certain varieties are demanded so farmers must take on the risk associated with tailoring their cropping for niche (urban) markets (see Section 3.1.3). Aware of the risks to farmers presented by commercialization, promoters have explicitly included in their extension and production mechanisms measures to promote and encourage the continuation of smallholder agriculture. Indeed, the organic farming and certification system, as currently promoted in Cambodia, facilitates farmers to maintain the relevance of their lifestyle and, indirectly, of their landrace rice varieties. The ideological goal of promoters of domestic ecological schemes is to enable (not force) in-situ conservation of culture and agriculture, because many aspects of society are primarily conducted in the framework of cohesive rural communities (based on personal communication with organic rice leaders and model farmers: Yang Saing Koma, Prak Ches, Mey Som 2007). Although not always successfully, the organic rice production system does so using any of the following strategies: increasing productivity through higher yields, adding resilience through more diverse farming systems, avoiding health expenses associated with exposure to agro-chemicals, saving on some input costs, and escaping market exploitation by getting organized in cooperatives.²⁵ While the long-term results of the promotion of organic rice farming are still up in the air, the adoption dynamics already speak to the attractiveness of this system. Ecological rice farming in Cambodia has already been picked up to some extent by 7-10% of farming families (see Section 5.3.2). One critical aspect of the adoption dynamics for ecological rice farming is that it does

²⁵ In the next chapter (Chapter 5), I evaluate some of these strategies to evaluate their effectiveness.

not disrupt agro-ecosystem dependencies (see, for example, Figure 3.1) that have functioned to maintain the resilience of traditional farming practices.

In Cambodia, green revolution rice varieties have succeeded not where they have displaced landrace varieties, but in cases where they complemented the traditional farming system—namely the early season in May-July. Explanations for the specific adoption pattern of HYVs are illustrative of the resistance to grand projects. On the social end of the spectrum, the low demand for green revolution varieties by consumers (as opposed to military and prison mess halls, or humanitarian aid suppliers) is due to their poor taste, texture and lack of cultural relevance (see Section 3.2.2). Rice can be differentiated for use in foods, porridge and dessert, for different types of events, such as festivals and funerals, and for consumption in different regions. A small set of generic-tasting rice varieties would diminish this cultural relevance. On the scientific end of the spectrum, the low demand for HYVs has to do with their cultivation dynamics. A lowland farmer explained how farmers are already recognizing the challenges of green revolution varieties:

“This year, the rice blast disease started already in the early-season. Everyone was growing IR66 so it spread very fast to almost all the fields around. After that, it was easy to spread to the long-season rice.” [TA-SU]

If they had not already, farmers in that area became aware of the risks of monocropping. During the 2007 brown plant hopper infestation, farmers also recognized that certain varieties fared better than others and organically-grown rice in general fared better. In addition, the diverse mosaic of landraces retarded the spread of the pests within the village and between villages [DT-MS; HH-KS; TK-TK].

Some of the hesitance to green revolution also emerged in response to demands for organic farming. In other work, I have shown how the organic production and distribution system in Cambodia continually draw farmers into a bounded socio-economic system of controlled production, quality control, and marketing (Feuer 2007). Stipulating the rice variety grown, how the harvest should be processed, and whom the rice can be sold to are now common criticisms of the organic rice system. However, organic rice growing provides a platform on which to support rural rice varietal diversity because it increases the transparency of the supply chain and supports research

as well as emotional²⁶ and legislative support for low-external input agriculture, which promotes the productivity of landraces. Built into the system are also systemic assistance to the farming system, such as advancement options into ecological livestock raising, self-sufficiency through gas biodigesters and decentralized power, and a broad suite of rural development options that are often linked to ecological farming. As a result, ecological agriculture in Cambodia coexists in both formalized (organic) and informalized forms (viable farming systems), neither fully constitutive of technique nor fully escaping from it. In green revolution agriculture, the complementary aspects that suit existing norms and farming systems are embraced more openly while those constitutive of technique are resisted both passively (by constraints in farming systems, lack of infrastructure, poor demand for rice varieties, etc.) and actively (by skepticism, cultural preferences, tastes, pest/disease control concerns, etc.). This explains, on the one hand, how HYVs have become popular for early season cultivation, where they fit the farming system and, on the other hand, how poor tastes often means that HYVs are sold to as the government for low-cost prison and army rations.

4.2.3 The Hospitals of Jayavarman VII

Although only preliminarily excavated and analyzed, near to the gates of Angkor Thom, the “downtown” of urban Angkor, are the ruins of hospitals which were built by Jayavarman VII, and which, for Khmers, provide legitimacy for traditional medicine but muddle the conception of the proper institutional framework for the provision of healing. George Cœdès (1940) catalogued 102 such hospitals for the *Bulletin de l'Ecole Française d'Extrême-Orient* and their existence has become a component of the Khmer argument that traditional medicine effectively sustained a great empire and is relevant for the contemporary health system. Cœdès, writing at the end of the French protectorate in Cambodia, also symbolizes the dramatic changes in health system ideology underway in Cambodia. The French were, on the one hand, awed by Angkor and the ancient Khmer civilization, including ruins and stelae depicting the medical system dating but, on the other hand, were unconvinced about the utility of the of the

²⁶ By “emotional”, I refer to the valorization of farmers as professionals and not peasants. This is ongoing in the radio and television, and it builds upon the exceedingly strong ties between rural and urban Cambodia. In general, the ultimate goal is to position farming as an equally or more honorable job than a city job—and to encourage youth to stay or return with new ideas to rural areas.

indigenous health system compared to their own (Guillou 2001). Instead, promoting a biomedical system responded to nationalistic and practical priorities (through the ideologies of *mission civilisatrice* and *mise en valeur*) as a way to bring the universal ideals of French culture to their colonial subjects and maintaining the productivity of the population through hygiene and epidemic control. However, the international discourse on traditional medicine experienced a sea-change in the early 1990s when the utility of traditional medicine was acknowledged by the WHO and transformed even more rapidly since 2002, when the traditional medicine was more formally institutionalized (WHO 2002). Due to the complexity of traditional medicine, including taxonomy, wild collection, preparations, contraindications, and spiritual functions, it is unlikely that extensive references have survived since the Angkorean period, particularly after the destruction by the Khmer Rouge regime in the late 1970s.²⁷ Nonetheless, it is common to hear lines such as, “our ancestors from the Angkor period survived well 1,000 years ago with traditional medicine”, which provide blind faith into the actual efficacy of the Angkorean health system.

However, if there ever was such a thing as a comprehensive medical system at Angkor, it is not manifest in any of the current healthcare systems. There are two aspects of this historical legacy that speak to modern Cambodians. Firstly, there are clearly different diseases and syndromes than existed in the Angkor period, many of them from outsiders, which implies consulting doctors who are familiar with these diseases. Secondly, the concept of a hospitals or clinic, as a state-sponsored, institutionalized center of medical care has an historic basis in Angkor. For many modern Cambodians the former existence of hospitals is very much clear and present evidence of the former comprehensiveness of the traditional care system. This has made Western clinics appear to be a logical institutional form for national healthcare but Western-styled hospitals and clinics have often failed to recreate the health care atmosphere indigenous to Cambodia. Sokhieng Au’s (2011) account of the efforts of the Assistance Médicale Indigène (Native Medical Aid) during the colonial period demonstrates that while the efficacy of French medicine and the institution of the hospital eventually became widely accepted, systemic understanding of the biological

²⁷ Ovesen and Trankell (2010) argue that the Khmer Rouge regime did not obliterate traditional medicinal practice, as some historians hyperbolize, but that significant changes and losses in indigenous knowledge did occur.

basis of sickness (particularly microbes) was not forthcoming. Furthermore, there was continual widespread aversion to the cold institutional nature of hospitals, which was evident particularly in hospital births, quarantine, the distant and impersonal behavior of doctors, the expectation for payment in advance, and the seeming disregard for modesty. However, contemporary traditional medicine can also hardly be called a healthcare system. In practice, most healers that I have interviewed have fragmented specialties, treatment styles and “coverage areas”, and they rely on generic treatments for symptoms they are unfamiliar with (i.e., there is little communication). Early efforts to test and produce traditional medicine at the national level were supported by the Vietnamese starting in 1982 and had some success with artisanal medicinal products and in the isolation of berberine, the active ingredient used against leishmaniasis, shingles, and amoebic dysentery (Guillou 2001, p. 313). In general, however, the successes at the institution level have been minor and only recently has the situation improved. Formerly, traveling around Cambodia to find a specialist healer was a rather time-honored tradition, but these days most people would rather go to a local practitioner or go to the nearby Western clinics because they can nominally treat most maladies. One solution for integrating Angkorean expectations with modern institutions would be to train traditional healers in Western medicine (i.e., naturopathic doctors in the West), or to have traditional healers available at hospitals to provide competing and complementary diagnoses and treatment suggestions (e.g., China and India). Although only in early stages, this is what the newly-active NCTM is rapidly moving toward in the Ministry of Health.

Integrating traditional medicine into a government health system dominated by allopathic medicine, however, involves inviting *technique* into traditional medicine in ways that challenge the heritage and diversity values that bind Cambodians to traditional medicine in the first place. From casual interviews during the 6-month traditional healer training course (the first ever) at the NCTM, five themes emerge in dialogues with students, healers, patients, and allopathic doctors:

1. Spiritual healing and other non-material treatments are downplayed in order to focus on tangible, commodity-based medicine and to gain external legitimacy

2. The burden of proving efficacy of botanical medicines at the early stages is often too great; but if the burden is too low, quack-doctors and fakes will emerge
3. Many healers are too old and conservative to be retrained; their children are less interested in general and demand salaried jobs
4. Diagnosing with tests and machines can diminish the personal relationship and holistic process of seeking out disease and ailment, but not doing so can reduce legitimacy and risk faulty diagnosis
5. Traditional medicines can be become somewhat like pharmaceuticals, but farming or over-processing plants is antithetical to holistic practice; healers also prefer to be in control of the production of medicines

One informant, in particular, captures the dilemmas inherent in all of these themes. She is an amateur traditional healer who sells lingzhi forest mushrooms collected where she lives, in the Kirirom National Park.

Luong has been selling forest mushrooms since she moved to the national park with her mother in 1998. Her mother was a traditional healer who focused on women's health and mental problems, but had not been able to practice since the late 1960s, when the political turmoil began. Lin learned amateur diagnosis and basic wild collection methods and taxonomy in order to treat the family during the Vietnamese occupation. She also assisted her mother when she handled people with mental disturbances after the war. (With great effort, she sounded out the word "psycholog", which is her understanding of the Western term for a doctor of mental illness.) Lin's mother used to calm people who were excited and 'warm' people who were depressed using medicine and religious words. If the condition was unstable, she tried to find ways to banish the evil spirits with spiritual ceremonies or with meditation. From her childhood experience, Lin remembers that many people were treated successfully over the long-term but some were a lost cause. Lin believes that the Khmers in the Angkor period had a comprehensive system of medical health and psychological health but now that there are new diseases like HIV that confuse healers, it is necessary to round out Khmer medical knowledge with Western medicine and diagnostic equipment. From her experience living

in a peri-urban area and later in the national park, most Khmers still use traditional medicine, but they are strategic in how they use it. Customers of her shop do not fit any specific social class—rich, old, young, and impoverished all buy from her and consult her. Small pains (like headaches, stomach aches), fatigue, chronic pains from old age, infant's health, and women's health are commonly managed with traditional medicine. Sometimes foreigners come and they are usually interested in a 'natural' medicine as opposed to a 'traditional' medicine. Skeptical foreigners often frustrated her when they ask if the medicine really works. She can only rely on reputation because she cannot test the mushrooms and the other medicines individually; but she knows that the mushrooms are well-known in China and that her mother's expertise was used to select the other medicines. She trusts her mother to find the proper medicinal plants but she notices that her neighbors have also begun collecting, but they do not know exactly what they are looking for so they take the most colorful mushrooms and strongest-smelling bark. Generally, she sells the mushrooms whole because she has experienced that people like to touch the mushrooms before buying them and many like to boil different sized pieces for a different effect. At the bottom of the mountain the NCTM is preparing a plantation for traditional medicines, but she disagrees with this, arguing that it will primarily support well-known Chinese medicines from which they have seeds and cuttings and, in any case, traditional plants are not as effective when cultivated out of their natural habitat. [KR-SL]

Based on the results of a researcher-merchant partnership with healers in another tourist destination of Cambodia, the holy mountain of Phnom Kulen, I can confirm some of Luong's statements and partially refute others. In aggregate, 40% of customers who bought traditional Khmer medicine (TKM) from partner healers were familiar with and regularly used TKM.²⁸ The other 60% were purchasing without any prior

²⁸ In this experiment, TKM is defined as treatments that are primarily received through traditional healers or botanical outlets, as opposed to common self-medications (like ginger tea with honey and lemon). Based on a sample size of 374 customers who consulted with the healer and purchased traditional medicine. Naturally, there are some who consult but do not purchase and others who do not consult and purchase, but there is no way to collect data on people who browse, buy gifts, or simply ask for advice. For additional discussion, please refer to Appendix 1 (Methodology).

experience with TKM; however, of these, 76% were under age 25 and 56% were urban citizens, which indicates a slight urban bias against TKM and perhaps a lack of exposure due to young age. However, for products with new and redesigned packaging and labeling (an experiment of this project, see Figure 4.1), the average age of the consumer dropped from 40 to 30, so younger customers are reachable through marketing measures (see Section 5.4.3 for more detailed analysis). Additionally, 31% of customers who buy traditional medicine have or will consult with an allopathic doctor for the same illness and an additional 11% already consulted a different traditional healer. The types of medicine purchased broadly reflect Lin's assessment (traditional remedies for well-known maladies), with one exception: due to its high turnover, traditional healers often sell a botanical remedy for "energy", which is generally a euphemism for sexual stamina. They also commonly sell medicine for indigestion, yeast and bladder infections, liver infection (i.e., hepatitis), hemorrhoids, pre and post-birth conditions, overactive children, sleeplessness, arthritis, and high blood pressure. Although criticized overzealously for this, it is not uncommon for well-known traditional healers to also sell medicine purporting to cure cancer, serious venereal disease, and sometimes even leprosy and psoriasis.²⁹ Healers are also generally available for (free) consultations and are often willing to explore medicinal and non-medicinal treatments for psychological problems.

²⁹ It is necessary to point out that the existence of these medicines does not necessarily invalidate the credibility of the doctor. I have found many healers who keep a few special remedies (sometimes ingredients from endangered animal species) for special purposes, but these are usually an afterthought. There are, however, a few major exceptions.

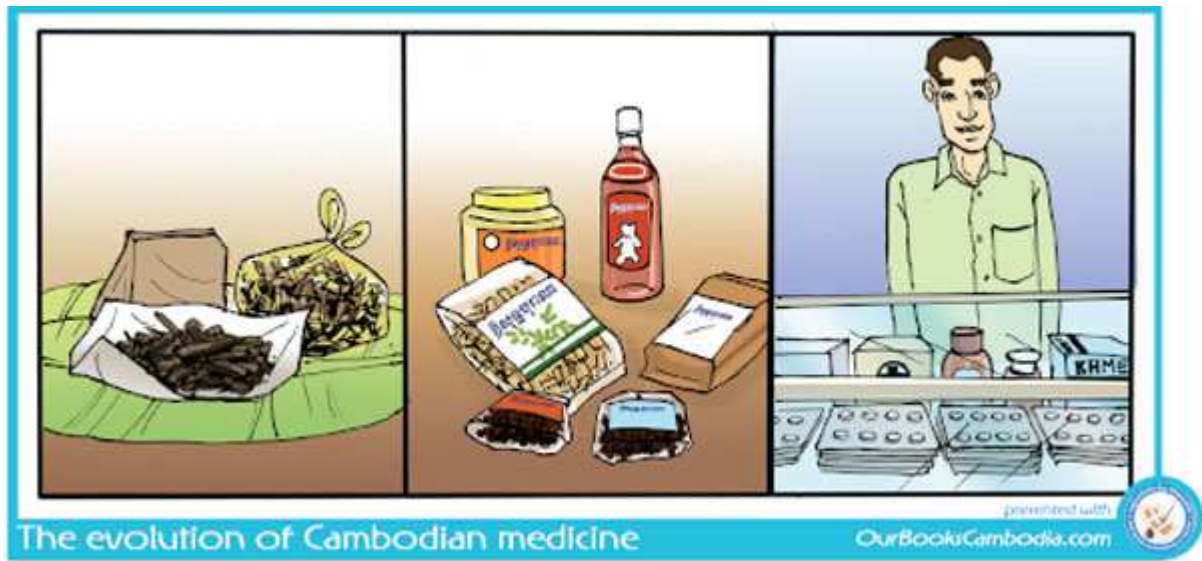


Figure 4.1 Extract from an online youth magazine published by the Phnom Penh Post³⁰

The dilemma at the NCTM is how to be inclusive of the diversity of traditional healing practice while maintaining legitimacy in the eyes of reigning health institutions that are generally dubious of traditional medicine. In 2010, it was not clear precisely which model of professionalized traditional medicine they would support, as their curriculum and institutions were still in flux. Their primary aim now is to stem the loss of knowledge regarding traditional medicine and they are producing at least one or two books per year that focus on species. The NCTM is also aiming to open a laboratory to be able to test the efficacy of medical plants and to serve as a regulator for the exploding market in traditional medicine, which has produced many quack doctors. In one conversation with the director of the Center, I asked him outright if they were aiming to create the Cambodian system based on the well-known standards in other regions. He told me they wanted the “best” one. Going one by one he confirmed that he indeed wants the “best” of the Ayurvedic, Chinese, Japanese, and Western naturopathic traditions, but he added “they all have problems” [PP-HP]. Since many of these traditions have either contradictions or simply do not overlap, it is unclear how the NCTM will go about “cherry picking” from them all. However, in the spirit of Angkorean comprehensive medical systems, the director clearly wants to try.

³⁰ This comic strip was created by Our Books Cambodia and published in the Phnom Penh Post by Kounila (2010)

4.2.4 The Noble Palmyra Palms of Angkor Wat

Angkor Wat also embodies another element of the land, aesthetics, and tastes that is ingrained in Cambodian consciousness. The bounty of the forest is symbolized by the two famous palmyra sugar palms that nobly (and symmetrically) flank the sides of the temple. These palms, immortalized as they are alongside Angkor Wat, are not precisely an archaeological relic, but they are associated with the lineage of the kings and were also utilized for functional and aesthetic purposes during the Angkor period (Zhou 2007[1297]). In 1901, then King Norodom decreed that all households plant a few palm trees. The campaign was so successful that Cambodia gained the highest density of *Borassus flabellifer* in mainland Southeast Asia; in contrast, regions of Cambodia that were in the dominion of Siam during King Norodom's reign, such as Battambang, have very few palm trees (Yang Saing 2000). Until 1955, when cane sugar became plentiful in the market, Cambodia was a major exporter of palm sugar, particularly to its eastern neighbor (Romera 1968). Much like Angkor Wat, the palmyra palm became an example of Cambodian exceptionalism in the region, which has only enhanced its symbolic esteem. An interview conducted by a Cambodian newspaper with a representative of Confirel, the only internationally-certified organic palm product company in Cambodia, demonstrates the intensity of this sentiment:

“The company recommends local people to consume local products, in order to give jobs to local people who are not yet involved in a company such as ours. This is so that we conserve palms, which are the symbol of our country. Because we now have problems with Thailand,³¹ we should use our palm sugar to demonstrate our unity. The Confirel company promises that they will help poor people and protect the palm tree forever.” (Koh Santepheap 2008)

Contemporary nationalism intersects with the timelessness and distinctiveness of Angkor Wat to engender a culture of domestic consumption (Vida and Reardon 2008). The marketing exemplar below (Figure 4.2) combines all of these elements: Angkor Wat, palms in the lowland landscape, hygiene and manufacturing, and the motto “protect and valorize the palm tree”. Although the imagery is broadly indicative of

³¹ “Problems with Thailand” refers to the recent flare-ups over territorial sovereignty and cultural dominion over the Preah Vihear temple and its surrounding area on the border between Cambodia and Thailand.

popular sentiment toward Cambodian palms, it does not necessarily make it a successful product. Middle to lower class residents of Phnom Penh have not been overly persuaded to actually purchase Confirel's products. The company has followed in the footsteps of its founder, whose primary business is pharmaceuticals, in formalizing the production and marketing so much that the products are no longer authentic or affordable from the perspective of many urban citizens. Firstly, the owner took samples of Cambodians palm sap to France in order to elaborate the production and select quality yeast strains for fermentation. Secondly, he moved directly to high technology in production. And thirdly, his marketing and products were clearly aimed at export (e.g., international organic certification) or at the local upper class (expatriates and rich Khmers). The marketing director acknowledged that, after 13 years, Confirel is still not profitable and that they have therefore developed a new line of products aimed at the local Khmer market [PP-CHR].



Figure 4.2 Advertisement issued by Confirel in 2010



Figure 4.3 Workers of Khmer Natural Enterprise bottling palm beer. Photo provided by Khmer Natural Enterprises



Figure 4.4 Workers of Khmer Natural Enterprise labelling palm vinegar. Photo provided by Khmer Natural Enterprises

One of Confirel's competitors, Khmer Naturals, produces palm vinegar and palm beer and has used a decidedly less technological approach, but the patriotic marketing and Angkorean reference are largely the same. The general manager has assembled moderate investment capital and began village-level production, using no electricity and only refilled Heineken bottles (see Figure 4.3). Their products are still

hygienic and modern in appearance and the marketing is openly focused on Angkor, but they are significantly cheaper (around the price of average-quality beer or vinegar) and the labeling is clearly aimed at middle to lower-class urban Cambodians (see Figure 4.4). No chemicals are used in production, but an organic certification will not be forthcoming, primarily because palm products are already associated with nature and purity and the general manager prefers relying on this perception as long as it lasts [PP-LRS].

The other initiatives targeting palm products in Cambodia are primarily development oriented, focusing on the transformation of the process of peasant sugar production to improve livelihoods and reducing the environmental impact of palm sap. The organization Development Appropriate Technologies (DATE) and CEDAC both carry out schemes with four goals: improving cookstoves for efficiency, encouraging sugar cooperatives to provide bargaining power, discouraging chemical preservatives, and promoting granulated sugar that can compete with cane sugar. Although not always explicitly stated, I have ascertained that the justification for promoting peasant sugar production (as opposed to semi-industrialization) is twofold: firstly, palm trees are scattered throughout the landscape and are accessible only to diffuse farmers³²; secondly, palm sugar should remain a cheap staple for cultural heritage reasons, and the processing implied in different product forms (like alcohol) detracts from this. These primarily NGO-led initiatives (with emergent pseudo-private sector approaches) have aspects that both compound technique and fight against it. Improving cookstoves through technical cooperation with international partners can create technological dependency, but in many cases the manufactured cookstoves have been further adapted and now local entrepreneurs have evolved their own models (see Figure 4.5). Avoiding preservatives is less straightforward—due to soil type and microclimate, certain regions produce whiter sugar than others and, in the competition for whiter sugar, regions with equally tasty (but naturally darker) sugar, are drawn into this race. Discouraging preservatives often implies tackling the problem of preservation through other technological means, such as vacuum packaging, special earthenware pots, and new

³² Although data on the accessibility of palms for tapping is scarce, studies at the beginning of the 20th century, when palm tapping was a major trade of Cambodians, indicates that diffuse farmers' participation in tapping will be essential if a significant proportion of Cambodian palmyras are to be harvested for sap. The data in question come from two surveys conducted in 1938 and 1960, which showed that respectively only 26% and 30% of palmyras were actually tapped (Romera 1968).

vaporization technology, rather than pushing for urban appreciation of the different colors of palm sugar.



Figure 4.5 Custom-made palm sugar cookstove based on NGO-developed designs, Kampong Speu province

These initiatives, as well as more diffuse sentiment among palm tappers and traders, indicate that threats to the palm tree from and opportunities through domestic consumption have led to solutions that reposition and/or reinvent palm products and production so that it exists in diverse forms for different cultural and socioeconomic milieu. Emphasis has been on expanding the range of palmyra palm products and also maintaining it as a viable complement to rural life, should people continue to value it. The versatile palm sap is transformed into sugar (syrup, paste, cakes and granules), vinegar, wine, beer, and liquor. Currently, artisanal production, in-situ semi-industrialization, and city-based industrialization are all carried out alongside initiatives for GI. There coexist different forms for rural consumption (informally ecological), urban marketing (as an ecological heritage product with superior hygiene and

packaging), and for export (particularly as a certified organic product).³³ Process improvements are also forthcoming, particularly energy-efficient stoves, sanitary processing and non-chemical preservation, all of which serve to broaden the palette of palm options while buttressing existing product forms.

4.3 Conclusion

Angkor and the fall of Angkor are an encompassing metaphor for the Cambodian ideal of society, including the place of agriculture, rural vs. urban, and new health institutions. Embedded in the popular conceptions of Angkor is a very rough blueprint for how to organize certain things in society to both mimic Angkor, in cases where people believe it succeeded, and diverge from Angkor, in cases where it produced undesirable consequences. The Angkorean “Urgeschichte”, as I argue, remains a common point of departure for modern Cambodians analyzing the role of the old in modern society, both by referring to the material history (i.e. artifacts, cuisine, infrastructure, etc.) and semiotic history (learning from the embedded lessons in symbols from Angkor). The metaphorical overlay I used to understand this was that of the ancient city of Babylon, which fell in dramatic fashion, and for which Jacques Ellul has posited that the spread of *technique*, or the corruption of society through technological dependency, was responsible. The “city” of Angkor is the metaphysical space in which technologies (irrigation infrastructure, health care institutions, new food products, etc.) are drawn to such a large scale that they become constitutive of society. The disadvantages of the large-scale systematization come into relief as does the concomitant alienation and disembedding of social relations from nature (Ingold 2011[2000], pp. 300-302). In this chapter, I explain how technique is both sought out and actively fought against in a variety of ways as modern Cambodians apply an “iterative approach” to understanding modern development through the lens of popular characterizations of Angkor. Specifically, I examined:

- the symbol of Angkor Wat temple, which symbolizes the valorization of domestic consumption, heritage products and GIs

³³ Here, I reference ecological product lines not only being produced by villagers themselves but also a series of ecological entrepreneurs and non-governmental organizations, including Khmer Natural, DATE, CEDAC, Confirel Ltd., and the Group for the Environment, Renewable Energy and Solidarity (GERES).

- the waterworks of Angkor, which invoke resistance to the externally-driven implementation large scale technological packages such as green revolution agriculture
- the hospitals of Jayavarman VII, which represent the importance of a centralized health system with hospitals and health administration that nonetheless is constitutive of traditional health cosmology and the approach of botanical medicine
- the palmyra sugar palms of Angkor Wat, which, as symbols of Cambodia's sense of exceptionalism in mainland Southeast Asia, are representative of nationalistic desires to show off national culture by modernizing it

These cases demonstrate that, although many aspects of production and consumption are constitutive of technique, there are also built-in mitigation measures that are embedded in awareness of the fall of Angkor, new media, and in the initiatives of some development agents. Sometimes these manifest in skepticism surrounding the scale/scope of grand projects, resistance to certain parts of a technology package, re-embedding of technology in nature and social relations, or commodification of heritage culture to keep it relevant.

Observers of Cambodia have a tendency “to regard Khmer society in general as static and conservative, an observed characteristic of its rural economy and noted also is the Cambodian trait of looking to traditional ways for how society should behave” (summarized in Lustig 2009, p. 69). In this chapter, I challenge the premise of this group of observations, arguing instead that the rural economy and continued reflection on (Angkorean) history contribute to modern Cambodians' capacity for critical review of contemporary development. While I must limit this challenge to the evidence presented for agriculture, medicine and food, there are likely other areas in which historical memory or agro-social skill play a role in appraising changes in Khmer society. While critics of the political system and corruption may quickly point the finger at the enduring and archaic exercise of power, social hierarchies, patriarchal dominance, peasant docility (see summary in Öjendal and Kim 2007, pp. 507-508), their potential for reflecting on and criticizing the past—not necessarily recreating it—also originates from the tendency to look back on the past.

5 EVOLVING AGRI-MARKET ORIENTATION TOWARD ECOLOGICAL PRODUCTION IN CAMBODIA

In the 1990s, the international discourse of agricultural development became more fully opened to alternative models, providing the impetus in Cambodia for a broad range of international and domestic actors to begin focusing on activities such as heritage production, agroecological farming, and sustainable wild collection (hereinafter, these activities will be collectively referred to as “natural production”). While the ideological goals of many international initiatives were often already aligned with the practices of local producers (cf. ASEAN 2009; Källander and Rundgren 2008; WHO 2008), intervention by state, development, and private sector agents has been necessary to begin formalizing the relevant social and bureaucratic structures for natural production. The goal of this formalization, in a general sense, is to enable natural products to enter urban markets in a manner that is transparent and understandable to consumers as well as regulatory agencies. Promoters of natural production, such as certifiers, traders, shopkeepers, and some entrepreneurial activities of NGOs, become the agents through which the process of commoditization takes place—they decide what products should be focused on and how they shall be presented. Their collective decisions determine how the diverse realm of natural and heritage products in the countryside is translated into discrete consumable goods. This chapter focuses on the constraints and opportunities faced by these promoters and analyzes the performance of a few representative initiatives.

For the scope of this study, institutionalization of natural production began at the end of the 1990s with the beginning of initiatives by the Cambodian Center for Study and Development in Agriculture (CEDAC, French acronym) to promote ecological rice intensification. This trend picked up pace in the mid 2000s as the NCTM developed a new healer-market-policy interface that has brought traditional knowledge and forest ecology into national debates about regulation and commercialization of traditional medicine. Palm products also came back into the spotlight in the 2000s with the establishment of two private companies focused on heritage production—Confirel and Khmer Natural Enterprises—as well as the engagement of the CEDAC Enterprise and other NGOs in palm sugar production. So far, these initiatives have been led primarily

by Cambodian nationals (many of them foreign-trained) and they typically aim to leverage pre-existing rural structures in ways that correspond with ideological goals of the international sustainable agriculture and alternative medicine movements (Le Meur 2007). Principally, these efforts have come to be governed by a market orientation that, nonetheless, explicitly seeks to balance the primarily urban imperatives of commercialization with the needs and constraints of small producers and healers—in other words, commoditization should complement and support rural development. However, balancing pro-producer development goals with achieving profit from marketing natural products often presents practical and ideological dilemmas, which can lead to creative improvisation or to market failure and contradiction.

In this section, I illuminate these dynamics by investigating the intentions, strategies, and results of initiatives to formalize natural production. In the first part, I outline historical features and contemporary trends of the demand for natural production, looking at how embedded expectations of quality underlie this demand. In the second part, I individually survey the production and commodification/marketing initiatives for ecological rice, advanced traditional medicine, and heritage palm products. For each case, I take a broad snapshot of the challenges faced by producers, handlers, and traders in making strategic decisions about how to simplify rural diversity for market sales. Specifically, I look at how indigenous products are variously transformed to suit modern expectations, such as hygiene, packaging, and grading while still meeting the heterogeneous standards arising from agro-social skill, such as good flavor, variety, texture, aroma, place of origin. Through an analysis of the performance of various initiatives for sustainable intensification, organic, geographical indication, and sustainable wild-harvest, I explore what it takes for promoters to commercialize products in ways that fit the cultural milieu, reward producers, and make money.

5.1 The Latent Demand for Ecological Products

Initiatives promoting ecological production that began to emerge at the end of the 1990s in developing countries were initially driven largely by sustainability discourse in international aid combined with a renewed focus on rural development, participatory methods, and environmental protection. However, the popularity, success, and long-

term outlook of these projects were also due to demand and acceptance from farmers and consumers themselves, for whom the concepts and practices of natural production were not only customary, but resonated at many other levels. For many farmers in the 1990s in Cambodia, agrichemicals had not only become expensive, reached productive plateaus and begun harming soil fertility, they had also become a health liability and a symbol of exploitation from neighboring countries (EJF 2002; Yang Saing et al. 2000). These liabilities were passed along to the consumer, whose exposure to these chemicals led to health problems and prompted widespread distrust of uncontrolled agricultural products (see [RE-LS] in Section 3.1.3 and Keam 2007). This phenomenon in the agricultural sector coincided with decline in the quality (and increase in toxicity) of imported pharmaceutical medicines, and has built upon a hesitance toward Western medical practice dating from the French colonial period (for a fuller account, see Au 2005). As a result, “chemical agriculture” (*kasekam mien jit chemi*) and western pharmaceuticals (*thnam pairt*) began to be lumped together as unreliable elements in society for which transparent and regulated alternatives were needed (Kampuchea Thmei 2008). Lacking this in a formal sense in the late 1990s, urban consumers continued to rely on traditional and informal networks that they still trusted and over which they had some nominal control. Well-reputed pharmacists, traditional healers and farm-based relatives in the countryside, however, are not available to everyone and ensuring quality has, over time, predominantly become a market-based activity.

The companies and agencies entering into the market for natural and heritage products are attempting to capitalize on the latent demand for these products in a formalized manner targeted primarily at urban dwellers. As I demonstrated in Chapter 3, demand for natural production in Cambodia is largely driven by values arising from agro-social skill that are reproduced in the city while being adjusted to accommodate urban class distinctions, the availability of desired products, and technical standards for food. Modern urban expectations for food commodities typically include strict hygiene control, grading, branding, packaging, and certifications, all of which both enhance—and complicate—the valuation of agricultural products in the city. Companies and agencies transforming raw agricultural inputs into consumer products must consider these new characteristics as well as satisfy the underlying demands on quality originating from the countryside. Palm beer from Khmer Natural Enterprises, for

example, is a re-creation of the traditional sour palm drink (*duk tnot chu*) consumed primarily in the countryside during Khmer New Year. Instead of wild fermentation, however, the palm beer is yeast-fermented, pasteurized, and bottled for sterility. As highlighted in Section 4.2.4, this product draws on the storied past of the Khmer civilization to legitimize itself, but it also reflects modern imperatives for sterility, packaging, and retail availability. Geographically indicated Kompong Speu palm sugar is a similar formalization of a regionally well-known product that, previously, could not be confidently identified by urban dwellers. In short, the demand for palm beer, sugar and many natural products exists as a historical fact reflecting long-term demand; the products, however, are increasingly transformed (i.e. commoditized) in order to facilitate their consumption in non-traditional contexts (usually in urban areas or distant regions).

In many cases, however, the product itself does not necessarily fulfill countryside expectations unless the manner of production embodies traditional or ecological values. For example, traditional medicines made from ingredients that are hand-selected by knowledgeable healers from old-growth forests are typically more sought after than imported or plantation-grown ingredients. Regionally-specific rice varieties grown by acquaintances that cultivate organically are typically desired over anonymous market rice. In general, the familiarity with farming and rural life that still predominates in Cambodia (see Chapter 3) means that a higher value can be, and often is, accorded to so-called process-oriented qualities (Brunsø et al. 2002). Many of these qualities, however, are not immediately visible and, even agro-social skill and informal quality assessments cannot uncover hidden qualities, such as pesticide residues, degraded active-ingredients, or artificial colors and flavors.

Due to the awareness campaigns of the government, development agencies, and local NGOs, informal suspicions about unsafe agriculture and dubious medicine became a prominent issue in newspapers, radio broadcasts and party newsletters after the year 2000. By 2010, the problems with industrial agriculture, unsustainable wild collection, and unregulated pharmacies were being discussed in scheduled radio shows, television spots, speeches by the prime minister, minister of agriculture and in development programs (CEDAC 2007; Hun 2007; Keam 2007; Ky 2010; Radio France International 2010; Sarun 2009). During 12 months of fieldwork with farmers, traders, healers, and

customers, practically all informants were at least moderately acquainted with the negative impacts of agrichemicals, toxic preservatives, and misuse of biomedicine and at the same time aware of natural or local alternatives. Furthermore, as modernity, hygiene and health come to be associated with natural production, the demand for emerging natural products and agroecological techniques has risen across the demographic spectrum. In fact, according to my surveys, which I will illuminate in-depth below, consumers of organic rice and modernized traditional medicine are generally defined by a lack of a particular demographic bias.

5.2 The Landscape of Ecological Product Initiatives

The ecological products commercialized in Cambodia thus far have primarily been drawn from the range of items, typically food and medicine, that have historically robust consumption patterns in the countryside. In addition to the products discussed here, charismatic products such as pepper, coffee, durian, noni fruit, *prahok* (fermented fish paste), and forest honey have also experienced some time of commercialization. While global commodities like granulated cane sugar, HYVs and Chinese botanical medicine can substitute for Khmer food ingredients and traditional medicine to some extent, there is an inherently conservative demand structure for the originals informed by tastes, nationalism, and familiarity. However, as will be illustrated below, capacity constraints, development project goals, and limited quality control mechanisms have meant that, so far, primarily the most economically and culturally significant products have been commercialized as ecological products. In agriculture, rice makes up 84% of the production, making it the dominant candidate for commercialization (Purcell and Rich 2002). Nevertheless, natural meat and fish products, vegetables and fruit are receiving initial attention through the CEDAC Enterprises' natural food stores and a few additional small entrepreneurs. Other product lines, such as cosmetics, household products, cooking oil, and most packaged foods are not produced domestically as a cottage industry and thus do not have ecological counterparts. Formally, organic rice, geographically indicated pepper, granulated palm sugar and boutique palm alcohol were the first products to enter urban markets, and the initial support came from development funding and/or social entrepreneurial investments. Other natural agricultural products have, since then, incrementally joined urban markets, including fruit juices, fermented

soy products, and dry snacks. A similar process of formalization, consolidation, and commercialization occurred for traditional medicine. The build-up in external support and latent demand for advanced traditional medicine (and professionalized healers) led to the founding of the first training institute for traditional healing, the first certifying mechanism for healers and their medicines, the roll-out of the first laws for traditional medicine, and the creation of research and marketing networks to professionalize and disseminate modernized traditional medicine (see Tharp 2010; WHO 2012).

Over time, natural production has evolved into what amounts to a sector in agriculture and wild-collection, drawing attention from the government and the more typical private sector actors. This sector is perhaps most prominently on display at the annual “One Village One Product” trade fair hosted by the Ministry of Commerce.³⁴ But there is additional evidence that natural production has moved beyond development aid and government support. First of all, even the historically aid-driven initiatives have undertaken reforms to enable them to act more like the private sector. For example, according to the executive director, the CEDAC Enterprise is planning plantation-style organic rice cultivation [PP-LSH]. The international NGO GERES (Groupe Energies Renouvelables, Environnement et Solidarités) has shifted to market-oriented assistance for palm sugar processing, charcoal production, and cookstove manufacturing. Some private sector actors of long-standing have also moved incrementally toward natural production. For example, chemical-free rice has been supported by formerly conventional rice milling associations, such as Angkor Kasekam Roongroeng (Saroeng 2001). The Suzuki Chemical Company, in cooperation with the Cambodian Sugar Association, has begun product testing in advance of setting up large scale palm sugar refining facilities in Cambodia (Chun 2010; Soeun 2010). The French pharmaceutical company Pharnext has also recently invested in advanced traditional medicine through a company called Medikhmer Pharmaceuticals.³⁵ In general, however, the various enterprises and development-aid funded projects occupy a largely experimental arena of natural production. There are clear historical guidelines for estimating potential demand in natural products but not for these emerging socio-natural hybrids that try to merge modern imperatives for commercialization with traditional preferences.

³⁴ See <http://ovopcambodia.com>

³⁵ See <http://www.medikhmer.com>

The data presented and discussed below present a snapshot of initiatives aiming to create desirable and feasible natural products and investigates their corresponding demand characteristics. In addition to structured farmer interviews and rice productivity measurements, the quantitative and qualitative data used are gleaned from research-merchant partnerships, an innovative approach in which market players become active data gatherers and reflexive observers of market dynamics and consumer behavior (see Appendix 1 for details). The goal of this methodology is to artificially stimulate market situations that would reflect the day-to-day interactions of promoting and marketing natural and heritage products. One subsidiary goal of this exercise was to focus on wet markets, which are still the primary marketplace for most urban Cambodians and which are otherwise less prioritized in initial market propagation of natural and heritage products.

5.3 Organic Rice

As a formal concept in Cambodia, organic agriculture is construed in many different ways by its promoters and it is understood in equally differentiated ways by farmers and consumers. The classic development-oriented model of organic agriculture views it as a tool for rural development, allowing farmers to receive more for their harvest and, on a macro level, providing the country access to a high-value niche international market. The model that has predominantly evolved in Cambodia as a result of development initiatives, however, sees ecological agriculture as a good in and of itself, with commercialization in general as a secondary goal and export promotion as a tertiary goal. The practical justification for this, as I argued in Chapter 3, is that farmers and their families make up the majority of rice consumers and that focusing on improving productivity and ecological performance *for their sake*, pays higher dividends in the short-term in terms of well-being, health, and biodiversity. If and when farmers produce surpluses that are not informally consumed by relatives in the cities, there will be a push for the commercialization of ecological rice. Certifying organic rice and marketing in urban areas, however, is a contested process and often multiple models are developed in parallel. This section investigates the productivity and utility of natural rice production from the farmer's perspective and illuminates the methods by which organic rice is eventually processed, marketed, and consumed in urban areas.

5.3.1 Initial Stages of Institutionalization

The formalization of organic rice has proceeded along two parallel strands reflecting the priorities and constraints of the domestic and export markets. With initial recruitment of farmers into the ecological SRI beginning in 2000, CEDAC laid the groundwork for its subsequent foray into the formal organic market. Farmers' yields improved modestly under SRI but CEDAC accomplished far more through their rice extension: most participating farmers reduced or eliminated fertilizer and pesticide application and joined institutionalized rice producer groups. By the time commercialization of organic rice became a priority in 2004, many farmers were already conceptually aligned with the basic tenets of ecological production and were, to a large degree, organized in farmer associations, which facilitated the establishment of internal control systems³⁶ and their conversion to strict organic rules. CEDAC, however, was not the only player in this heady field at the time. From 2003 to 2007, a rash of development projects, social enterprises, and government initiatives haphazardly entered the domestic 'natural rice' market, increasing the number of certifications (or brand names) and quality control schemes, which impeded efforts to agree on regulations and expectations in the organic market. By 2010, the Cambodian Organic Agriculture Association (COorAA, which was initially established in 2005) finally managed to consolidate most of the players under a unified set of organic and chemical-free domestic standards. During this time, export-certified organic rice began as a project of the former German Technical Cooperation (GTZ, and their partners) as well as Oxfam Quebec. These efforts, however, were slow and problem-ridden, with organic rice exported only once to Germany in 2007 and, in limited quantity, to the USA from 2010. In terms of market share, the domestic market is the clear driver of demand: from the 2008 harvest, approximately 1,200 tons of

³⁶ In reality, CEDAC's quality control system is a mixture of internal control system and a newer concept, participatory guarantee system (PGS). The differences between these systems are subtle, but ICS is required for formal certification, while PGS focuses on creating internal solidarity networks that are not entirely based on organic certification but also include information sharing, credit schemes, and other social activities. Since farmer associations served a variety of development functions prior to the imposition of CEDAC's bylaws for an ICS, they are an example of both models operating simultaneously.

certified organic rice was marketed, of which only 230 tons was exported (Bun 2009); by 2011, organic rice exports dropped to 39 tons.³⁷

International media and market analysts, following the development-oriented model of organic agriculture, tend to attribute the limited extent of export-certified organic rice in Cambodia to technical constraints rather than a conscious decision to focus on the domestic market (Johannsen et al. 2005; McNaughton 2002; Schmerler 2006). Indeed, promoters of export certification in Cambodia have often expressed frustration regarding the supposed unwillingness of the Cambodian private sector to engage in profitable exports (Beban 2008, pp. 76-77). In contrast, promoters of the domestic market, particularly the president of CEDAC, view the domestic market as an equally profitable domain and one which can serve the additional purposes of supporting an environmental movement and promoting healthy eating.

“I am interested in moving us forward [in Cambodia] to a post-modern consumer model. [...] From my side, I see we are making a quiet revolution for food independence and health; export is not necessary to accomplish that goal.” [PP-YSK]

The president of CEDAC argues that aligning the production, marketing, and consumption of organic rice to improve overall well-being (particularly of farmers), requires an ideological and technical model of organic agriculture that results in a visible and thriving domestic organic market. The domestic market, furthermore, is also easier to scale up, which can lead to more systemic—as opposed to niche-level—change in agriculture and rural development (Bellows and Hamm 2001; McNaughton 2002; Röling 1994). Given the vast pool of farmers recruited by CEDAC since the year 2000 and the initial sales volumes of organic rice, this view is perhaps not unwarranted. However, the long-term viability of CEDAC’s model has already come under scrutiny and, since at least 2007, their “honeymoon” success in organic rice commercialization has largely come to an end. This research, which was conducted between 2007-2010, evaluates this post-honeymoon period and the evolving conditions for organic rice promotion in rural and urban contexts.

³⁷ While certified organic rice represented less than 1% of rice production in 2008 (USDA 2010), the remainder is not necessarily “conventional”. Due to the quantity of subsistence farmers, there are no reliable data sources available for characterizing farming methods (ecological or otherwise).

5.3.2 Negotiating Product Form of Natural Rice

The primary challenge faced by promoters of ecological agriculture (and subsequently, organic agriculture) is to invent a set of product forms that satisfy the broadest range of stakeholders without becoming too numerous for commercialization. Each agent along the path from paddy to rice bowl, whether it is a farmer, miller, trader, consumer or agronomic research agency, has different expectations about what constitutes quality and suitability in each of their domains, which in turn shapes how rice is viewed and transformed at each step in the production-consumption chain. Generally, farmers tend to value farm system characteristics; traders and processors value standards and marketability; consumers (which also includes farmers) value taste, texture and fragrance; agronomic research institutions privilege productivity and consistency. These actors exert their respective influence on the various configurations of rice by demanding and transforming varieties, cultivation methods and standards that suit their evolving needs on the farm, in the test plot, in the marketplace, and on the kitchen table. In a neutral playing field, these actors would reproduce demand for a diversity of rice varieties, farming systems, and urban product forms that suit their contexts. As I have outlined in Chapter 3, farmers in agrarian societies, as the majority of producers and consumers, have historically played the largest cumulative role in the formation of tastes, farming systems, and processing. Urban consumers and traders, as well as research institutions, also play a role in configuring production-consumption patterns for rice. In many countries with green revolution agricultural legacies,³⁸ the state and select international agencies have typically become the dominant agents. They typically privilege a narrow productivist view of rice and generally work to curtail the influence of producers, traders and consumers (Courville 2006; Smith 2010).

The actors in this arena of commoditization and agrarian transformation engage with each other primarily by repositioning and reconfiguring what I call technical and ideological standards. Technical standards are a codification of certain material aspects of rice that the private and public sectors deem are worthy of institutionalization and

³⁸ By green revolution agriculture (lower case), I primarily refer to a package of policy and technical interventions referenced in modernist agricultural literature, including, but not limited to: government-assisted land consolidation; widespread irrigation projects; varietal narrowing through external seed input; and support (usually subsidies) for fertilizer and other agro-chemicals (Kaosa-ard and Rerkasem 2000).

regulation (see for example Hill 1990; Thévenot 2009). Ideological standards are informal, relational and flexible guidelines for quality assessment rooted in experience that often overlap with technical standards but are defined in different terms and experienced in different ways (e.g., sensory perception, in negotiation, through measurement).³⁹ A relevant example is the technical standard “organic” and the ideological standard “natural”. The former requires specific guidelines to be fulfilled; the latter is broadly agreed upon in society but ultimately settled individually. In a general sense, ideological standards are the antecedents of technical standards, though the former has a much broader purview and can encompass characteristics that are not easily defined or are symbolic (Appadurai 1986), such as tastiness, fragrance, texture, and heritage value. Ideological standards are also relational and fluid, which is to say that they do not judge one characteristic to the exclusion of others and that they are configured both individually and in relation to group preferences. Technical standards, on the contrary, are fixed and derive from a limited participant base (often international standards), which can result in contradictions, such as a rice variety with excellent growth characteristics but such miserable flavor that it is only consumed as famine food or military rations (Khush and Juliano 1985). It is through this type of narrow specification that the industrialization and globalization of agriculture has caused technical standards to become increasingly decoupled from ideological standards.

In Cambodia, a constellation of civil society elements comprised of concerned farmers, politicians, non-governmental organizations and rural associations arose at the end of the 1990s to preemptively supervise the formalization of these ideological standards to match domestic sentiment. In terms of their influence on policy and farmer practice, these formalization “moderators” in Cambodian civil society are at least competitive with the nascent global agriculture sector, which includes agribusiness concerns, international agronomic research institutions, large traders, and exporters (see discussion in Section 1.1.1). Functionally, all of these stakeholders share a common view about raising milling quality, promoting more rice varieties in urban markets, and

³⁹ This conception of ideological standards is broadly consistent with French convention theory (notably from Boltanski and Thévenot 2006); differences are clarified further in the text. The choice of 'ideological' as opposed to 'cultural' standards is based on experience using these two terms in conversation with other academics. 'Cultural standards' tended to evoke connotations of broadly-consistent preferences across national lines, which differs from the intention I had for 'ideological' standards, which are individually-generated.

potentially achieving export ratings, but they differ on the issues of who drives this process, the early priorities, and what conditions and restrictions shall be imposed upon this commoditization. Typically, the productivist, industrial agriculture stakeholders support strict technical standards, objective dimensions for quality determination, and harmonization with international standards. Civil society stakeholders, speaking primarily on the behalf of small-scale farmers and domestic consumers, typically advocate for more flexibility in production dynamics and for a more diverse view of standards and quality, in which protocols for technical quality and desirability can evolve with farmers' practice and consumer preference (Beus and Dunlap 1990; Vandermeer 1995).

Organic rice promoters find themselves squeezed between these stakeholder bases. On the one hand, they favor one overarching framework, in this case ecology, for advancing productivity, marketing, and consumption. On the other hand, they inhabit a sustainable agriculture discourse that encourages harmonization with the decentralized and user-specific model of peasant rice agriculture carried forward by the inertia of historical production and consumption patterns. Unlike classical agronomic research initiatives, however, the focus on ecology provides promoters of organic rice with a more flexible set of parameters for envisioning and shaping agriculture modernization—assuming they choose to embrace them. These parameters can range from a rural development orientation, such as privileging the advancement of traditional farming systems and conserving landraces to favoring commercialization and exclusive export varieties and long value chains. How the organic rice sector evolves to balance these competing demands is the primary question to be answered in this section. Below, I outline how different parties view the imperatives of rice production and how this has been reflected in urban consumption patterns and traders' attempts to promote ecological and organic rice.

Farmers and Farmer Families

With more than 75% of Cambodians living in the countryside⁴⁰ and primarily engaged in rice agriculture, most production decisions are oriented towards supporting the family (including urban-based members) and the farm and not anonymous consumers in the

⁴⁰ World Bank. World Development Indicators, 2008. Web: <http://data.worldbank.org>

market. The family unit often includes kin living temporarily in urban areas who receive rice from rural-based relatives. Generally, rural-based members of the farming family calculate the value of the rice produced based on the utility it provides within the entire farming system, which includes human consumption, but also livestock and ecosystem needs. Although farmers' material interactions with rice are mostly practical in nature, they also value abstract ideals such as purity, cultural value and heritage, locality, diversity, and taste. Indeed, the persistence of "folk varieties" indicates that complex farming system and social characteristics provide incentive to be wary of modern varieties and the consequent changes to farmer practice knowledge systems they entail (Cleveland et al. 1994; Fitzgerald 1993).

While farmers tend to be conservative regarding variety for home consumption, they are relatively more open to changing their management and cultivation practices. This partially explains the adoption success in Cambodia of the SRI, which is primarily concerned with improving productivity through adjustments in nurserying, transplanting, and weeding. Although SRI is not explicitly an organic form of rice cultivation, ecological management practices are both implicitly and explicitly encouraged through CEDAC's projects. In trainings and organization literature, SRI is promoted as a way to maintain or increase rice yields while reducing or eliminating pesticides and inorganic fertilizer. The Khmer translation of System of Rice Intensification even specifies that it is "natural" (*tomacheat*). The popular narrative concerning SRI in Cambodia is that CEDAC's current president adapted the original Madagascar system to Cambodian traditional wet-season cropping on his own test fields at the end of the 1990's. This "adaptedness" is frequently cited as the basis for SRI's popularity over competing management packages (that encourage external inputs). According to CEDAC's own reports, which I can largely substantiate in four regions,⁴¹ around 7-10% of Cambodian farmers were engaged in SRI by 2010, making it perhaps the most ubiquitous agriculture development initiatives in the country (CEDAC 2008; Yang Saing 2010).

For family farmers, certified organic and uncertified ecological rice cultivation is a broadly useful model as it facilitates stewardship of the preferences desired by the

⁴¹ In general, SRI is a fluid set of cultivation techniques that cannot define a farmer's practices in a discrete manner (for a more complete discussion of this, see Glover 2011b), so measurement here is based on awareness, experience, and intentionality regarding SRI.

farming family as well as characteristics useful on the farm. Farmer-friendly characteristics, such as flood resistance and straw output are usually associated with landrace or traditional varieties (Feuer 2007). And generally, organic cultivation is more suited to traditional varieties because they do not respond to fertilizer as readily as HYVs and carry a systemic resistance to local pests and diseases because farmers typically crop many varieties in one field or in adjacent fields. Due to inherited preferences (and potentially objective eating quality), farmers also prefer the taste, texture and aroma of landraces, and they value having a diversity of varieties available. In two districts of Takeo province in Cambodia in 2007, I documented 31 distinct varieties of rice. Often, farmers grow 3-5 varieties in separate plots in order to cater to different functions, such as for festivals and weddings, visitors, elderly without teeth, pastries, and animal feed. Because of synergies with SRI and traditional varieties, SRI indirectly encourages in-situ preservation of landraces and thereby valorizes farmer variety preferences. As one farmer aptly described it,

“People will always choose to grow the rice they like to eat - eating is the most profitable use for rice.” [TK-BO]

By profitable, he is referring to the fact that eating one’s own rice effectively cuts out the middleman, allowing the farmer to avoid transport and marketing costs. Added to this is the benefit of being able to choose your favorite varieties and cultivate them ecologically without need for certification. Often underappreciated by outside observers, the emphasis on taste is an important characteristic because it signifies that even impoverished farmers wish to eat rice they enjoy and that quality is often not necessarily subservient to quantity. Indeed, HYVs, commonly grown in the early season, are usually only used for animal feed or emergencies, as the farmers (and urban dwellers) consider the taste and texture undesirable (see Section 3.1.3). Although agronomic research institutions still typically put emphasis on modern varieties (for Cambodia, see Mak 2001), buried in this literature are occasionally admissions that improving traditional varieties would be more profitable as well as environmentally and culturally appropriate (Agrifood Consulting International 2002; Arulpagasam et al. 2003; Nesbitt 2002; Thavat 2011).

When CEDAC began promoting certified organic rice, they were confronted with similar challenges about the specification of varieties. Because certified organic rice was initially started as a development project, CEDAC tried to buy a range of varieties that most farmers were already growing, but even this list excluded most traditional varieties. Specifically, they chose two medium-to-long season aromatic varieties, Phkar Malis and Phkar Kney, a short-grain variety from Kompong Cham province called Gnou Poug, and a variety of sticky rice called Domnaup. One notable exclusion was the variety Neang Meng, a traditional aromatic variety with cosmopolitan ambitions that was commonly marketed in the capital. During the period of my market research, the CEDAC Enterprise effectively stopped buying Gnou Poug and Domnaup. Increasingly viewed as a high-value commodity, CEDAC distilled their selection to only a handful of well-known aromatic varieties. Farmers who worked with CEDAC were, in turn, effectively instructed to grow Phkar Malis or Phkar Kney on a contract basis. This has generally been negatively viewed by most smallholders, who have one hectare or less of rice land per family, and cannot not consistently produce a surplus of the desired variety to sell to CEDAC [TK-CH; TK-PR; TK-YS; TK-IS; RE-KS; RE-NS].

“Our producer group has between five and ten members, depending on if they have a surplus to sell in the year. [...] Everyone grows a little more Phkar Malis than usual, so that if they have a surplus they can sell to CEDAC. If they don’t have a surplus, they will eat more Phkar Malis that year.” [TK-CH]

Mr. Chum, quoted above, grows six varieties of rice on his 0.75 hectare of rice land and, most days he consumes a variety called Red Rice, with Phkar Malis saved for guests and special occasions. He acknowledges that, because of hydrology in the area, Phkar Malis, which is a medium-term variety, would normally not take up a large proportion of his rice land but that, in hopes of a good sale price, some people are willing to take this risk. In contrast, private traders generally buy any variety, even “lowly” traditional varieties and, in contrast to CEDAC, they make few demands about post-harvest processing.

Ultimately, farmers have a choice about whether they carry out ecological farming for subsistence and informal sale or for subsistence and certified organic sales.

Organic cultivation carried out for subsistence carries four advantages for farmers. Firstly, it does not require exposure to unhealthy agrichemicals and eliminates the costs associated with purchasing external inputs. Secondly, it allows farmers to maintain biodiversity of rice species *in situ*. Thirdly, it often brings farmers into contact with new farming methods that can increase yield, as well as potentially provide the benefits of membership in farmer associations. Lastly, it does not require the hassle and costs of certification. Indeed, because most organic rice is consumed by farmers themselves, the amount sold in urban areas reflects only the tip of the iceberg. Of the group of more than 100,000 farmer families participating in SRI as part of CEDAC's programs, only around 5,000 families market organic rice (CEDAC 2009; Keam 2007).⁴²

Organic varieties sold for certification, in contrast, are usually fancier and more universally well-known, and thus appear to be more suitable for anonymous urban markets. Organic paddy can fetch a 5-10% premium, which combined with savings from avoiding fertilizer purchases, can compensate farmers for yield loss resulting from organic cultivation of 0.30 to 0.55 tons/ha, not including potential health benefits and improvement to rice grain quality. However, from a statistical perspective, it is not clear whether organic conversion would result in a yield loss at all due to the simultaneity involved between (a) discontinuing the use of agri-inputs, (b) the lag in the reconstitution of soil quality, (c) changes/improvements in farmer skill, and (c) farming system adjustments caused by SRI. Of these, my in-depth survey of 70 farmers in two neighboring low-land districts in Cambodia indicates that the *changes in farmer skill represent the most dominant impact on yield productivity*, and that other variables tend to act through this parameter in endogenous manner. This conclusion emerges from the two models found Table 5.1, which analyze the determinants of rice yield at the plot-level by looking at farming skills, household characteristics, and biophysical factors. Detailed descriptions of each variable listed in Table 5.1 are found in Appendix 3, so I will only highlight aspects of variables that are significant and not generally self-explanatory.

⁴² It should be noted that not all families growing according to SRI standards are chemical-free, nor are all plots grown according to SRI methods. A previous study conducted by me in the same area has indicated that, on average, 51% of a typical participating farmer's fields are cultivated with ecological SRI methods (Feuer 2007).

Table 5.1 Modeling determinants of rice yield (Ordinary Least Squares, OLS)

	(1)		(2)	
	yield	Std. Err.	yield	Std. Err.
cultivation	0.400 ***	0.089		
SRI_quality			0.304 ***	0.096
plotsize	-0.003	0.003	-0.005	0.003
organic matter	0.002	0.143	0.020	0.151
soil quality	0.247 **	0.104	0.294 *	0.108
labor	0.007	0.010	0.014	0.010
wealth	0.178 **	0.085	0.168 *	0.090
fertilizer/ha	0.079 **	0.039	0.039	0.039
constant	1.844	0.273	1.638	0.298
<i>n</i>	90	$R^2 = 0.38$	90	$R^2 = 0.31$

Confidence: *** 1%, ** 5%, * 10%

Before describing the differences between the two models depicted in Table 5.1, let me highlight what they illustrate together about determining rice yield. First, both models examine the same 70 farmers, from which 90 plot-areas can be distinguished by the farmer's intention to carry out SRI farming.⁴³ Second, the base rice yield (represented by the constant) is around 1.6-1.8 ton/ha, which represents the influence of factors that are not included (i.e., the error in the model), such as base growth potential, climate, irrigation, and rice variety. The overall rice yield among sampled farmers ranged from a minimum of 1.1 tons/ha to a maximum of 4.8 tons/ha. Third, in both models, soil quality and asset-based wealth are significant determinants of yield. The *wealth* variable is an index composed of factor analysis (maximum likelihood) scores with the minimum and maximum between -1.6 and 1.5 (see Appendix 4 for the breakdown of the index and its respective scoring weights). These extremes are associated with an effect on rice yield ranging between -0.48 and 0.46 ton/ha and underline how better-off farmers (which can indicate ownership of animal traction and farming implements) are able to outperform poorer farmers. While wealth can facilitate yield by potentially allowing the farmer to buy better land, superior farming implements (weeders, water pumps, strong cattle for plowing, etc.), ducks for pest control, and

⁴³ Some farmers do not conduct SRI and hence are considered to have one plot, while others conduct exclusively SRI farming and are also considered to have one plot. Yet others conduct SRI and traditional agriculture and are thus considered to have two plots (one SRI, one traditional).

agricultural inputs, it may also facilitate yield by allowing positive risk-taking behavior in agricultural improvement. *Soil quality* is an ordinal variable with values 0, 1 and 2, corresponding to increasing soil richness defined at the village-level. On the margin, higher soil quality is associated with increased yield of 0.25-0.6 ton/ha across both models. However, in the short-term, soil quality cannot be changed and must be viewed as an exogenous determinant.

The differences in specification and results between the two models in Table 5.1 not only go toward explaining the impact of SRI on farming, but more generally help to illuminate the interplay between farmer skill and technical learning. The primary difference between the models is the exchange of the variables *cultivation* (model 1) with *SRI_quality* (model 2), which are two different ways of looking at aptitude in rice farming. *SRI_quality* is an ordinal variable describing the extent of SRI application, with 0 defining non-application, 1 partial SRI cultivation, and 2 good SRI practices. *Cultivation* is an index variable aggregating farming practices and their implementation by individual farmers. Rather than introduce bias by evaluating farmer skill using subjective measures, I allowed the factor analysis (maximum likelihood) to sort out good farmers from bad based on the specific cultivation steps inherent to lowland rice in Cambodia, which are elaborated in Maddocks (1994).⁴⁴ This results in a cultivation index with minimum -1.36 and maximum 1.66. If one browses the weights assigned by the factor analysis in Appendix 4, it stands out that many strongly-weighted cultivation practices (i.e., farmer habits that the factor analysis considered influential) tend to also be among the most important steps in SRI. On the one hand, this suggests that SRI has been so well-adapted to the Cambodian context by CEDAC that it is really a logical extension of good farming habits (as suggested by Glover 2011b; Ly et al. 2012). On the other hand, this also suggests that SRI has influenced and come to define good farming habits. Indeed, ethnographic work with farmers suggests that farmers with high yields practiced many SRI-like steps prior to being trained.

“The first time I met a CEDAC staff member and we talked about SRI, I ended up teaching the staff member also. I already did many of the steps he taught us

⁴⁴ The question of what should be considered ‘good’ or ‘partial’ SRI is still debated, so I employ a mixed definition of best practices combined with self-identification by the farmer. Specifically, a farmer is considered to apply good SRI if he or she achieves all of the following conditions: (1) transplanting the same day as pulling, (2) ageing seedlings less than 23 days and (3) spacing hills at least 20cm or more from one another.

because of what I learned from the effective farming of my father. We did not use one stem only but we used less than farmers around us. And we worked hard to improve our dikes and ponds so we had better water control. And I have many recipes for biological pesticides that I learned by experimenting. [...] Still, I learned a few things from CEDAC that I now use in my farming.”
 [TK-CL]

Mr. Chan, quoted above, also visited the Cambodian guru of SRI, Mey Som as part of a farmer exchange program organized by CEDAC. He maintains that this experience taught him not only how to efficiently apply SRI, but how to be a better farmer in general.

So although many SRI farmers intentionally apply the formal steps on only a portion of their land (see footnote 43), SRI influences their overall farming habits (*cultivation*), which affects the yields from all of their plot-areas. This already hints at what I concluded above, namely that SRI raises yields by working through farmer skill. The results of the models specified in Table 5.1, specifically the same magnitude of effect on rice yield, indicate that SRI quality and cultivation practice, for practical purposes, often come to represent the same thing. Good SRI application is associated with a maximum increase of 0.6 tons/ha while the best cultivation practices increase yield by 0.66 tons/ha (or decrease it by 0.54 tons/ha in the case of low-skill farmers). In other words, SRI quality is a less-precise proxy for overall cultivation practices in areas that have SRI-training programs. A simple comparison of mean cultivation scores with SRI quality (see Table 5.2) further demonstrates that the extent of SRI application is incrementally matched by cultivation skill.

Table 5.2 Cultivation score by SRI quality

<i>SRI quality</i>	<i>Cultivation</i>	
	Mean	Std. Dev.
0	-0.68	0.46
1	0.70	0.54
2	1.21	0.34

Another indication that SRI raises yield through overall productivity increases is suggested by comparisons of SRI vs. non-SRI yields *by the same farmer*. In 34 cases out of 70, farmers have intentionally discrete field areas for SRI and non-SRI cultivation. For these farmers, SRI field areas achieve only 0.28 ton/ha more than non-SRI field areas. Now if we compare SRI yields to non-SRI yields in the overall sample we find that SRI plots, on average, achieve 0.7 ton/ha more than non-SRI field area (see Table 5.3).

Table 5.3 Yield of plot areas by SRI quality

<i>SRI quality</i>	<i>Yield (ton/ha)</i>		
	Mean	Std. Dev.	Freq.
0	2.06	0.52	54
1	2.70	0.72	13
2	2.77	0.96	23

In short, farmers who apply SRI improve their yields on their so-called non-SRI plots as well as, to a somewhat higher degree, on intentional SRI field areas. The lesson of this result for studies on the effect of SRI on rice yield is that the formal application of SRI (i.e., the steps themselves) is less important than the broad-base effect of SRI on farmer skill. In other words, without controlling for the simultaneity effects of SRI training and base farmer skill (a doubtful proposition given the individuality of farming styles and the heterogeneity of field areas), evaluating SRI yields amounts to little more than arbitrarily picking fields to compare based on a subjectively chosen point on the spectrum of farmer skill at a given moment in time (cf. Glover 2011a). As a result, some reports can find very high yields from SRI (i.e., good farmer skill, small area, third year) or very poor SRI yields (unskilled or unmotivated farmer, large area, first year), an issue which is not untangled in CEDAC’s internal reports (e.g., Ly et al. 2012; Suon 2007a, b).

The implication for farmers considering whether to engage in organic agriculture is that the productivity of ecologically grown rice will depend more on the farmers themselves (and their capacity for learning and adapting new practices) than on the specifications of the farming system promoted by extension agents. Farmer skill even trumps external inputs. As model 1 in Table 5.1 indicates, fertilizer application is a

significant variable, but its effect is largely irrelevant. For example, application of an additional 50kg bag fertilizer is only associated with an increase of 79 kg of paddy per hectare, which barely reaches the break-even point for smallholder farmers. Furthermore, as the weight for inorganic fertilizers in the cultivation index (see Appendix 4) shows, application of fertilizer is associated with decreases in farmer skill. This suggests that investments in long-term soil quality and farming skill provide greater returns in respect to yield. This also suggests that the productivity of any new farming systems is based on the internalization of that system by the farmer rather than the strict implementation of necessary steps. The lesson for integrating modern or ecological agricultural techniques into rural development plans is that external farming systems are more effectively implemented when they complement and build upon local conceptions of good farming.

Farmers and farmer families, which represent the largest producer and consumer market in Cambodia, have expectations of agricultural development and food systems that correspond with the priorities and vagaries of rural life. Modern varieties and new methods of cultivation must somehow come into alignment with farmers' demands of cultivation practices and rice eating quality. In the case of long-season rice cultivation elaborated above, the utility of new practices is manifested in, and expressed through, farmers' overall skill rather than in 'adoption rates'. As long as government programs or drastic declines in rice seed do not compel farmers to do otherwise, small farmers are in a position to integrate outside experience into their existing skillset rather than having their skillset displaced by outside practices. As the collective stewards of agrobiodiversity, farmers appear to be favoring a more careful reassessment of production and consumption ideals. Despite a high level of influence on urban demands through family in the city, cities evolve their tastes and priorities along a somewhat parallel trajectory, which I will elaborate below.

The Urban Consumer

Urban preferences for rice are as diverse as the population in the cities. In addition to the wider spectrum of incomes and backgrounds, many urban dwellers in Cambodia are actually extensions of farming families. These émigrés represent the family in the city and retain strong connections back to their farmstead. Due to the proximity of the

densely populated rice-growing lowlands to the capital and the largest provincial centers (usually within one hour), many urban farmer family members consume rice directly obtained from their rural-based family. Urban dwellers that do purchase rice in the market often derive their knowledge of, and some preferences for, rice from their not-so-distant rural background or from relatives in the countryside (Janz et al. 2003). This dynamic is particularly salient in Cambodia, a country in which, in 1975, all urban citizens were marched into the countryside by the Khmer Rouge to take part in an agrarian social-economy based on rice farming. The population of former urbanites was decimated due to politically-motivated killings and the hardships of transitioning to rural farm life (Chandler 2000[1983]). The cities only repopulated slowly after the Khmer Rouge were deposed in 1979, and most urban Cambodians today still are either directly connected to the countryside through land or close relatives, or have, at most, one generation separating them from rural life.⁴⁵ Sitha Meng (pseudonym), an accountant at a bank in Phnom Penh, shares a typical story of a new urban family:

“My parents grow rice and have a small banana plantation in Kompong Cham province. My father used to be a furniture-maker in Phnom Penh before Pol Pot came, but now he is a farmer. [...] When I was growing up, we used to eat a rice variety called Bei Khua [Three Panicles]. We also ate special rice for festivals and holidays called Phkar Malis. When I first moved to Phnom Penh to study, I brought bags of our traditional variety of rice to eat with my brother who was living with me. We saved a lot of money that way, only buying vegetables and some meat. These days, I buy most of my rice in the market, even though I still bring a little bit of rice back when I visit my parents during Khmer New Year. [...] Because I studied hard and I have a good job now, I started to buy Phkar Malis to eat at home all the time. It has a good aroma and it is soft and good for guests. But if I go home, I enjoy Bei Khua, because it reminds me of my childhood.” [PP-MS]

Despite her new identity in the city, Sitha still refers to her parents’ farm in Kompong Cham as “home” and, like many urban dwellers, she romanticizes the

⁴⁵ Anecdotal evidence of this phenomenon emerges annually during the extended holiday of Khmer New Year, in which, consistently, around half of the urban population returns to their homesteads in the countryside.

traditional varieties of her childhood, although she considers her ability to buy Phkar Malis as a signifier of her upward class mobility. The transition to urban lifestyles is often accompanied by an appreciation of product-oriented quality and quality control, such as “premium” grades (Brunsø et al. 2002). For Sitha and other rural émigrés, however, formal market quality characteristics only bracket the individual and personal process of selecting suitable rice of a desired quality, which is informed by their rural background and knowledge in rice. This often corresponds with a high value placed on market rice from their home province or from other famous provinces, and with process-oriented qualities such as “healthy” or organic. In fact, according to my market experiment in Phnom Penh, organic rice appeals strongly to the lower middle class patrons of typical wet markets in the city. Among my sample, 72% of consumers were described as lower-middle to middle class and 25% were rich, which corresponds to the average demographic of people who shop for rice in wet markets.⁴⁶ This demographic characteristic would be expected to be skewed towards richer patrons due to the premium price (3-10% on organic rice), so this result indicates that the even the poorer demographic is equally willing to pay for the benefits of organic rice. Based on my analysis of rice packaging and consumer motivations, the most common reasons given for purchasing organic rice are primarily purity/health, taste, and modernity (due to packaging, certifications, advertisements, etc.). The organic rice bag in Figure 5.1 captures many of these elements.

⁴⁶ Interviews have indicated that poor city dwellers frequent wet markets, but rarely purchase rice. Rather, they often have networks back to the countryside for direct supply and rarely elect to purchase milled rice in the city.



Figure 5.1 Organic rice package sold by the CEDAC Enterprise

Urban consumers employ certain strategies, based on their knowledge of rice, to select rice from the open market. While certain indicators of rice quality, such as breakage, foreign matter, or fragrance (Webb 1991), generate obvious quality brackets for customers (and traders), preferences for other criteria, such as variety, origin, texture and organic cultivation are configured individually (Cleveland et al. 1994; Kloppenburg Jr. et al. 2000). To illuminate this idiosyncratic dynamic, I will contrive two stories about buying rice in Cambodia based on fieldwork with traders and consumers. These stories, much like tricks for choosing tasty apples or scanning ingredient lists, provide informal evidence of quality and ordering of preferences.

In the big city. After scanning the available varieties and inquiring about the place of origin of the rice, the average urban consumer in Cambodia will refer

to her informal list that ranks her favorite provinces matched with various varieties. Before judging if the price is fair, she may also confer with the trader about invisible characteristics, such as organic production. She will make a judgment concerning the honesty and reliability of the trader and weigh this accordingly. Finally, she will bury her hand deep in the rice and then scoop up a handful of a potential candidate to examine it visually and smell it. She is feeling for coarseness and inspecting for extraneous stones, broken and yellowed grains and considering shape and opacity. She is put off mildly by broken and yellowed grains but she strongly disfavors stones, which can damage teeth. The shape is both an aesthetic and a nutritive consideration. A pleasing shape is a casual indicator of the “fullness” of the grains (i.e., their maturity, and potentially their nutrition). The fragrance, similarly, is a hygiene consideration as well as a matter of preference; it should be free of musty odors and at least lightly floral, even if it is a non-aromatic variety. This indicates whether it has been dried and stored correctly, and, as some farmers argue, whether fertilizers have been used (they diminish fragrance, in addition to affecting cooked texture). A particularly lovely bouquet can, at this point, compel a purchase. In the end, she buys one kilogram of the chosen variety to taste at home, checking finally for a fluffy texture and post-cooking aroma. If she is satisfied, she will return to the same trader during that year but she will continue to make occasional inspections.

In a village or small-town market. The average rural consumer directly examines the various grains on offer with a clear picture of what her family needs. Because she is familiar with the advantages and disadvantages of different cultivars, she will often select multiple varieties that fulfill different purposes: for steaming, for soups, for dessert, and even for animal feed. With little input from the trader, she will determine where the rice originated, if the grains are mature and whether or not fertilizers or pesticides have been applied. She has a clear preference for rice from particular areas in the regions and for rice unaffected by agro-chemicals (though she does not seek a

strict organic certification). In particular, she inspects the chalkiness of the embryo and the fragrance because she desires a grain that swells upon cooking, which is indicative of higher protein content and of rice that is lighter on the stomach (so as not to hinder manual labor). She is generally not concerned by broken grains, admitting that they have poor milling machinery locally and that kernel breakage is an aesthetic luxury she cannot indulge in. Generally, she is seeking a weaker fragrance and a neutral taste, as her family eats proportionately far more rice than urban people and they desire an everyday variety. After the inspection, she will negotiate on the price and, if fair, she is usually confident enough to buy as much as she can afford.

In both of the preceding stories, the buyers clearly consider some of the characteristics that are traditionally standardized in rice, but they also prioritize other characteristics without a clear hierarchy (Straughan and Roberts 1999). Price is perhaps the only characteristic that has a linear (negative) relationship with desirability. But in general, the mental calculus that leads to an eventual purchase of rice comprises a complicated series of trade-offs that pre-empt the possibility of universally desirable rice. This aspect of rice both improves the potential for ascribing features such as justice and ecology into the rice, and also complicates it. Indeed, fulfilling a technical standard, such as organic, does not necessarily create an organic substitute; instead it invokes an ideological standard of natural rice that reshuffles valuation of other dimensions of the rice (Murdoch and Miele 1999). The natural conclusion here, based on the narrative above, would be that consumers will be more satisfied if they can find a configuration of rice characteristics (quality, price, variety, region etc.) that specifically satisfies their needs, which is to say they demand a diverse set of configurations so that their preferred configuration is more likely to be among them.

Promoters of organic rice, such as CEDAC, can either view this as an opportunity to expand the scope of organic rice acquisitions to more varieties, regions and qualities, or they can view fulfilling the diverse demand as a hopeless endeavor and instead focus on finding individual configurations that fulfill the largest demand segments. By 2011, it was clear that the CEDAC Enterprise had mostly opted for the latter approach, viewing the efficiency and streamlining of organic rice acquisitions as

more important than satisfying the diverse demand, at least in the short term. According to the head of the CEDAC Enterprise, they plan to remedy their financial troubles by more efficient expansion [PP-LSH]. By this, he indicated, they would focus on farmers with higher output, remove farmers who are difficult to reach or are unreliable, and create plantations that employ small farmers to use CEDAC rice varieties and management practices. Only in the long-term there exists an ideal to focus on diversity.

“We want to be able to label our rice more detailed and especially say where the rice comes from. But the system is complicated so we cannot do. Our vision in the future is to have more varieties, but maybe we can do this only when we start sales in provinces.” [PP-LSH]

The market and profitability orientation here means that fewer farmers will provide fewer varieties but will do so in a more efficient way. The focus will be on price and rice configurations that have the most potential in the major cities. This is generally consistent with early-stage commoditization. However, CEDAC’s goal has always been systemic—drawing on agroecology and *Farmer First* discourses, their president and founders view ecological agriculture as a cultural revolution. And yet, if plans to scale up organic through plantations and weeding out small producers materialize, the rice marketing initiative may ironically erase its gains in rural development (for a similar example, see Henderson 1998, p. 177). Providing organic rice for limited segments of the population, such as wealthy urbanites, would seem to contradict the development goals associated with this commoditization. Because demand is still so differentiated, avoiding this would depend on a broad base of consumers accepting a limited range of characteristics in exchange for the organic feature. A few customers with whom I have had direct contact have commented to me that although the organic rice they bought is not perfect, “it will do” (*gor bann*). To what extent organic rice configurations that are eventually commercialized “will do” for the majority of the urban population is a question I investigate now.

While rice evaluation is highly variable and largely informed by individual preferences and priorities, the actual purchasing behavior of customers can reveal broader trends about the salience of the organic feature in rice sales. In a researcher-merchant partnership with traders in ten wet markets across greater Phnom Penh, we

gathered data on the basic demographic characteristics of consumers and their purchases. Traders also make recurring qualitative observations about their customers throughout the process which can be used to support and explain the quantitative trends. This methodology, including its limitations, logistics and ethical considerations is more fully elaborated in Appendix 1. In general, I compare the demographic characteristics of consumers with two aspects of purchase: the (relative) price and the amount purchased of different varieties in each transaction. The profitability and marketing considerations of the traders and handlers are examined in the next section.

Table 5.4 Demographic characteristics in organic rice purchase price and purchase amount

Characteristic	Retail Price (Cambodian Riels)					Purchase Amount (kg)				
	<i>n</i>	Mean	Std. Dev.	Min	Max	<i>n</i>	Mean	Std. Dev.	Min	Max
Middle Income	423	3266	245	2500	4000	422	14	15	1	150
High Income	138	3162	174	2630	3600	137	38	21	5	100
Khmer	526	3246	234	2500	4000	524	19	19	1	150
Non-Khmer	35	3146	205	2800	3400	35	32	24	2	100
Age 0-30	128	3202	343	2500	4600	124	10	12	1	50
Age 31-49	369	3245	273	2500	4400	312	15	15	1	60
Age 50+	131	3281	268	2300	4000	126	19	19	2	100

(wholesale excluded)

The summary statistics in found in Table 5.4 present an overview of the kind of demographic data collected with merchant partners and suggests, perhaps misleadingly, some of the emerging trends. At first glance, it may appear that rich, non-Khmer, and young people will pay less for organic rice and that rich, foreign, and elderly people buy more rice per transaction. The first step in unraveling these data is to disaggregate by rice variety and examine statistical interactions. The models in Table 5.5 examine the demographic characteristics from Table 5.4 and how they explain willingness-to-pay for the organic premium (marginal price difference between organic and conventional equivalents) overall and for two rice varieties for which equivalents exist. Based on these models, it turns out that the age of the consumer and nationality are not statistically significant considerations—something else is explaining organic purchases.

This, however, is an important conclusion unto itself: responding to the relative price, *buyers of organic rice are age and nationality neutral*. This may not come as a surprise, as young, elderly, foreign or Khmer would have inconsistent personal and health reasons for purchasing organic rice. The conclusion suggested in Table 5.4, that older people buy more rice per transaction, is, as it turns out, generally true of rice consumers in wet markets and not specific to organic rice. After explaining this initial result to a trader in Phnom Penh, she responded that,

“You should not be surprised that older people buy more organic rice. They buy more rice all the time. I think young people do not earn enough each month to buy large bags of rice, so they must buy small amounts. Elderly people can buy more at one time and if they buy one sack [50kg], I usually deliver because it is heavy for them.” [PP-US]

The more divisive question, however, remains open: is there a class or income distinction between purchasers of organic rice? The results that initially emerge from Table 5.5 may seem paradoxical—it appears that middle class people are willing to pay more than rich people for organic rice. Specifically, the results suggest that, for all varieties, middle income customers are willing to pay 1.8% more than rich people for organic rice (over conventional rice). If I plot these margins (see Figure 5.2), however, one can more clearly understand the purchasing behavior of rich vs. middle-income people under various conditions. For both varieties, middle-income people have a higher willingness-to-pay for organic rice at small purchase amounts but increasingly demand a better price as purchase amount grows. Rich people have steadier willingness-to-pay across purchase amounts. For Phkar Malis, a more expensive aromatic variety, middle-income people are willing to “splurge” for lower quantities but are not willing to pay much of a premium at higher quantities. There is a similar trend for Phkar Kney organic premiums, a middle-range variety. For Phkar Kney, however, the overall willingness-to-pay is higher than Phkar Malis (between 10 and 15% for small amounts, compared to 5-10%). The higher willingness-to-pay for cheaper rice suggests that consumers are sensitive to absolute price. Phkar Kney, even with a higher price relative to its conventional equivalent, is still cheaper than Phkar Malis and therefore more affordable. This also indicates that people are willing to “downgrade” in variety in order

to afford organic rice. The sharp slopes for middle-income people, however, indicate that middle-income consumers are more sensitive to the amount/price relationship and that the absolute price of organic rice will have to drop (especially for large purchases) to encourage strong demand. The gentle slopes for rich consumers indicates that, consistently, they will pay 4% more on the margin for organic Phkar Malis and 10% more for organic Phkar Kney.

Table 5.5 Modeling determinants of willingness to buy organic rice over conventional (OLS)

Proportion of marginal price difference between organic and conventional rice							
	(1)		(2)		(3)		
	all varieties	Std. Err.	Phkar Malis	Std. Err.	Phkar Kney	Std. Err.	
foreigner	-0.011	0.007	-0.010	0.008	-0.018	*	0.010
age	0.000	0.000	0.000	0.000	0.000		0.000
year 2010 ⁴⁷	-0.030	***	0.013	0.009	-0.033	***	0.005
high income	-0.018	**	-0.039	***	-0.029	***	0.011
kg bought	-0.001	***	-0.001	***	-0.001	***	0.000
income*kg	0.001	***	0.001	***	0.001	***	0.000
constant	0.107	0.008	0.074	0.013	0.153		0.009
<i>N</i>	561	$R^2 = 0.20$	237	$R^2 = 0.33$	128	$R^2 = 0.52$	

Confidence: *** 1%, ** 5%, * 10%

The observations of the traders involved in this research project can fill in other aspects of this consumer narrative. In fact, the results in Table 5.5 were first calculated six months after returning from the field but a keen rice trader had already explained this dynamic to me before departure from the field.

“If you look at one purchase, poorer people pay a high price. I try offer them a better price if they buy more, but they usually just buy 5 or 10 kilo. But I think in the end of the year, they will spend less than rich people on rice. One, they buy small amounts because they wait for their family to bring rice from the farm. Two, they buy small amounts because they are waiting to find a very

⁴⁷ Because data was gathered over the period 2009-2010, I tested this model with the interaction term year 2010 to determine if there was a fundamentally effect on the data. Purchasing behavior remained broadly consistent between these two models.

good price somewhere, then they buy a lot. Three, they don't have enough money to buy more. I think this is the reason they don't buy much organic rice, because I can see in their eyes that they want it but they cannot pay! So they buy Kney instead of Malis." [PP-CN]

Indeed, on average, rich customers spent 112,885 Riel (\$28) per transaction while middle-income customers spent 41,635 (\$10). Since most Cambodians will consume approximately the same amount of rice per year (165 kg), smaller purchases necessitate either more frequent purchases and/or larger, but more strategic, purchases.

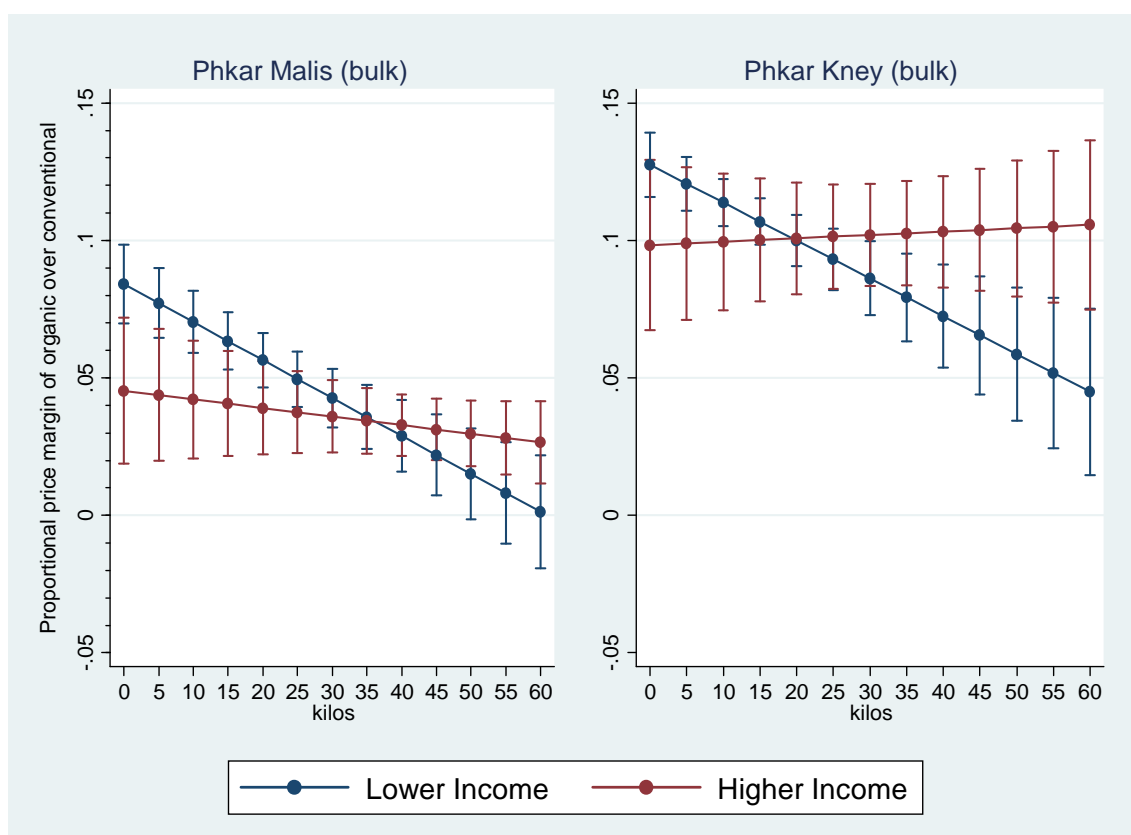


Figure 5.2 Margin plot of willingness to pay organic premium by age over purchase amount

Two traders that eventually discontinued the researcher-merchant partnership added a few additional dimensions to purchasing behavior in their explanation for why they were ending the research partnership.

“Selling your rice was too much work! Most people ask me about the variety and where it comes from and then they quietly check the rice and buy. If they come from Kompong Cham they usually buy from that province or Battambang. With your rice, they took a long time and asked many questions and made me work hard. Sometimes they do buy rice from a different province just because it’s natural, but they spend a lot of time to make their decision!”
[PP-CH]

“The first month I sold this rice from the organization, I thought I sold a lot. Many customers were asking me about it and I had a busy stall. But after that month, I looked inside my purse and I had only a little money. Everyone bought only one or two kilograms to taste at home. Some people came back and bought the other natural variety to taste also. Some people bought more after that, I guess they liked it. But others asked me if I had even more varieties to give them, but I only had two. They went over to the organization’s shop because they were looking for a different natural rice that they like. Maybe from a [specific] province or a variety they like to eat, I don’t know. But they stopped shopping with me.” [PP-PSC]

Three aspects are consistent from these two stories: (1) the organic concept was popular if not the products themselves, (2) the organic feature complicated normal purchasing behavior, and (3) the organic feature still had to fulfill consumers’ other expectations, such as region of origin and variety. In short, organic rice was not a simple substitute—it forced a reevaluation of the consumers’ ideological standards for rice and adjusted their price expectations. There is, however, an important difference between the two explanations above. In the first story, the trader acknowledged that some consumers sacrificed their preference in order to buy an organic variety. This is consistent with the conclusion above, that consumers can downgrade variety (e.g., from Phkar Malis to Phkar Kney) in order to be able to afford organic. In the second story, in contrast, consumers clearly demanded the organic feature but seemed less willing to sacrifice their desired characteristics and went to another shop. Although the data sets do not provide a way to evaluate the extent of this behavior, the CEDAC Enterprise should

take note. Diversity and preference-matching is so important for some potential organic-buyers that they will walk away from a purchase if their needs are not met while others may compromise on their expectations in order to purchase organic.

Compared with farmer families, city dwellers have different constraints and priorities when considering the marginal utility of new agricultural development concepts, such as organic. Without many of the considerations particular for cultivation, urbanites base their purchases upon heterogeneous sets of expectations of tangible and intangible rice qualities. Many preferences derive from rice eating habits in their region of origin, such as variety, texture, and aroma, but they increasingly correspond to technical standards such as breakage and storability. Even for people with high environmental and health motivations, a new concept such as organic cannot necessarily be expected to crowd out these standards. As long as city dwellers continue to leverage agro-social skill to demand diverse configurations of rice, initiatives in the framework of ecological modernization, such as organic, must complement, not override other standards in order to gain widespread traction.

Handlers and Traders

The imperative for traders and handlers is to add enough value to the grain to increase price enough to outweigh the costs associated with their salary, transport, milling, certification and packaging, while ensuring optimum storability. Each marginal product-quality (e.g., aromatic), process-quality (e.g., organic), quality control (e.g., premium grade) or marketing technique can raise the selling price of the rice (Grunert 1995), but insofar as it raises costs, it comes at the risk of losing the marginally poorer consumer. The common result is that traders market enough varieties and quality grades to capture the widest range of desirability configurations, ideally so that each consumer buys the most expensive price that she is able. Urban markets, however, cannot represent the exhaustive diversity of the countryside, so strategic considerations about selection must be made and this process begins with acquisitions.

At the farm gate, the trader (or handler) must determine the potential value of the farmer's rice and must consider the risk of receiving degraded rice. Through interviews and other formal and informal assessments, the trader must ascertain the variety, harvesting conditions, and cultivation practices (e.g., organic). A trader can

typically inspect the grains, sample the steamed rice, crush the grains to check for moisture and starch gel consistency, or employ measurement instruments (e.g., for moisture content). Depending on his or her relationship with the farmer, he or she may also cross-reference any information provided, particularly cultivation practices, with neighbors. After purchase, reducing grain breakage through proper drying, preparation and milling becomes a priority. Based on her chosen degree of market segmentation, the trader will sort the rice into different grades: breakage percentage of 0-5% with little foreign matter typically indicates ‘premium’ quality; 5-20% is viewed as ‘grade 2’; more than 30% is summarily lumped together as ‘low quality’, ‘cheap’ or ‘grade 3’. Additionally, broken and damaged kernels can be graded in a separate category for livestock feed or powdering.

After milling, the trader or processor focuses her attention on selecting how to represent the product to consumers. Generally, a trader has an incentive to achieve product-qualities that are readily visible to the consumer, such as milling quality, polish, aroma and packaging. Invisible characteristics that cannot be readily confirmed by customers before purchase, such as place of origin, age, and variety can be promoted, downplayed or distorted through marketing (Schnettler et al. 2008). Often, in an attempt to differentiate themselves from neighboring shops/stalls, traders sell along specific themes: working-class quality rice, region-specific varieties, aromatic rice, wholesale-only, and healthy options (brown rice, organic, no additives, etc.) [PP-PSC; PP-CN; PP-CT; PP-OCN; PP-DKN; PP-CH]. Traders can also attempt to manipulate consumers by using artificial whiteners, aromas, or by mixing together different varieties. A common practice, for example, is to mix together traditional varieties, whose names are too numerous or unfamiliar to urban consumers, and market the bag using the varietal name of a more well-known traditional variety [PP-CT]. Finally, they must decide how to price their product—an issue I will take up shortly.

Handlers and traders of organic rice face many of the same demands as those dealing in conventional rice but they must additionally consider the ideological views of their investors and consumers base. As actors embedded in a broader ecological movement, promoters of organic rice must manage the contradictions that emerge from attempting to satisfy both the standards of the urban market and the principles of ecological rural development. On the one hand, natural rice production is a byproduct of

a sociotechnical regime populated mostly by rural development projects such as that of the CEDAC, which have goals outside of producing for the market, including smallholder self-sufficiency, conserving biological and cultural diversity, and providing a fiscally safe environment in which to transition from conventional to organic rice production. On the other hand, quasi-private sector promoters such as the CEDAC Enterprise are compelled to cater to a sociotechnical regime dominated by preexisting traders, marketers and historical consumer expectations, which include basic characteristics such as standardized quality and consistent products (Straughan and Roberts 1999). Finding a middle ground is a matter of balancing commoditization (i.e., urban market expectations) with the ideological demands of the consumers and promoters embedded in the 'alternative agriculture' paradigm. And this must be accomplished while observing the practical realities of sourcing organic rice from farmers with heterogeneous farming styles and habits (Van der Ploeg 1996, p. 31).

Many of the goals inherent to the rural development programming are inconsistent with satisfying the technical standards of marketers (Ellis et al. 2006). For example, serving as a reliable and supportive middleman for smallholder organic rice farmers occasionally obliges the CEDAC Enterprise to purchase low grade paddy from participating farmers. This endangers their standardized quality and jeopardizes other desirability characteristics such as fragrance. Indeed, 2008-season rice was plagued with mildew because of inconsistent drying practices of some farmers and poor storage capacity of the CEDAC Enterprise. The Enterprise also faces problems of scale: it lacks the transport capacity to draw rice from diffusely scattered smallholders, and it has insufficient bargaining power at local rice mills to prioritize organic paddy, according to their president [PP-LSH]. The result is a degradation of standardized quality in their milled rice, which diminishes their credibility and negatively affects the perception of organic. On many levels, the development goals that helped secure donor funding and promote rural development involve practices that sacrifice the promoters' capability to achieve marketability.

Due to the diversity in ideological standards for rice, the CEDAC Enterprise cannot position its organic rice as a simple substitute for conventional varieties. Instead, they try as hard as they can to achieve quality parity with rice in the marketplace and then hope consumers' ideological standards for natural rice balance out negative

characteristics. Consumers who are attracted to the organic feature are commonly faced with the trade-offs resulting from CEDAC's production and processing. Firstly, they must occasionally settle for lower quality rice (by milling standards), although this is improving incrementally according to some traders [PP-DH; PP-HML]. Secondly, their selection of rice varieties is limited; only the middle to upper spectrum of varieties is represented. There are often subtle ideological standards for quality, i.e., configurations of fragrance, cooking quality and place of origin, that are not necessarily aligned with many consumers' preferences. And thirdly, the price is higher—typically 5-10%, but up to 30% according to my surveys. The result is that the ecological attribute must often compensate not only for the price premium, but also potentially for other unwanted or neutral characteristics. As one trader above reported, this may cause consumers to seek a different trader or a different variety to align their preferences more precisely—but in the case of organic rice, they are constrained to very few readily available companies⁴⁸ and may have to compromise.

As highlighted above concerning Figure 5.2, data from partner merchants suggests that rich customers are willing to pay a consistent organic price premium while middle-income people value organic rice enough to pay even higher premiums, but cannot afford to do so consistently or for large amounts. The price setting strategies of the partner merchants (see Table 5.6) support these conclusions, while offering a more detailed insight into traders' expectation about the relative value of organic rice products.

Table 5.6 Marginal Price Difference of Organic Over Conventional Rice

Variety	n	Retail (Percent)				Wholesale (Percent)			
		%	Std. Dev.	Min	Max	%	Std. Dev.	Min	Max
Phkar Malis Grade 2 (Bulk)	237	4.50	4.36	-4.69	13.33	12.52	0.99	10.91	14.81
Phkar Malis Grade 2 (Pack)	196	4.01	2.75	-3.94	29.03	12.34	0.45	11.11	12.50
Phkar Kney Grade 2 (Bulk)	128	10.84	3.90	-2.59	16.00	22.63	2.70	19.05	24.64
All Varieties	561	5.78	4.66	-4.69	29.03	14.76	4.53	10.91	24.64

⁴⁸ Cambodia has a few other non-certified organic rice labels, such as Ibis, New Rain, Saravan and the CCRD Rice Mill (Schmerler 2006). These initiatives, however, have a very small scale and minimal diffusion into regular markets in Cambodia compared to CEDAC's NAP brand.

The data presented in Table 5.6 show the percentage difference for organic rice over its conventional equivalent in both the retail prices set by traders and the wholesale price paid by traders to the rice miller. Overall, it is clear that traders derive less profit per kilogram from organic rice sales than from conventional. To take an example, a trader pays 12% more to buy wholesale packages of organic Pkhar Malis over the conventional equivalent, but then does not pass on the full price increase to customers, who are charged only 4% more in the shop. For all varieties, traders pay almost 15% more to millers for organic rice but consumers only see a price increase of 6% over conventional equivalents. Although these transactions do not lead to a loss, they lead to smaller profit margins for traders. For all varieties, traders make a gross margin of 472 Riel/kg (\$0.12) for conventional rice and only 270 Riel/kg (\$0.07) for organic rice. Despite the lower turnover, traders set this price because consumers are price sensitive and they often disagree with the basis of the price premium.

“In the beginning, I worried that people would not believe me that this rice here is organic. If it is in an open bag like this [sold bulk], I understand... maybe I do not trust also in their situation. But actually this was not a problem. They said they believed me. But they think the price should be the same, because farmers do not use expensive fertilizer. I tell them that the farmer gets more money from the organization for this rice and that they pay money to monitor the farmer. I think many do not believe in paying the farmer more, but they understand why to pay the organization more.” [PP-CN]

In fact, farmers receive 5-10% more on average for organic paddy (and up to 15% for Phkar Kney) while the CEDAC Enterprise’s gross margins are lower (around 2-4%), according to the fresh produce director [PP-LSD]. Although the Enterprise passes this entire premium (and usually more) onto the traders in the form of higher wholesale prices, the eventual retail prices are artificially suppressed by traders in order to narrow the price differential with conventional rice. And in fact, based on Table 5.7, which highlights organic premiums over conventional at different markets, most locations charge a mere 2-4% (i.e., essentially the margin of the CEDAC Enterprise) more for organic rice over conventional. In other words, the trader is absorbing some of the

premium paid to the farmer by accepting lower margins at retail. This demonstrates the concern that traders have that the organic feature, in the absence of many other quality parameters that people may value, is not adequate justification to charge customers much more [PP-HML; PP-US; PP-PSC; PP-CT; PP-DKH; PP-CH].

Table 5.7 Gross Margin of Organic Over Conventional Rice by Location⁴⁹

Market	<i>n</i>	%	Std. Dev.	Min	Max
Toul Tompong	7	2.76	4.34	-3.23	6.45
Takhmao Thmei	214	10.49	3.41	0.00	29.03
Samaki	7	2.30	2.25	0.00	4.84
Boeung Chouk	184	3.85	2.00	-4.69	6.06
Nokia	77	0.55	2.01	-3.13	6.25
O'Wake'Om	62	3.32	1.63	1.67	5.17

The results from the trader in Takhmao Thmei market (10.5% organic premium) appear to contradict this, but upon extensive follow-up, her apparent success is derived from good marketing and inventory decisions rather than the product selling itself. Takhmao Thmei is the most distant market from the center investigated over the long-term in this study.⁵⁰ Nuon (pseudonym), a female trader approximately 45 years old, is a cheerful salesperson and has exploited many marketing opportunities to sell the organic rice that other traders have not [PP-CN]. While most traders usually focus on the technical standard when speaking to customers (i.e., the organic certification), Nuon has had more success by appealing to the ideological standards for natural rice. First, she positions the rice as both romantically traditional (farming in the old way) and also modern (inspected and controlled, advertised on the radio). She continually reminded customers that NGOs and the minister of agriculture talk about organic rice on the radio and television. Second, she aggressively marketed the rice. In addition to displaying the provided posters prominently, she often gave free samples and told customers that she consumes the organic rice herself. She also made claims on quality appeal to the ideological standards for ‘natural’ even if they are not objectively proven, including

⁴⁹ Not all locations studied appear in this chart because some locations sold varieties for which no conventional equivalent exists for price comparison purposes. Negative values under minimum appear because some traders took losses on organic rice in order to promote it during certain periods.

⁵⁰ Two traders initially began the project in the nearby market of Takhmao Chas, but stopped the partnership due to price and quality concerns.

better fragrance, texture, and health due to the avoidance of chemical inputs. In a country where such claims are not preemptively rejected by agri-business concerns and besieged by lawyers, traders in Cambodia can casually justify their claims with common sense or expedience. As she related,

“Farmers say that rice made with fertilizer is tough and not as tasty-smelling [chngiou chngang]. And until someone finds out that this is wrong, I will tell this to my customers. [...] I’m not one-hundred percent sure if eating organic rice is healthier, but I guess that it improves the farmers’ health. So if it improves anyone’s health, I think it’s fair to say that this rice is good for health.” [PP-CN]

Third, Nuon eventually adjusted her selection so that the organic rice varieties she sold fit a clearer configuration of price and performance (see her shop in Figure 5.3). For example, she purchased a conventional variety of Phkar Malis that was a visibly lower grade than the organic Phkar Malis. As a result, when customers tried to justify paying more for the organic rice, they could do so based on quality and ecological considerations, rather than only the latter. In fact, prices in her shop (including those for organic rice) seemed to reflect quality and variety, while the organic feature was marketed as an extra bonus. In contrast, most other merchant partners stocked a conventional Phkar Malis that was a close substitute for the organic version and thus came into direct competition. During 16 months of our researcher-merchant partnership, Nuon sold three tons of organic rice, representing approximately 20% of her total rice sales. In our concluding interview, she predicted an eventual finding of this study:

*“I sold a lot of organic rice and I am very happy. I think the customers are happy too, because they usually come back. **But if you had given me more varieties, I could have sold much more.**”* [PP-CN, emphasis added]



Figure 5.3 The rice selection at Nuon's general store

The Cambodian urban rice market is still marked by diversity, both of in terms of varieties and quality characteristics. Merchant partners in this study sold a minimum of four varieties as well as additional grades and regions within these varieties, with some traders offering around 40 configurations (for a typical selection, see Figure 5.3). However, the current trend in organic rice since 2007 rice is to focus less on promoting diversity and, instead, to focus on efficiency. Between 2009 and 2011, they dropped two out of four rice varieties. As quasi-private sector promoters of organic rice, the CEDAC Enterprise has generally favored reducing the number of configurations of rice (fewer varieties, less variation, reduced geographical representation, etc.) as this appears to facilitate acquisition, processing, and commercialization of a simpler product line. By their own admission, this may exclude farmers; in the city, however, it may also exclude consumers who are looking for diverse configurations of rice. While some consumers may downgrade their preferred configurations in order to purchase organic, and while some farmers may adjust their planting diversity to focus on preferred organic varieties, narrow product lines inherently exclude the large cohort of more discerning consumers and independent farmers. These groups, ironically, are CEDAC's likely allies in the long term, often represent citizens with high agro-social skill who tend to champion diversity and quality.

The imperatives of commoditization, which typically drive the development of modern products, do not sit well with such a diverse market because economies of scale cannot as readily be achieved for so many disparate configurations of rice. Furthermore, as new players in the rice market, organic promoters also face the challenges of creating awareness for a new characteristic, drafting regulations, establishing trusted quality control systems, and gaining legitimacy. In general, promoters like CEDAC must fill the role of meso-level brokers, tasked with reconciling the heterogeneous demands of macro-level discourse, donors and the realities of local demand (cf. Lewis and Mosse 2006). In the case of rice promotion, CEDAC is negotiating among the discourses of empowerment, sustainability, neo-liberal marketization and social enterprise. Embedded within these discourses are world-views and practices that are not necessarily commensurate with each other, or with donor requirements and local conditions.

The optimistic view is that, by operating at the “interfaces of different world-views and knowledge systems”, NGOs like CEDAC are strongly positioned to negotiate novel representations, discourses and practice of development (Lewis and Mosse 2006, p. 10). Theory might suggest that CEDAC can engage in an iterative process that develops integrated solutions for the mismatches in discourse. During the period of this study, however, even the president of CEDAC has acknowledged the internal contradictions that have emerged as a result of internalizing so many disparate discourses (see Section 3.5). For example, CEDAC’s oft-cited focus on empowerment generally follows the classic definition of developing the “potential of poor people to challenge structural inequalities through education, organization, and mobilization” (Lewis 1997, p. 35). Yet, CEDAC is also embedded in the discourse of neo-liberal marketization, which privileges strategies intended to enhance the effectiveness and survivability of an initiative in a society dominated by capitalist ideology and functioning.

The trends in CEDAC’s organic rice initiatives vis-à-vis farmer inclusivity and consumer demands can thus be explained by contradictions inherent to melding such opposing discourses. Based on interviews with the CEDAC’s president (see Section 3.5) and the executive director of the CEDAC Enterprise (see *Urban Customer* above), in the short-term the dilemma can be represented as follows: satisfying everyone and

supporting diversity will ultimately lead to bankruptcy while profitably satisfying the few goes against development goals (cf. Shepherd 2006). In the long-term, they hope this dilemma will work its way out, which fits with a group of food system commentators, particularly in the agroecology and alternative food sub-fields, who challenge this zero-sum view of agricultural development (Altieri 1995; Badgley et al. 2007; Francis et al. 2003; Goodman 1999; Van der Ploeg and Saccomandi 1995). In the long-term, organic regulations will become institutionalized, the concepts behind ecological agriculture will enter national consciousness and gain acceptance and governmental support, which will provide the organic feature has an opportunity to become one of the mainstream considerations in domestic products. Organic promoters hope this will create room to expand the diversity of organic rice offerings. However, as I have argued above, the current demand for, and ability to appreciate, diversity in rice is dependent on agro-social skill, which has an endogenous relationship with diverse marketplaces. The longer it takes for organic to “get over the (institutional) hump” by focusing on efficiency, the more agro-social skill may decline in the meantime.

5.4 Traditional Medicine

Traditional and heritage products often share similar narratives regarding the effects of globalization and impact through neoliberal marketization. Much like field agriculture, traditional medicine in Cambodia has relied on a diverse and regionally-specific natural resource base, the skill of healers and collectors, and the broad-based support of the consumers. Like rice farmers, traditional healers are more noted for their diversity and independence in their ways rather than their solidarity or adherence to a shared health cosmology. And much like domestic agriculture is non-exhaustive and faced with pressures from globalization, Khmer traditional medicine is a historically-predicated but non-comprehensive medical system that is increasingly compelled to justify its efficacy and evolve in the face of allopathic medicine and imported botanical medicine. Traditional medicine, however, has a strong historical base of support in addition to increasingly being aligned with international alternative health discourses. Originating in primordial narratives of the Angkorean civilization, traditional medicine has historical legitimacy that perpetuates its presence in modern Cambodian culture independent of the extent of its usage (see Section 4.2.3). In addition, Western medicine

has become more open to alternative practices since its original entry into Cambodia with French colonizers (a more complete story can be found in Au 2005). And particularly since the WHO more concretely institutionalized traditional medicine in the early 2000s, it has received more support and legitimation. And while this has led to long-term initiatives to begin determining the objective efficacy of traditional remedies, it does not directly address the more urgent threats to the survival of Khmer traditional medicine: (1) the loss of knowledge by elders, (2) the loss of medicinal species and their habitats, (3) and the impact of commoditization on medicinal diversity.

This section examines these threats through qualitative methods as well as through researcher-merchant partnerships. In particular, I analyzed four different initiatives to advance traditional medicine:

1. The development program of a conservation NGO that sought to promote traditional medicine in the context of domestic eco-tourism and participatory forest monitoring (Prek Thnot, Kampot province by Save Cambodia's Wildlife)
2. An non-profit venture to commercialize traditional ethnic minority remedies and create traditional medicine clinics in isolated parts of Northeast Cambodia (Ratanakiri province by Médecine de la Nature)
3. Efforts to create a national education program and regulatory framework for commercialization of medicine under the Ministry of Health (Phnom Penh by the NCTM)
4. A research-merchant partnership to rapidly advance traditional remedies and gather data on consumer response (Phnom Kulen, Siem Reap province by the author)

In addition to these four initiatives, I also carried out ethnographic work with traditional healers, collectors, and traders in four national parks, two lowland provinces, and in the capital, Phnom Penh. A more detailed account of these research sites and locations can be found in Appendix 1.

5.4.1 Gathering and Formalizing Traditional Healing Knowledge

Soveat is a 77-year-old traditional healer living in a lowland rice-farming village in Kompong Chhnang province. During the Sangkum period prior to

the revolution, he was a monk and spent a few years wandering the countryside on a pilgrimage. On the way, he visited many religious laypeople who were healers and began keeping a book of plants and remedies, which developed into an extensive collection. Much of the book was lost during the Khmer Rouge period in which he worked as a group laborer but he claims to have re-written much of it from memory. During the Vietnamese occupation he was employed as a clinician and received two days of training per month. Lacking many pharmaceutical medicines, he continued to employ botanical treatments in the clinic. He claims he was able to slow a cholera epidemic during the K5 period⁵¹ with botanical medicines he developed at the clinic. Since retiring, he has returned to traditional medicine, primarily specializing in decoctions and post-natal care. Soveat is also a specialist in reestablishing karmic balance and banishing evil spirits, primarily through holy water shower rituals and Pali prayers. His relationship with biomedicine is informed by his experience as a clinician, in which he believes healers can be the first and last line of defense. Doctors can help diagnose mysterious illnesses, relieve suffering and prevent death. He points out that many Western medicines are based on plants but all of them need guidance because they are strong. He views casual pharmacies and business-oriented traditional medicine sellers as the largest threat to traditional health practice. [RE-KSa]

The healer described above is in his late 80's and continues to consult patients, create remedies, and provide informal prescriptions for pharmaceutical medicine. As with most traditional healers, his knowledge is derived from a life narrative in which remedies and consulting practices were gained and lost, recorded and destroyed throughout the tumultuous modern history of Cambodia. Healers derived their skills from a heterogeneous and unstable pool of local knowledge and, until recently, have not experienced a systematization of their collective trade. Nevertheless, Soveat has

⁵¹ Colloquially known as Ka Pram, or also the Bamboo Curtain, K5 was a Vietnamese-organized program of the People's Republic of Kampuchea (PRK) that attempted to create a defensive perimeter along the Thai-Cambodia to prevent infiltration by Khmer Rouge fighters. Many Cambodians were forced to work in isolated areas felling trees, digging trenches, laying mines and building fences, which resulted in ecological destruction as well as sicknesses (particularly from malaria) and death in 1985-1989 (Ovesen and Trankell 2010, pp. 124-125).

witnessed the waxing and waning of nominal political support for traditional medicine over his long lifetime. During King Sihanouk's Sangkum Reastr Niyum period in the 1950's and 1960's, populist health modernization was based on the French legacy of biomedicine and largely ignored traditional medicine (Ovesen and Trankell 2010, pp. 78-83). The Khmer Rouge, in the 1970's, did not espouse a specific health system but valorized a few strands of traditional medicine that had military utility. The Vietnamese in the 1980's, however, promoted traditional medicine in addition to biomedicine as part of their socialist ideology of self-sufficiency (Ovesen and Trankell 2010, pp. 120-122). With the arrival of the United Nations intervention in the early 1990's, international aid focused exclusively on biomedicine again. Soveat, like many of his contemporaries, has been forced to adapt his practices to suit varying institutional frameworks and political climates but he has, nonetheless, consistently used traditional medicine throughout these various periods. This facet and two others from Soveat story speak to the contemporary development of traditional medicine.

Without comprehensive institutionalization of traditional health practice, the fate of Soveat's knowledge lies primarily in the hands of his descendents or apprentices. While basic institutions can often record botanical recipes, an apprentice is necessary for inter-generational transfer of practices such as consultation, diagnosis, wild collection, and medicine creation. In Soveat's case and a few others [PS-PK; PK-TH; PS-ON], he has no descendents interested in his trade nor did he have apprentices; a foreign researcher (not the author), however, did copy his recipe book. In other types of cases, however, apprentices and inter-generational transfer is commonplace, particularly in pagodas.

“After we fled to the borders, Ieng Sary told many people to train as medics because life would not be easy in the jungle. In that time, I trained many students and we created traditional medicine like a factory for the cadres. After we joined the government, I went to live in a pagoda for ten years. When they discovered my ability, many young monks and lay functionaries [achaa] came to train under me. Some of them have businesses in traditional medicine now and they visit me from time to time.” [PS-KS]

Despite his many apprentices, the reintegrated Khmer Rouge cadre quoted above indicated that, to this day, he has never written down any of his recipes. He argues that, “traditional Khmer medicine is not just mixing ingredients [*phsom thnam*].” In this, he highlights a common criticism of early-stage traditional medicine policies and institutions that reduce the art of healing to set recipes, thereby only capturing a limited portion of health knowledge.

Soveat’s story described at the top of the section also outlines the debate concerning the separation of health practice into discrete schools of biomedicine and traditional medicine. In his experience, he contends that he successfully integrated both systems during his time at a Vietnamese-run clinic and does not find any contradictions between their practices. Naturopathic schools, particularly those in North America, aim for a similar dual system (i.e., naturopaths can legally prescribe allopathic medicine such as antibiotics) (for a more complete discussion, see Ben-Arye 2008). The Chinese medical system, in contrast, regards biomedicine and traditional medicine as separate, promoting each with somewhat distinct institutions. The Indian Ayurvedic system also follows this pattern, as do most medical systems worldwide. Even in the populist Chinese traditional medical system, allopathic medicine tends to dominate health development. This explains how the WHO arrived at the term *complementary and alternative medicine* (CAM) to describe the role of traditional medical practices in highly advanced medical systems. Changes in the current medical system in Cambodia appear to be following this pattern as well according to officials at the NCTM [PP-HP; PP-PS]. However, despite bureaucratic separation, this does not prevent traditional medicine from drifting in the direction of biomedicine. In particular, newer traditional medicine clinics in Cambodia often have a similar atmosphere to allopathic clinics and the remedies themselves are often commercialized in order to mimic the hygiene, brand-name appeal and ease-of-use of pharmaceutical medicine [PP-LSHe; PP-BP]. But how far can this go? Although considerable integration is possible (e.g., Nordstrom 1989), long-term separation of the two schools seems likely due to critical differences in the health cosmology informing diagnosis and treatment of allopathic and traditional Khmer healing, as one middle-aged healer commented:

“*[Discussing naturopathic medicine] It may be possible to have a doctor who can do both traditional and modern medicine. Many things are the same. They*

have different abilities. Sometimes the healer does better, sometimes the doctor does better. If I have a motorbike accident, I now go to the doctor. But if I have pain in my joints, I use traditional medicine. [Hesitation] But there will be problems. We look at the patient's wind. We find if their spirit is hot or cold. We try to help the body [immune system] to fight diseases. The doctor is trained to kill diseases, so he may do other things. It is better if the doctor is not confused like this." [KR-TP]

The strong allopathic orientation of foreign aid, which has dominated the health sector in Cambodia since the UN interventions, has largely pre-empted discussion of this sort. Policy interventions and research on the Cambodian health system either ignore traditional medical practices or pick up on stereotypes viewing traditional medicine as a barrier to proper health care, a threat to wildlife and natural resources, or a field led by quacks and witchdoctors (e.g., Tanaka et al. 2009).

The NCTM in Cambodia has largely adopted a path that attempts to counter these stereotypes by aligning traditional medicine with the functional framework of allopathic medicine. In particular, the Center only supports physical remedies, such as medicines, acupuncture and massage. Furthermore, they are establishing model medicinal plantations to both conserve and control the quality of botanical ingredients [KR-NCTM]. In general, they are attempting to create legitimacy in traditional medicine by educating health professionals in a standardized manner and monitoring the commercialization of traditional medicines. The model is a centralized traditional health care curriculum like China's with careers in regulated traditional medicine pharmacies, medicine manufacturing, and clinics (for consultations and physical treatments). The first steps of this process have involved training mostly younger people and compiling a pharmacopeia of botanical ingredients and their preparation, harvesting, and storage. Because many traditional healers, especially elderly ones, would balk at stopping their lifestyle to study, the NCTM has also set up a network called the Cambodian Traditional Medicine Organization (CaTMO). The purpose of this organization is to maintain connections with independent healers and alumni of the NCTM training courses so that they can contribute to the national project for institutionalizing traditional medicine in Cambodia. Students and alumni hope that, over time, this

network will create opportunities for working with and learning from unaffiliated healers [PP-MH; PP-NS; PP-SS].

The maintenance of reproduction of traditional health knowledge is a particular challenge for ethnic minority groups living within Cambodia. Their medical systems may use similar botanical ingredients as ethnic Khmers but their practices and health cosmology can be quite dissimilar. In these cases, the formalization and inter-generational transfer of knowledge is more precarious because it is typically carried out within smaller communities. The co-founder and president of the organization *Médecine de la Nature* works exclusively with ethnic minority communities to establish formal institutions and commercial products that contribute to reproducing and buttressing their medical knowledge [NGO-VC]. His primary goals are to create transparency and commercial viability through three types of activities. First, he works with communities to set up traditional medicine clinics, where a healer and some assistants (potential apprentices) carry out consultations and create and store medicinal products [RK-KD; RK-KT]. Second, communities leverage agroforestry principles to create medicinal gardens that can help streamline collection and conservation of botanical ingredients [RK-ST; RK-KT]. Third, certain blockbuster products that would have broader appeal are commercialized outside of indigenous areas, using the model of *Médecine de la Nature* [NGO-VC]. The NCTM has sponsored a few students from ethnic minority groups, but the director acknowledges that their community initiatives will be necessary to more comprehensively preserve their knowledge and modernize it in a culturally sensitive manner [PP-HP].

5.4.2 Harvesting and Conserving Medicinal Plant Species

The pharmacopeia being collected and processed at the NCTM illustrates the relationship between biological diversity and the future potential of traditional medicine in Cambodia. In the various publications that comprise this ongoing project,⁵² many botanical species are already listed as rare or difficult to gather due to increasing scarcity or isolation. Many species, particularly certain vines, mushrooms and roots, require long growing or ripening periods and thrive under specific ecosystem conditions

⁵² Sorting, commenting, photographing and publishing the pharmacopeia has proceeded with donor support in an incremental manner. The current books being published by the NCTM often integrate material from previous collections carried out by interested parties over the past century.

that are hard to recreate on plantations. For most species, however, propagating medicinal plants on plantations is a viable option although there are advantages and disadvantages to consider. As outlined in Schippmann et al. (2002), plantations allow for organic certification, supply and quality consistency for manufacture, better phytosanitary conditions for regulatory approval and preclude over-exploitation of forest resources. The disadvantages are that plantation-cultivated botanical ingredients occasionally have lower concentrations of active ingredients and are not always readily accepted due to cultural norms. Lacking comprehensive laboratory testing, the latter disadvantage plays a much more significant role in the promotion of cultivated botanical ingredients. The quote in Section 3.1.1 by traditional healer and merchant partner Vireak [PP-CV] highlights that not only old forests but holy religious areas (such as the mountain of Phnom Kulen) imbue medicinal ingredients with additional potency. This factor is so influential, that the NCTM has located its medicine plantations within or near important national parks and religious areas. Additionally, healers who live in or near these areas are generally regarded with more respect and admiration and even petty traditional medicine mixers (*kru phsom tham*) tend to have more success selling to tourists and pilgrims such areas.

“Before, I used to do everything on top of Mount Kulen. I collected ingredients and mixed medicine and sold them in my shop. After I trained with the NCTM, I learned how much respect people have for medicine from Phnom Kulen so I made a business as a travelling salesman. I still have more workshop on the mountain but now I sell all over Cambodia to people who cannot go to Phnom Kulen. My training showed me that if you really want to cure someone, you have to be able to talk to them and visit them. Now I think it is strange that we waited up on the mountain for sick people to come to us!” [PP-CV]

Vireak notes that the general expectation was that people who wanted special medicine should travel to Phnom Kulen themselves or on behalf of a sick person. Most studies of health care choices highlight that the primary determining factor in seeking out health care is distance (Guillou 2001, pp. 370-379; Put 1992; Yanagisawa et al. 2004). Commonly, a petty pharmacist is the nearest source of advice and remedies, followed by a traditional healer, clinic, and then a hospital. Vireak’s long-term plan is to establish

a clinic in Siem Reap town because, as he relates, “if I stay up here, I will only see patients with diseases that don’t affect their mobility” [PP-CV]. In the meantime, with the advent of better roads and transport conditions across Cambodia, Vireak has improved access to other provinces. This allows him more direct access to many patients as well as opportunity to come in contact with unfamiliar traditional healing practices, which he can record from and eventually pass on to CaTMO.

Another model for providing access to traditional health treatment is to promote specific destinations as centers for wellness. So far, this has occurred in certain national parks like Kirirom, Phnom Kulen, and Phnom Bokor, where entrepreneurs and healers locate in order to take advantage of tourists’ association between natural areas and traditional medicine. More intentionally, however, under the framework of an eco-tourism project primarily directed at Cambodian nationals, the local organization Save Cambodia’s Wildlife (SCW) supported the establishment of an association of traditional healers in Prek Thnot, a district in Kampot province bordering the Phnom Bokor national park. However, unlike in most national parks, where medicine sellers compete with each other, healers involved in this initiative aim at leveraging the best local treatments in order to enhance the reputation of the eco-tourism site as a whole [PN-MC]. The long-term goal is to attract tourists to not only the natural sites but to the eco-wellness offerings of the local communities. As part of this initiative, they have worked with the TRAFFIC, the wildlife trade monitoring INGO, to establish sustainability regulations for wild collection of medicinal ingredients. In addition to this, they are also investing in the advancement of the product line to make it more hygienic while retaining its authenticity [PN-MC].

5.4.3 The Impacts of Commercializing Medicinal Remedies

The increasingly biomedical and pharmaceutical focus of health care provision in Cambodia has been paralleled by the growing presence of traditional medicine in the economic sphere. Formerly, peasants rarely had cash and money was only exchanged hands in rare cases during treatment by a healer (Au 2011, p. 186), whereas now even the most remote Cambodians are engaged in the cash economy. The increasing commodification of traditional remedies has created a competitive market that has given momentum to the process of consolidation and institutionalization of traditional healing.

Traditional healers are faced with new imperatives for profit-making, potential government oversight of their activities, and changing expectations of patients arising from exposure to biomedical practice. The trends and precedents set by the hegemonic biomedical or Western system of medicine have meant that the traditional medicine must reconcile cultural inertia with the need to adapt to patients' biomedical experiences. This has forced healers and medicine mixers to reevaluate who their patients are and what is necessary to maintain or gain their professional trust while finding ways to achieve financial stability. Efforts by the NCTM and Ministry of Health to crack down on quacks have also served to formalize and professionalize what was formerly a decentralized and informal trade. Actors focusing on traditional health primarily as an economic activity will often voluntarily engage with new institutions like the NCTM or at least gear up to respond to government intervention in their sector. At a very minimum, they must choose how to respond to the increasingly differentiated demand for commercial medicinal products and formalized medical practices.

The main challenge, as many informants have indicated, has been to align traditional medicines and consultations with new health values and urban product specifications while continuing to be cognizant of traditional health cosmology. Consumables are expected to be sturdily-packaged, labeled, certified, well-marketed, yet traditional and natural. The healers themselves are expected to display their diplomas and inspection records, but also have a solid reputation in the community. Clinics and traditional medicine dispensaries should be organized like biomedical pharmacies, complete with organized and hygienic furnishings and specified areas for waiting, consultation and treatment (see Figures 3.2 and 3.3), but should have more personal service from practitioners and certainly no secretaries or nurses [PK-TH; PK-CV; RK-KD; PP-LSHe; PK-SSV]. Nevertheless, patients embedded in the traditional health cosmology can have such divergent views about disease and cures that it is not easy to strike such a balance (see Figure 5.4 for the common progression in medicine advancement). French medical officers discovered the salience of these differences early in their colonial interventions. For example, hypodermic injections, quinine, and antibiotics, were readily accepted for their medical efficacy in rapidly curing diseases

and such medicines continue to be popular in contemporary Cambodia.⁵³ Other control methods such as quarantine, sterilization or destruction of infected property, and government intrusion into the sphere of healing were among the most unpopular activities carried out by the French medical authorities. Even today, Cambodians express a measure of disbelief and misapprehension when health officials respond to avian influenza by destroying chickens or hose down an outdoor market to prevent spread of disease. Following Ovesen and Trankell (2010, p. 243), and in reference to Mary Douglas' (1966) work, for Khmers, hygiene is primarily a matter of orderliness and symbolic purity rather than avoiding microbes. According to Au (2011, pp. 2, 108-109) and my own fieldwork, for Khmers, well-being and the susceptibility to disease is related primarily to nutrition, over-work, genes and social/spiritual/moral standing, not (primarily) to microbes.⁵⁴ It is then unsurprising that contemporary biomedical observers in Cambodia continue to be dismayed by the seeming lack of motivation to learn about the mechanisms underlying sickness and disease transmission (e.g., Richman et al. 2010).

⁵³ Ovesen and Trankell (2010, p. 68) find fault with unsubstantiated references that generalize the efficacy of French medicine throughout the period of colonization in Cambodia. However, particularly with the subsequent development of antibiotics, certain measures eventually became well-accepted in Cambodia.

⁵⁴ This idea has, incidentally, been reinforced in contemporary Cambodia with the advent of longer life spans. Diseases such as diabetes, dengue fever, Alzheimer's, as well as cancer and HIV/AIDS, which have no biomedical cure, are more easily associated with spiritual and moral causes, which vindicates the healer ideology.

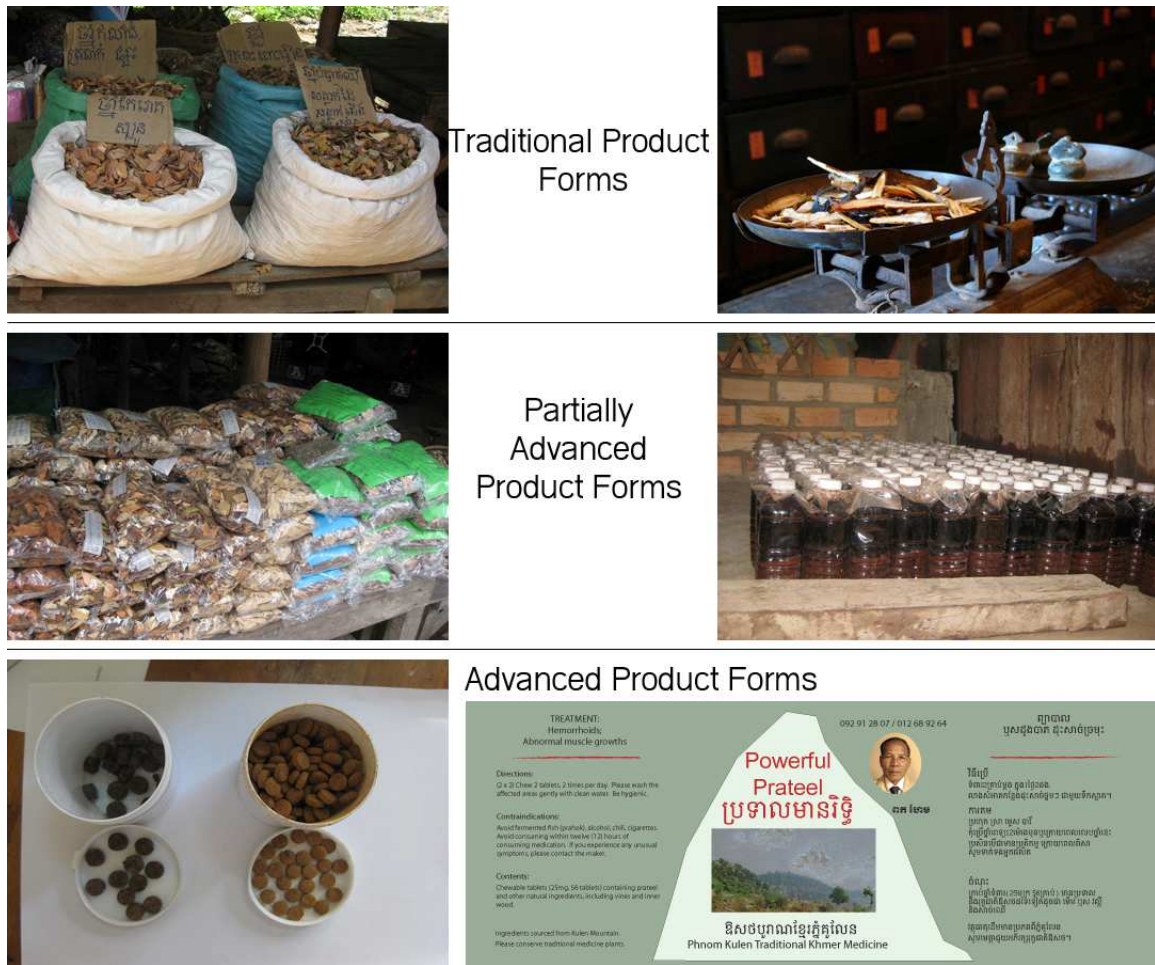


Figure 5.4 Common progression from traditional to modern product forms

Despite the challenges in adapting to the Cambodian cosmology, many aspects of the biomedical system did eventually become normalized or adapted sufficiently to avoid conflict with indigenous healthcare. Although Western medicine is, much like McDonalds, fairly consistent in its systematization throughout the world (Howes 1996), it is not monolithic in its deployment; indeed, it is often challenged in its home turf⁵⁵ in the West and undergoes even more adaptation worldwide to situate it in different cultural milieu. In Cambodia, for example, the distribution of pharmaceutical drugs has been facilitated by providing pills/capsules in colorful and diverse forms, a practice which is informed by the art of botanical mixing specialists (the *kru phsom thnam*)

⁵⁵ Here I refer to the rise of naturopathic medicine, homeopathy, acupuncture, and other alternative health care options (and their concomitant health centers, universities, research stations, etc.) in the West that were not formerly covered by most health insurance and thus not a formally institutionalized part of the health system.

(Ovesen and Trankell 2010, pp. 237-238). Suitability of Western treatment can also be accidental: the concept of ultrasound, for example, already had a strong indigenous basis in the ‘seeing eye of the healer’ and was readily integrated into the Cambodian health system (Grant 2011). In general, the increasing integration of less reductive conceptions of health (i.e. more holistic conceptions) into Western medicine abroad, including nutrition and lifestyle, psychological well-being, natural cosmetics, chiropractic care, and naturopathic medicine (which is often based on Eastern medical traditions) (Segal 1998), provide developing countries more room to maneuver. Although biomedicine is rather conservative and guards its territory (see Section 5.4.1.), the Cambodian Ministry of Health has nominally supported the assertive re-emergence of the NCTM and is busily drafting laws to legitimize the formal sector of traditional medicine. The director and students of the NCTM, however, admit that reducing traditional medicine to a form acceptable to the Ministry (i.e. to allopathic expectations) often contradicts the unspoken societal goal of recreating the glorious Angkorean health system based on inscriptions, stelae, and the archaeological remains of the Jayavarman VII hospitals (see Section 4.2.3). At the contemporary NCTM, Angkor still remains an inspiration to advance traditional medicine but, due to practical concerns, efforts have largely shifted to a focus on expedience—conserving traditional medicine through documentation and making it more useful through training, legislation and the promotion of non-toxic physical medicine alternatives [PP-HP; PP-PS; PP-PSu; PP-MH; PP-SS].

Due to the combined effects of WHO support, international alternative health discourse, and the ecological movement in Cambodia, the transformation of traditional healing services and products has initiated a rapid formalization and institutionalization of the sector. This has resulted in the inevitable contradictions that arise when radically new commercial and legal contexts preside over the commoditization of a diffuse body of traditional knowledge. Indeed, most traditional medical practice is not transparent for the purposes of bureaucratization. It remains locally-practiced (including at home) and primarily undocumented. Furthermore, indigenous healing knowledge is dispersed unevenly among many different types of healers, many of whom do not necessarily focus on physical medicine or feel the need to undergo formal training. Particularly in urban areas, however, traditional medicine will have to become more transparent,

primarily by respond to popular and institutional trends in the biomedical practice of hospitals, clinics, pharmacies, and their respective training centers. Adaptation is particularly likely (and important) for aspects of the medical systems that openly contradict one another, including hygiene, professionalization, payment, prescriptions and medical packaging.

The Double Consciousness in Traditional Healing

As certain practitioners begin to express traditional medicine in novel ways—for example through modern packaging or cash payments or clinical environments—they must also normalize these practices within the health cosmology of traditional healing. Making simple or one-dimensional changes decrease the likelihood that the innovation in traditional medicine is eventually viewed as alien. More generally, maintaining some systemic anchor (or tether) to core elements of traditional practice is usually fundamental to retaining authenticity. For my purposes here, creating a ‘double consciousness’ describes how rooting innovations in a familiar *habitus* is used to heighten or maintain familiarity and avoid cognitive dissonance (Bourdieu 1977, p. 85; Moreiras 1999).⁵⁶ In the following, I describe practices undertaken by healers, businessmen and institutions to accommodate the biomedical experience without “straying” outside of the sphere of authenticity in traditional medicine. To some extent, I also describe the response of patients/consumers to these attempts.

Neo-Traditionalists⁵⁷

I begin with the neo-traditionalists, because describing them indirectly clarifies what might be considered a traditionalist. Neo-traditionalists engage in what Wherry (2006) calls transcendental appropriation of authenticity. They respect the need to maintain familiarity regarding core characteristics of the product but are free to rearrange the manner in which the product is produced and exchanged.

⁵⁶ An example of a double consciousness is the Arab bazaar in many Middle Eastern countries. On the one hand, the spatial organization, decoration, haggling-culture, smells, etc. are familiar but what underlies the bazaar now is often a capitalist system of procurement that is epithetic to the economic system of the former bazaar. From the consumer’s perspective, however, the bazaar remains largely unchanged and thus feels authentic.

⁵⁷ The following is based Anne Guillou’s (2001) typology of traditional healers.

The shop of Mrs. Son But and Mr. Pheng Bun (see Figure 3.3) in Phnom Penh is typical of neo-traditionalists. Mrs. Bun is in her late 60s and was a traditional healer off-and-on throughout the conflicts in Cambodia. Mr. Pheng, her son-in-law is a relatively young man in his early 40s who has childhood experience with traditional medicine and was trained recently at the NCTM. They decided to establish this shop in 2010 in order to increase exposure and expand upon their sub-urban shop. Their business is called “Mangorow Khmer Traditional Medicine”. Their new shop is white, tiled, and organized like a pharmacy-cum-clinic. Clean, organized glass cases display a very wide range of traditional medicines in different product forms, including chopped wood chips, decoctions in sealed wine bottles, tablets, capsules, eye-droppers, powders, and more. The labels are very professional, even translated into English, and the packaging (or hygiene) is clearly a high priority, but they admit that the products do not yet quite look like pharmaceutical equivalents. Set next to the display cases is a consultation table with chairs. Across the room are three additional chairs for waiting customers. Most of the medicines are produced by family or in-laws in the sub-urban shop. Pheng and Son oversee the production and facilitate the sourcing of raw materials from traders and collectors, but they are slowly distancing themselves from the actual work of producing medicine. Instead, they wish to focus on creating a professional clinic space and dispensing medicine. They are very concerned with new laws and regulations and display their permits, training certificates, association memberships and awards proudly in their shop. Also on the wall are anatomical pictures that one finds in urban clinics. Although Mrs. Son has some experience with spiritual treatment and curses, she does not relate this to customers or the authorities.

[PP-BP]

Mangorow creates a double consciousness that exploits the professionalism of a clinical setting, formal training, and advanced packaging while delivering similar traditional medicines that one would find from a reasonably well-established village healer. Their longer supply chain and increasing distance from medicine production, however, clearly

separate them from traditional healers who produce (and often collect raw materials for) their own medicine. They view traditional medicine as under threat because it is not evolving fast enough, particularly for urban dwellers, and that an advancement and formalization along the lines of biomedicine is a suitable compromise for halting the loss of traditional knowledge and practice. Furthermore, they view legislation and other state-sponsored mechanisms for legitimating healers as a necessary evil for protecting the reputation and purity of traditional medicine from quack healers and unsavory businesspeople. In the end, while the Mangorow practice is executed differently, the core elements of the medicine and consulting with a healer remain constant.

Urban Traditionalist

The urban traditionalist, in contrast to the neo-traditionalist, exploits the familiarity of experience rather than the physical medicine to engender authenticity in their practice. Without direct access to the farm or resources in the countryside, urban traditionalists are not usually engaged in the production of medicine and more strictly require continuous cash income to maintain their livelihoods in the city. They often exhibit what Wherry (2006) calls complicit appropriation of authenticity, in which an inauthentic experience or product will suffice if it does not detract unduly from the original. This device is common for healing practices that are removed from their (rural) socio-cultural context.

Mr. Moni (pseudonym), early 60s, is the founder of the Cambodian Traditional Healer Association, which has 30-40 city-based healers. He maintains his own residence as a healing sanctuary, in which he specializes in post-natal and infant care. Most of the lobby is dedicated to plastic chairs for seating and it is usually full with mothers and children throughout the day. Mr. Moni carries out his consultations, diagnoses and treatments publically at a desk, behind which is situated a very large altar to his ancestors (part Chinese) and to Angkor-era animistic deities who play a role in health and fertility. The diagnosis begins with the mother explaining the symptoms and concludes, most often, with a spiritual investigation (mul knong) which determines if bad spirits, blocked wind, or other psychological disturbances are responsible for the symptoms. Based on his diagnosis, he might prescribe

certain botanical remedies, some of which he has available but many of which must be purchased separately at the market for traditional medicine. If bad spirits are the result, he will attempt to banish them by exhaling an odorous herbal concoction onto the infant (gkea-ta), showering the baby with blessed water, and usually uttering words in Pali, the Buddhist religious language. This banishment is quite theatrical and he is well known for it, as well as for calming babies—which explains why mothers will wait more than an hour sometimes to be seen by the healer. Additionally, he can provide talismans, protection belts, and inscribed cards used to ward against evil spirits. In conclusion of the service, payment is conducted by publicly raising an unspecified amount of money (usually similar to other patients) above the head to honor the spirits before placing it down on a metal plate nearby. [PP-MV]

Outside of Mr. Moni's sanctuary, ambulances from a nearby clinic pass by ferrying injured. At least three pharmacies carrying Western medicine can be found within the same city block. But inside, Mr. Moni creates the atmosphere of a rural healer receiving patients. Certain characteristics of the practice, however, indicate that the authenticity of the experience is subject to certain aspects of Western medical professionalization. Instead of being seated on the floor, patients sit on chairs lining the walls. Furthermore, the desk itself is unusual for healers, as it prevents the patient and the healer from sitting opposite one another in the Buddhist positions for mutual respect. Indeed, Mr. Moni's composure during the process is reminiscent of an impersonal medical doctor who is moving quickly from patient to patient and generally expects a fee for his service. Indeed, although the ceremony for voluntarily donating cash to the healer is carried out by the patients, repeat visits and discussions with the patients indicate that he expects USD 2.50 or more. While he does not openly exhibit his wealth, Mr. Moni's urban practice has made him wealthy, which is commonly viewed as antithetical by rural healers.

Rural Traditionalist

The rural traditionalist healer is the largest and most diverse category. Most neo-traditionalist and urban healers, in contrast, already represent some kind of amalgamation or composite of healing cosmology and practice because they have to cater to the diverse city population. Rural healers are more embedded and individualized within a constrained spatial setting, and many are not exclusively healers. They are often farmers, traders, local officials and maintain a small practice on the side that brings some income and good karma to their families. As the inheritors of the culture of traditional medicine, they generally only become aware of authenticity when they seek to expand their healing practice, either by commercializing their medicine or opening a more formal clinical setting. Often they exhibit what Wherry (2006) calls reactive identity, in that they promote traditional healing as a counterpoint to Western medical practice in the city or foreign schools of traditional health.

Mr. Team (pseudonym) is a self-taught traditional healer in his 50s living at the base of Mount Kirirom. He has been assisting people for more than ten years and before then became inspired to learn the art of traditional healing when his wife began to have severe pain during her pregnancy in 1984. Without a hospital in town, he began learning from nearby healers and reading pharmacopeia books. He now keeps a well-kept notebook of plants and their uses which is based on his experience but he also has published pharmacopeia books from the NCTM. He collects raw materials and also grows the most essential botanical materials in his garden. In his storehouse are pre-sorted plastic packages (approximately 250 grams) with printed labels that include his phone number and the type of illnesses treatable with this medicine. He refuses to sell to wholesalers, noting that they may tamper with the medicine, store it improperly, or prescribe it incorrectly. As a retiree, he can devote more time to his practice but he does not advertise himself. Indeed, Mr. Team views this as somewhat shameful and it is a balance he has struck with his sons, who are embarrassed by their father's non-modern work. He told me with a wink, "that poor son doesn't know that this traditional medicine helped him get born". His patients come from the area and even from around Cambodia because of certain specialties he has. Richer patients

from further afield usually donate more and also spend more time consulting with him. The nearby clinic he views as an asset for the purposes of diagnosing illnesses more precisely, which can help his treatment as well. He acknowledged that many people went for blood tests but would come to him for medicine. The doctors there are aware of this and are sympathetic but they are not allowed to prescribe botanical medicine themselves. [KR-TP]

Soveat (see his story in Section 5.4.1) could also be described as a rural traditionalist. In both of these cases, the healers have very different entry points to their relationship with traditional medicine. In Soveat's case, he followed a more common path by gaining much of his knowledge through monkhood, lay service, self-learning, travel or spiritual experience. Mr. Team's skills, and particular his specialty with prenatal care, are due to his experience with his wife and significant self-learning.

Learning from Pharmaceutical Medicine

From the perspective of most healers with which I have communicated, biomedicine is generally viewed as a potentially useful complement to the health system but it is also viewed critically as a hegemonic influence that crowds out other practices unjustly. The capacity in biomedical practice for diagnosis, ultrasound, and emergency care are almost universally respected. The view on pharmaceuticals is more mixed—they are frequently viewed as both powerful (effective, *p'setapheap*) yet dangerous (toxic, *pul*) and they have a disruptive influence on people's health seeking behaviors. With proper guidance pharmaceuticals can be more therapeutically effective for many treatments than traditional medicine, but they promote less preventative behavior, weaken the focus on holistic health and can be used criminally to pollute botanical medicine. The view on hospitals and clinics as a setting for healing is generally negative, with healers criticizing the impersonal social relations, lack of family space and the contractual payment system. Some of these concerns, such as advance payment, are being allayed as people become increasingly normalized to workings of the market economy. Transforming traditional medicine into a commodity is viewed ambiguously. With the lack of tamper-proof packaging, proper storage, and proper medical guidance, the indiscriminant marketization of traditional medicine can become a healthy hazard and

damage the reputation of traditional health systems. But neo-traditionalists and the NCTM are beginning to provide oversight and regulation, traditional rural healers are more hopeful that the traditional pharmacopeia can be rendered more responsibly into industrial products. Foreign traditional medicines, however, despite often employing comparable botanical treatments, are most often viewed as a threat by crowding out the development of local equivalents.

The neo-traditionalists, urban traditionalists and rural traditionalists all have differing views about how to promote traditional medicine to accommodate free markets and commodification, formalization and professionalization, urban lifestyles, and the availability of biomedical care. All healers, however, share a need to root their practice in specific notions of what constitutes authentic traditional medicine even as they adjust other aspects of their practice to suit various social and geographical conditions. They do this by isolating familiar aspects of traditional medical health care (i.e., something important in the *habitus* of health treatment, such as the context, product, or practice) that can sanctify their practice as authentic and “traditional” while leaving space for other aspects to adapt to non-traditional influences in the wider medical system. This “double consciousness” allows patients to experience traditional health care, while giving those systems space to reorganize to suit contemporary pressures and conditions. This raises the question of how effective a double consciousness might be? In other words, how would a system of traditional health incorporating lessons from pharmaceutical medicines be received by patients?

Researcher-Merchant Partnership in Advancement of Traditional Medicine

In order to explore consumer response to pharmaceutical-like traditional medicines, I designed a natural experiment with two partner healers that would yield data on buyer demographics and purchase behavior. A detailed account of the set-up and logistics of this experiment can be found in Appendix 1. To summarize, the research project provided interest-free loans and facilitated the rapid advancement in packaging and product form of three treatments for each healer. In exchange, the healers gathered data on patients (not necessarily the buyer), which were anonymized and transmitted to the researcher. In order to understand the challenges presented by such an endeavor, including purchasing new equipment, selecting containers, designing labels, and

applying for permits, I actively took part in each of these steps. The two research partners (see Figure 5.5) were selected from the first cohort of graduates from the NCTM training course and both lived on Mount Kulen. Prior to their engagement with the project, both healers could be described as rural traditionalists. They collected or sourced their ingredients in the region, produced their own medicine, and ran small consultation pharmacies near Preah Ang Thom pagoda. Vireak (approximate age 30) chose to advance treatments for thrush (Heavenly White Lotus), hepatitis (Rama Medicine) and indigestion (Happy Stomach). Ta Huon (approximate age 70) chose to advance treatments for circulation (Energy Boost), hemorrhoids (Powerful Prateel), and hepatitis (Magic Jackfruit). Period sales for all of their medicines, including the advanced ones, can be found in Figure 5.6.



Figure 5.5 Vireak (left) and Ta Huon after a training course in Siem Reap

The research project also supported each healer to improve their storefront in order to establish what amounted to small rural dispensaries (see Ta Huon's shop in Figure 3.2). The new advanced pharmaceutical-like medicines made their shops similar to those of neo-traditionalists. Pilgrims and tourists to Phnom Kulen would find a clean, well-organized pharmacy staffed by an officially trained healer. They could purchase a range

of product forms, including raw ingredients, tonics, tablets, and hand-made pills with varying types of packaging.

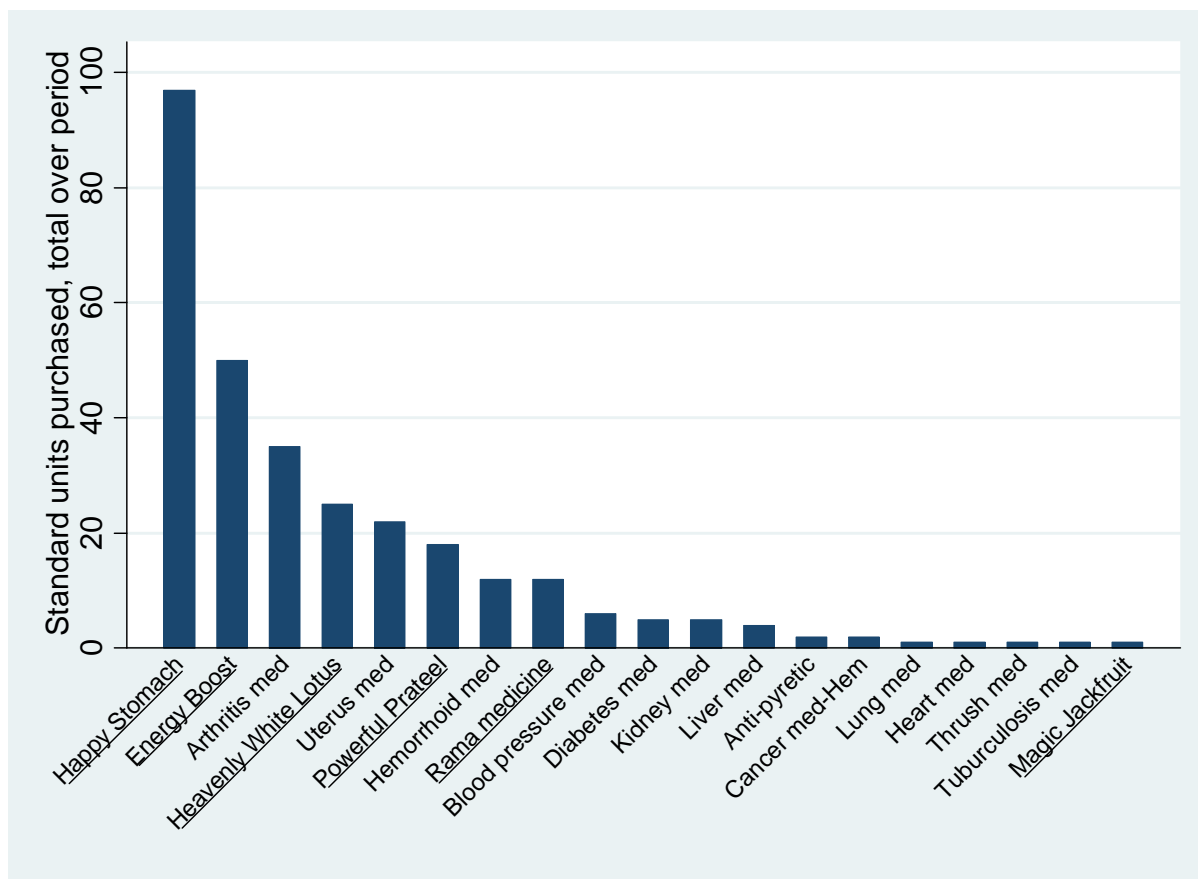


Figure 5.6 Absolute sales of traditional medicines over project period⁵⁸, not including wholesale (underline denotes products advanced in this project)

The demographic characteristics of customers to Vireak and Ta Huon’s shops were broadly consistent with those of visitors to Phnom Kulen, with one exception. Although many foreign tourists visit Phnom Kulen to see the riverbed sculptures and reclining Buddha, less than 1% of traditional medicine sales were to foreigners. Shops that sell traditional medicine usually offer souvenirs in order to attract business from this sector. Most customers (75%) were above the age of 35, with a mean of 43. More than half of patients (61%) had already consulted a doctor in order to be diagnosed

⁵⁸ The project period ran for 13 months from January 2010 to March 2011. Healers were instructed to collect data only during periods in which they had the advanced medicines available for sale (to make data comparable), which was around 120 days. The data in this figure do not include (1) wholesale, which amounted to 74% of total sales and (2) custom mixed medicines (9%)

before purchasing traditional medicine. According to my partners, the majority of these patients had already tried a biomedical treatment and were seeking to either supplement it with traditional medicine or replace it altogether [PP-CV, PP-TH]. The data reveal that those who had not consulted doctors often had chronic or easily diagnosable ailments (e.g., indigestion, diabetes, thrush, poor energy, etc.); according to Vireak and Ta Huon, this is common as people are seeking long-term treatments that fit into their daily life. About half of the customers (47%) had previous experiences with TKM and this segment favored the most commercially advanced types of traditional medicine (65%).

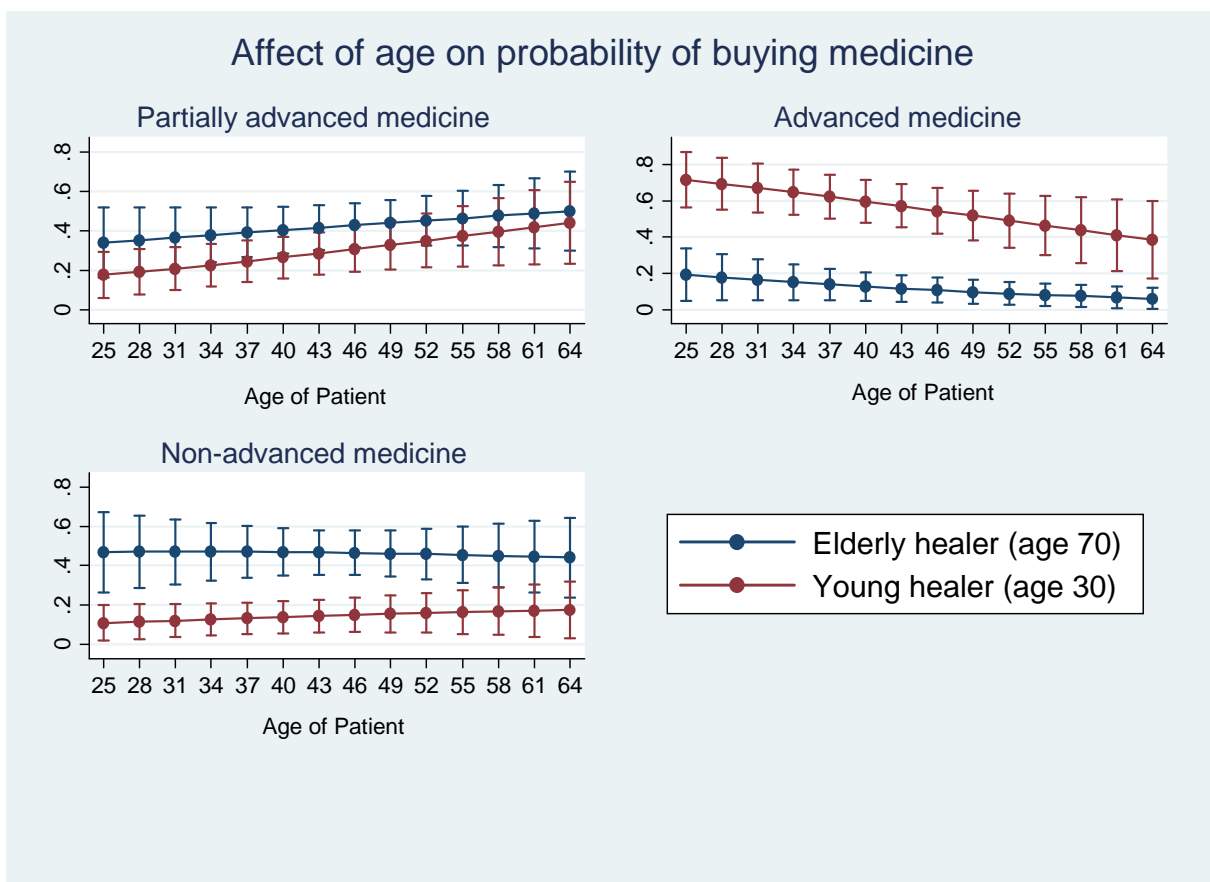


Figure 5.7 Multinomial logistic regression examining the interactions between patient age, healer age, and advancement of medicine⁵⁹

Based on the data presented in Figure 5.6, one might conclude that the advanced medicines were a sales success. However, because the healers logically chose to advance medicines that were already popular, this cannot be immediately concluded.

⁵⁹ The underlying model for this plot can be found in Appendix 5.

The more relevant question is to ask who chooses to buy advanced medicines and under what conditions. By plotting the margins of a multinomial logistic regression (Figure 5.7), three basic trends emerge: (1) younger customers prefer to buy the most advanced medicines, and they prefer to buy them from a younger healer; (2) older people prefer partially-advanced medicines; and (3) age plays no role for purchases of non-advanced medicines but an elderly healer is a more successful sales agent. These results suggest that the most advanced medicines might alienate elderly customers, particularly if they are being bought from an elderly healer. If elderly patients buy from a younger healer, the advanced product form comes as less of a surprise and is, as a result, demanded relatively as much as partially or non-advanced medicines. This is reversed for non-advanced medicine, for which customers are more likely to purchase from an elderly healer. Ta Huon has a partial explanation for this effect:

“I notice that when I wear my lay functionary [achaa] outfit, I sell more old style medicine. I guess they believe religious people should make more traditional medicine. But now the old people prefer easier products because they do not want to get up to make tea so much, so [partially advanced medicine] sells okay now. But if they meet me, they cannot believe that I make such a nice medicine but some still buy.” [PK-TH]

The more general conclusion to draw is that, while medicine in its non-advanced product form is demanded equally by all patients of all ages, advancement should be carried out with an awareness of the age of the healer and the intended audience of the different types of medicines. To provide extremes: an elderly healer would likely not be successful marketing an advanced medicine for a typical elderly disease, such as arthritis. A young healer, in turn, should probably avoid commercializing partially advanced or non-advanced medicines intended primarily for young people, such as thrush or pregnancy medicine. More broadly, according to these results, younger healers would be more successful creating a double consciousness that speaks to their modernity but maintains partially-advanced product forms for elderly customers. Elderly healers, to leverage their age, experience and possible religiousness should generally avoid advanced-looking medicines and focus on partially advanced or non-advanced products. In fact, the underlying strategy of the NCTM (reviewed in Section

4.2.3) has very much predicted this state of affairs. They have focused their training efforts at younger healers and the advancement of medicinal products. To a large degree, they have accepted that while rural traditionalists may improve the packaging, hygiene and labeling of their products, full-scale commercialization is neither feasible nor desirable. Instead they have focused on outreach and inter-generational transfer of knowledge through CaTMO, the association of traditional healers. The initiatives by Médecine de le Nature with ethnic minority groups and SCW with eco-tourism groups have also created a double consciousness that anchors advancements in clinical setting and medicinal products in long-term cultural expectations. By doing so, these initiatives make progress toward preventing the loss of knowledge by encouraging the future viability of traditional medicine without creating cultural alienation. In general, buttressing the viability and cultural space of traditional medicine provides an opportunity for agro-social skill in medicine and healing to be transformed and re-embedded in prevailing social and economic relations. Aspects of traditional healing and traditional medicine that are reinvented and justified may coexist with the hegemonic influence of allopathic medicine.

5.5 Sugar Palm-based Products

Similar to organic rice and traditional medicine, products based on the palmyra palm (*Borassus flabellifer*) in contemporary Cambodia lie at the intersection of contested processes of natural resource conservation, cultural transformation, and commoditization. In conservation, these sugar palms are both a source of damage and a victim: palm sugar production requires fuelwood and bamboo ladder material to be cut down but, if sugar production is ceased, the palms themselves are often cut down. As one of the few trees that can grow easily in the lowland paddy areas, it is treasured for its aesthetic contribution to the landscape (see Section 4.2.4) and a source of building and farm materials. The palm sap is transformed into many natural products that add distinctiveness to festivities, sweets, and the cuisine. A simple poem published in the magazine of the ruling Cambodian People's Party (CPP) dramatizes the palm's diverse utility:

Value of the Palm, by Sothun Sok (trans. Piseth Som)

Provide a lot of advantages; you are valuable, I should love you

durable and strong, house, boat, bridge, frond for string, basket, leaf for wall and roof, drying mats, hat, backpack, fruit for eating, make desert and soup, palm sap, sugar – the real Khmer Treasure
(Sok 2004)

As substitutes such as cane sugar, acetic vinegar, and malt beer appear on the market (not to mention substitutes for the other uses Sok lists above), pressure to commercialize emerges as a way to maintain competitive and justify keeping the sugar palms around (Khan 2009). Commodification, however, can proceed along very different paths. One option would be to invest in long-term sugar palm plantations; other avenues would focus more on utilizing existing trees and peasant production. A premise of this section is that Cambodians wish to conserve the aesthetic beauty and symbolic importance of palms as well as the cultural relevance of palm-based products, but are faced with trade-offs regarding how to accomplish this.

5.5.1 Commodification of a National Symbol of Nature and Heritage

As a national symbol second to Angkor Wat, the palmyra palm has, through the initiatives of development agents and private sector actors, been transformed into a commodity that is imbued with values of heritage, conservation and efficiency. The prime minister has often referenced the sugar palm, noting that it is a Cambodian symbol and should not be taken “out to make space for anything” (Hun 2008). The CPP and King decreed (Prakas 481, 5 September 2003) that felling and export of sugar palms is illegal and the CPP magazine focused awareness on the value and precarious situation of palm trees (Sarun 2005). By 2000, between 1 and 2 million palm trees had survived (Romera 1968; Yang Saing 2000). The decline in palm tree numbers has been more anecdotally felt as well, prompting many of the private sector and development initiatives. The managing director of Confirel, Cambodia’s first organic palm product firm, exhibits this romanticism, commenting that,

“I used to live in France, and whenever I saw thnot [Cambodian palm] I really missed my homeland. So that is why I came back and developed a business using thnot. They are emblematic of our culture and of our agricultural industry. [...] France is known the world over for their exquisite

red wines, why don't we make Cambodian palm wine and palm products the envy of the world too" – Te Laurent, quoted in the Web of Cambodia⁶⁰

Although entrepreneurs and traders have contributed to raising the profile of the Cambodian palm since the late 1990s, government support for palmyra products culminated in the 2010 decision to grant Kompong Speu province palm sugar a Geographical Indication (GI) (Soeun 2010). Much like products designated under the French system of AOC and similar GIs, products made from the palmyra palm are protected through recognition and economic promotion. This process tends to protect palmyra trees (within the affected geographic area) and produces a form of cultural intellectual property that generates pride and valorizes indigenous culture. As experiences with the AOC have demonstrated, heritage commodification can also lead to second-stage affects such as preservation of biodiversity and alternatives to agro-industrialization (Bertozzi 1995). Heritage product promotion is also aligned with the development of environmental movements and awareness, as it links patriotism, conservation, and natural atavism (Prak 2009).

As industry insiders note, heritage value, quality and conservation will become necessary value-added characteristics as efficiency improvements can only go so far. The most common efficiency improvements have come from development initiatives to advance the cookstove for peasant palm sugar production, which have met with moderate success (San 2005). Even medium-size businesses have a pessimistic outlook on lowering production costs sufficiently:

"We are happy to compete on a level (fair) playing field, but if we have to compete with non-standard products, we will have a very difficult time selling in the market. Our palm vinegar, for example, comes from raw palm sap while other vinegars can come directly from low-grade natural gas / petroleum derived acids." (Reasay Leak Pok quoted in Khan 2009)

Nevertheless, the continual improvements in processing already demonstrated in the facilities developed by Confirel and Khmer Natural Enterprise indicate that large scale may achieve production parity with certain substitute products. So far, these companies

⁶⁰ Author unknown. Article accessed 20 February 2011: http://www.web-cambodia.com/en/article/Cambodian_Sugar_Palm_Tree-36033.html

have achieved this without significantly adjusting the peasant-production system or crowding out traditional product forms. Whether these companies wish to—and are able to—continue commercializing in a manner that avoids commoditization/simplification of the product is a question I investigate below.

5.5.2 Transforming Cambodian Palm Products

The commercialization of palm products presents an opportunity for international concepts of ecological and social enterprise to intersect with domestic efforts to promote national heritage, smallholder agriculture, and local cuisine. Social enterprises, development NGOs and businesses view the Cambodian palm as an opportunity to create profit, help rural development, and increase national pride. The access points for different agents in this process are numerous, providing a broad range of activities. Promoters can make palm products more environmentally friendly through organic methods, improving energy/production efficiency, or they can evolve novel product lines for the domestic or international market. Palm products have the potential to retain their position as domestic staple products or they can be transformed into exotic, gourmet exports. As a commodity, palm sap can be processed into granulated sugar, much like demerara or turbinado or also even refined to simulate cane sugar. For the niche segment, it can be processed into syrup similar to agave nectar. As a domestic staple product, it can be produced under more efficient and hygienic conditions into palm sugar paste and crystallized forms for traditional cuisine. As an alcohol, it can be control fermented like wine or beer, with even the expectation for year-to-year vintages. As an exotic international export, palm-based products can be marketed as organic, natural, or traditional. While there is indeed room for all of the above initiatives (given the abundance of palmyras in Cambodia), what are the dominant trends in this sector so far? Is a productivist export-orientation becoming dominant or is there a domestic-oriented approach focused on diversity and maintaining agro-social skill?

Three basic types of agents are engaged in palmyra promotion in Cambodia: NGOs (i.e. value-added for farmers and efficiency), the philanthropic investor (i.e., long-term product development), and domestic entrepreneurs (i.e., profit-orientation in

established markets).⁶¹ So far, most initiatives have been loss-leaders, but investor support usually does not diminish due to patriotism and support from development aid. In general, these initiatives are all of a hybrid nature—expressing a strong focus on commercialization (and sometimes export) while supporting heritage product forms and existing models of peasant production. In the following, I profile the main companies and organizations exploring models for transforming the Cambodian palm into a commodity.

Confirel Co, Ltd.

Established in 2001 by Dr. Hay Ly Eang, a Cambodian of French background, Confirel was intended to showcase the potential of the Cambodian palm, help conserve palmyra palms, and support rural ecological development. After a period of restructuring, it began producing a line of internationally certified organic products in 2004, many of which were novel in Cambodia. These included granulated sugar (see Figure 5.8), wine, vinegar, liquor, cocktails and candied fruit. Due to the certification, expensive processing and elegant packaging, the products were initially marketed to the upper class domestic market and exported to France, Korea and Japan. Subsequently, discounted versions of the same products were targeted to the domestic middle class (Koh Santepheap 2004). According to the marketing and logistics manager, Confirel has not yet been profitable, but investors (particularly the founder) are not worried because they ideologically support the enterprise and always knew the investment period for a small company with new products would be long [PP-CHR].

Although most of Confirel's products are not strictly traditional, their legitimacy as heritage products is based on the promotion of palm tappers' livelihoods and their use of geographically indicated Cambodian palm sap as their basic raw material. The products with the closest existing traditional counterpart are the plain palm wine (11% and 8% alcohol content) and non-alcoholic palm juice. Historically, however, raw palm juice would only be consumed by the tapper and his family directly after collection. If left for too long it would ferment itself with wild yeasts and become a mildly alcoholic palm beer called *thnot tchu* (sour palm), which is drunk traditionally at Khmer New Year. Confirel's palm drink, however, is control fermented using French wine yeasts

⁶¹ Although some foreign companies have expressed interest in the Cambodian palm product sector (see Section 5.2), none have committed significant resources yet.

and its palm juice is pasteurized and bottled to prevent fermentation. Another product that has a traditional basis is the palm vinegar, a historical product which has declined recently in Cambodia. Conspicuous is Confirel's decision to only produce granulated palm sugar as opposed to the traditional pastes and crystallized forms, which is indicative of its goal to provide new and improved products and not compete in the traditional palm sugar market.



Figure 5.8 The leaflet of Confirel's organic granulated palm sugar

Imbued in the processing and marketing of Confirel's products are ideological goals predicated on environmental concerns, social justice, and patriotism (see Section 4.2.4). Through their contracts with palm tappers, they provide a premium and guaranteed buyer as well as lift the burden of reducing the palm sap from the farmer. Their processing is then more centralized and energy efficient, hygienic, and—according to most palm tappers that I interviewed—tasty. And despite the divergences from traditional product forms, Confirel can claim authenticity and develop patriotic symbolism. In particular, through their export promotion they position the Cambodian *Borassus flabellifer* as a unique species, thereby differentiating and valorizing Cambodian natural production.

Khmer Natural Enterprise

Established in 2002 with private investor funding, Khmer Natural kept its mandate modest, focusing on creating a low-cost palm beer, juice and vinegar that could be distributed in urban areas. The general manager stated that the development goal was to create rural employment opportunities and purchase fresh palm sap directly from

tappers, while the national goal was to provide working class urbanites access to traditional palm products that would normally only available in the countryside [PP-LRS]. Their production facility is located near a few palm-tapping villages in Kandal province. This allows them to employ local people, reduce the risk of unwanted fermentation, and, due to its proximity to Phnom Penh, reduce transport costs. The company collects palm sap from tappers between November and February, after which they encourage tappers to produce palm sugar privately until May. The finished beer, juice and vinegar is bottled and transported to the cities to be sold in high-end supermarkets as well as in working-class wet markets. The price of the vinegar is competitive with other fermented vinegars, though more expensive than chemically-produced acetic acid. The palm beer has no urban counterpart, but is competitive with the cost of bottled beer (made of rice and barley) of the same volume. The palm juice is artificially aromatized to cater to the perceived urban demand. Despite low overhead in the countryside and other cost-cutting methods (such as using refilled Heineken beer bottles), Khmer Natural has not become profitable. Similar to Confirel, most of the investors are not deterred by this. In fact, since 2010 they have invested additional capital into a larger facility to exploit economies of scale (see Figure 5.9).



Figure 5.9 Construction of Khmer Natural Enterprises new palm manufacturing facility

Khmer Natural's model is based on rural development, ecological production, and heritage promotion. The Khmer Natural label proudly displays Angkor Wat flanked by two palmyra palms and the printed text romanticizes Cambodia's natural beauty and ancient relationship to the palm. Advertisements for Khmer Natural depict the pastoral view of noble palmyras against lowland paddies to promote the authenticity of consuming bottled palm beer, even in the city. Despite profit constraints, investors are willing to carry on due to their commitment to preserving the Cambodian palm, creating rural jobs, and providing a typically rural product to the increasingly urban population.

CEDAC Enterprise and DATE

Unlike the previous two social enterprises, the CEDAC Enterprise and the national NGO Development and Appropriate Technology (DATE) operate from the standpoint of development organizations. Although both aim to create sales of palm sugar in the city, their business networks with farmers are also based on promoting self-sufficiency and improving ecological performance (see all of their claims in Figure 5.10). Because they work with pre-existing palm sugar producers, they promote the use of efficient cook stoves, which can decrease the fuel consumption by 10-30%, depending on the model (San 2005). They also discourage the use of unhealthy preservatives and bleaching chemicals, such as sodium hydrosulfite. Conspicuously absent in the development model are integrated farming uses of the palmyra, for example in livestock husbandry (Borin 1996) and agroforestry (Mogea et al. 1991). Rather, CEDAC and DATE organize farmers into producer groups that can collectively ensure product quality, encourage value-added processing, store palm sugar for better market conditions and negotiate more fairly with palm sugar brokers. Although these efforts have met with fragmented success, new awareness about product handling and cook stove engineering has combined with the ingenuity of farmers and led to many informal improvements in the health and efficiency of palm sugar production.



Figure 5.10 Granulated palm sugar packaging from DAtE and other donors

Typically, traders bought palm sugar paste and crystallized sugar directly from tappers, who used inefficient stoves to reduce the sap and were often requested to add bleaching agents during processing. The reliance on firewood (and in some cases residues from rice mills and textile factories) results in a large energy footprint (GERES 2009). Private companies such as Confirel and Khmer Natural improve upon this by collecting the sap and processing it more efficiently. Development projects, however, generally aim to improve marginal conditions (such as health and energy intensity) without displacing production from the farm to a factory. In most cases, palm trees are too dispersed to create centralized processing facilities for palm sap, which is a practical justification for initiatives focusing on rural production. Naturally, development projects have ideological reasons for promoting farm-based production. Specifically, improving processing and creating producer groups promotes the maintenance of traditional crafts and empowers rural people. For many lowland farmers, the dry season without palm sugar creation would be a time for migration to the city to look for construction jobs. Due to the low sale value of palm sugar, predatory pricing by brokers, and the high fuel requirement, many sugar producers were leaving their occupation. CEDAC and DAtE (as well as their donors) viewed the creation of markets for chemical-free and granulated palm sugar as a way to revitalize the occupation while improving

environmental conditions. Non-chemical palm sugar of comparable quality reaches premiums of 10-15%, up to 25% on famous regional palm sugars (see preparation for urban sale in Figure 5.11). Promotion for the Cambodian palm is also coming in the form of continual urges from top politicians to conserve palmyras as well as the Ministry of Commerce's establishment of a GI for Kompong Speu province palm sugar.



Figure 5.11 Scooping natural palm sugar paste into containers at the CEDAC Enterprise

5.5.3 Guiding and Scaling Commodification

In his poem, Sothun Sok (see Section 5.5) outlined the diverse uses and symbolic adoration of palmyra palms in Cambodia but ultimately leveraging these characteristics to conserve sugar palms remains a complicated and contentious process. It is evident that politicians, development agents, and private sector actors are interested in commercializing sugar palm-based products to valorize their underlying productive capacity but are unsure as to which method holds the greatest potential. As a result, a diversity of initiatives has emerged, exploring the potential for commercialization, rural development, ecological performance, and the preservation of heritage culture. Tappers

with whom I have interacted are, in general, thankful for these efforts as they both lament the loss of palmyras and the art of tapping, but are burdened by the dangerous and onerous work and the increasingly unviable fuel costs. One tapper explained this very elegantly:

“There is no respect for construction workers who migrate to the city, so I prefer to stay and make palm sugar in the village. When we had little wood left, we got rice hulls and cloth scraps to burn from nearby factories but those are now expensive too. Now I put my hopes on these companies. So far I do not join the company but soon I hope the owner finds a good way to do this. We all want to keep the beautiful palms and our good reputation for palm sugar.” [AS-TS]

While none of the initiatives have emerged profitably yet, these are pioneer initiatives and even proof-of-concept is judged as valued progress by promoters (and by tappers). More importantly, the wealth of these initiatives is indicative of a dynamic and evolving platform for envisioning how to conserve Cambodia’s palmyras and preserve palm heritage culture through commodification.

5.6 Conclusion

The 1990s were a period of intense scrutiny of agricultural development that led to many changes in the stance of the alternative agriculture movement vis-à-vis predominantly rural economies. Atavistic notions of maintaining the human bond with nature through petty production were challenged by development actors hoping to mainstream and formalize natural production and provide smallholders in poor countries viable ways to transform the bounty of rural agricultural heritage into marketable consumer goods. However, as many private sector and social entrepreneurs discovered, linking producers to markets and aligning the expectations about quality, hygiene, and diversity with the imperatives of commercialization is a contested process.

Efforts in commercialization often lead to a simplification of agro-biodiversity in terms of the range of varieties and qualities of heritage products that are available in the domestic marketplace. While residual agro-social skill in Cambodia leads to demand for a broad selection of products and quality characteristics by urban dwellers, logistics

and marketing considerations often result in a process of reduction. Furthermore, agricultural products cannot simply be transferred to urban areas, they must be transformed to suit urban and modern expectations, particularly regarding hygiene, packaging, and transparency of quality characteristics. Handlers and traders are faced with trade-offs between ideological standards for measuring quality (flavor, texture, aroma, place of origin, etc.) and emerging technical standards (regulations, grading, storability, etc.) and must strategically select product configurations that capture their intended market segments. Promoters of ecological and heritage production, similarly, find that they are not creating simple organic/GI substitutes but rather reconfiguring existing products in ways that consumers do not predictably and consistently respond to. Indeed, this chapter examines the new breed of ecological and heritage characteristics in Cambodia precisely because producers, promoters and traders are struggling to account for their experiences with formalizing natural and heritage products.

Promoters and producers are scrambling to define what constitutes sustainable intensification, organic, geographical indication, and sustainable wild-harvest in ways that fit the cultural milieu and reward producers. In the case of sustainable rice intensification and organic certification, promoters have relied on adapting outside technologies and schemes, such as SRI, HYVs and participatory guarantee systems. As I conclude in Section 5.3.2, these have worked better to produce higher yields and reliable ecological performance when they have leveraged farmers' inherent skills rather than relied on direct implementation. Traders attempting to market organic rice, in turn, have learned how to treat the organic certification as just another characteristic that is sought with varying priority and in different combinations by consumers. The most successful traders have learned how to exploit the organic feature to achieve organic premiums up to 10% or more (compared to 2-4% for other traders) when selling to the typical lower middle-class patrons of wet markets. Promoters of palm products, such as Confirel and Khmer Natural Enterprise, have also found success in keeping their commercial products embedded in the culinary expectations of Cambodians while improving hygiene, modernizing packaging, and certifying GI. Confirel adapted a new line of domestic-oriented products that are affordable by domestic consumers but still achieve the high technical standards and certifications of their export products while Khmer Natural has improved economies of scale and brought ordinarily rural palm

products to urban households of all socioeconomic classes. Traditional healers and medicine producers have also reached new markets by being cognizant and reflexive about the evolving cash economy and changing expectations brought on by pharmaceutical medicines and phytosanitary regulations. In marketing traditional medicine, success has been met by advancing certain medicines to correspond with the image of the healer (young and modern, elderly and traditional) and the age-specific and context-specific (urban/rural) expectations of consumers.

From a macro-perspective, the challenges of commodification faced by producers, handlers, and traders have primarily had to do with making strategic decisions about how to simplify rural diversity for urban sales. However, at the same time, a robust parallel system originating in the countryside has also continued to support the diversity of food and medicine. This is accomplished by maintaining diversity in-situ and by reproducing agro-social skill and transferring ideological standards to urban areas. Farmers maintain and improve rice varieties that are not sold in marketplaces and, through their circulating relationship with the cities via work immigration, routine travel, and homesteads, they constantly reinforce rural tastes in city life. Palm producers sell raw sap to private companies that often privilege domestic over export markets, but they also continue to produce traditional palm products for local markets and petty traders. Healers and medicine producers are increasingly producing pharmaceutical-like medicines, but they often stock botanical remedies in unprocessed and partially-processed form to exhibit transparency and provide products that fulfill diverse expectations. Commodification is clearly desired by producers and consumers to bring about viable economic opportunities and higher technical standards but it is also constrained by indigenous demand for diverse product forms. This tempers the pace of commodification, and in concert with the parallel system in the countryside, leads to something of a “thoughtful commodification” that provides economic space and also time to reflect on the process direct it more proactively.

6 DIRECTING COMMODIFICATION IN FOOD AND MEDICINE

This work is concerned with the question of democratic governance of food, agriculture and medicine, particularly in countries like Cambodia where industrial agricultural systems have not yet become hegemonic. Although I do not aim to discredit the Green Revolution, biomedicine, or the productivist paradigm of agricultural development, this work has focused on ways in which the hegemonic characteristics of industrialization and capitalism are critically negotiated, which often means seeking out and occasionally privileging alternative viewpoints. In this study, this involves finding examples in which the various agricultural paradigms have been, or continue to be, contested, reinvented and adapted. This is most visible in the arena traditionally dominated by industrialization and capitalism: namely in the commodification of production. The “pharmaceuticalization” of Khmer traditional medicine, organic production of rice and promotion of Cambodian heritage food products are all illustrative of different aspects of the attempt to manage commodification in a local manner. Throughout this work, I have highlighted the historical, cultural and economic processes that are unique to each case study while also suggesting which underlying societal trends play a role in managing commodification. I analyze these using the following three points of departure:

- skills and knowledge that frame the interaction with change
- the historical background that creates reference points for understanding change
- contemporary discourses available to leverage and learn from

Chapter 3 evaluates the role of agro-social skill in creating reflexivity about economic development and maintaining peoples’ capability to judge and value quality independently. Chapter 4 illustrates the role that historical national narratives play in the perception of contemporary development models. Chapter 5 looks at ways in which actors in Cambodia have integrated, adapted and implemented aspects of various agricultural development paradigms and attempted to direct the concomitant commodification of agricultural products. Together, these chapters present the tools, context, and physical activities surrounding contemporary efforts to take proactive control over the process of development.

In analyzing the consequences of agricultural development, I take a forward-looking approach to the ongoing processes of change in agricultural production and consumption. In contrast, the discourse of ecological modernization primarily speaks to post-industrial contexts that, unlike Cambodia, are in the process of “re-engagement”, or reconciling contemporary trends in sustainable agriculture with the inertia of the past (Marsden 2004, p. 138). This often means working at the niche level within a dominant agricultural system (Marsden and Smith 2005). Often, the overarching narrative is the destruction and rebuilding of local systems (see overview in Beus and Dunlap 1990). Typically, the decline in importance of the local ecosystem and locally-specific end-products (e.g., Van der Ploeg and Saccomandi 1995) is followed by discussions of novel forms of socionatural production (e.g, organic, Fairtrade, slow food, heirloom fruits and vegetables, etc.) (Guthman 2002) and repeasantization (Van der Ploeg 2007). In many developing country contexts, such as Cambodia’s, the ecological modernization view must be turned on its head and viewed more as a process not of loss, but of change with critical reflection. Following Amartya Sen, I view the capability of people to freely choose and proactively govern their agricultural heritage and economic structures as the benchmark for forward-looking development in agriculture. Implied by this is that commodification in agriculture should neither be resisted nor encouraged along any particular normative lines—indeed, this work primarily concerns itself with cases in which the rather inevitable process of commodification is directed or channeled, rather than blocked or averted. As listed above, the capacity of a society to manage commodification is based in part on the historical context, the tools or skills available for making sense of commodification and the awareness and implementation of competing discourses of agricultural development. As time goes on, the force with which commodification is pursued by ‘capitalist actors’ will increasingly play a role, although this work is not primarily focused on this arena.

In the following, I will trace the experience of managing commodification in Cambodia through these three lenses before drawing a few overall conclusions and making suggestions for future research.

6.1 History Matters

History plays a decisive role in determining the fate of agricultural development, both by creating long-term narratives on which contemporaries draw and by creating proximate events that shape the course of development. It is useful here to depart from Cambodia to understand how history has played out in various contexts. For example, Japan's "rice riots" of 1918 led to a nationalistic policy of 'imperial self-sufficiency' that, although a "costly solution, in both the short and long terms, to the food supply problem of industrial Japan can be argued to have been less a 'defeat for agriculture' and more a compromise between industrial interests, consumer demand and the prevailing structure of agriculture" (Francks 2003). Because of the foresight or luck of turn-of-the-century Japanese, the structures for fulfilling modern (i.e., post-industrial) preferences for Japanese-grown rice were preemptively laid down (Ohnuki-Tierney 1994, pp. 25-26). In the USA, in comparison, droughts affecting corn seed stocks and seed viability in the Midwest during the mid-1930s compelled farmers to adopt new hybrid varieties and wiped out many landraces (Fitzgerald 1993). This facilitated in the consolidation of (corn) agriculture into large agri-business. In Cuba after the fall of the Soviet Union, the continuing embargo and a rapid decline in imports of agriculture inputs compelled the government to develop what later became one of the most comprehensive and institutionalized post-industrial organic agricultural economies in the world (Funes et al. 2002; Kilcher 2009). Certain events can shape the trajectory of agricultural development in ways that ultimately align with post-modern discourses in sustainable development (as in the case of rice in Japan and organic agriculture in Cuba) or clash with them (as in the case of corn in the USA).

Cambodian history is similarly illustrative of long and short-term reasons for its current orientation in agricultural development. In general, Cambodian history contains recurring incidences of massive agrarian change, which have held promise, possibly succeeded for a time, but were ultimately unsustainable. Most prominently, this includes the civilization of Angkor, the Sangkum Reastr Niyum (Great Society period), and Pol Pot's Democratic Kampuchea. The result of this recurring narrative is an increasing skepticism and conservatism regarding grand schemes, which has led to more cautious adoption of agricultural development models. The short-term reasons for Cambodia's agricultural development orientation, which are detailed primarily in

Chapter 1, are related to the timing of Cambodia's contemporary revolutions. The decline of the Sangkum era in the 1960s led to a sustained period of isolation and instability that coincided with the heyday of the Green Revolution. By the time Cambodia re-opened with the signing of the Paris Peace Accords in 1991, the discourse in agricultural development had diversified enough that Cambodia was selecting from a more competitive cohort of agricultural development paradigms. Although the playing field in the 1990s cannot be described as level, the context was relatively more favorable for selectively buying into multiple development models, which has led to less lock-in of state policy and a competitive range of institutions and private sector actors leading agricultural development in Cambodia.

The long-term view, which I address in Chapter 4, explores semiotics and metaphors in society, particularly those that relate to the Angkor period and inform current behavior regarding agriculture and health care. The "Angkor narrative" generally has two main pillars to which Cambodians commonly refer. The first is ambivalence toward grand schemes. Although Cambodians often yearn to return to the glories of Angkor, awareness of the eventual collapse of Angkorean-era infrastructure creates mixed sentiments about jumping headlong into new all-encompassing initiatives (such as green revolution agriculture). Henderson's (1998, pp. 193-195) account of the disparity between hopes for irrigation (provide water to yeoman farmers) and the ultimate effect (frequent flood disasters and the consolidation into large tenant farms) demonstrate that these concerns are still current. The second pillar of the Angkor narrative is more practical in nature, with Cambodians viewing Angkor as a rough "blueprint" for organizing modern society. This work focuses on the following four themes that speak to these two pillars of the "Angkor narrative":

The *temple of Angkor Wat*, which graces the Cambodian flag, is a symbol for the uniqueness and recognized value of Khmer culture. Cambodians have commonly used symbols from Angkor to market their products domestically but institutionalizing "place", now often in the form of Geographical Indications (GI), has rapidly become a national, if polarizing, project.

- The *irrigation canals of Angkor* are a symbol for the hubris of overly centralized efforts in agricultural development and the risks of drawing the rural sphere into the economic relations of the city. Concretely, this symbolism is parlayed into

not only skepticism about bureaucratic or technocratic meddling in farming but also into concerns about the impacts of urban (capitalist) economic relations on the social fabric of the rural countryside. Contemporary efforts to promote organic rice are illustrative of the challenges faced in designing development initiatives that address these concerns, to wit: “organic” certification is an attempt to make viable the rural smallholder systems but it also inevitably draws farmers into market-based (and contractual) economic relations.

- The archaeological remains of the *hospitals built by King Jayavarman VII* during the peak of Angkor are symbolic of current attempts to institutionalize a health system. While Western hospitals, clinics and the formalized and hierarchical organization of the health administration that supports them is reminiscent of Jayavarman VII’s centralized health institutions, the healthcare atmosphere and medicinal content of Western health centers departs from Cambodian expectations.
- The *palmyra sugar palm trees that flank the temple of Angkor Wat* are living reminders of Angkorean cuisine, heritage, and aesthetics and modern symbols of Cambodian nationalism and exceptionalism. Cambodia, which, despite logging, has the densest population of sugar palms in mainland Southeast Asia, has inscribed the palmyra as a national symbol of Cambodia. Its aesthetic and functional value in the countryside and its role in Cambodian cuisine (palm sugar, wine, vinegar, etc.) have spawned both political campaigns to preserve the remaining palms as well as economic initiatives to transform palm products into commodities that represent Cambodian culture.

These four themes are indicative of the many ways in which history and heritage are given material form in products or institutions. They also represent a few ways in which Cambodians evaluate the successes and mistakes of their ancestors to make sense of contemporary development initiatives. For example, on the one hand, GI of food products is accepted and understood because it taps into generalized appreciation for national and regional culinary tradition. On the other hand, there is ambivalence toward the systematization of geographic indication because it can decrease the importance of informal quality valuation as well as unfairly exclude high-quality producers in non-GI

areas. Cambodians working in agriculture and interfacing with international agricultural discourses are caught between the desire to formalize and transmit their national culture in commodity form and the awareness that doing so often means employing technocratic measures that diminish diversity and create unwanted regional divisions. One-dimensional solutions that privilege certain aspects of a product at the cost of others, such as high-yielding, certified organic, geographically indicated, or laboratory-tested (traditional medicine), are recognized as imperfect solutions even as they are implemented. Many of these new products, regulatory frameworks, and national discussions are premised on the assumption that, in the face of globalization, expressions of tangible and intangible culture will—and must—evolve. In describing the advancement of medicine, for example, Arthur Kleinman wrote that commodities are a “medium through which the pluralities of social life are expressed and recreated” (1995, p. 24, quoted in Ovesen and Trankell 2010: 5). With globalization, and particularly the awareness of, and interaction with, biomedicine and different models for agricultural change, the question of cultural distinctiveness and authenticity must continually be re-evaluated. With no basis on which to assess competing development ideas, historical experience (in narrative form) can provide relevant benchmarks.

6.2 Skills and Preferences Matter

Continuing urbanization is a prospect with which most developing countries must come to terms but the quality and nature of this process varies in different contexts. Migration studies have tended to focus on the pathways and causes of physical mobility. Using this lens, Cambodia exhibits a rather typical pattern of domestic seasonal labor migration complemented by frequent rural-urban trips for pleasure or business. Most city dwellers in Cambodia cite a native province (*srok gomnaut*) to which they are bonded and return for family events, ceremonies, voting, and escape from the city. Conversely, most rural people have children, partners, or extended family living in cities (for some period in the year). While this work is informed by these migration patterns, I focus instead on how rural skills and expectations are reproduced in this rural-urban nexus. In general, I take a qualitative view of urbanization, suggesting that expressions of urbanity plays as much of a role as the urbanization rate and physical migration patterns. In Cambodia, this is a relevant distinction to make. Lacking multiple

generations of city-born children due to the forced ruralization in the 1970s, an overriding city culture does not (yet) exist to a large extent (for a basis, see Saphan 2011). Although urbanization is increasing at pace with East Asian trends (Asian Development Bank 2012; World Bank 2004), the effect for now is a more embedded regional identity and a more regular interface with the rural sphere.

As a result, a relatively high degree of agro-social skill persists in Cambodia. Agro-social skill is the accumulation of knowledge about, and experience in, agriculture and rural life that affects the way people encounter and understand rural and urban development. Chapter 3 is an in-depth look at the forms this agro-social skill can take, the functions it carries out in society, and activities that influence the reproduction of agro-social skill. High agro-social skill, for example, enables certain people with farming backgrounds to determine individual rice quality without help from grades and certifications. In general, it enhances peoples' ability to understand and appreciate inherent value and ecosystem limits, which plays counter to commodification in many ways. Agro-social skill is therefore an important barometer of agricultural development because it can indicate the relative penetration of capitalist relations (or commodification) into production and consumption of food. Increasing social and cultural distance from rural farming and the use of certain technologies that affect one's ability to employ agro-social skill (such as vacuum packaging around rice) can suppress and discourage the reproduction of agro-social skill (Ingold 2011[2000], pp. 289-290, 314). Fitzgerald (1993) describes how American farmers who were once able to differentiate between and breed their own varieties of corn increasingly lost their abilities with the advancement of commercialized hybrid corn varieties. In Cambodia, the advent of artificial whiteners has narrowed the variation in color and aroma of different regional palm sugars such that farmers struggle to differentiate their product and consumers struggle to select preferred palm sugar varieties. Countering this type of commoditization with the rebuilding and maintenance of agro-social skill is a common theme in food education in developed countries. Jamie Oliver, the famous British chef and food activist, writes in his "manifesto" that, "As well as eating good food, children need to learn about where it comes from, how it's made and the importance of seasonality. This will give them the knowledge and skills to make better choices about their diets in the future" (Oliver 2011, p. 7). This follows Stephen Ingold's

(2011[2000]) argument that the tools and techniques that make up agro-social skill (e.g., farming, living in the countryside, cooking, etc.) are predicated on minimizing the distance to nature and drawing nature into the nexus of social relations. Being involved in cultivation, foraging for medicine and food, and cottage industries is the most direct way of building agro-social skill in a socialized context.

The inter-generational transfer of agro-social skill is one of the most important aspects of creating value around ecological production, as alluded to by Jamie Oliver. Cambodian children who grow up on farms, for example, can commonly identify dozens (or hundreds) of medicinal plant species and their preparation. In general, rural upbringing or socialized transfer of agro-social skills increases the likelihood that a child develops knowledge and appreciation about the diversity in varieties, production systems, and qualities (see Section 3.1.1). Later in life, these values underlie the sense of legitimacy surrounding efforts to maintain diverse food, rural heritage products, and traditional medicine. Even as children grow up and take urban jobs and start visiting Western doctors, these preferences are often maintained and reproduced independently as well as through rural visits (for example, see the story of [PP-MS] in Section 5.3.2).

The preferences and knowledge about food and medicine frame what I term “ideological standards”, or relational and flexible guidelines for quality assessment based on individual preference and collective experience. Ideological standards often overlap with (or serve as the basis for) technical standards (such as rice grades) but are defined in different terms and experienced in different ways (e.g., through sensory perception, in negotiation, by measurement). In comparison, technical standards, which are the result of commodification, create simplified ways of defining quality that often produce contradictions. Premium grade rice might, for example, taste and smell bad (to discerning rice farmers) even though its milling quality is good. Ideological standards, when laid over technical standards, play a role in maintaining the peoples’ ability to judge and appreciate quality in a holistic manner. Some people, for example, know how to judge fruit quality through inspection at the market while others rely on packaging or the word/reputation of the salesperson. For consumers, unprocessed food (and medicine) enables the employment of agro-social skill as quality can be more readily assessed from raw ingredients without packaging. The typical wet market of Cambodia is geared toward providing this experience to consumers’ while supermarkets tend to

rely more on packaging, grades and reputation. This process has parallels in rice farming as well. When selecting rice seed, most farmers choose seed from sources with which they have direct access, such as their own or neighbors' fields. Commercial seed, in contrast, is an unknown quantity; local growing conditions may differ from field tests and flavor may not correspond with the farmer family's tastes or demand in local markets.

In Cambodia, concerned farmers, politicians, non-governmental organizations and rural associations arose at the end of the 1990s to begin supervising the formalization of these ideological standards to match domestic sentiment. These formalization "moderators" in Cambodian civil society share an arena with the nascent global agriculture sector, which includes agribusiness concerns, international agronomic research institutions, large traders, and exporters. Functionally, all of these stakeholders share a common view about raising milling quality, achieving export ratings, and raising yields, but they differ on the issues of who drives this process and what conditions shall be imposed upon farmers and consumers in the process. Typically, the productivist, industrial agriculture stakeholders support strict technical standards, a narrower range of rice varieties, objective dimensions for quality determination, and harmonization with international standards. Civil society stakeholders, speaking primarily on the behalf of small-scale farmers and domestic consumers, advocate for more flexibility in production dynamics and for a more diverse view of standards and quality, in which protocols for technical quality and desirability can evolve with farmers' practice and consumer preference (Beus and Dunlap 1990; Vandermeer 1995). Conflict arise between these two constellations of actors because one side tends to view technical standards as constitutive of quality and the export market as the ultimate audience while the other side focuses on the ideological standards of domestic urban dwellers and the short-term needs of smallholder farmers. Thus far, organic certification and GI have largely been a compromise between these two constellations: they narrow diversity (variety and geographic origin) for the sake of logistics and bureaucratic efficiency while promoting viable rural livelihoods on the assumption (or hope) that agro-biodiversity will be informally maintained in the rural sphere. However, according to the president of CEDAC, the initial organic model underestimated the ideological standards driving urban demand and future initiatives will aim at increasing the

diversity of organic rice [PP-YSK]. In general, if the agro-social skill enabling these ideological standards is reinforced and reproduced, rural and urban areas will play a role in maintaining diversity within the context of ongoing commodification.

6.3 Global Discourse Matters

Globalization has often been referenced in this work as a conduit for foreign goods and services that challenge and compete with local versions, but globalization is also the encounter with foreign ideas emerging from, among others, international aid, development discourses, and worldwide movements. In Section 6.1, I discuss how the arena for these foreign ideas had become more competitive during the 1990s when Cambodia emerged from international isolation. The competition between paradigms such as green revolution vs. alternative agriculture or allopathic vs. traditional medicine has effectively created more space for countries like Cambodia to “mix and match” among and between these various offerings, often resulting in a collage of national policy and decentralized initiatives that draw from multiple discourses. Doing so, however, involves resolving discursive inconsistencies within and between different paradigms. This is particularly pronounced within environmentalism where “there is a tension between reformism and radicalism, and between technocentrism and ecocentrism. Because of its roots in environmentalism the same tensions exist in debates about sustainable development” (Adams 1995, p. 88). In Chapter 5, I refer to Cambodia’s blend of sustainable development (in the agriculture sector) as having an ecological agri-market orientation. In that chapter I focus on how socio-technical paradigms embodied in alternative health care, social enterprise and alternative agriculture are instrumentalized in private sector and civil society initiatives and regulated by government. Furthermore, I analyzed the performance of these initiatives to see who in society bought into the idea, how generalized the demand was, and what farmers and consumers took away from these initiatives. In some cases, I simulated the initiative myself using researcher-merchant partnerships to understand how the initiative might turn out if it were farther along. The looming question asked in Chapter 5 was how state institutions, civil society, and private sector actors accommodate the contradictions that emerge from mixing various discourses and matching them to the Cambodian context.

The answer to this question is delivered through case studies of initiatives aiming to commercialize organic rice, advance traditional medicine and promote heritage palm products. This landscape of ecological product initiatives is, generally speaking, populated with attempts to reinvent rural systems for urban areas by adapting mechanisms developed in foreign countries. For example, as rice is moved to urban markets in Cambodia, informal village-level mechanisms for ascertaining rice production characteristics (e.g., natural) must be replaced. The most common international method for formalizing a guarantee system for urban customers is organic certification. Likewise, as pharmaceutical medicine plays an increasing role in medical care, traditional healers and health institutions are compelled to adapt their product forms (powders, raw botanicals, tonics, etc.) and regulatory oversight to match the new expectations arising from biomedicine. Naturopathic medicine and foreign traditional medicine systems offer ways of transforming these product forms into well-labeled and easy-to-use tablets, droppers, capsules and syrups. As cane sugar replaces indigenous sweeteners, tappers, traders and business owners seek out ways to compete with cane sugar. Alternative agricultural movements throughout the world suggest creating substitutes (e.g., granulated palm sugar) or reinforcing niches with marketing (e.g., GI, advertisements, etc.). Transforming these product forms, however, is not as simple as taking international know-how in certification, medical processing and granulation and applying it to existing products.

In my analyses of the performance of these ecological product initiatives, I generally find that promoters of various new products (including those created in cooperation with my own partner merchants) misapprehend, or simply cannot cater to, the nature of the demand for these new agri-products. Consumers often want modernized characteristics (such as good hygiene, useful packaging, and proper regulatory oversight) but not to the detriment of the ideological standards they hold for indigenous products. Indeed, the relatively high level of agro-social skill underlying these ideological standards in Cambodian society drives a seemingly contradictory demand for products that are modern yet fulfill traditional expectations both in product form and presentation. I will illustrate with a few examples drawing from results in Chapter 5:

- Research in wet markets demonstrates that organic rice is demanded by patrons of urban wet markets, which serve the majority of Cambodian rice customers, but, until 2010, organic rice promoters had focused almost exclusively on supermarket customers. The challenge in reaching these customers, however, lies in reproducing their demand structures. Wet market rice traders often offer between 20-40 configurations of rice based on quality, region, variety and ecological characteristic. Organic rice varieties sold in Cambodia, in contrast, are limited to two or three varieties (selection even declined between 2009 and 2010) and one or two milling qualities. This makes it challenging for most traders to sell organic rice as anything but a complementary product as well as for farmers who often have different priorities when choosing rice varieties to plant. Because organic rice consumers are age and nationality neutral, promoters of organic rice must only adapt to demand differences between rich and middle class customers. And while rich customers are willing to consistently spend between 4-10% more for organic rice, middle class customers are more sensitive to absolute price. For Phkar Kney, an above-average variety, middle class customers will pay a minimum of 5% more for organic while for premium varieties their minimum willingness to pay for organic is 0%—in other words, they cannot afford it for regular purchases. This indicates that the organic characteristic is desired but middle class patrons need more rice configurations, probably including “lower quality” varieties to become interested.
- The growing presence of development initiatives and private companies in the palm product business is indicative of the growing interest in using heritage products to make a profit, support smallholders, and preserve the palmyra palms, a Cambodian national symbol. The first products to be developed were interesting proofs of concept, demonstrating that palm sap could be transformed into high quality (and potentially organic certified) liquor, beer, granulated sugar and vinegar. The second round of products has focused less on the advancement of products and more on trying to meet the ideological standards of middle-class urban dwellers. One company created a new “proletariat” line of their palm products for the domestic market. Another company is scaling up to decrease cost. A social enterprise has started more extensively marketing ecological palm

sugar in traditional forms (paste, syrup, solids) in addition to granulated palm sugar. In general, the palm product sector is employing an iterative process to learn how to create commodities that match the diverse ideological standards of urban consumers.

- The traditional medicine sector is the process of becoming more formalized and institutionalized but it is unclear precisely which model will emerge. Individual healers, entrepreneurs and development initiatives have already experimented with a number of ways for modernizing traditional medicine and making it relevant in urban areas or for minority groups. Based on these experiences and data from a researcher-merchant partnership, the commodification of botanical medicines and remodeling of traditional health outlets (dispensaries, consultation areas, clinics, etc.) is broadly desirable but must be carried out with an eye toward fulfilling expectations based on stereotypes about traditional healing. The age of the healer and relative advancement of his or her medicine, for example, play a role in determining which patients seek consultation and buy what forms of medicine (see Section 5.4.3). In general, there is role to play for both advanced pharmaceutical-like botanical medicines and for traditional product forms within the same dispensary (even if the content of these medicines is essentially the same). Likewise, it is important to craft a health care atmosphere that appeals to modern desires for hygienic premises and trained professionals while also fulfilling expectations about the social experience of traditional health consultations and care giving. In drafting regulations for traditional medicine, organizing healers' associations and training new practitioners, modernization and oversight will have to go hand-in-hand with presenting a façade of tradition.

In the case studies described above, a technocratic orientation tends to dominate initial attempts to create new products or services. At first, the commodities tend to be created by instrumentalizing international know-how without much regard for the nature of the demand. When confronted with consumers' ideological standards, promoters of these new products and services can revisit and adapt their product forms, adjust superficial aspects of their services, or pay lip service to the nature of consumer demand.

6.4 Conclusion

This work considers the ability (or capability) of developing countries to mould novel and independent models of agricultural development that transcend the discursive and technological boundaries of global paradigms. Holloway et al. (2007), critiquing the tendency among scholars to bound and typologize agricultural economies using limited narratives, suggest a framework for analyzing the composition and trajectory of agricultural development that does away with the concepts such as alternative or oppositional in favor of diversity and embeddedness. This follows researchers such as van der Ploeg (1996), who find variation in “styles of farming” even in post-industrial contexts where conventional agriculture—as well as organic—are often assumed to be more strictly homogenized. I will not argue away the hegemonic influences of industrial agriculture or the dominance of specific models of ecological/alternative agriculture (e.g., export-oriented organic certification) but instead posit that the commodification inherent to these processes can be managed to a certain degree. In this work, I use Holloway et al.’s (2007) general framework to analyze both the *capacity* of actors in Cambodia (i.e., public institutions, civil society, private businesses, individual producers, etc.) to meaningfully direct commodification and the *results of their initiatives*. Capacity I examine using Amartya Sen’s idea of ‘capability functionings’, or the historically-based preferences, skills, and socialized supports that, with freedom to manifest, inform the process of shaping commodification. In analyzing the results or performance of initiatives in agricultural development, I examine how flexibly and creatively local actors mix-and-match the discourses and technological packages that come attached to alternative agriculture initiatives (e.g., organic, GI, advanced traditional medicine) and individualize/localize them. Specifically, I look at how local conceptions of agricultural development, embodied in ideological standards, are expressed through this commodification process (following Jackson 2010, p. 93). I argue that this process is the pre-industrial counterpart to ecological modernization, defined as the reflexive engagement with environmental and heritage stewardship in ongoing processes of capitalist transformation.

The rural development initiatives being undertaken in Cambodia broadly have an agri-market orientation, which is to say they are focused on transforming food and

botanical medicine into commodities for urban consumers. On the one hand, this is viewed as an inevitable part of the shift to capitalist relations in economic development. On the other hand, this is viewed as a potential avenue for formalizing and legitimizing the tangible and intangible food and medical heritage of Cambodia. However, as promoters of these new products have discovered, commodification makes for an imperfect solution to the preservation of ecological and cultural diversity. Traditional and heritage products are often defined by their uniqueness and spatial rootedness, which is inherently antithetical to the simplification entailed by commercialization. This is perhaps most apparent in export markets, in which precise standards and limited selection are common features of agricultural commodities (German NGO Forum 2005). And while international markets are not monolithic and there is increasingly space created for expressions of locality (e.g., Fairtrade, organic, and heritage/heirloom, exotic products, etc.), domestic demand is more diverse, knowledgeable, and discerning (see, e.g., McNaughton 2002; Schnettler et al. 2008; Vida and Reardon 2008). This work focuses on the domestic market in Cambodia because it demonstrates the potential for novel expressions of the process of commodification. This potential, however, is subject to historical conditions and contemporary trends in agricultural knowledge and experience.

History and agricultural knowledge and skill, therefore, represent the basis on which commodification can be judged and evaluated. The “Angkor narrative” in Cambodia is an historically-rooted set of benchmarks, or a frame, for encountering (and critiquing) contemporary development initiatives. In Chapter 4, I demonstrated how this narrative can create a precedent for conservation (of palmyra sugar palms), offer guidance on how to shape the health care system, encourage skepticism towards grand schemes in rural development, and help understand the impacts of urban commercial relations on the social fabric. This provides some background for understanding some 21st century trends such as industrial agriculture, commodification, environmentalism and Western biomedicine. History and inter-generational knowledge transfer also provide the basis for individual and collective agro-social skill, which is the capacity for recognition and appreciation of inherent value and quality. This can broadly be seen as an asset that individuals and society collectively leverage to understand the consequences of commodification and challenge them. In Chapter 3, I outlined many

ways in which the agro-social skill of farmers, consumers, traditional healers, and patients maintain the pressure behind the demand for products that comply with diverse (and historically-rooted) ideological standards. I also demonstrated how agro-social skill can be deceived by artificial ingredients, packaging, and supermarkets and how this skill can erode or become redundant over time if not maintained through rural connections.

Historical experience and contemporary skill are then put to the test by the inevitable commercialization of heritage food and medicinal products. In Chapter 5, I presented cases from alternative agriculture and medicine initiatives in Cambodia in order to demonstrate that even they are a force for commodification. Consumers and promoters of these products are forced to seek out creative compromises to balance ideological standards with the technocratic orientation of contemporary agricultural development initiatives. Meeting ideological standards facilitates in counterbalancing the reduction of quality and social value of products through simplification. Organic, for example, is often criticized in developed countries for having fragmented ideological standards for natural and ethical food into isolated technical standards that are collectively weaker—the so-called “conventionalization” of organic (Guthman 2004; Lockie and Halpin 2005; Vaarst et al. 2006). With this in mind, I evaluated the evolving strategies used by Cambodian public institutions, private businesses, and development organizations for controlling the commodification process in the development of agri-market products services. While some initiatives, such as organic rice, appear to be moving farther away from ideological standards in favor of commodity logistics, other initiatives such as palm sugar are iteratively being reinvented to suit ideological standards. The traditional medicine sector, although too immature to determine a specific orientation, has left space for traditional medicine to modernize while remaining rooted by traditional expectations.

Commodification of agricultural heritage and the healthcare experience will entail profound changes in material culture and the rearrangement of economic relations in society. And while some form of commodification is inevitable in the process of economic development, the scope and nature of this commodification are clearly malleable—they can be proactively and reflexively directed with the guiding help of historical experience, contemporary agro-social skill, and creative reinvention. Sen’s

concept of ‘capability functionings’ suggests that the role of development in such cases is not to apply a normative lens to this process but rather to facilitate the capability of individuals to freely express desires and to collectively participate in the process of commodification. DuPuis and Gillon (2009) call this “civic agriculture”. This is not to say that development assistance and foreign influence should not continue to channel development and entrepreneurial initiatives to places like Cambodia, but that these processes should not undermine the historical basis and skills with which Cambodians use to reflect on foreign ideas and adapt them. Only time will tell how commodification will proceed: will a regime of wet-market economic relations supported by agro-social skill predominate or one of supermarkets and technical standards? Will traditional medicine remain rooted in traditional product forms and social care giving experiences or become “pharmaceuticalized” and anonymously professionalized? Although I shall not wager on the future equilibrium, the reserves of agro-social skill and reflexive progress of a few initiatives leaves the door wide open.

Keeping this door open, however, depends on the maintenance and reproduction of agro-social skill and the concomitant ideological standards that will be applied to commodification. Inter-generational transfer of knowledge has already been an important aspect of supporting agro-social skill but the Cambodian case demonstrates that it must be complemented with continual rural exposure. If farming and the rural sphere continue to play a role in everyone’s life, the alienation from nature that urbanization can cause can be diminished.

This door, however, can also be closed by artificial means. One avenue is through the activities of large agricultural concerns, which have already demonstrated how rapidly they can transform the rural landscape and how willing the Cambodian government is to oblige to their requests for large land concessions. It is well-documented that agri-business corporations and the research agenda set by foreign agronomists often pre-empt prove endogenous agricultural development (Uquillas 1994). The “open market”, furthermore, can be ruthless to emerging market forms. Seed peddlers, livestock traders, and fertilizer and pesticide companies are hegemonic forces in development and have many tools at their disposal to disrupt or co-opt the thoughtful processes of transforming agricultural economies. Another disruptive factor is the effect of certain shifts in political orientation. As discussed in Chapter 1, the current political

agenda is not aligned with any particular agricultural development paradigm but the influence of normative development intervention and multilateral research institutions have historically been hegemonic in this respect. Another question concerns the ability of the agricultural sector to stay aloof of the rapid industrialization that is taking place in most other sectors in Cambodia. While the Mann-Dickinson theory suggests that agriculture can exist somewhat apart of general capitalist development, even proactive directing of commodification is not a guarantee for developing a fundamentally different form of agriculture economy. Leveraging agro-social skill and adapting alternative agricultural initiatives is, in the end, less of a solution for culturally-embedded sustainable development, but more of a bridge that extends the window of opportunity for exploring endogenous development so that creative and embedded ideas for agricultural development have a conducive environment in which to incubate and more time in which to hatch.

6.5 Future Research

This research is not directly transferrable or applicable to many other contexts in the world, but many countries have undergone radical transformations in agriculture and a few countries might yet do so. I have discussed particular events and situations in Japan, Cuba, and Bhutan; the Holloway et al. (2007) framework can be used to investigate these cases using similar criteria as well to investigate spatially-significant hotspots in many developed countries. Because the results of various attempts to create novel agricultural economies would be relevant for policy-making worldwide, I would also recommend long-term studies of the same areas that can explore the waxing, waning and evolution of different agricultural regimes using baseline studies.

7 APPENDICES

7.1 APPENDIX 1

METHODOLOGY

This work draws together evidence about how Cambodia's ancient and contemporary history impact current-day development initiatives. It is also an attempt to deconstruct the emic narrative around agriculture to understand how rural and urban Cambodians use history and experience to shape their encounter with development. Lastly, this work investigates the results of specific activities to refashion development using both econometric and ethnographic analysis. It is the project of a researcher with a background in economics, environmental studies, and rural sociology and bears the interdisciplinary imprint of an institution with strengths in ecology, rural development, and environmental sustainability. As a result, the methodology does not draw on pre-existing and disciplinarily-vetted sets of techniques and has even invented new techniques that suited the dilemmas encountered in fieldwork. I collected quantitative data when they seemed to reliably reflect conditions and otherwise employed mixed qualitative methods, including semi-structured and open interviews, as well as targeted archival research. Although the methodological portfolio is extensive, it is also intensive. I do not, for example, include a "social aspect" to econometric analysis or an "economic aspect" to qualitative analysis. This manner of interdisciplinarity is commonly found in fields such as agronomy when they are criticized for failing to consider social and historical context; the result is often methodologically-lite assessments such as total factor productivity that purport to consider "local culture" (Dawe and Doberman 1998). In this research, in contrast, I used qualitative research methods to create opportunities for gathering reliable quantitative data and I leveraged the experience of gathering quantitative data to improve the reliability and content of qualitative interviews. Generally, I made explicit use of a framework for understanding interdisciplinarity developed by Mollinga (2008), which researchers can use to instrumentalize and build-in various boundary-crossing techniques. This was often used to adapt certain well-known methods, such as institutional analysis, to serve multiple

purposes such as facilitating organizational ethnography and preparing experimental conditions for economic data gathering.

Adaptive methods are critical in studies of sociotechnical change as expectations of quality data for different fields are rapidly changing and often experimental (Bamberger 2000). In the sections below, I outline the context of this research and then focus in detail on certain clusters of methods which were found to be complementary and were thus adapted for used together.

Who, what, where, when, and why?

This research is the accumulated result of inquiries into different aspects of Cambodian development going as far back as 2004 and 2007, although the bulk of fieldwork that is directly used in the PhD was carried out between 2009 and 2011. The subject began developing in 2004, when, as a bachelor student studying entrepreneurialism among peri-urban farmers in Siem Reap province, I stumbled upon interesting cases of creative adaptation of market mechanisms, particularly those that related to agricultural commodities for sale in urban areas. I returned to Cambodia as a master student in 2007 to study the implementation of ecological farming and the first steps of social and eco-entrepreneurship in the agricultural sector. In 2009, I returned with the explicit goal of investigating the risks and opportunities faced by Cambodian institutions, development organizations and individual producers in the commodification of agricultural heritage products. I undertook research in three specific product areas which were, at the time, receiving a lot of focus in the private and NGO sectors—namely organic rice, palm products, and traditional medicine. In order to understand how these products evolved into commodities and how producers, traders, and consumers influenced the process (Kemp and Rotmans 2005), I elected to work with informants at each stage in the commodity chain of the agri-products (Smith et al. 2002). And while these were my main sources of information, I did not artificially exclude informants on the periphery of these processes, such as policymakers and observers of Cambodian agriculture. A general illustration of the main parties interviewed is found in Figure 7.1. Although some informants are more significant in their role than others, there were at least 250 individuals and families involved. A precise list of informants *that appear in this work*

(and consented to have their contribution published under pseudonyms) can be found in Appendix 6.

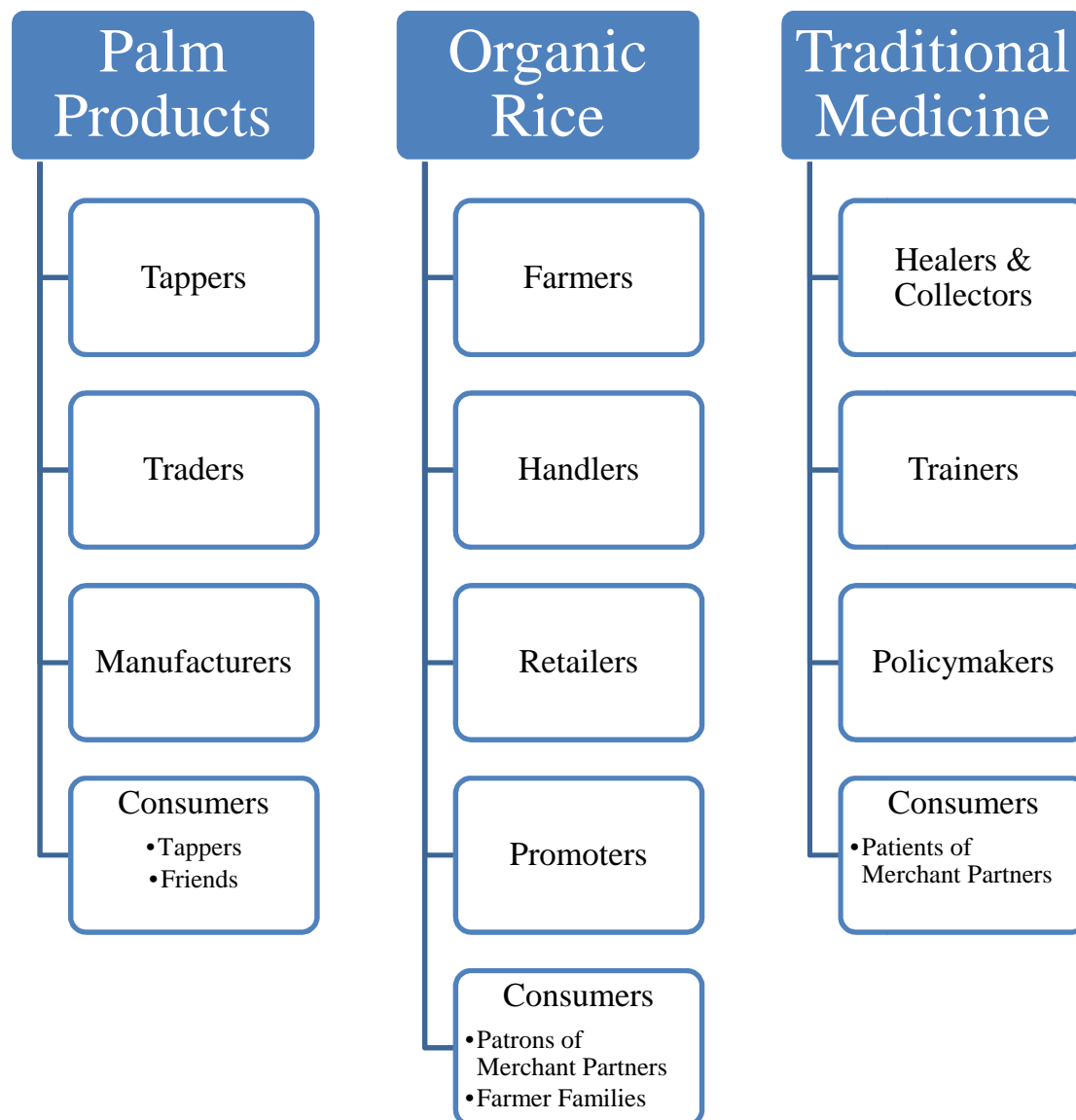


Figure 7.1 Categories of informants by research subject

In general, most of the interviews with producers took place at the household of the interviewee in the countryside whereas all other interviews and data gathering were conducted in and around Phnom Penh. The map of Cambodia in Figure 7.2 generally illustrates where the fieldwork was conducted. The more remote sites were usually national parks, where I was given access by the Ministry of Environment to conduct

interviews exclusively with traditional healers. In individual lowland sites, in contrast, I typically interviewed rice farmers, palm tappers and traditional healers living in the same general vicinity. Methods for selecting (or more precisely, finding) informants varied based on the data intended to be gathered. In Takeo province, for example, I was seeking a representative sample of rice farmers with which to conduct econometric analysis about rice production. Therefore, I chose two districts and randomly selected from each district three villages in which ecological agriculture initiatives were ongoing and, within these villages, randomly selected 70 rice farmers. In many of the national parks, in contrast, I wished to speak to healers with assorted backgrounds and demographic characteristics. To this end, I simply entered the parks and began asking around for local healers and medicine gatherers. In many cases, however, I wished to explore the commodity chain so I asked various initiatives (private sector and NGO) for a list of participating rice farmers, healers and/or palm tappers. From these informants, I usually snowballed to similar informants or to other interesting characters on the periphery of these agriculture initiatives.

In the process of seeking out and creating research opportunities, certain regions of Cambodia became more important for certain subjects. For palm products, I studied the initiatives of CEDAC in Kompong Chhnang province as well as the private sector initiatives of Khmer Natural Enterprises and Confirel in parts of Kandal and Kompong Speu provinces that were near to the capital. For traditional medicine, I carried out a project on Mount Kulen, Siem Reap province (see *Transdisciplinarity: Researcher-Merchant Partnerships* below), and studied the NGO-led initiatives with ethnic minorities in Ratanakiri and with eco-tourism healer cooperatives near Bokor Mountain, Kampot province. For studying ecological rice, which was very widespread nationally, I was able to carry out interviews with individual farmers and cooperatives in the lowlands of Takeo, Kompong Speu and Kompong Chhnang provinces.

Unlike most other informants, I had to study consumers using mostly indirect methods. Observing consumer behavior was relatively uncomplicated as I had primary data on sales of rice and medicine made available through merchant partners (more on this shortly). For observing consumer motivations and attitudes, however, I had to be more flexible. I had rejected hand-out surveys, interviews at the point-of-sale, and other anonymous modes of contact as too intrusive, difficult and unreliable for reaching

consumers. Instead, I opted for indirect information mediated through traders and healers, and I sought additional information from friends and other types of informants. Ironically, almost all Cambodian informants could be considered “consumers” of palm products, rice, and medicine (including the palm tappers, rice farmers, and healers themselves). However, while they could provide clarification and context about consumer behavior, they could not directly be connected to the sales data. The merchant partners, in contrast, were trained to passively interview consumers and they gathered considerable information about consumer motivations.

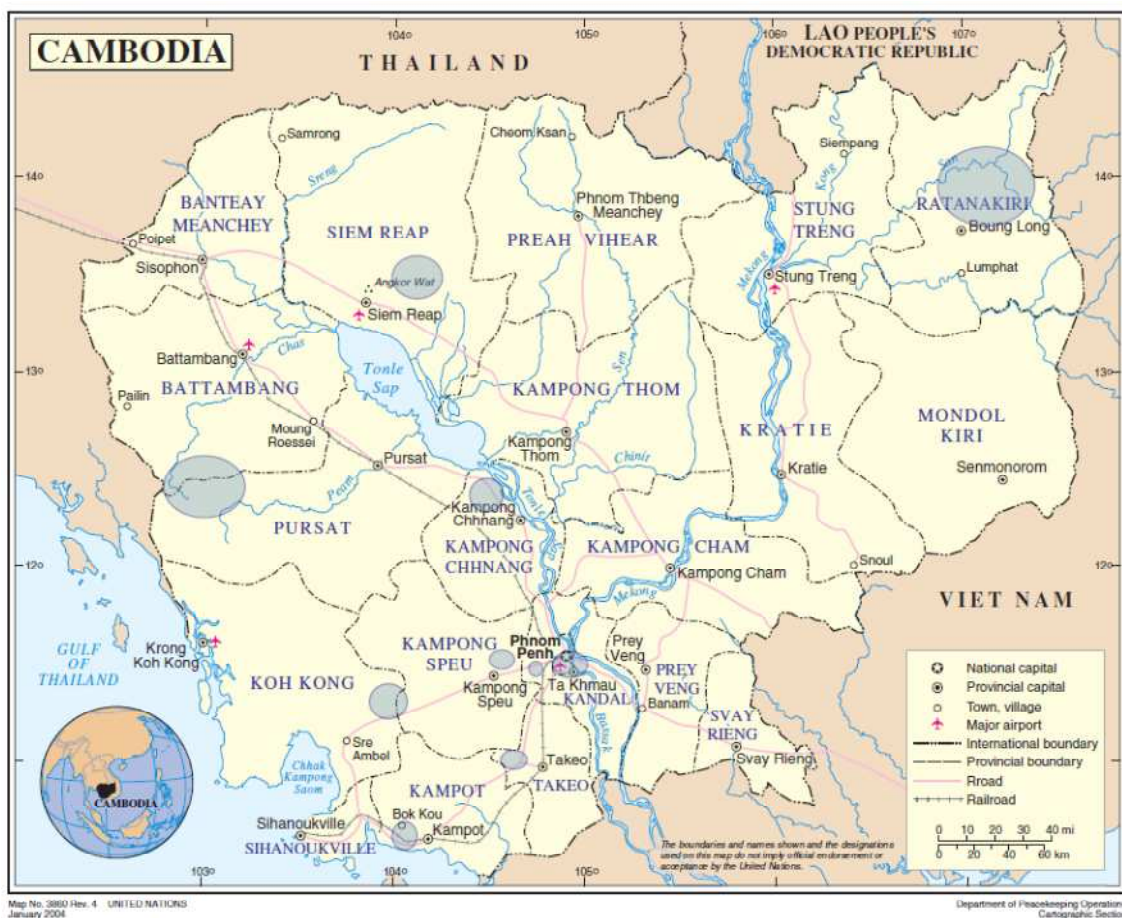


Figure 7.2 Map of Cambodia with fieldwork sites highlighted. Source: UN Cartographic Section

The Researcher: Positionality and Personal Methods

“Student guides to the process of educational research usually emphasize that it is the nature of the research questions which should dictate the

methodological approach adopted. What choice of methodology comes down to for many of us, we suspect, is personal taste.” – Dlamini and Simelane (1990, p. 17)

In development research, there exist important relationships of power between the researcher and the researched, and between various targets of research, and these power dynamics must be self-consciously factored into fieldwork plans (Rose 1997). Root (1993, p. 243) points out that, in many cases, it is preferable to acknowledge one’s “conscious partiality” rather than develop artificial “value-free” justifications for one’s methodological decisions. Rubin and Rubin (2005) also remark that attempting to be neutral or dispassionate about one’s interests can be problematic because one cannot empathize with interviewees. Therefore, in light of the challenges of conducting fieldwork in a foreign country and the ethical considerations that must be made to honor and protect informants, it is important for me to present the manner in which I conducted myself and offer some justification and background for these choices.

Facilitating communication and establishing trust and rapport are perhaps the most important duties in laying the ground for interviews that are stress-free, productive and interesting to both parties. Through past experience in Cambodia, I was able to amicably chat with most interviewees and create a direct connection between the researcher and the researched. However, if discussions become complex or if informants are unusually difficult to understand (due to age, accent, or topic of conversation), I allowed my interpreter to intervene. Piseth, my interpreter since 2007, has a rural background but has studied and lived in the city long enough to be able to comfortably interact with a range of figures, stretching from high-level government officials to elderly healers in remote areas. Piseth was young enough to appear harmless but could rely on the professional/academic status of his employer to command respect in elite interviews. Although the pitfalls and problems with interpreters have been heavily discussed (see Temple and Edwards 2002), we have spent considerable time over the years reflecting on our idiosyncrasies and training ourselves to work well together (England 1994). In particular, I trained Piseth to have a large degree of autonomy in how we navigated through various topics and managed interviewee personalities. Because of my conversational capacity in Khmer, I could follow along

without many ungraceful interruptions and would intervene in the course of discussion as needed. This system allowed for fairly efficient and engaging interviews that largely pre-empted the problem of interview-fatigue (Chapman 2001) and led to many lasting relationships with informants. In many cases, ‘after hours’ relationships (e.g., eating a meal together or returning for tea after a hot day) helped evolve interview relationships into friendships and, therefore, opportunity for participant observation (Gellner and Hirsch 2001).

Managing my identity as an academic researcher and my personal views on sustainable development, however, has often proved to be a sticking point in interviews. With very sympathetic informants, I occasionally could not help but interject my opinions about ecological sustainability, which may have diminished the academic aura of critical objectivity I tried to represent as a researcher (Root 1993, p. 243; Rose 1997). In addition, choosing whether to presenting myself as a “PhD student” (*neak sut tweh bundut*) or a “researcher” (*neak sut slau chrieu*) or something else had a noticeable effect on interview interactions in some cases. Furthermore, the process of establishing informed consent was initially very formal, which caused some informants to become shy. Because I generally wished to decrease my status and thereby seem more companionable (Markowitz 2001), Piseth and I often sought ways to introduce ourselves by virtue of our work or subject rather than by our position. After the first few interviews in 2009, I was more able to balance the need to elicit information with the need to establish rapport and trust (Oakley 1990). Despite these efforts, rural informants occasionally made use of various honorifics (such as “teacher” – *lo kru*) when referring to me or they would petition me for various gifts commonly distributed by charities. Such misunderstandings create noticeable distraction with a few interviewees. Occasionally I sought to change the tone of a conversation or defuse tense interview situations by chit-chatted in Khmer and acted openly playful (i.e., climbing trees, demonstrating my coconut-opening skills, playing games with the children, making jokes, etc.) but generally, our interviews rarely faced significant challenges.

Transdisciplinarity: Researcher-Merchant Partnerships

The fieldwork in this research made extensive use of a transdisciplinary method that I invented called “researcher-merchant partnerships”. These partnerships are a formalized

business cum research relationship allowing local entrepreneurs and development researchers to collaborate in a mutually beneficial manner that serves to create data for the researcher while, at the same time, supporting the advancement of a mutual enterprise. Setting up these research partnerships amounts to rapidly generating what Mollinga (2008) has called a *boundary setting*, which is the physical space and long-term relationships that facilitate transdisciplinary research. But why do we need such partnerships? On their own, small enterprises, such as those found in wet markets, are challenging to monitor and study because they do not keep records. They typically lack two important resources that researchers can potentially provide: market analysis and credit. Researchers, in turn, typically lack two resources that entrepreneurs can provide: market data and research access to entrepreneurial activities. This type of scenario invites transdisciplinary research methods, which aim to flatten hierarchical relationships between researchers and the researched and encourage integration of different types of knowledge (c.f., Elzinga 2008; Gibbons et al. 1994; Hirsch Hadorn et al. 2008). Individual researchers or larger projects can serve as investors and partners in exchange for privileged research access and shared control over the data collection activities of the enterprise. The entrepreneur benefits by receiving a line of credit (often with favorable conditions), an unpaid associate, and the results of the researcher's data analysis.

The "data" (or knowledge) production from the partnership generally falls into three categories: (1) collected data (from shared gathering), (2) data about the process of forming, maintaining and evolving the partnership, and (3) data obtained through critical reflection after recursive self-learning and conscientization by all parties (Novy et al. 2008). These data fit the model of so-called post-normal science (Funtowicz and Ravetz 1992 cited in Elzinga 2008, 349), which engages practitioner or group validation of data. Through this process, some of the early analysis is completed together in the field, while the long-term relationships allow for subsequent follow-up, discussion, and revision. Due to their smaller-scale, researcher-merchant partnerships are suited to extended PhD fieldwork and/or smaller project-based research.

Rice and Medicine Partnerships

Organic Rice Partnerships

In this partnership, I selected ten wet markets ranging in size and clientele in the Phnom Penh metropolitan area. I visited each market and established researcher-merchant partnerships with one or more petty rice traders. As the researcher, my duties were to provide the trader with all of the supplies necessary to market certified organic rice. I provided a sign indicating that the shop sold organic rice and a poster detailing the aspects of organic rice. I also guaranteed to deliver whatever amounts and varieties of organic rice the trader demanded. The trader's responsibility, in turn, was to pay wholesale price for any organic rice sold between visits and to collect data about organic rice sales. In sum, I provided a no-financial-risk marketing opportunity in exchange for data gathering. Informally, I also encouraged traders to speak with customers and learn their motivations or concerns regarding organic rice.

From the initial ten wet markets, partnerships were discontinued in three because traders were unable to sell (sufficient) organic rice within the first two months (the trial period) so the rice was returned to the wholesaler. In three other marketplaces, organic rice sales were steady but traders failed to gather sales data or falsified the data. In the remaining four markets, most traders successfully sold organic rice and recorded reliable data for up to 16 months. It is important to point out that although more than half of the partners did not complete their end of the bargain, they still provided data types 2 and 3 above, some of which was used in this work. In other words, even when the partnership failed it often produced interesting results and did not financially hurt the petty rice trader.

Advanced Traditional Medicine Partnerships

In this partnership, I selected two healers with whom I could work over the long-term (approximately 18 months). For data analysis reasons, I chose one young (age 30) and one elderly (age 75) healer. Each healer received an interest-free loan for a period of 18 months that would be spent on (a) upgrading their rural dispensaries to make them more organized and hygienic and (b) purchasing a tableting machine that would be used for advancing the product form of their traditional medicine. With each healer, I selected three medicines from their repertoire that they wished to advance. Over the first six

months, we worked together to import the tableting machines, prepare the medicines, design professional labels and select packaging. From the research budget, I provided each healer with 1,000 bottles and labels to use for the initial production line. Once the new medicines were on the shelf, the healers would be responsible for collecting (and anonymizing) sales data for all products sold (including non-advanced medicine).

Even with concerted effort on my part, preparations for the initial sale took longer than expected. It was at least nine months before the first batch of advanced tablets and tonics were on the shelves, which meant that data gathering continued long after I left the field and it took longer (an additional six months) for the partners to pay back their loans. However, because of the investment made by both sides and the friendships established in the process, the process yielded all of the data types mentioned above. Sales data was extensive and reliable and I directly experienced the challenges faced by healers trying to develop their businesses.

Structured Interviews: The Performance of Ecological Rice Intensification

As the most widespread ecologically-oriented rural agricultural initiative in Cambodia, the performance of the SRI was an obvious avenue of inquiry for understanding new initiatives in agricultural development. Because the heated debates about SRI often pitted agronomists against rural sociologists, this also presented a strong case for interdisciplinary methods. To conduct the survey regarding the performance and adoption of SRI, I developed a questionnaire that examined the degree of adoption of SRI, household characteristics, household well-being, and rice yield. This questionnaire was also meant for non-SRI farmers who were to be used as a control group. In section 7.1, I describe the sampling methodology which produced 70 stratified randomly selected farmers from areas in which SRI extension programs were ongoing. After discussions with most informants produced preferences for anonymity, I decided to anonymize the entire cohort of farmers. As such they do not appear in the informant list in Appendix 6 unless they were later interviewed and their information was published in this work. This research was primarily conducted over the course of three months around the transplanting period in May-August 2007.

To measure wealth/well-being in this study I used an asset-based measurement developed by Sahn and Stifel (2003). Research indicates that this method creates a more

accurate ranking of wealth precisely in places like the Cambodian lowlands, where consumption is hard to measure but assets are visible. As noted by Judy Ledgerwood (1998), Cambodian villages are rather homogeneous communities in which social forces exist that restrain individual families from distinguishing themselves. Assets in Cambodia are typically fewer, easier to measure and, to a large degree, not prone to reporting bias because they are visible to the researcher. Usually, durable assets such as radios, TVs, bicycles, motorbikes, and housing materials are used to construct such the wealth index. The assets I used were screened for sufficient variance before being included in the factor analysis. For most components of index, it is straightforward to predict the effect on wealth. For instance, the larger the amount of agricultural land and housing floor area, the wealthier the family is expected to be ranked. It is somewhat more problematic, however, to value the quality of the housing materials. For this, each type of material (bamboo, wood, aluminum, concrete, etc.) was separated into a group representing poor, medium, or high quality material, as outlined by Krishnamurthy (1999) and Ebihara (1968). Dummy variables were created for the poor and high quality materials, while an absence of a value for both of these dummies indicates a medium quality material. A delineation of this valuation system can be found in Appendix 2. Using the method developed by Sahn and Stifel (2003), and the assets determined in my previous research (Feuer 2004), I scored a composite ranking of the relative wealth of each household in the cross-village sample. The factored weights for the individual components of the wealth index can be found in Appendix 4. I verified the accuracy of the factored index values for each household by confirming with qualitative evidence. I confirmed that the poorest and most destitute villagers ranked the lowest in wealth index while those ranking near the top held considerable sums of land, a motorbike, and owned a large and well-built home.

I measured the cultivation practices using the same statistical method. Due to the diversity of ways in which SRI can be understood and implemented, I gathered data on a wide variety of farming practices carried out at the field level. Building on the work by Sras and Chuong (2007), I developed a set of dummy, ordinal, and continuous variables representing rice cultivation practices normally associated with, but not exclusive to, SRI. However, rather than making a subjective judgment about the significance (or weight) of each practice for the quality of technique, as done by Sras

and Chuong (2007), I allowed factor analysis to determine the weights and rank farmer families based on their both their reported SRI and non-SRI cultivation practices. For the purposes of this research, I defined households as having two separate “fields”—one representing total area under reported-SRI cultivation area and the rest defined as non-SRI. The cultivation practices I actually measured and the scores/weights calculated by the factor analysis (maximum likelihood) can be found in Appendix 4.

To gather accurate cultivation and yield data in interviews, I employed a number of techniques to help confirm or triangulate informants’ responses. In many cases, I could observe the fields directly to evaluate whether certain cultivation practices and field conditions applied. My priority was to reconstruct conditions from the season corresponding to the most recent, and best remembered, yield data. Determining rice yield required more vigilance and cross-referencing as there was rarely a sense of *intersubjectivity* between my manner of understanding and measuring yield and the farmer’s (Alrøe and Kristensen 2002). Indeed, yield can be one of the most problematic elements to measure accurately in the Cambodian countryside, but I employed a number of tactics to triangulate these values. In many cases, the farmer remembered his previous yield in a certain unit, which I could convert to metric tons per hectare. In other cases, the farmer might compare the yield to another year that he remembered more clearly or measured more accurately. In many cases, I would investigate the family’s rice storage unit and measure its volume which would be adjusted for the amount of pre-existing paddy. These values could be cross-referenced again by asking the primary cook in the family how many “tins” of rice were served per day (adjusting for surplus or deficit, celebrations, and animal feed) and extrapolating out to the year.

If any of the data were inconsistent or suspicious, I flagged them during the structured interview. If there was time to discuss these issues directly after the interview, I would raise these issues or save them for follow-up interviews. Follow-up interviews would take an unstructured form to more fully understand various patterns in adoption or disadoption. In some cases, follow-up interviews occurred after the data were analyzed. In more rare cases, follow-up interviews were conducted two or three years later.

In 2007, I As a token of appreciation, and polite Cambodian gesture, I always presented the primary respondent with a small Cambodian scarf (*kromah*). I chose this

gift because it is unlikely to cause jealousy amongst villagers due to its ubiquity in Cambodian society at all levels.

Unstructured Interviews: Exploring Narratives of Agricultural Change

During the research period 2009-2011, the majority of the primary data was collected through unstructured interviews of different types. Because researcher-merchant partnerships were facilitating the collection of survey data on rice and traditional medicine sales, I was free to gather qualitative data. In most cases, unstructured interviews of various forms were the most logical and comfortable manner for collecting data, particularly as I was investigating historical changes, opinions about agriculture and development and the nature of my informants' work. Depending on the situation, I used life history approaches, small-group interviews, or prepared research questions in advance. Figure 7.3 matches the types of interviewees with different unstructured interview forms.

Generally speaking, however, I employed an interpretive constructionist approach to interview content (see Rubin and Rubin 2005, pp. 27-28). I attempted to provide space for people to express how they view an object or event (such as Angkorean history) before soliciting opinions about alternative topics or distracting aspects of a topic. I looked for how people create definitions in cases of uncertainty by leaving certain ideas or practices undefined during initial parts of the interviews. I also tried to challenge interviewees to think hypothetically and redefine subjects (such as the role of traditional medicine in society) if situations were different (such as if regulations were passed or if strong medicine research institutions existed).

Certain qualitative interviews were meant to provide "flesh and bones" to the ongoing quantitative data collection and analysis process (Bamberger 2000, pp. 15, 21-22; Dlamini and Simelane 1990, p. 18; Streiffeler 1990, p. 9). These were usually reactive interviews, prompted by inconsistencies in the data or questions about patterns emerging in the analysis.

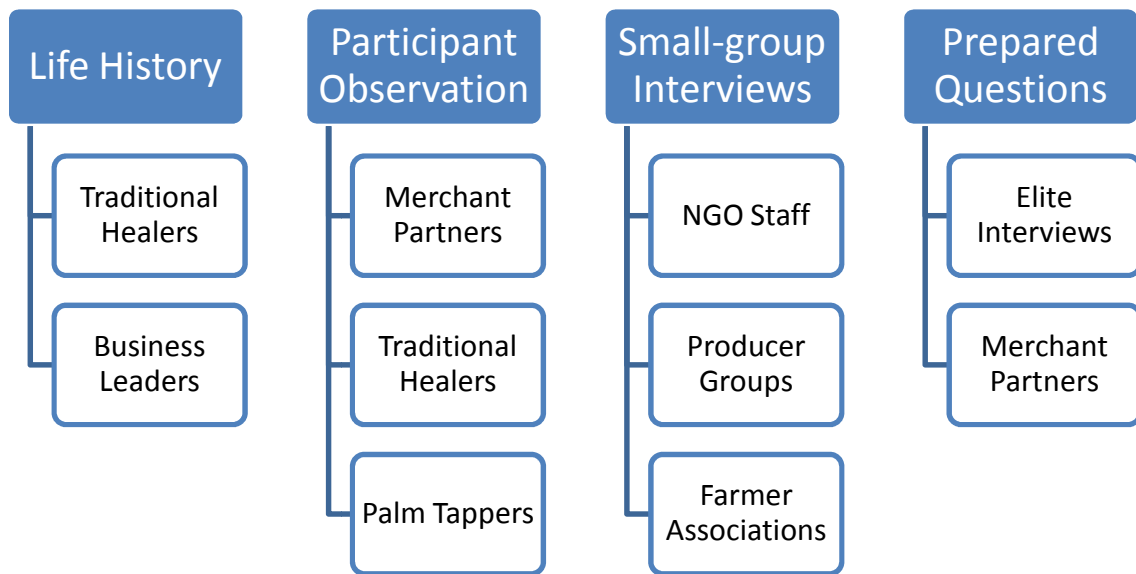


Figure 7.3 Unstructured interview formats matched to different informant types

Archival Research: Popular Representations and Internal Coding

The archival research conducted for this work can be separated into four categories: internal reports from CEDAC, media portrayals of agriculture, political party newsletters and local journals.

Media. This category includes Khmer and English newspapers (Rasmeay Kampuchea, Koh Sokapheap, Kampuchea Thmei), Khmer-language radio shows (Radio France Internationale, Radio Bayon), Khmer-language television channels (Bayon TV, Cambodian Television Network) and occasional Khmer-language blogs. The period reviewed was broadly 2003-2010, but I targeted certain periods in which agricultural discussions were hot topics. From 2009-2012, I consistently reviewed the English-language newspapers. Some of these are sources are referenced in the text, but most were used as background material and to generate new lines of inquiry in interviews

Local Journals. This category includes quasi-scientific publications in Khmer, including CEDAC’s Farmer magazine, Green Fire, Messenger magazine, the Pesticide Watcher Bulletin, and the Magazine of Environment, Agriculture and Sustainable Development. Rather than reviewing these journals over specific time periods, I chose editions by

theme, focusing on those pertaining to rice cultivation, palm products and traditional medicine. Often these sources included statistics or updates on the progress of various development initiatives. More often, they were editorial pieces written in quasi-journalistic form, which I read to gauge the range of opinion on certain topics in Cambodian society.

Political Party Newsletters. With there being only one major political party in Cambodia (that consistently publishes a newsletter), there is primarily the Cambodian People Party's *Preacheachun* bulletin. I selected certain editions ranging from 2004-2010 that dealt with such topics as palm sugar production, national agricultural symbols, regulation of agricultural inputs, and discussions of sectoral growth in agriculture. The primary author of most these entries is the current minister of Agriculture, Forestry and Fisheries, Dr. Sarun Chan.

CEDAC's Internal Reports. In 2007, I began collecting official CEDAC reports to conduct a discourse analysis concerning the evolution of CEDAC since its establishment. I wanted to experience CEDAC much as donors would—through color brochures, reports and press releases (particularly those produced to honor CEDAC's 10th anniversary). I also sought out impact evaluation reports to understand how CEDAC conceived of, and measured, their own performance (for donors and for internal use). Eventually CEDAC allowed me to access the archived reports in the office of Zone 2, where I was conducting the survey of SRI adoption and performance described in Section 7.4. Like many such collections, the CEDAC archives include a measure of organized and well-maintained set of official documents, routine reports and donor updates in addition to a measure of messy and unsorted equivalents. And probably like many such researchers, I was the first to unearth many of these documents since they were filed away. My general strategy, given the immensity of the task, was to work from the present to the past, most relevant to least relevant. Thus I began by translating and analyzing the most recent documents concerning the villages included in my study. Determining relevance was a question of linking documents to informants or acquaintances in the field, or reading documents prepared by CEDAC staff whose work and/or personalities were familiar to me. In many cases, I presented specific documents

to staffs as ‘nostalgic memorabilia’, which often elicited excited discussions of the particular training session or meeting in question. While serving as examples of how the past is officially represented, or made ‘legible’ by staff (see a discussion in Scott 1998, p. 24), many documents were mostly useful for cuing forgotten memories and initiating discussions about how things have changed over the years. For comparative quantitative data, I primarily use two of the most recent impact assessments produced by the now-defunct Research and Development Department at CEDAC: one focusing on country-level impacts (Suon 2007a), and the other focusing on the area in which I conducted fieldwork (Suon 2007b).

7.2 APPENDIX 2

Housing Material Valuation

Outer Wall, Inner Wall, and Roof

Poor Quality:	Bamboo, Thatch, None
Medium Quality:	Wood, Metal, Fibrous Cement
High Quality:	Concrete, Ceramic Tile

Flooring

Poor Quality:	Earth, Bamboo
Medium Quality:	Low-grade or used wood
High Quality:	High-grade wood, Cement

7.3 APPENDIX 3

Description of variables used in the statistical analysis

Variable	Obs.	mean	Std. Dev.	Min.	Max.	Description
<i>cultivation</i>	90	0.00	0.96	-1.36	1.66	composite factor analysis score of cultivation practices
<i>sriquality</i>	90	0.66	0.86	0.00	2.00	ordinal: 0 - non-SRI, 1 - partial SRI, 2 - good SRI
<i>plotsize</i>	90	35.76	26.73	2.00	118.00	plotsize in ares (1/10 hectare)
<i>organic matter</i>	90	0.61	0.49	0.00	1.00	dummy: 1 - access to abundant organic matter
<i>soil quality</i>	90	1.38	0.71	0.00	2.00	ordinal: 0 - poorest soil quality, 1 - average soil quality, 3 - good soil quality
<i>labor</i>	90	14.18	7.74	2.29	36.80	total land area / residents
<i>wealth</i>	90	-0.05	0.92	-1.62	1.54	composite factor analysis score of asset-based wealth
<i>yield</i>	90	0.79	0.61	0.04	2.40	rice yield in metric tons / hectare
<i>nationality</i>	628	0.07	0.25	0.00	1.00	dummy: 1 - non-Khmer
<i>year2010</i>	628	0.79	0.41	0.00	1.00	dummy: 1 - purchased in 2010 (not 2009 or 2011)
<i>age</i>	628	39.87	9.42	0.00	80.00	age in years
<i>high income</i>	628	0.24	0.43	0.00	1.00	dummy: 1 - rich or high income
<i>kg bought</i>	628	18.58	19.87	0.50	150.00	kilograms purchased
<i>young_healer</i>	374	0	0.50032	0.00	1.00	dummy: 1 if healer is young
<i>agepatient</i>	374	43	11.52	15.00	77.00	age of the patient in years
<i>advance</i>	374	1	0.80484	0.00	2.00	ordinal: 0 - non-advanced medicine, 1 - partially-advanced, 2 - advanced

7.4 APPENDIX 4

Variables used in factor analysis and their scores

Cultivation Index

Scoring coefficients, regression method

Wealth Index

Scoring coefficients, regression method

Variable	Factor Weight	Component	Factor Weight
seedling age	-0.1622	livestock value	0.1077
stems per hill	-0.2273	livestock sales	0.0748
depth (shallow)	0.0310	plough	0.0928
transplant duration (days)	-0.0946	radio	0.0267
spacing (cm)	0.0426	tv	0.0542
levelness of field (flat)	0.0091	motorbike	0.0977
paddy water level (<5cm)	0.0137	phone	0.0273
guidling lines (straight rows)	0.0796	bicycle	0.0172
seedling selection	0.0533	generator	0.0185
weeding (frequency)	0.0095	gas pump	0.0797
fertilizer per hectare	-0.0388	rice mill	0.0176
seed separation by wind	0.0262	floor area per resident	0.0524
seed separation by water	0.0209	low quality floor	-0.1481
nursery pulling (gently)	0.2457	high quality floor	0.0889
nursery (elevated)	0.0279	low quality roof	-0.0448
biological pesticides	0.0094	high quality roof	0.0917
no seedling trimming	0.2004	low quality outer wall	-0.1172
		high quality outer wall	0.0621
		low quality inner wall	-0.1191
		high quality inner wall	0.0627
		painted house	0.1095
		battery	0.0466
		toilet	0.0216
		bucket well	0.0081
		pumped well	0.0123
		charcoal fuel	0.0248
		buy wood	0.0216
		wet rice field	0.0449
		dry rice field	0.0143
		orchard land	0.0116
		garden land	0.0286
		residential property	0.0116
		pond area	0.0158

7.5 APPENDIX 5

Multinomial logistic regression examining the interactions between patient age, healer age, and advancement of medicine

Multinomial logistic regression				Number of observations	374	
				LR chi ² (4)	117.15	
				Prob > chi ²	0	
				Pseudo R ²	0.1428	

Advance	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
0	(base outcome)					
1						
agepatient	0.011	0.012	0.950	0.341	-0.012	0.035
young_healer	0.797	0.290	2.750	0.006	0.230	1.365
constant	-0.610	0.564	-1.080	0.279	-1.716	0.495
2						
agepatient	-0.028	0.013	-2.110	0.035	-0.054	-0.002
young_healer	2.773	0.328	8.460	0.000	2.131	3.416
constant	-0.188	0.621	-0.300	0.763	-1.404	1.029

7.6 APPENDIX 6

Informant List

Code	Pseudonym	Interview Date(s)	Location	Background/Position of Interviewee
AS-CY		29.10.09; 15.05.10	Kandal province	Palm sugar producer, male
AS-TS		29.10.09	Kandal province	Palm sugar producer, male
AS-YC		29.10.09	Kandal province	Itinerant traditional medicine salesperson, male, approx. age 55
DT-MS		23.08.07	Takeo province	Traditional rice farmer
HH-KS		06.08.07	Takeo province	Traditional rice farmer
KC-OS		19.10.09	Kompong Chhnang province	Agri-input seller, female, approx. age 45
KC-SY		13.10.09	Kompong Chhnang City	Director of DATe, male, approx. age 40
KC-TSB		20.03.10	Kompong Chhnang province	Traditional rice farmer, male, age 28
KP-SR		12.01.10	Kampot City	Restaurant owner, female, age 45
KR-NCTM		16.06.09	Kirirom National Park	Traditional medicine farm caretakers, husband and wife
KR-SL	Luong	16.06.09	Kirirom National Park	Traditional healer, salesperson of traditional medicine, female, approx. age 35
KR-TP	Mr. Team	11.06.09	Kirirom National Park	Traditional healer, male, approx. age 50
KR-WF1		16.06.09	Kirirom National Park	Traditional medicine selling family
KS-CE		27.01.10	Kompong Speu province	Organic palm sugar producer, male, approx. age 30
KS-LR		15.02.10	Kompong Speu province	Palm sugar producer, female, age 46
KS-OC	Om Channa	27.01.10	Kompong Speu province	Retired traditional healer, palm tapper and rice farmer, male, approx. age 70
KS-RT		27.01.10	Kompong Speu province	Palm sugar producer, male, approx. age 40
NGO-VC		23-24.11.09; 29.01.10	Phnom Penh; Ratanakiri province	Director of traditional medicine NGO, male, approx. age 35
PB-KN		07.11.09	Bokor Mountain	Head monk and traditional healer, male, age 67
PK-CV	Vireak	29.01.10; 12.02.10; 14.02.10; 20.02.10; 10.07.11	Phnom Penh and Mount Kulen	Traditional healer, salesperson of traditional medicine, male, age 32
PK-SSV		22.06.09	Mount Kulen	Salesperson of traditional medicine, male, approx. age

PK-TH	Ta Huon	29.07.09; 02.09.09; 29.01.10; 12.02.10; 10.07.10; 11.07.11	Phnom Penh and Mount Kulen	Traditional healer, salesperson of traditional medicine, male, age 76
PN-MC		08.11.09	Kampot province	Traditional healer and healer association member, male
PP-BP		30.05.2012; 02.06.2012	Phnom Penh	Founders, traditional medicine company, approx. ages 40 and 65
PP-CH		2009-2010	Phnom Penh	Rice retailer, female, approx. age 45
PP-CHR		03.08.09	Phnom Penh	General manager, Confirel Co. Ltd., male, approx. age 35
PP-CN	Nuon	2009-2011	Phnom Penh	Rice retailer, female, approx. age 45
PP-CT		2009-2010	Phnom Penh	Rice retailer, female, approx. age 40
PP-DH		24.09.09	Phnom Penh	Rice retailer, male, approx. age 60
PP-DKH		2009-2010	Phnom Penh	Rice retailer, female, approx. age 40
PP-HML		24.09.09	Phnom Penh	Rice retailer, female, approx. age 60
PP-HP		30.06.11	Phnom Penh	Director, National Center for Traditional Medicine, male
PP-LRS		10.10.09; 07.05.10; 15.05.10; 03.07.11;	Phnom Penh and Kandal province	Executive director, Khmer Natural Enterprises, male, approx. age 40
PP-LSD		25.11.09	Phnom Penh	Fresh produce director, CEDAC Enterprise
PP-LSH		01.07.11	Phnom Penh	Executive director, CEDAC Enterprise, male, approx. age 40
PP-LSHe	Son Hon Lon	19.06.09	Phnom Penh	Founder, traditional medicine company
PP-MH		14.07.09	Phnom Penh	Student, National Center for Traditional Medicine
PP-MS	Sitha Meng	03.03.10	Phnom Penh	Urban worker, rice consumer, female, age 32
PP-MV	Mr. Moni	02.02.10	Phnom Penh	Urban traditional healer, male, approx. age 60
PP-NS		14.07.09	Phnom Penh	Student, National Center for Traditional Medicine
PP-OCN		2009-2010	Phnom Penh	Rice retailer, female, approx. age 55
PP-PS		03.06.09	Kirirom National Park	Administrator, National Center for Traditional Medicine, male
PP-PSC		2009-2010	Phnom Penh	Rice retailer, male, approx. age 45
PP-Psu		03.09.09	Phnom Penh	Administrator, National Center for Traditional Medicine, male

PP-SP		2007-2012	Phnom Penh	Assistant to the researcher, male, age 26
PP-SS		03.06.09	Kirirom National Park	Student, National Center for Traditional Medicine
PP-UMG		18.06.09	Phnom Penh	Shopkeeper, traditional medicine outlet, female, approx. age 45
PP-US		2009-2010	Phnom Penh	Rice retailer, female, approx. age 55
PP-YSK		15.07.07; 24.09.07; 15.07.11	Phnom Penh	President of CEDAC, male, approx. age 50
PS-KS		13.11.09	Pursat province	Traditional healer, male, age 75
PS-ON		14.11.09	Pursat province	Ethnic minority traditional healer, male, age 102
PS-PK		13.11.09	Pursat province	Traditional healer, male, age 57
RE-AC		18.10.09;20.03.10	Kompong Chhnang province	Organic rice producer, male, approx. age 55
RE-KS		12.10.09; 20.03.10	Kompong Chhnang province	Village chief and producer group leader, male, approx. age 50
RE-KSa	Soveat	19.10.09; 19.03.10	Kompong Chhnang province	Traditional healer, male, age 77
RE-LS	Sophea	18.10.09	Kompong Chhnang province	Organic rice farmer and ecological palm sugar producer, female, approx. age 40
RE-NS		19.10.09	Kompong Chhnang province	Organic rice and vegetable producer, female
RE-SS		20.03.10	Kompong Chhnang province	Palm sugar producer and cooperative member, male, approx. age 45
RE-TB	Bao	12.10.09; 19.03.10	Kompong Chhnang province	Palm sugar producer and cooperative member, male, approx. age 45
RE-TCS	Soun	20.03.10	Kompong Chhnang province	Palm sugar trader, female, approx. age 35
RK-KD	Duon	25.11.09	Ratanakiri province	Traditional healer and traditional health clinic doctor, male, approx. age 50
RK-KT		28.11.09	Ratanakiri province	Traditional healer and traditional health clinic operator, male, approx. age 70
RK-ST		26.11.09	Ratanakiri province	Traditional healer and traditional health clinic doctor, male, age 63
TA-SU		03.08.07	Takeo province	Traditional rice farmer
TK-BO	Ovun	07.10.09; 08.02.10; 15.05.10; 04.07.11	Takeo province	Organic rice producer, male, approx. age 45
TK-CH		07.10.09	Takeo province	Organic rice farmer, female, approx. age 45

TK-CL	Mr. Chan	07.02.10	Takeo province	Organic rice and vegetable producer, male
TK-CS		09.10.09; 27.01.10	Takeo province	Organic rice producer, male, approx. age 35
TK-IS		08.02.10	Takeo province	Organic rice farmer, female, age 45
TK-NN		08.02.09	Takeo province	Organic rice producer, male, approx. age 45
TK-PM	Kunthea	22.08.07; 22.09.09; 14.03.10; 04.07.11	Takeo province	Village chief and local organizer, male, age 55
TK-PR		23.07.07; 08.10.09; 07.02.10	Takeo province	Rice farmer and village head, male, approx. age 40
TK-SH		08.10.09; 27.01.10	Takeo province	Ecological livestock producer, male, approx. age 50
TK-ST		19.08.07	Takeo province	Traditional rice farmer, male, age 35
TK-TK		30.08.07	Takeo province	Traditional rice farmer
TK-YS		07.02.10	Takeo province	Organic rice farmer, male

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